

Hayes Park

Flood Risk Assessment

May 2023

Whitby Wood



whitby wood

Hayes Park

Flood Risk Assessment

Client: Shall Do Hayes Developments
Limited

Date: June 2023

P450887-WW-XX-XX-RP-C-0001

whitby wood

91-94 LOWER MARSH
LONDON SE1 7AB
UNITED KINGDOM

+44 (0)20 7442 2216

www.whitbywood.com

Whitby Wood Limited
reg in England and Wales
reg no 07786822

Pound House
62A Highgate Street
London N6 5HX

REVISION RECORD

Rev	Date	Description	Prepared	Reviewed	Approved
P1	27/03/2023	Draft Issue	TT	RW	RW
P2	09/05/2023	Revised Issue	TT	RS	RS
P3	12/06/2023	Revised to Red Line Boundary	TT	RS	RS

This report is to be regarded as confidential to our client and is intended for their use only. Any liability to any third party in respect of the whole or any part of its contents is hereby expressly excluded. Before reproduction of its content, circulation or use by any third-party, our written approval and disclosure must be obtained.

Prepared by:



Tom Tosetti

Graduate Engineer – Civils

Reviewed by:



Ryan Saunders

Design Engineer – Civils

Approved by:



Saunders

Design Engineer – Civils

TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	Sources of Information	1
1.2	Environment Agency Data.....	1
2	THE SITE	2
2.1	Site Location.....	2
2.2	Watercourses	2
2.3	Geology	3
2.4	Proposed Development	3
3	FLOOD RISK.....	4
3.1	Fluvial (Rivers and Seas)	4
3.2	Pluvial (Rainfall)	5
3.3	Groundwater.....	8
3.4	Sewer Flooding.....	9
3.5	Artificial Sources.....	10
3.6	Summary.....	11
4	PLANNING POLICY AND GUIDANCE.....	12
4.1	National Planning Policy Framework.....	12
4.1.1	Sequential Test	12
4.1.2	Flood Vulnerability Classification	12
4.1.3	Exception Test.....	14
4.2	Climate Change	14
4.2.1	Peak Fluvial Flows.....	14
4.2.2	Peak Rainfall Intensity.....	14
4.3	London Plan.....	15
4.4	Local Plan	15
4.4.1	Local Plan Part one (2012).....	15
4.4.2	Local Plan Part two (2020)	16
4.4.3	Local Plan Part two (2020)	16
4.5	West London SFRA.....	17
5	MANAGING FLOOD RISK.....	20
5.1	Master Planning	20
5.2	Safe Access and Egress.....	20
5.3	Mitigating Measures	20
6	SURFACE WATER MANAGEMENT.....	21
6.1	Existing Site Drainage	21
6.2	Runoff Rates.....	21
6.2.1	Existing discharge rates	21
6.2.2	Storage Volumes.....	22
6.3	Delivering a SuDS Scheme	22

6.3	Drainage Hierarchy	23
7	CONCLUSIONS AND RECOMMENDATIONS	24

APPENDICIES

APPENDIX A – SITE PLANS
APPENDIX B – GROUNDWATER MAPPING
APPENDIX C – THAMES WATER ASSET SEARCH
APPENDIX D – GREENFIELD RUNOFF RATE ESTIMATION
APPENDIX E – SURFACE WATER STORAGE VOLUME ESTIMATION
APPENDIX F – THAMES WATER CAPACITY CONSENT

TABLES

TABLE 1 - FLOOD RISK SUMMARY.....	11
TABLE 2 - FLOOD RISK VULNERABILITY AND FLOOD ZONE COMPATABILITY	12
TABLE 3 - FLOOD RISK VULNERABILITY CLASSIFICATION	13
TABLE 4 - PEAK RIVER FLOW ALLOWANCES FOR LONDON MANAGEMENT CATCHMENT	14
TABLE 5 -PEAK RAINFALL INTENSITY ALLOWANCES FOR LONDON MANAGEMENT CATCHMENT	14
TABLE 6 - GREENFIELD RUNOFF AND EXISTING DISCHARGE RATES	21

FIGURES

FIGURE 1 - SITE LOCATION PLAN.....	2
FIGURE 2 - ENVIRONMENT AGENCY FLOOD ZONE MAP	4
FIGURE 3 – FLOOD ZONE MAP	5
FIGURE 4 - RISK OF SURFACE WATER FLOODING EXTENT MAP.....	6
FIGURE 5 - RISK OF SURFACE WATER FLOODING DEPTH MAP	7
FIGURE 6 - RISK OF SURFACE WATER FLOODING VELOCITY MAP.....	7
FIGURE 7- RISK OF SURFACE WATER FLOODING HAZARD MAP.....	8
FIGURE 8 – SUSCEPTIBILITY TO GROUNDWATER FLOODING MAP FROM WEST LONDON STRATEGIC FLOOD RISK ASSESSMENT (2017)	9
FIGURE 9 - SEWER FLOODING RECORDS MAP FROM WEST LONDON STRATEGIC FLOOD RISK ASSESSMENT (2017)	10
FIGURE 10 – FLOOD RISK FROM RESERVOIRS MAP	11
FIGURE 11 – PRE-DEVELOPMENT EXSISTING DISCHARGE RATES AND BETTERMENT CALULATIONS.....	22
FIGURE 12 - TREATMENT TRAIN.....	23

1 INTRODUCTION

This Flood Risk Assessment (FRA) has been prepared in accordance with National Planning Policy Framework (NPPF) in support of the detailed planning and listed building consent application being submitted by Shall Do Hayes Developments Ltd ('the Applicant') to the London Borough of Hillingdon ('the Council') for the proposed residential conversion of two listed buildings at Hayes Park, Hayes End Road, Hayes, UB4 8FE ('the site'). This assessment has been undertaken to ascertain the constraints in order to redevelop the Site, and to assess the impact of the proposals with respect to flood risk.

The description of the proposed development for the detailed planning and listed building consent application is as follows:

"Change of use of the existing buildings to provide new homes (Use Class C3), together with internal and external works to the buildings, landscaping, car and cycle parking, and other associated works."

1.1 Sources of Information

A review of the relevant information from a range of sources has been undertaken and includes the following:

- ~~Barent~~ Hillingdon Council, Local Plan Parts one (2012) and two (2020);
- West London Strategic Flood Risk Assessment (2017);
- Environment Agency, Flood Risk Mapping (2023);
- Greater London Authority, The London Plan (2021);
- British National Geology Viewer [Accessed March 2023]; and
- National Planning Policy Framework (2022); and
- The West London Strategic Flood Risk Assessment (SFRA) Online Flood Mapping [Accessed 2023].

1.2 Environment Agency Data

The following information has been gathered from DEFRA's Spatial Data Catalogue of data.gov.uk [accessed March 2023]. As the site is situated within Flood Zone 1, no further data has been requested from the Environment Agency (EA).

- Flood Map for Planning (Rivers and Sea) – Flood Zone 2;
- Flood Map for Planning (Rivers and Sea) – Flood Zone 3;
- Risk of Flooding from Reservoirs – Maximum Flood Extent;
- Risk of Flooding from Surface Water Extent (1%, 3.3% and 0.1% AEP);
- Statutory Main River Map; and
- Preliminary Flood Risk Assessment for England, October 2018.

2 THE SITE

2.1 Site Location

The site sits within a wider former business park know as 'Hayes Park'. The red line site area which forms the basis of this application is 3.73 hectares and comprises of Hayes Park South, Hayes Park Central, the surrounding grassland area, and the associated car parking and road areas. The approximate centre of the site is located at an easting and northing of 508877 and 182442, respectively.

The site is bound to the east and south by the open parkland, which is private land owned by the Church Commissioners. To the west the site is bound by the agricultural land and the buildings of Home Farm. To the north, the site is bound by Hayes Park North and the adjacent multi-storey car park, with open farmland beyond that.

A site location plan has been included in Figure 1 which can also be found in **Appendix A**.

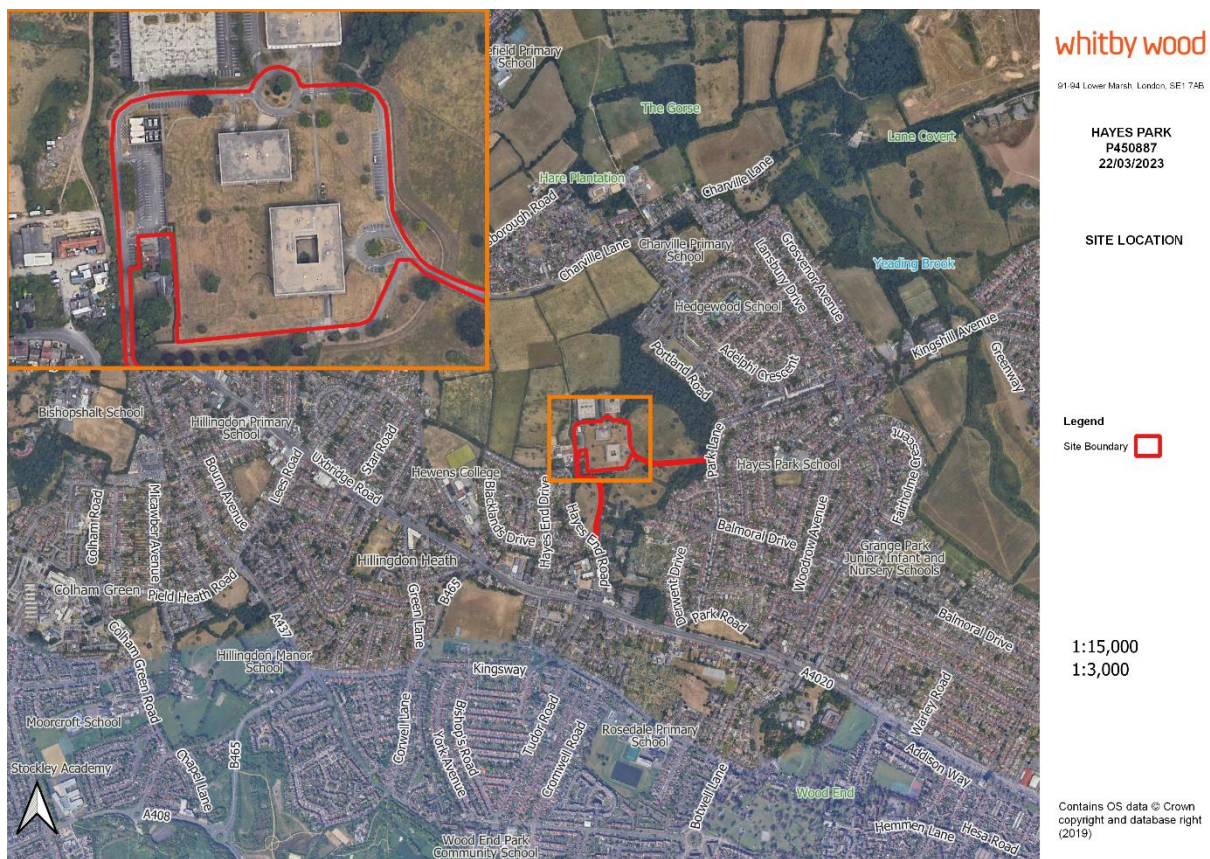


FIGURE 1 - SITE LOCATION PLAN

2.2 Watercourses

The closest surface watercourse is a small ditch located just beyond the north-eastern boundary. The Yading Brook is located approximately 800m to the east of the site and is a tributary of the River Thames. The River Thames is located approximately 7km to the south east.

2.3 Geology

The British Geological Survey's Geology of Britain map has been reviewed as shown in **Appendix B** and it indicates a bedrock geology of London Clay Formation (Clay, Silt and Sand), and superficial deposits of Boyn Hill Gravel Member (Sand and Gravel).

2.4 Proposed Development

The proposed development has evolved through an extensive pre-application and wider stakeholder consultation process, which has included collaborative discussions with the Council, Greater London Authority ('GLA'), Historic England ('HE'), and several other key stakeholders.

The proposed development will bring two long-term vacant office buildings, which are unique heritage assets, back into active use through their conversion to residential. The proposed development provides the opportunity of a second life for the buildings and presents a long term sustainable use that will ensure the buildings are protected and celebrated for years to come.

From the outset, the Applicant has taken a carefully informed heritage-led design approach. The objective has been to enhance the listed buildings, their setting, and the contribution they make to the wider surroundings, whilst at the same time delivering a range of planning benefits.

An area schedule of existing and proposed floorspace and residential mix has been incorporated in **Appendix C**.

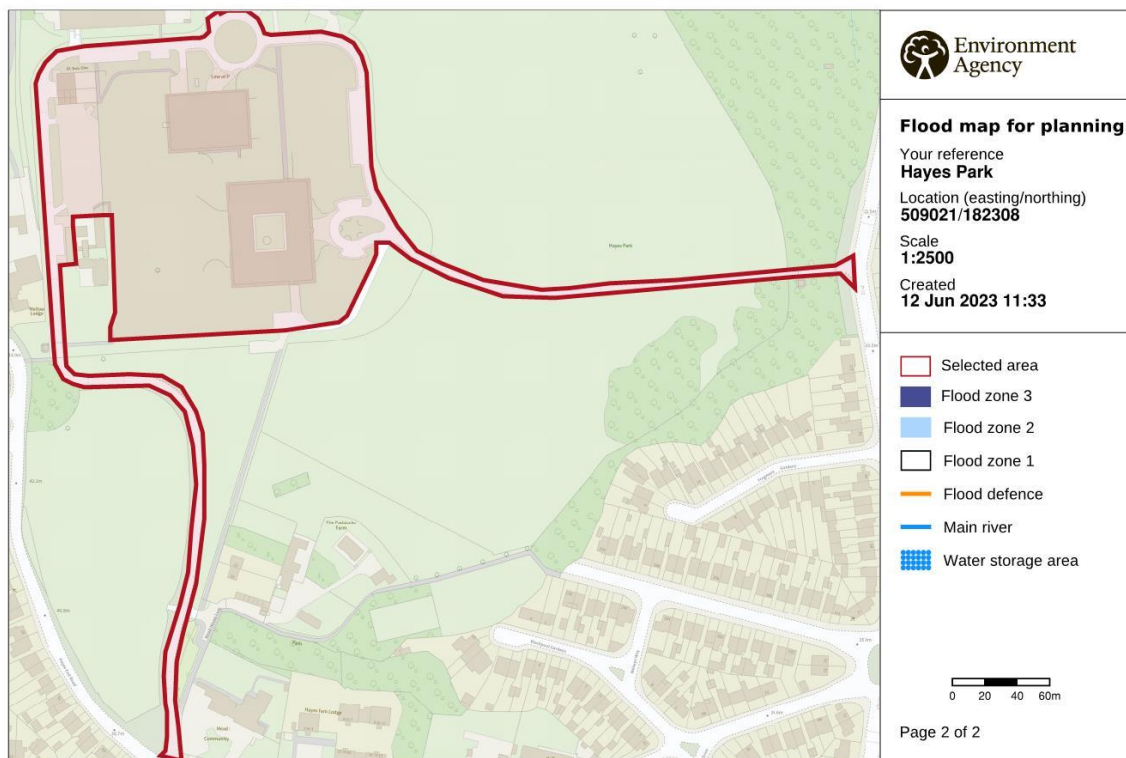
For this proposed development, it can be stated that only the building footprint for Hayes Park Central and Hayes Park South buildings (0.517ha – total drained area) will be used when calculating the existing and proposed discharge rates. This is due to the development being a refurbishment so will not incur any increase in footprint and all landscaping areas are protected, therefore can't forgo any significant alterations. This expressed site area will be incorporated when considering calculations referred to in section 5.

3 FLOOD RISK

3.1 Fluvial (Rivers and Seas)

The Environment Agency's (EA) Flood Risk Data shows the entire site is situated within Flood Zone 1 as demonstrated in Figure 2 and therefore at very low risk of fluvial flooding. Figure 3 shows the site overlaid by the flood zone map in retrospect to the nearest Flood Zone 2 which is located circa 750 meters away. The definition of each flood zone can be found below.

- Land in **Flood Zone 1** has a 0.1% or less annual probability of river or sea flooding;
- Land in **Flood Zone 2** has between 0.1% and 1% annual probability of river flooding and between 0.1% and 0.5% annual probability of sea flooding; and
- Land in **Flood Zone 3** has a 1% or greater annual probability of river flooding and a 0.5% annual probability of sea flooding.



© Environment Agency copyright and / or database rights 2022. All rights reserved. © Crown Copyright and database right 2022. Ordnance Survey licence number 100024198.

FIGURE 2 - ENVIRONMENT AGENCY FLOOD ZONE MAP



FIGURE 3 – FLOOD ZONE MAP

3.2 Pluvial (Rainfall)

The risk of surface water flooding has been assessed by viewing the Updated Flood Map for Surface Water (uFMfSW), which have been replicated in Figure 4-7. This shows for the majority of the site the risk is 'very low'. However, there are areas of the site classified as 'low', 'medium' and 'high' risk of surface water flooding. These are situated in the north of the site, at the Hayes Park Central building which experiences 'low' risk along the north building interface. The central and western areas of the Hayes Park South building encounter a range of 'low' to 'high' risk of flooding. During a 1in1000 storm the maximum water velocity is 0.5m/s and depth is 0.6m, this converts into a Flood Hazard Rating of 1.25 which is classified by 'Danger for some – including the general public.' As previously identified, most of the site is at a 'very low' or 'low' risk. The definitions for each surface water flood risk category have been detailed below:

- **Very low** risk means that each year this area has a chance of flooding of less than 0.1%.
- **Low** risk means that each year this area has a chance of flooding of between 0.1% and 1%.
- **Medium** risk means that each year this area has a chance of flooding of between 1% and 3.3%.
Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding.
- **High** risk means that each year this area has a chance of flooding of greater than 3.3%.

It should be noted that flooding from surface water is difficult to predict as rainfall location and volume are not easy to forecast. In addition to this, local features can greatly affect the chance and severity of

flooding. It is therefore important to consider exceedance routes and overland flow paths of surface water. Areas of medium and high risk can be mitigated against through the design of proposed levels and an effective localised drainage system to prevent flood at low spots.



FIGURE 4 - RISK OF SURFACE WATER FLOODING EXTENT MAP



FIGURE 5 - RISK OF SURFACE WATER FLOODING DEPTH MAP



FIGURE 6 - RISK OF SURFACE WATER FLOODING VELOCITY MAP



FIGURE 7- RISK OF SURFACE WATER FLOODING HAZARD MAP

3.3 Groundwater

The West London Strategic Flood Risk Assessment (SFRA) includes a broad scale assessment of the susceptibility of groundwater flooding and increased potential for elevated groundwater across the borough. Figure 8 is taken from the SFRA online data maps and illustrates that the site is within an area that has potential for groundwater flooding of property located below ground level to occur.

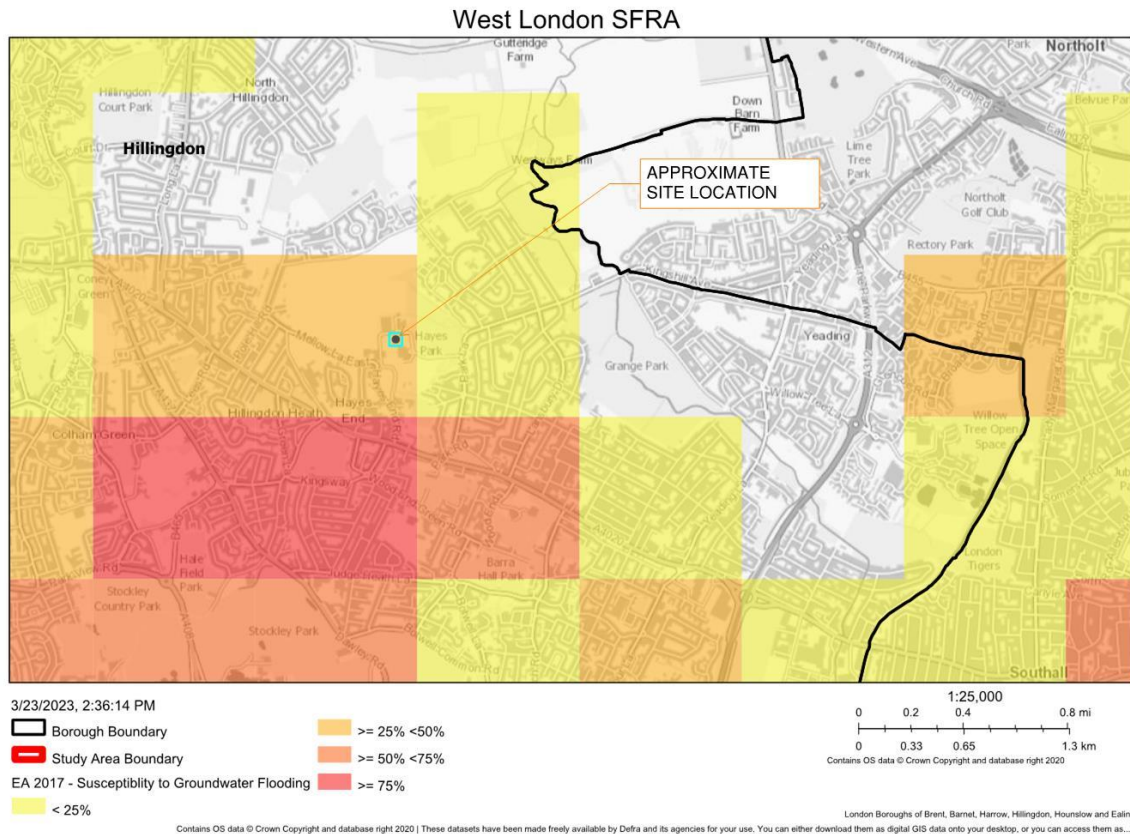


FIGURE 8 – SUSCEPTIBILITY TO GROUNDWATER FLOODING MAP FROM WEST LONDON STRATEGIC FLOOD RISK ASSESSMENT (2017)

3.4 Sewer Flooding

As of 2017, according to the West London SFRA there have been no known instances of property flooding within the area, within the last decade, relating to external Thames Water sewers surcharging. Figure 9 demonstrates that there have been no reports of sewer flooding.

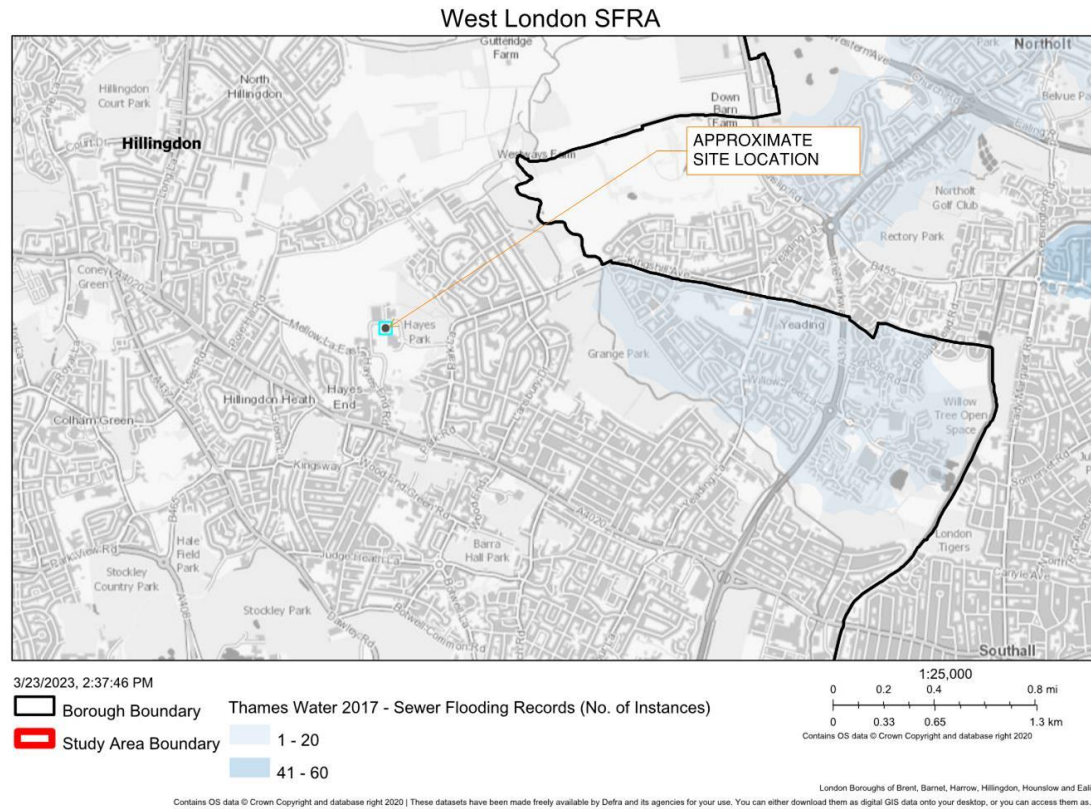


FIGURE 9 - SEWER FLOODING RECORDS MAP FROM WEST LONDON STRATEGIC FLOOD RISK ASSESSMENT (2017)

3.5 Artificial Sources

Figure 10 indicates that there is no risk of reservoir flooding to the site or its surrounding area. This is therefore not considered further within the report.



FIGURE 10 – FLOOD RISK FROM RESERVOIRS MAP

3.6 Summary

The table below provides a summary of the 5 sources of flood risk. The site is deemed to have an overall flood risk of low for the Fluvial flood type. Risk of flooding from pluvial sources is deemed to be due to local topography and will be mitigated through the proposed drainage design. All West London SFRA data maps and flood maps can be located in **Appendix D** and **Appendix E** respectfully.

TABLE 1 - FLOOD RISK SUMMARY

Flood Type	Risk		
	Low	Medium	High
Fluvial	✓		
Pluvial		✓	
Groundwater		✓	
Sewer	✓		
Artificial	✓		

4 PLANNING POLICY AND GUIDANCE

4.1 National Planning Policy Framework

The National Planning Policy Framework July 2021 (NPPF) provides the planning framework on which this FRA has been based. The NPPF states that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk. Where development is necessary, the development should be made safe and not increase flood risk elsewhere.

4.1.1 Sequential Test

The aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding. Development should not be permitted if there are reasonably available sites appropriate for Proposed Development in areas at a lower risk of flooding.

It is necessary to undertake a Sequential Test for a planning application if both of the following apply.

- The proposed development is in Flood Zone 2 or 3; and
- A Sequential Test hasn't already been completed for a development of the type you plan to carry out on your proposed Site.

As the proposed development is entirely within Flood Zone 1, the Sequential Test is deemed to have been passed and Exception Test is not required.

4.1.2 Flood Vulnerability Classification

Any proposed development on the Site will be subject to the planning requirements of the London Borough of Hillingdon, the lead local flood authority (LLFA) and the National Planning Policy Framework (NPPF).

Flood risk vulnerability classification for all flood zones has been reproduced in Table 2 below. This has been extracted from Table 3 of the NPPF Planning Practice Guidance. Building types are classified depending on their use and are placed in a higher vulnerability class depending on flood risk sensitivity. Examples of typical building uses for each vulnerability classification have been included in Table 3.

The NPPF guidance states that 'buildings used for dwelling houses' and 'offices' fall under the category of 'more vulnerable' and 'less vulnerable' respectfully. As the site is entirely within Flood Zone 1, the proposals are acceptable, and an exception test is not required.

TABLE 2 - FLOOD RISK VULNERABILITY AND FLOOD ZONE COMPATABILITY

Flood Zones	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a	Exception Test required	X	Exception Test required	✓	✓
Zone 3b	Exception Test required	X	X	X	✓

TABLE 3 - FLOOD RISK VULNERABILITY CLASSIFICATION

Vulnerability Classification	Building Use Example
Essential infrastructure	<ul style="list-style-type: none"> • Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which must be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. • Wind turbines.
Highly vulnerable	<ul style="list-style-type: none"> • Police stations, ambulance stations and fire stations and command centres and telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use. • Installations requiring hazardous substances consent.
More vulnerable	<ul style="list-style-type: none"> • Hospitals. • Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. • Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. • Non-residential uses for health services, nurseries and educational establishments. • Landfill and sites used for waste management facilities for hazardous waste. • Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.
Less vulnerable	<ul style="list-style-type: none"> • Police, ambulance and fire stations which are not required to be operational during flooding. • Buildings used for shops, restaurants and cafes, offices, general industry, storage and distribution, non-residential institutions not included in "more vulnerable", and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Water treatment works which do not need to remain operational during times of flood. • Sewage treatment works (if adequate measures to control pollution and manage sewage during flooding events are in place). • Car Parks.
Water compatible	<ul style="list-style-type: none"> • Flood control infrastructure. • Water and sewage transmission infrastructure and pumping stations. • Sand and gravel working. • Docks, marinas and wharves. • Navigation facilities. • Ministry of Defence installations. • Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. • Water-based recreation • Lifeguard and coastguard stations. • Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. • Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

4.1.3 Exception Test

With the sequential test being deemed as passed and flood vulnerability classifications acceptable, an Exception test is not required. Refer to sections 4.1.1 and 4.1.2 for more details.

4.2 Climate Change

In May 2022, climate change allowances were published by the Environment Agency. These allowances are based upon predicted changes in fluvial flows and rainfall intensities due to climate change.

4.2.1 Peak Fluvial Flows

Table 4 has been extracted from the DEFRA's climate changes allowances map showing peak river flow allowances for the London Management Catchment. As the Site is in Flood Zone 1 and proposals are considered 'more vulnerable', the central allowance would be appropriate.

TABLE 4 - PEAK RIVER FLOW ALLOWANCES FOR LONDON MANAGEMENT CATCHMENT

Allowance category	Central	Higher	Upper
Total potential change anticipated for '2020s' (2015 to 2039)	15%	20%	31%
Total potential change anticipated for '2050s' (2040 to 2069)	14%	21%	38%
Total potential change anticipated for '2080s' (2070 to 2115)	26%	36%	64%

4.2.2 Peak Rainfall Intensity

The peak rainfall intensity is expected to increase as a result of climate change. Table 5 has been extracted from DEFRA's climate change allowances and assesses different scenarios of 1% and 3.3% annual exceedance rainfall events. Both the upper and central allowances of the associated epoch should be reviewed for a proposed development.

TABLE 5 -PEAK RAINFALL INTENSITY ALLOWANCES FOR LONDON MANAGEMENT CATCHMENT

Allowance category	Total potential change anticipated for the '2050s'		Total potential change anticipated for the '2070s'	
	3.3% rainfall event	1% rainfall event	3.3% rainfall event	1% rainfall event
Central	20%	20%	25%	25%
Upper	35%	40%	35%	40%

4.3 London Plan

The London Plan is a framework which should be used for all developments within London. Policy SI 15 of the London Plan 2021 is specific to flood risk management and all development proposals should adhere to; the policy has been reproduced below.

- A. Current and expected flood risk from all sources (as defined in paragraph 9.2.12) across London should be managed in a sustainable and cost-effective way in collaboration with the Environment Agency, the Lead Local Flood Authorities, developers, and infrastructure providers.
- B. Development Plans should use the Mayor's Regional Flood Risk Appraisal and their Strategic Flood Risk Assessment as well as Local Flood Risk Management Strategies, where necessary, to identify areas where particular and cumulative flood risk issues exist and develop actions and policy approaches aimed at reducing these risks. Boroughs should cooperate and jointly address cross-boundary flood risk issues including with authorities outside London.
- C. Development proposals should ensure that flood risk is minimised and mitigated, and that residual risk is addressed. This should include, where possible, making space for water and aiming for development to be set back from the banks of watercourses.
- D. Developments Plans and development proposals should contribute to the delivery of the measures set out in Thames Estuary 2100 Plan. The mayor will work with the Environment Agency and relevant local planning authorities, including authorities outside London, to safeguard an appropriate location for a new Thames Barrier.
- E. Development proposals for utility services should be designed to remain operational under flood conditions and buildings should be designed for quick recovery following a flood.
- F. Development proposals adjacent to flood defences will be required to protect the integrity of flood defences and allow access for future maintenance and upgrading. Unless exceptional circumstances are demonstrated for not doing so, development proposals should be set back from flood defences to allow for any foreseeable future maintenance and upgrades in a sustainable and cost-effective way.
- G. Natural flood management methods should be employed in development proposals due to their multiple benefits including increasing flood storage and creating recreational areas and habitat.

4.4 Local Plan

Hillingdon's Local Plan is a framework which should be used for all developments within the borough. Within the this documents are Policies that outlines the strategic principles, spatial strategy and technical criteria to follow and implement when considering flood risk management:

4.4.1 Local Plan Part one (2012)

The Council will require new development to be directed away from Flood Zones 2 and 3 in accordance with the principles of the National Planning Policy Framework (NPPF). The subsequent Hillingdon Local Plan: Part 2 -Site Specific Allocations LDD will be subjected to the Sequential Test in accordance with the NPPF. Sites will only be allocated within Flood Zones 2 or 3 where there are overriding issues that outweigh flood risk. In these instances, policy criteria will be set requiring future applicants of these sites to

demonstrate that flood risk can be suitably mitigated. The Council will require all development across the borough to use sustainable urban drainage systems (SUDS) unless demonstrated that it is not viable. The Council will encourage SUDS to be linked to water efficiency methods. The Council may require developer contributions to guarantee the long-term maintenance and performance of SUDS is to an appropriate standard.

4.4.2 Local Plan Part two (2020)

Management of Flood Risk:

- A. Development proposals in Flood Zones 2 and 3a will be required to demonstrate that there are no suitable sites available in areas of lower flood risk. Where no appropriate sites are available, development should be located on the areas of lowest flood risk within the site. Flood defences should provide protection for the lifetime of the development. Finished floor levels should reflect the Environment Agency's latest guidance on climate change.
- B. Development proposals in these areas will be required to submit an appropriate level Flood Risk Assessment (FRA) to demonstrate that the development is resilient to all sources of flooding.
- C. Development in Flood Zone 3b will be refused in principle unless identified as an appropriate development in Flood Risk Planning Policy Guidance. Development for appropriate uses in Flood Zone 3b London Borough of Hillingdon Local Plan Part 2 - Development Management Policies 80 will only be approved if accompanied by an appropriate FRA that demonstrates the development will be resistant and resilient to flooding and suitable warning and evacuation methods are in place.
- D. Developments may be required to make contributions (through legal agreements) to previously identified flood improvement works that will benefit the development site.
- E. Proposals that fail to make appropriate provision for flood risk mitigation, or which would increase the risk or consequences of flooding, will be refused.

4.4.3 Local Plan Part two (2020)

Water Management, Efficiency, and Quality:

- A. Applications for all new build developments (not conversions, change of use, or refurbishment) are required to include a drainage assessment demonstrating that appropriate sustainable drainage systems (SuDS) have been incorporated in accordance with the London Plan Hierarchy (Policy 5.13: Sustainable drainage).
- B. All major new build developments, as well as minor developments in Critical Drainage Areas or an area identified at risk from surface water flooding must be designed to reduce surface water run-off rates to no higher than the pre-development greenfield run-off rate in a 1:100 year storm scenario, plus an appropriate allowance for climate change for the worst storm duration. The assessment is required regardless of the changes in impermeable areas and the fact that a site has an existing high run-off rate will not constitute justification.
- C. Rain Gardens and non householder development should be designed to reduce surface water run-off rates to Greenfield run-off rates.

- D. Schemes for the use of SuDS must be accompanied by adequate arrangements for the management and maintenance of the measures used, with appropriate contributions made to the Council where necessary.
- E. Proposals that would fail to make adequate provision for the control and reduction of surface water run-off rates will be refused.
- F. Developments should be drained by a SuDS system and must include appropriate methods to avoid pollution of the water environment. Preference should be given to utilising the drainage options in the SuDS hierarchy which remove the key pollutants that hinder improving water quality in Hillingdon. Major development should adopt a 'treatment train' approach where water flows through different SuDS to ensure resilience in the system.
- G. All new development proposals (including refurbishments and conversions) will be required to include water efficiency measures, including the collection and reuse of rainwater and grey water.
- H. All new residential development should demonstrate water usage London Borough of Hillingdon Local Plan Part 2 - Development Management Policies 83 rates of no more than 105 litres/person/day. I) It is expected that major development⁸ proposals will provide an integrated approach to surface water run-off attenuation, water collection, recycling and reuse.
- I. All new development proposals will be required to demonstrate that there is sufficient capacity in the water and wastewater infrastructure network to support the proposed development. Where there is a capacity constraint the local planning authority will require the developer to provide a detailed water and/or drainage strategy to inform what infrastructure is required, where, when and how it will be delivered.

4.5 West London SFRA

1. Boroughs should adopt a sequential approach for planning and development to identify areas that are not susceptible to flood risk impacts posed by climate change. Development should be encouraged in these identified areas to make properties more resilient to increasing flood risk and reduce the reliance on property level protection methods.
2. Boroughs should apply the Sequential Test to Allocated Sites within the LPA area at an early stage in the Local Plan development process to help identify any lower flood risk areas that may not be suitable for development. This can be used to inform spatial planning and identify key growth locations, increasing the possibility of facilitating development which is not exposed to flood risk whilst meeting development objectives.
3. Boroughs should implement measures through their Local Plans to deal with the Sequential Test acceptability of windfall site development proposals at the strategic level. The measure could set out locations and quantities of windfall sites that would or would not be acceptable in Sequential Test terms (to provide input to the process defined in *Section 4.2.1*). This would help create efficiencies in the process.
4. If it is determined by evidence that there are insufficient sites within Flood Zone 1 to meet the borough's housing development targets, then windfall developments in Flood Zone 2 or 3 might be

acceptable and should be considered (preferably with support of a Level 2 SFRA). This would inform an approach determining locations where the Sequential Test would be passed. Conversely, if the borough has sufficient land available in Flood Zone 1 to accommodate windfall development sites, then it may not be possible or prudent to consider windfall development in Flood Zone 2 or 3 as acceptable.

5. Existing and planned flood alleviation schemes should be incorporated into Borough Infrastructure Delivery Plans (IDPs). Where these IDPs, or similar corporate work programmes (e.g. planned highway improvement works or Green Infrastructure Plans), identify predicted or actual flood risks, new potential strategic level flood alleviation schemes should be developed.
6. Boroughs should make space for water storage by identifying strategic locations that are required for current and future flood risk management. These identified areas of land should be safeguarded via Local Plans to facilitate links between flood risk management and other environmental priorities.
7. Boroughs should adopt a Catchment Based Approach to ensure recognition of catchment wide flood issues to justify the collection and use of S106 funding to investigate and develop flood alleviation schemes within the catchment the development falls within. CDAs defined by the Borough SWMPs (for surface water flooding) or policy sub-areas defined by EA CFMPs (for fluvial / tidal flooding) provide an established technical basis for this approach.
8. Boroughs should set up mechanisms to enable the use of CIL charges to be used for flood alleviation schemes across the borough to address the cumulative impact of development on flood risk.
9. Boroughs should use their Local Plans to ensure developments within CDAs (as defined by SWMPs) provide increased surface water drainage requirements. Examples could include increased storage through the use of SuDS to restrict off-site runoff rates to greenfield (or lower) conditions.
10. Boroughs should develop standing advice for the assessment of minor development planning applications with surface water implications. This will aid LPAs in making informed and consistent decisions where the EA and / or LLFA has no statutory duty to provide comments as part of an application's review exercise.
11. Boroughs should review the benefits of removing Permitted Development rights for sites which fall within Flood Zones 3a and / or 3b, collaborating on Article 4 Directions where justifiable, defensible and beneficial. This could include provisions around sub-divisions, extensions and paving of gardens in specific areas.
12. Boroughs should use their Local Plans to ensure developments with a high susceptibility to groundwater flooding (as identified in the Sewer, Groundwater & Artificial Flood Risk Interactive Web Map and other available data) demonstrate that increased groundwater mitigation and management measures have been implemented to protect people from groundwater flooding. Any

known groundwater and flow routes should be safeguarded to ensure ground water flood risk is not increased on site or elsewhere.

13. Boroughs should consider implementation of further surface water flood risk mitigation requirements for proposed developments within Flood Zone 3a (surface water) where the development is also within the 1 in 30yr RoFSW mapped extents. These requirements could be similar to those adopted for Flood Zone 3b (fluvial / tidal) Functional Floodplain with modifications as follows:

- A. Development within the 1 in 30yr RoFSW mapped extent will be treated as if it were Flood Zone 3b (Functional Floodplain) as defined in PPG Table 1 (Paragraph 065).
- B. Development may be possible within the 1 in 30yr RoFSW mapped extents outside of existing infrastructure or solid building footprints.
- C. To enable development, the proposals must provide mitigation and resilience against flood risks (taking advice from the LLFA as appropriate) and provide appropriate compensation on existing flood risk levels (addressing the predicted 1 in 30yr and 1 in 100yr RoFSW mapped depths as a minimum), supported by detailed flood risk modelling if appropriate.
- D. The development must not increase flood risk elsewhere and where possible reduce flood risk overall.
- E. Where beneficial to flood risk and/or other planning requirements, it may also be possible for development to occur within the functional floodplain through the relocation (but not increase of footprint size) of an existing building's footprint within a site.

5 MANAGING FLOOD RISK

5.1 Master Planning

It is recommended that during the progression of the masterplan, the proposed development is continued to be designed with flood risk and drainage implications in mind. Proposed ground levels will need to consider potential exceedance flow pathways from onsite drainage. Any displaced surface water flooding should be mitigated against to avoid increasing flooding elsewhere.

5.2 Safe Access and Egress

As the entirety of the site sits within Flood Zone 1, it is considered that there will always be safe access and egress provided. Vehicular and pedestrian access is also available from all directions.

As the site sits in Flood Zone 1, a Flood Evacuation Plan (FEP) is therefore not required.

5.3 Mitigating Measures

Additional measures can be implemented to minimise the likelihood or severity of flooding. As flood risk for the site is mostly low, no specialist flood measures are required.

6 SURFACE WATER MANAGEMENT

6.1 Existing Site Drainage

A Thames Water Asset search has been carried out and shows combined surface and foul water infrastructure within and surrounding the Site confines. The asset search information can be found in **Appendix F**. A Surface Water and Foul pre-planning enquiry with Thames will be submitted to confirm discharge location and check for sewer capacity. As the proposed development is a refurbishment, minimal excavation of the existing pipe network will be conducted, therefore a CCTV Survey will be tendered out to gain an insight into the condition and connectivity of the drainage runs up to the Thames Water Outfall.

6.2 Runoff Rates

Greenfield runoff rates have been calculated using IH124 methodology which can be found in **Appendix G**. The table below shows the greenfield runoff rates for the Central Hayes and South Hayes buildings footprint (0.517 ha – total drained area) and factored to provide a runoff rate per hectare. External areas such as the road and cycling areas will drain as existing. The table also shows the current brownfield discharge rates, calculated using the modified rational method. A percentage of impermeable area (PIMP) of 100% and a time of concentration of 5 minutes were assumed at this stage. A runoff coefficient (Cv) of 1 has been used in the calculations.

TABLE 6 - GREENFIELD RUNOFF AND EXISTING DISCHARGE RATES

Return Period	Greenfield runoff rates		Existing Discharge Rates (l/s)
	Buildings Footprint [0.517 ha] (l/s)	Per hectare (l/s/ha)	
QBAR	2.18	4.21	-
1-year	1.85	3.58	102.2
30-year	5.01	9.69	241.6
100-year	6.95	13.43	306.3

6.2.1 Existing discharge rates

As shown in table 6, the existing discharge rates for the buildings footprint have been calculated for the specified return periods. As the proposed development is a refurbishment, the proposed discharge rate as a minimum should be greater than a 50% betterment than existing as an alternative to QBar. Figure 11 states the existing discharge and betterment for the development. With this in consideration, an optimum discharge of 51.1l/s is proposed which is a 50% betterment. These rates will be coordinated with Thames Water during a pre-planning enquiry to ensure drainage capacity.

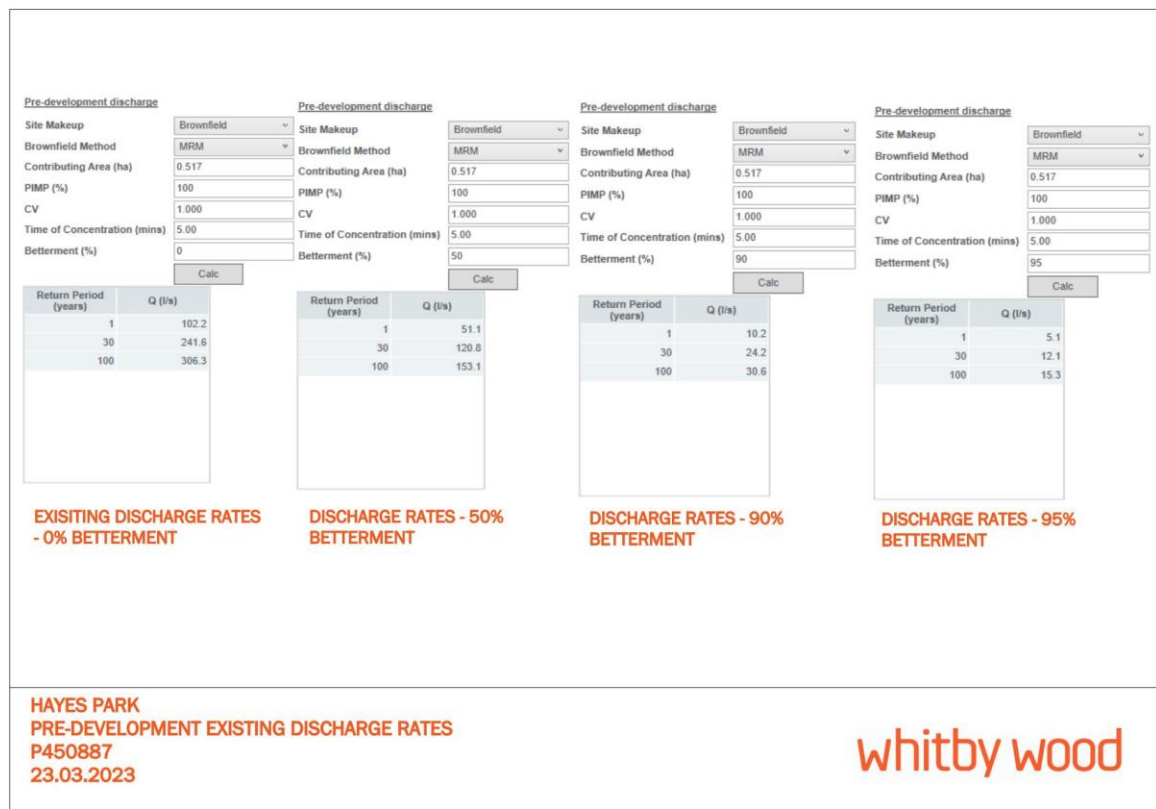


FIGURE 11 – PRE-DEVELOPMENT EXSISTING DISCHARGE RATES AND BETTERMENT CALULATIONS

6.2.2 Storage Volumes

Using the a 50% betterment of existing discharge rate of 51.1 l/s, a quick storage estimate for the site can be calculated using the UK SuDS surface water storage volume estimation tool, as shown in **Appendix H**. The output value shows that 90m³ of attenuation will be required. This is based on no flooding of the network or Site up to and including the 1 in 100year storm event plus a 40% allowance for climate change. The storage requirements are subject to change upon development of the design and impermeable areas.

6.3 Delivering a SuDS Scheme

The ‘four pillars’ of SuDS design as described by the SuDS Manual are;

- Water Quantity;
- Water Quality;
- Amenity; and
- Biodiversity.

The philosophy of SuDS is about maximising the benefits and minimising the negative impacts of surface water runoff from developed areas throughout its life cycle. This is known as the treatment train philosophy and uses drainage techniques to systematically control the three elements of runoff; pollution, flow rates and volumes.

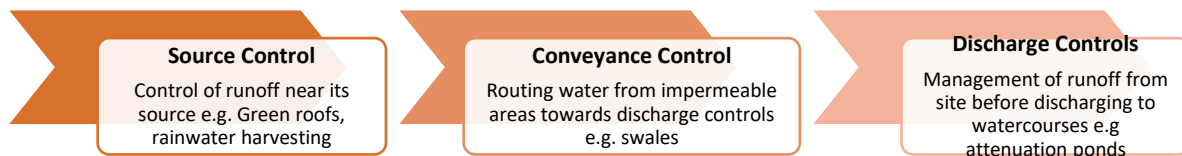


FIGURE 12 - TREATMENT TRAIN

SuDS can improve the quality of life in developments by making them more vibrant, visually attractive, sustainable and more resilient to change, by improving urban air quality, regulating building temperatures, reducing noise and delivering recreation and education opportunities. The SuDS design should therefore as much as possible, be based around the following:

- Using surface water runoff as a resource;
- Managing rainwater close to where it falls;
- Managing runoff on the surface;
- Allowing rainfall to soak into the ground;
- Promoting evapotranspiration;
- Slowing and storing runoff to mimic natural runoff characteristics;
- Reducing contamination of runoff through pollution prevention and controlling the runoff at source; and
- Treating runoff to reduce the risk of urban contaminants causing environmental pollution.

By following the above the proposed development has the potential to maximise SuDS and conform to SuDS best practice. Ultimately a well designed and constructed SuDS scheme will provide a robust and reliable surface water drainage network, whilst providing increased amenity and biodiversity.

6.3 Drainage Hierarchy

As stated in the National Planning Practice Guidance, the aim should be to discharge surface water run-off as high up the drainage hierarchy, as reasonably practicable. Local Authorities and Water Boards often require proof that each option is not feasible before considering the next.

The drainage hierarchy is as follows:

1. Discharge into the ground (infiltration);
2. Discharge to a surface water body;
3. Discharge to a surface water sewer, highway drain, or another drainage system;
4. Discharge to a combined sewer.

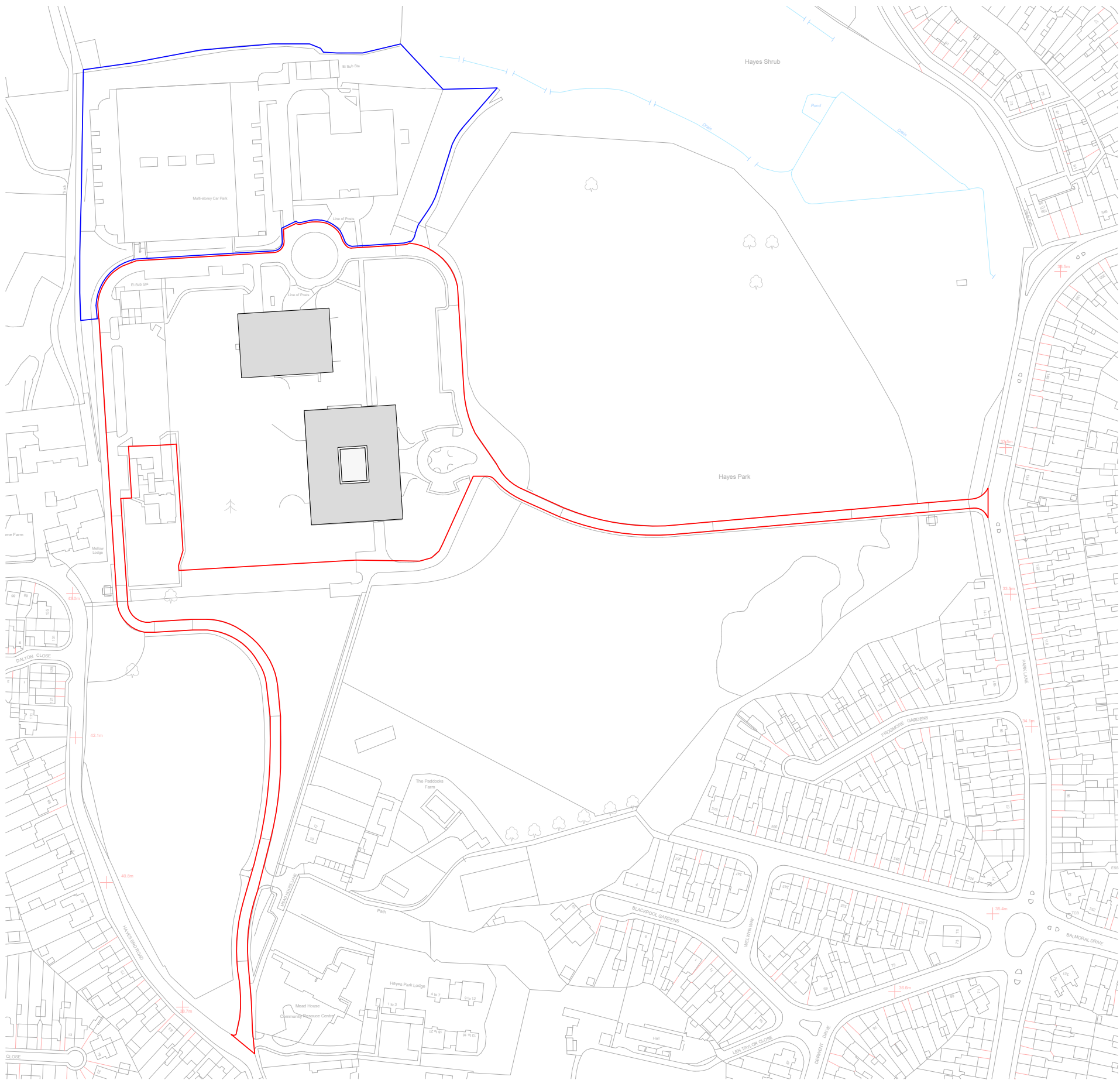
For this site, infiltration and connection to a waterbody is unlikely to be feasible due to the presence of clay and the protective areas within the landscaping on site. Discharge therefore be to the public sewer for both surface water and foul water.

7 CONCLUSIONS AND RECOMMENDATIONS

The main conclusions from this flood risk assessment are detailed below. These conclusions and recommendations may change if further Site investigations become available and the proposals are developed.

- The Site is entirely located in Flood Zone 1 with some patches of low, medium and high risk pluvial flooding, predominantly within low laying areas of the site.
- The West London SFRA illustrates that the site is within an area that has potential for groundwater flooding of property located below ground level to occur. Steps should be taken to reduce the risk of groundwater flooding of proposed basement levels. This should be reviewed as further site investigations are conducted.
- There is generally considered to be a low risk of flooding from all other sources.
- The predicted presence of clay and high groundwater means infiltration on site is not recommended at this stage.
- No specialist flood protection measures are required to protect against fluvial flooding.
- There is existing drainage within proximity to the site, the outfall location has been agreed via a pre-planning enquiry with Thames Water to ensure for capacity within the network.
- Ultimately surface water will discharge into the nearest Thames Water surface water public sewer, with foul water to the nearest available foul water sewer, where feasible.
- Currently the surface water is proposed to discharge at 51.1 l/s, with foul water unrestricted. Overall, a betterment of 50% will be achieved.
- The proposed development provides the opportunity to utilise SuDS. Not all SuDS techniques will be suitable for this site but through assessing the benefits and constraints the most appropriate SuDS techniques should be selected.

Appendix A – Site location



General Notes

No implied licence exists. This drawing should not be used to calculate areas for the purposes of valuation.
Do not scale this drawing for construction purposes. All dimensions to be checked on site by the contractor and such dimensions to be their responsibility.
All work must comply with relevant British Standards and Building Regulations requirements. Drawing errors and omissions to be reported to the architect.

Notes

Key:

— Planning Application Boundary

— Land Owned by Applicant

0 100m
@ 1:2500

Key Plan



3 Brewhouse Yard
London, EC1V 4JQ

hello@egretwest.com
+44 (0) 20 7549 1730

For Planning

Project No. 0419

Project Name

Hayes Park

Drawing Title

Existing Location Plan

Client Shall Do Hayes
Developments Limited

Scale @A3 1 : 2500

Date 12/05/23

Drawn by PJ


Checked by GLJ

P1	12/05/23	For Planning	SEW
Rev	Date	Reason	Chk
Drawing Number		Rev.	
0419-SEW-ZZ-ZZ-DR-A-000003		P1	

HAYES PARK
P450887
22/03/2023

SITE LOCATION

Legend

Site Boundary 

1:15,000
 1:3,000

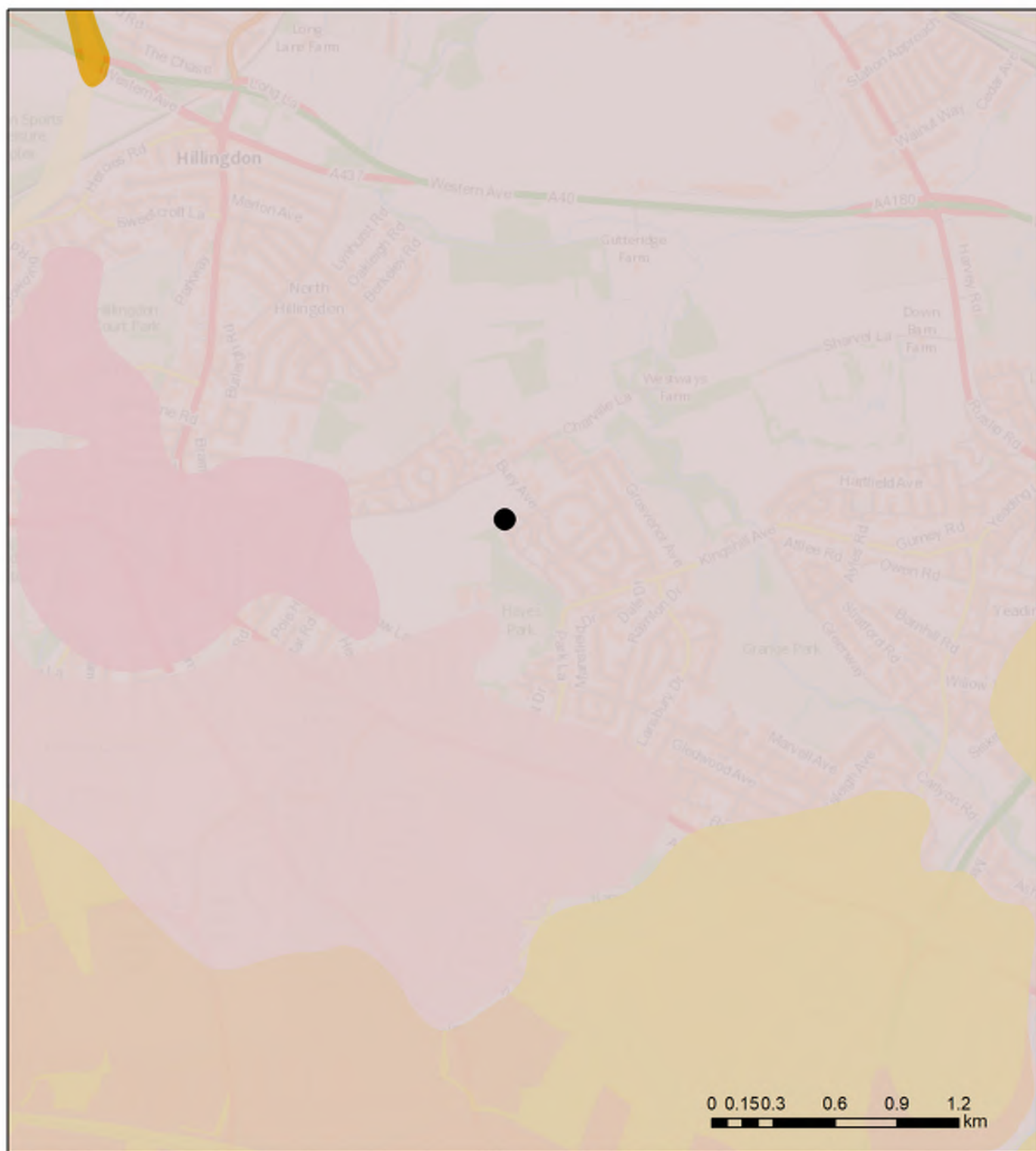


Appendix B – British Geology Society

GeoIndex Report



British
Geological
Survey



Contains OS data © Crown Copyright and database right 2020



GeoIndex Onshore Data Sources: NERC, Natural England, English Heritage and Ordnance Survey

Map Key

Superficial deposits 1:50,000 scale

-  [BOYN HILL GRAVEL MEMBER - SAND AND GRAVEL](#)
-  [ALLUVIUM - CLAY, SILT, SAND AND GRAVEL](#)
-  [TAPLOW GRAVEL MEMBER - SAND AND GRAVEL](#)
-  [BLACK PARK GRAVEL MEMBER - SAND AND GRAVEL](#)
-  [HEAD - CLAY AND SILT](#)
-  [SHEPPERTON GRAVEL MEMBER - SAND AND GRAVEL](#)
-  [LYNCH HILL GRAVEL MEMBER - SAND AND GRAVEL](#)
-  [LANGLEY SILT MEMBER - CLAY AND SILT](#)

Bedrock geology 1:50,000 scale

-  [LONDON CLAY FORMATION - CLAY, SILT AND SAND](#)
-  [LAMBETH GROUP - CLAY, SILT AND SAND](#)

Appendix C – Area Schedule

APPENDIX 1: SCHEDULE OF EXISTING AND PROPOSED FLOORSPACE

Table 1 – Site Wide Total Existing and Proposed Floorspace (GIA)

Use Class	Existing Sqm (GIA)	Proposed Sqm (GIA)	Variance Sqm (GIA)
Office (Class E)	12,655	0	-12,655
Residential (Class C3)	0	11,684	+11,684
Total	12,655	11,684	-971

Table 2 – Hayes Park South - Existing and Proposed Floorspace (GIA)

Use Class	Existing Sqm (GIA)	Proposed Sqm (GIA)	Variance Sqm (GIA)
Office (Class E)	7,381	0	-7,381
Residential (Class C3)	0	7,325	+7,325
Total	7,381	7,325	-56

Table 2 – Hayes Park Central - Existing and Proposed Floorspace (GIA)

Use Class	Existing Sqm (GIA)	Proposed Sqm (GIA)	Variance Sqm (GIA)
Office (Class E)	5,274	0	-5,274
Residential (Class C3)	0	4,359	+4,359
Total	5,274	4,359	-915

APPENDIX 2: SCHEDULE OF THE PROPOSED RESIDENTIAL MIX

Table 1 – Total Site Wide Housing Mix

	Low Cost Rent	Intermediate	Private	Total
1 bedroom (+ Studio)			65	65
2 bedrooms			41	41
3 bedrooms			17	17
4 bedrooms			1	1
Total			124	124

Table 2 – Hayes Park South Housing Mix

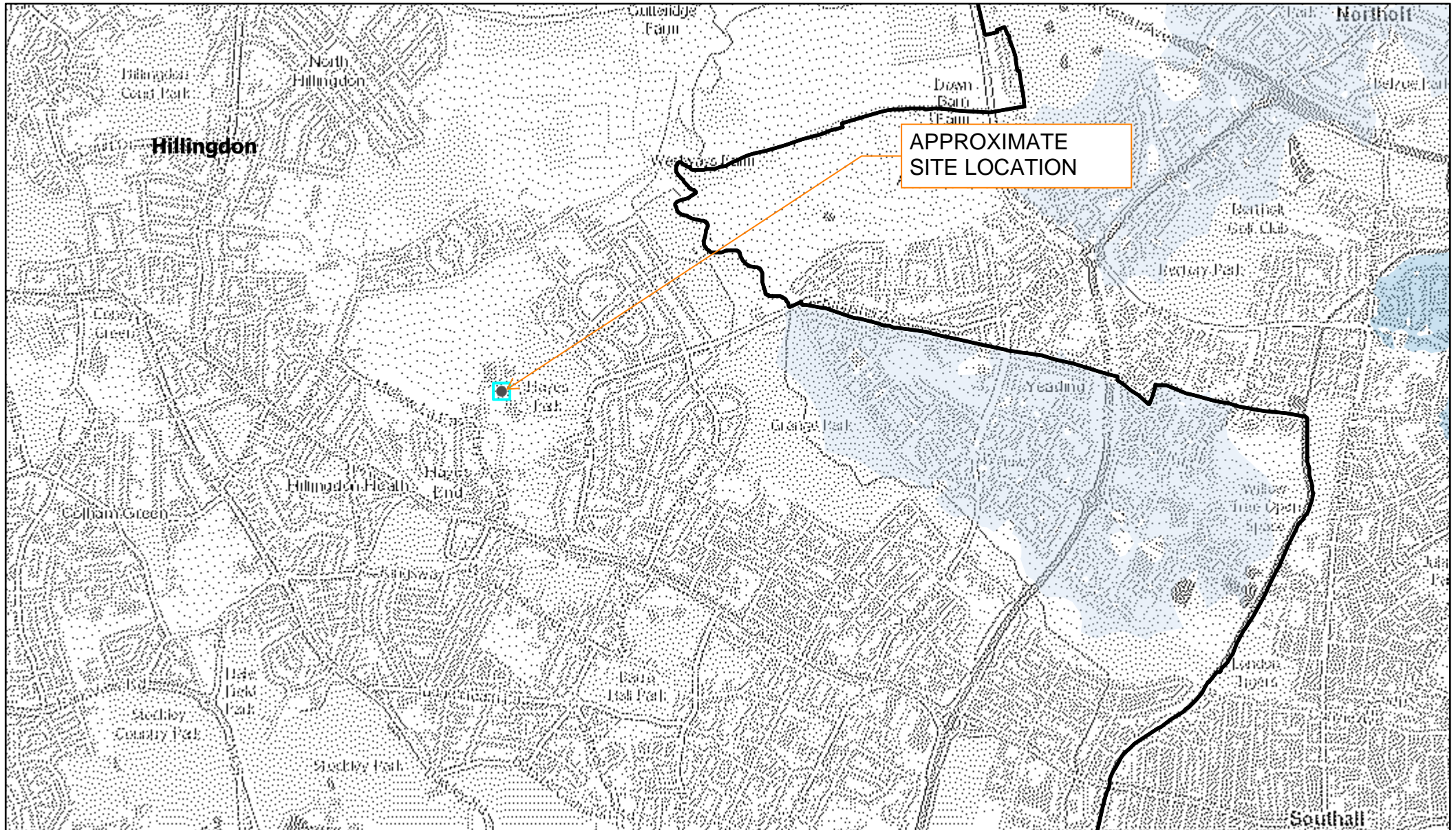
	Low Cost Rent	Intermediate	Private	Total
1 bedroom (+ Studio)			39	39
2 bedrooms			21	21
3 bedrooms			15	15
4 bedrooms			0	0
Total			75	75

Table 3: Hayes Park Central Housing Mix

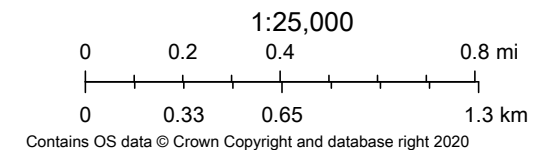
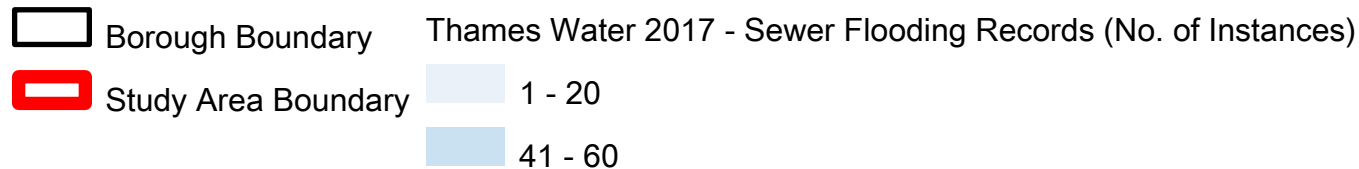
	Low Cost Rent	Intermediate	Private	Total
1 bedroom (+ Studio)			26	26
2 bedrooms			20	20
3 bedrooms			2	2
4 bedrooms			1	1
Total			49	49

Appendix D – West London SFRA Data Maps

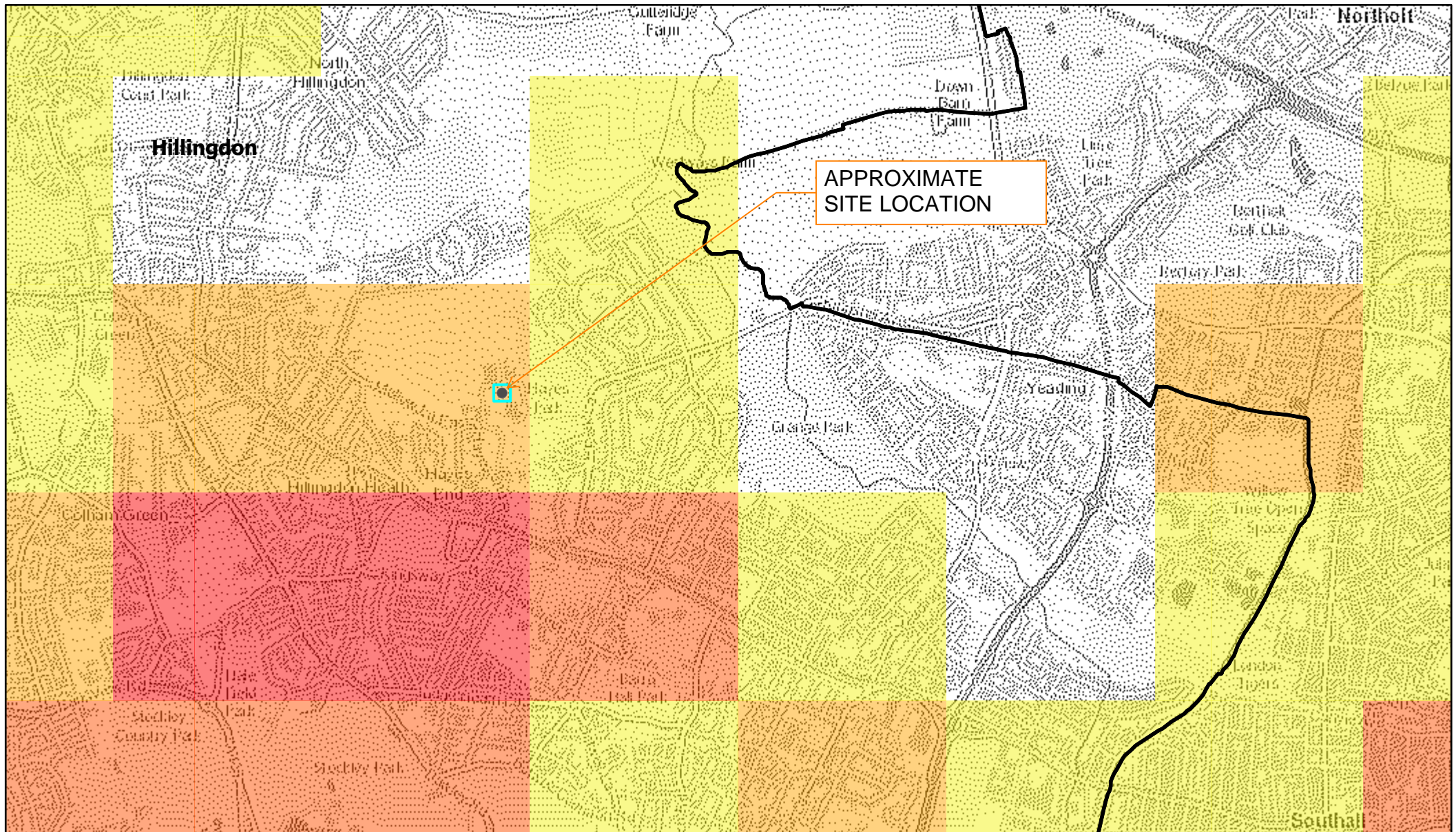
West London SFRA



3/23/2023, 2:37:46 PM



West London SFRA




3/23/2023, 2:36:14 PM


□

Borough Boundary




Study Area Boundary

 $\geq 25\% < 50\%$

 $\geq 50\% < 75\%$

 $\geq 75\%$

EA 2017 - Susceptibility to Groundwater Flooding

 < 25%

1:25,000

0 0.2 0.4 0.8 mi

0 0.33 0.65 1.3 km

Contains OS data © Crown Copyright and database right 2020

London Boroughs of Brent, Barnet, Harrow, Hillingdon, Hounslow and Ealing

Contains OS data © Crown Copyright and database right 2020 | These datasets have been made freely available by Defra and its agencies for your use. You can either download them as digital GIS data onto your desktop, or you can access them as...