STRATEGIC FLOOD RISK ASSESSMENT

LEVEL 2

PREPARED FOR LONDON BOROUGH OF HOUNSLOW

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Approved by Michael Arthur

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Version 2.0

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1.0	November 2018	Draft for client review	DRW	MA
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2.0	January	Final issue to client	DRW	MA

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EXECUTIVE SUMMARY

The West London Level 1 Strategic Food Risk Assessment (SFRA) was published online in April 2018. The assessment was carried out for the West London Boroughs of Barnet, Brent, Ealing, Harrow, Hillingdon and Hounslow. The overarching aim of the document was to assess flood risk from all sources and provide the evidence base to steer development away from areas identified most at risk. As part of the assessment, 'Capacity Sites' were evaluated as part of a Level 2 screening exercise to determine if a more detailed analysis of flood risk was required.

This Level 2 SFRA was commissioned by the London Borough of Hounslow and looks at 11 'Capacity Sites' put forward further assessment. Six sites were identified following the Level 2 screening exercise. This assessment was conducted in accordance with the National Planning Policy Framework and the accompanying Planning Practice Guidance (PPG). Five additional sites were identified as part of the additional capacity work undertaken by Hounslow to meet its objectively assessed needs.

The primary purpose of this Level 2 SFRA is to provide the information necessary for application of the Exception Test where appropriate. Level 2 assessments also provides spatial planning and site-specific recommendations to support any potential development opportunities for prospective developers.

This assessment provides a 'Developable Site Area' map for each site. The developable areas are categorised based on fluvial and surface water flood risk and display the proportion of the site within each developable area banding identified. The infrastructure and development classifications provided within the mapping is based on the PPG Flood Risk Vulnerability Classification. Of the 11 sites assessed, eight are located within predominantly high risk areas and the other three are in predominantly low risk areas. The assessments concluded that each site could support development providing the appropriate infrastructure and mitigation measures are employed.

CONTENTS

FIGURES AND TABLES

ACRONYMS AND ABBREVIATIONS

Abbreviation	Definition
FRA	Flood Risk Assessment
GIS	Graphical Information System
HR	Hazard Rating
NPPF	National Planning Policy Framework
PPG	Planning Practice Guidance
RoFSW	Risk of Flooding from Surface Water
SFRA	Strategic Flood Risk Assessment

1 INTRODUCTION

What is a Level 2 SFRA?

A Level 2 Strategic Flood Risk Assessment (SFRA) is a detailed assessment of all sources of flood risk for specified sites requiring targeted assessment. These sites may have been designated as 'Capacity Sites' by the Local Planning Authority or identified following the Level 1 SFRA if the site is in a flood risk area.

The Level 2 assessment should provide the information necessary for application of the Exception Test where appropriate. The site-specific assessment builds on the strategic flood risk information presented in the Level 1 SFRA and considers the detailed nature of the site's flood characteristics.

Who should use it?

As the Local Planning Authority, this document should be used by the London Borough of Hounslow. It also provides site specific guidance for developers and planners to ensure that planning permission requirements are met.

1.1 Background

The West London Boroughs of Barnet, Brent, Ealing, Harrow, Hillingdon and Hounslow carried out a Level 1 Strategic Flood Risk Assessment to assess the risk of flooding from all sources in the region, now and in the future. The SFRA was conducted in line with the National Planning Policy Framework (NPPF) and the accompanying Flood Risk and Coastal Change Planning Practice Guidance (PPG) and provides evidence to guide planned development and proposed land use changes away from the areas most at risk of flooding. It is used by boroughs for strategic planning and enables developers to have a better understanding of flood risk and the planning permission requirements for the area.

The Level 1 SFRA was designed to enable further site-specific assessments where required. It includes a Level 2 Screening Assessment which was completed to evaluate the Local Planning Authority's 'Capacity Sites'. The screening assessment was carried out by conducting an analysis of potential flood risk impacts for all 'Capacity Sites'. The Level 2 SFRA Recommendations section of the SFRA provides the criteria and assumptions used for conducting the high level screening of the 'Capacity Sites'.

The PPG recommends that a Level 2 SFRA is carried out when the "*Level 1 Assessment shows that land outside flood risk areas cannot appropriately accommodate all the necessary development*". Following the Level 1 SFRA screening assessment, 17 sites within the London Borough of Hounslow were recommended for further analysis as part of a Level 2 SFRA. 11 were eliminated upon further review, leaving six. Five additional sites were identified as part of the additional capacity work undertaken by

Hounslow to meet its objectively assessed needs. This Level 2 SFRA has been developed to assess the 11 'Capacity Sites' put forward by the London Borough of Hounslow.

1.2 Policy

This Level 2 SFRA has been produced in line with national, regional and local policy. The primary purpose of these policies is to ensure that development does not increase the risk flooding, and to ensure that property development is steered away from high flood risk areas to keep people safe from flooding. Although policy referenced as part of the Level 1 SFRA is relevant to the Level 2 SFRA, there are several policy documents that provide specific guidance and requirements that relate to Level 2 assessments.

The NPPF and the accompanying PPG provide national policy that guides the requirements of SFRAs. They introduce the purpose and requirements of the Sequential and Exception Tests, tests designed to direct developments to areas that possesses the lowest flood risk.

The Sequential Test is designed to steer development proposals to the lowest flood risk probability areas. The Level 1 West London SFRA provides the basis for the application of this test. The Exception Test is designed to follow the Sequential Test where necessary. It should be applied if it has been determined that a development cannot be located in an area with a lower risk of flooding. The Exception Test needs to demonstrate that the proposed flood risk management measures will be satisfactorily applied to ensure both people and the property will be safe for the lifetime of the development. This Level 2 SFRA is structured to provide the basis for the application of this test. The Level 1 SFRA provides further guidance on the application of these tests.

Policy 5.12 of the London Plan (2016) highlights that Local Authorities should utilise SFRAs to identify areas with flood risk issues, and develop actions and policies to reduce these risks. The outputs of the Level 2 SFRA include detailed assessments for each flood source, planning considerations, potential mitigation measures for each assessed site. These outputs enable developers to produce appropriate flood risk mitigation actions for each assessed site.

Policy EQ3 of the Hounslow Local Plan (Volume 1) highlights that developers must "*Prepare flood risk assessments, consistent with the requirements of the Environment Agency and the Strategic Flood Risk Assessment*". An output of the Level 2 SFRA is tailored flood risk assessment (FRA) preparation advice for each assessed site. This output assists developers in ensuring that an appropriate FRA is produced as part of the development proposal.

The Level 1 West London 1 SFRA provides a section on Planning and Policy Framework. This section provides an informative breakdown of the national, regional, sub-regional and local policy that LPAs, planners and developers should follow as part of the development proposal process.

1.3 Report structure

This Level 2 SFRA has been produced to assess 11 Hounslow 'Capacity Sites'. To meet the objectives of the assessment, this document has been structured as follows:

- **Section 1 (Introduction)** defines the Level 2 SFRA and outlines who the document is primarily for. This section provides the background of this Level 2 assessment and highlights key and influential policy.
- **Section 2 (Site Assessment)** provides an overview of the site assessments conducted. This section lists the 11 sites assessed and provides a summary of the site assessment results.
- **Section 3 (Methodology)** provides details on the methodology used to complete each site assessment. Each section on the site-assessment template is covered, alongside assessment data sources and the deliverable areas.
- **Appendices** contains data source information, flood risk mapping on a borough-wide scale, and full details for each individual site assessment conducted as part of the Level 2 SFRA.

2 SITE ASSESSMENT

2.1 Site assessment purpose

The primary purpose of the site assessments is to provide the information necessary for the application of the Exception Test. The assessments also provide recommendations and considerations for Local Planning Authorities and prospective developers to be used in conjunction with the guidance provided in Section 4 of the Level 1 SFRA. Developable Site Area maps are produced as an output for each site, displaying the areas in which certain types of developments could be developed across the site. For further information on the Level 2 SFRA methodology, refer to *Section 3* of the document.

2.2 Sites assessed

11 'Capacity Sites' were assessed as part of this Level 2 SFRA. Information on these sites are presented in *Figure 2.1* below and *Table 2.1*.

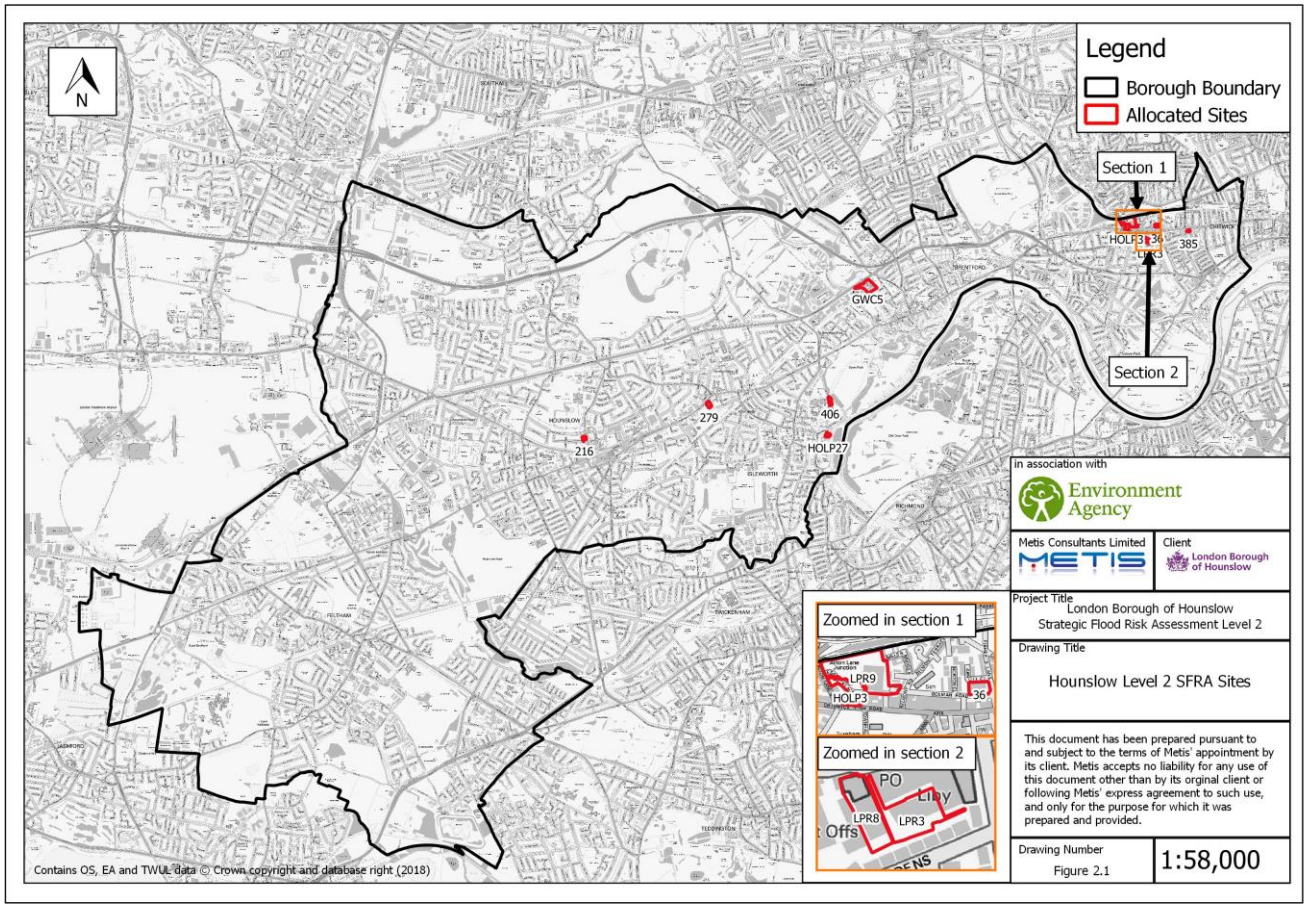


Figure 2.1. Borough map showing the location of the 11 sites targeted within the Level 2 SFRA

Table 2.1. List of the 11 Capacity Sites targeted within the Level 2 SFRA

Borough ID	Site Name	Proposed Use	Area (m²)
HOLP3	Empire House	Mixed Use	4897
HOLP27	Europa House	Mixed Use	2779
LPR3	Chiswick Telephone Exchange	Residential	2262
LPR8	Chiswick Delivery Office	Mixed Use	1941
LPR9	Sainsbury's Chiswick	Mixed Use	18211
GWC5	Great West Plaza	Mixed Use	22011
36	Chiswick Health Centre	Health Centre, Residential	2379
216	Site at 26 Lampton Road	Residential	2441
279	Feltham Coachworks	Mixed Use	3674
385	147 Chiswick High Road	Mixed Use	984
406	West Middlesex Site 5	D2	3579

2.3 Results

The primary map outputs from the Level 2 SFRA display the developable areas across each site. The developable areas are categorised and display the proportion of the site within each developable area banding identified. The bandings are:

- Very High Risk Area - Water Compatible and Essential Infrastructure Only
- High Risk Area - Less Vulnerable Development
- Moderate Risk Area - More Vulnerable Development
- Low Risk Area - All Types of Development

Of the 11 sites assessed, eight are located within predominantly high risk areas. Based on the developable area banding, these sites can only accommodate less vulnerable, water compatible and essential infrastructure only. The Great West Plaza, Site at 26 Lampton Road and Feltham Coachworks sites predominantly fall in low risk areas, allowing most of these sites to accommodate developments of all types. However, sections of those site areas are within high and very high risk areas, requiring proposals with highly vulnerable and more vulnerable development to avoid those areas. Full developable area and site-assessment information for each site can be found in *Appendix C*.

3 METHODOLOGY

3.1 Site assessment template

To assess each 'Capacity Site', a wide-ranging detailed risk assessment was conducted. A site assessment pro forma was prepared for each site covering the following areas:

- Flood risk assessment
- Developable site area
- Site access / egress
- Potential mitigation measures
- Site specific FRA requirements
- Planning considerations

Details of each section are covered below.

Risk assessment

This section covers the detailed FRAs conducted for each site. Datasets utilised to produce the West London SFRA Web Maps were used to carry out the analysis (see *Section 3.2* for more details). Flooding from surface water, sewer, fluvial / tidal, groundwater and artificial sources was analysed, identifying the predicted proportion of each flood risk type within each site. The assessments for fluvial, tidal and surface water flood risk are based on the Flood Zones defined in the Level 1 SFRA (see *Table 3.1*)..

The assessment also analysed the impact of flood defences, potential flood depth, potential flood hazards, climate change and geology. The outputs for the flood risk assessment section provides four maps, each providing different flood risk information across a specific site. Each map also provides the location of Main Rivers and ordinary watercourses in relation to the assessed site:

- Fluvial/Tidal Flood Zone – a map which provides the fluvial and tidal flood risk extent using the Flood Zones as defined in the Level 1 SFRA. The map provides the location of flood defences and highlights the areas that benefit from those defences.
- Fluvial Flood Outline – a map which provides the fluvial flood extent for defended 1 in 100-year and defended 1 in 100-year + climate change flood events. The map also shows the potential Thames Tidal Defence Breach Zone.
- Surface water flood risk (depth) – a map which provides the predicted surface water flood depth across a site for a 1 in 100-year event. This is a more detailed representation of the Flood Zone 3a (Surface Water) extent as defined in the Level 1 SFRA and *Table 3.1*.
- Surface water flood risk (hazard) – a map which provides information on the predicted danger of surface water flooding. The map categorises the danger based on predicted flood water depth and velocity for a 1 in 100-year event. This is a more detailed representation of the Flood Zone 3a

(Surface Water) extent as defined in the Level 1 SFRA and *Table 3.1*. *Table 3.2* provides further information on the hazard mapping categories.

Sewer, groundwater, artificial and climate change risk was analysed as part of the risk assessment but were not mapped for each individual site. *Appendix A* provides information on the data sources used to conduct the assessment. Full borough mapping for sewer, groundwater and artificial flood risk can be found in *Appendix B.*

Table 3.1. Level 1 SFRA flood risk Flood Zones

Term	Definition
Flood Zone 2	• Land within EA modelled fluvial flood risk extents predicted for 1 in 100 to 1 in 1,000 year return period events **(fluvial)**. • Land within EA modelled tidal flood risk extents predicted for 1 in 200 to 1 in 1,000 year return period events **(tidal)**.
Flood Zone 3a (fluvial and tidal)	• Land within EA modelled fluvial flood risk extents predicted for up to and including 1 in 100 year return period events **(fluvial)**. • Land within EA modelled tidal flood risk extents predicted for up to and including 1 in 200 year return period events **(tidal)**.
Flood Zone 3a (surface water)	• Land within EA modelled surface water flood risk extents predicted for up to and including 1 in 100 year return period events **(surface water)**.
Flood Zone 3b (fluvial and tidal)	• Land within EA modelled fluvial and tidal flood risk extents predicted for up to and including 1 in 20-year return period events allowing for the impact of flood defences **(fluvial / tidal)**. • Land which is included within the EA's Flood Storage Areas dataset **(fluvial / tidal)**.

Table 3.2. Surface water flood risk hazard rating (HR) categories

Flood Hazard		Definition
Low	0.5 ≥ HR < 0.75	Caution – Flood zone with shallow flowing water or deep standing water
Moderate	0.75 ≥ HR ≤ 1.25	Dangerous for some (i.e. children) – Danger: flood zone with deep or fast flowing water
Significant	1.25 > HR ≤ 2.0	Dangerous for most people – Danger: flood zone with deep fast flowing water
Extreme	HR > 2.0	Dangerous for all – Extreme danger: flood zone with deep fast flowing water

Developable site area

This section covers the developable area for the assessed Capacity Site. The risk assessment informs the Developable Site Area by visually summarising the results of the flood risk assessment to produce a map that provides information about the type of infrastructure that could be developed on site. The infrastructure and development classifications provided within the mapping is based on the PPG Flood Risk Vulnerability Classification.

Site access / egress

This section provides recommendations on where safe access and egress routes should be placed on site. This information is informed by the site-specific flood risk assessment and the Developable Site

Area map produced for the site. It is vital that that developers provide safe access and egress from their developments during times of fluvial and / or tidal flood.

Potential mitigation measures

This section lists potential mitigation measures which could be used to alleviate the risk of flooding to any potential development at the site. It provides site-specific recommendations to alleviate the risk of flooding for specific flood sources. The information provided should be used in conjunction with the guidance provided in Section 4 of the Level 1 SFRA.

Site specific flood risk assessment requirements

This section provides site-specific FRA requirements for prospective developers. These tailored requirements are informed by the site-specific flood risk assessment and the Developable Site Area map. They are produced in line with the PPG Site-Specific FRA guidance and EA's FRA for Planning Application guidance.

Planning considerations

The final section of the pro forma provides further planning considerations recommended for potential developments. These considerations are centred around four questions:

- Will development increase flood risk elsewhere?
- How can development reduce flood risk overall?
- How can the development be made safe?
- Is there a reasonable prospect of compliance with flood risk aspects of the Exception Test?

3.2 Data sources

Risk assessments for each site were completed by conducting detailed reviews of potential flood risk impacts using data from the Environment Agency, Ordnance Survey, Thames Water and the London Borough of Hounslow. Information on the sources, uses and limitations of each dataset are found in *Appendix A*. Borough-wide flood risk maps displaying sewer, groundwater and artificial (reservoir) risk are found in *Appendix B*.

3.3 Developable site area

The developable site area outputs for each site are based on fluvial, tidal and surface water flood risk. An analysis was conducted using the best available flood risk data for the Hounslow area. To produce the developable site area maps, the following Level 1 SFRA defined Flood Zones were analysed and assigned the developable area bandings listed below:

- Flood Zone 3b (fluvial / tidal) and / or the 1 in 30 year RoFSW extent – Very High Risk Area
- Flood Zone 3a (fluvial / tidal and surface water) – High Risk Area

- Flood Zone 2 (fluvial / tidal) – Moderate Risk Area
- Area outside of the flood risk extents listed above – Low Risk Area.

Sites are required to follow the guidance as provided in Section 4 of the Level 1 SFRA, as well as the tailored guidance provided for each site as part of the Level 2 site assessments (See *Appendix C*)

APPENDICES

Appendix A – Data used for site assessments

Appendix B – Borough-wide flood risk maps (sewer, groundwater and artificial flood risk)

Appendix C – Site assessments

Appendix A – Data used for site assessments

Dataset	Source	Use	Limitations
Ordnance Survey base maps	Ordnance Survey Open Data	Fluvial Flood Risk (Flood Zones) Maps; Flood Outline (Fluvial 100 year) Maps; Surface Water Flood Risk (Depth) Maps; Surface Water Flood Risk (Hazard) Maps	No known limitations.
Borough boundaries	Ordnance Survey Open Data	Fluvial Flood Risk (Flood Zones) Maps; Flood Outline (Fluvial 100 year) Maps; Surface Water Flood Risk (Depth) Maps; Surface Water Flood Risk (Hazard) Maps	No known limitations.
Hounslow site allocations	Local Plan 2015	Fluvial Flood Risk (Flood Zones) Maps; Flood Outline (Fluvial 100 year) Maps; Surface Water Flood Risk (Depth) Maps; Surface Water Flood Risk (Hazard) Maps	No known limitations.
Detailed river network (including Main Rivers and ordinary watercourses)	Environment Agency 2012	Fluvial Flood Risk (Flood Zones) Maps; Flood Outline (Fluvial 100 year) Maps; Surface Water Flood Risk (Depth) Maps; Surface Water Flood Risk (Hazard) Maps	This is captured from the water features theme of the OS MasterMap topographic layer and built into a network using automated rules. Other input datasets and extensive local Environment Agency staff knowledge has been used to augment the core geometry to incorporate critical spatial detail and attribution, such as flow direction and path, not available from the OS mapping and to verify the accuracy of the centreline itself.
National flood defences	Environment Agency 2017	Fluvial Flood Risk (Flood Zones) Maps; Flood Outline (Fluvial 100 year) Maps	This layer and documentation covers Spatial Flood Defences. It shows linear defences that act to prevent flood water from flowing inland. These can be man-made embankments and walls but also naturally occurring processes such as shingle ridges and dunes. All man-made defences will have a design level and/or a standard of protection. Some areas that already benefit from recently completed flood defences may not yet be indicated on these maps. The EA have assumed that flood defences act perfectly and give the same level of protection as when the assessment of the area was carried out. Flood defences do not completely remove the chance of flooding and can be overtopped or fail in extreme weather conditions.
Areas benefitting from flood defences	Environment Agency 2017	Fluvial Flood Risk (Flood Zones) Maps	It shows those areas that would benefit from the presence of defences in a 1 in 100 (1%) chance of flooding each year from Rivers; or 1 in 200 (0.5 %) chance of flooding each year from the Sea. If the defences were not there,

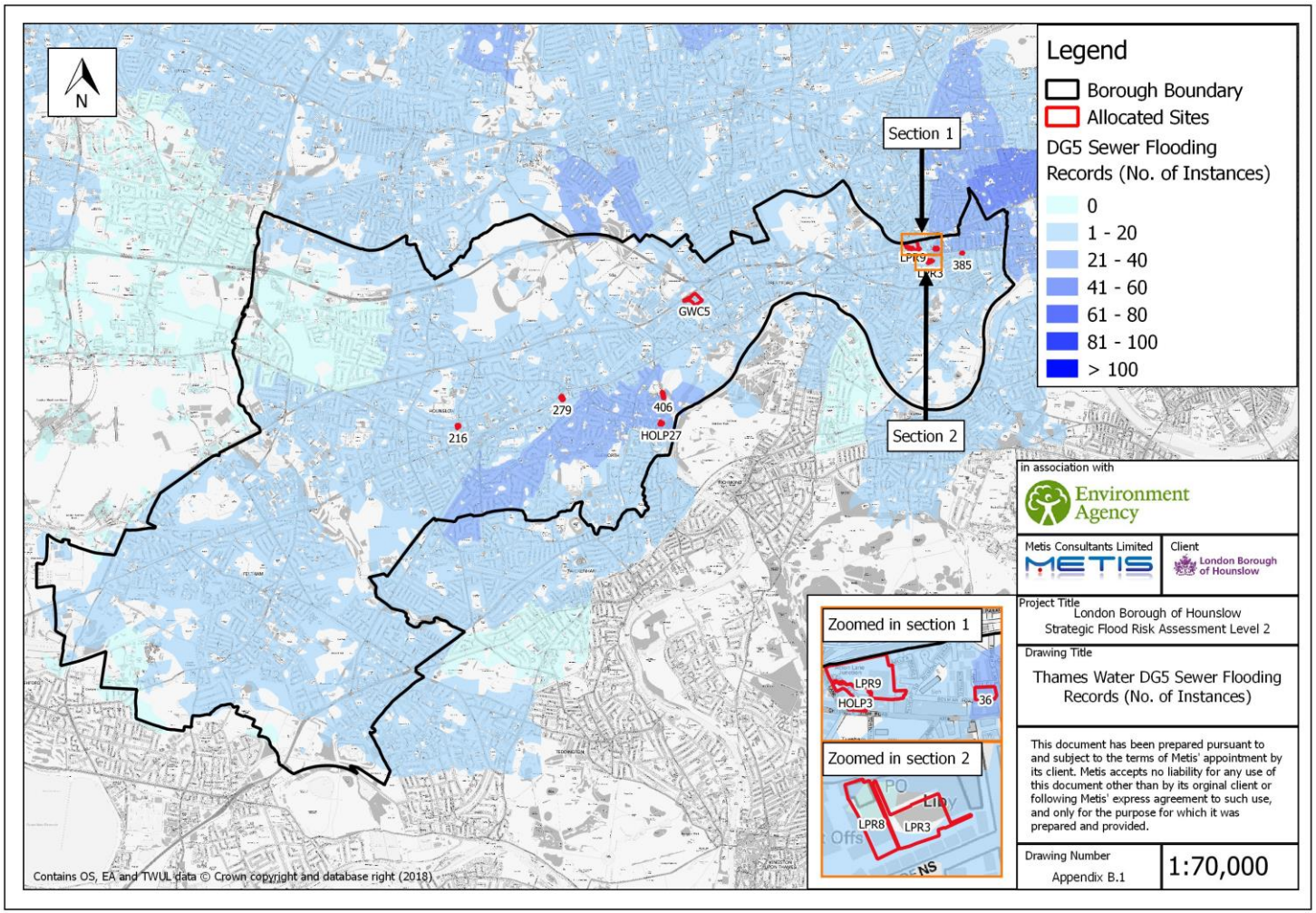
Dataset	Source	Use	Limitations
			these areas would flood. Note that this does not show all areas that benefit from all flood defences and it is assumed that flood defences and other operating structures act perfectly and give the same level of protection as when the assessment of the area was made. The information provided is largely based on modelled data and is therefore indicative rather than specific. Locations may also be at risk from other sources of flooding, such as high groundwater levels, overland run off from heavy rain, or failure of infrastructure such as sewers and storm drains
Thames tidal breach inundation mapping	Environment Agency 2017	Flood Outline (Fluvial 100 year) Maps	The map provides a maximum likely flood extent that would be achieved if an individual breach of the Thames Tidal Defence line was to occur at any point between Teddington Weir and the Thames Barrier. This has been undertaken for the 2005, 2065 and 2100 epochs.
River Brent model data	Environment Agency 2014	Flood Outline (Fluvial 100 year) Maps	This dataset shows the 1 in 100 year and 1 in 100 year plus climate change flood extents for the River Brent. This dataset is an EA model output that factors in national flood defences to provide predicted flood extents.
River Crane model data	Environment Agency 2008	Flood Outline (Fluvial 100 year) Maps	This dataset shows the 1 in 100 year and 1 in 100 year plus climate change flood extents for the River Crane. This dataset is an EA model output that factors in national flood defences to provide predicted flood extents.
Risk of Flooding from Surface Water Depth: 1 in 100 year event	Environment Agency 2017	Surface Water Flood Risk (Depth) Maps	This dataset shows the maximum depth of flooding from surface water that could result from a flood with a 1% chance of happening in any given year. The flood depth is grouped into 6 bands. NB: the maximum depth may not happen at the same time as the maximum speed of flow. This dataset is one output of our Risk of Flooding from Surface Water (RoFSW) mapping. It is not suitable to be used: • To identify if an individual property will or will not flood. • On a map with background mapping more detailed than 1:10,000. As the sole evidence for any specific planning or regulatory decision or assessment of risk in relation to flooding at any scale without further supporting studies or evidence.
Risk of Flooding from Surface Water Hazard: 1 in 100 year event	Environment Agency 2017	Surface Water Flood Risk (Hazard) Maps	This dataset shows the flood hazard rating for flooding from surface water that could result from a flood with a 1% chance of happening in any given year. The flood hazard rating is defined as a function of simultaneous depth and velocity and grouped into 4 bands. This dataset is one output of our Risk of Flooding from Surface Water (RoFSW) mapping. It is not suitable to be used: • To identify if an individual property will or will not flood. • On a map with background mapping more detailed than 1:10,000. • As the sole evidence for any specific planning or regulatory decision or assessment of risk in relation to flooding at any scale without further supporting studies or evidence.
Flood Zone 3b fluvial and tidal	Environment Agency fluvial/tidal model outputs	Fluvial Flood Risk (Flood Zones) Maps	1 in 20 year fluvial and 1 in 20 year tidal flood extents.

Dataset	Source	Use	Limitations
Flood Zone 3a fluvial and tidal	Environment Agency fluvial/tidal model outputs	Fluvial Flood Risk (Flood Zones) Maps	1 in 100 year fluvial and 1 in 200 year tidal flood extents.
Flood Zone 2	Environment Agency 2017	Fluvial Flood Risk (Flood Zones) Maps	Land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year.
Risk of flooding from surface water: 1 in 30 / 100 / 1000 year event	Environment Agency 2017	Used for site assessment purposes only	This mapping consists of the flood extent and depth of rainfall scenarios with a 3.3% (1 in 30), 1% (1 in 100) and 0.1% (1 in 1000) chance of occurring in any given year: It is not suitable to be used: • to identify if an individual property will or will not flood. • in detailed flood risk assessments. • on a map with background mapping more detailed than 1:10,000. It does not: • show future scenarios, for example climate change. • show flooding from other sources, including overflowing watercourses, drainage systems or public sewers, river flow, groundwater or the sea. • include the presence or effect of pumping stations in catchments with pumped drainage. • include any allowance for tide locking, high levels or fluvial levels where sewers cannot discharge. This means that where these elements play a role in the way flooding happens, this information may not show what actually happens locally.
Flood Zone 3a – surface water	Environment Agency 2017	Used for site assessment purposes only	This mapping consists of the surface water flood extent with a 1% (1 in 100) chance of occurring in any given year: It is not suitable to be used: • to identify if an individual property will or will not flood. • in detailed flood risk assessments. • on a map with background mapping more detailed than 1:10,000. It does not: • show future scenarios, for example climate change. • show flooding from other sources, including overflowing watercourses, drainage systems or public sewers, river flow, groundwater or the sea. • include the presence or effect of pumping stations in catchments with pumped drainage. • include any allowance for tide locking, high levels or fluvial levels where sewers cannot discharge. This means that where these elements play a role in the way flooding happens, this information may not show what actually happens locally.
Susceptibility to groundwater flooding	Environment Agency 2017	Used for site assessment purposes only	Areas Susceptible to Groundwater Flooding is a strategic scale map showing groundwater flood areas on a 1km square grid.

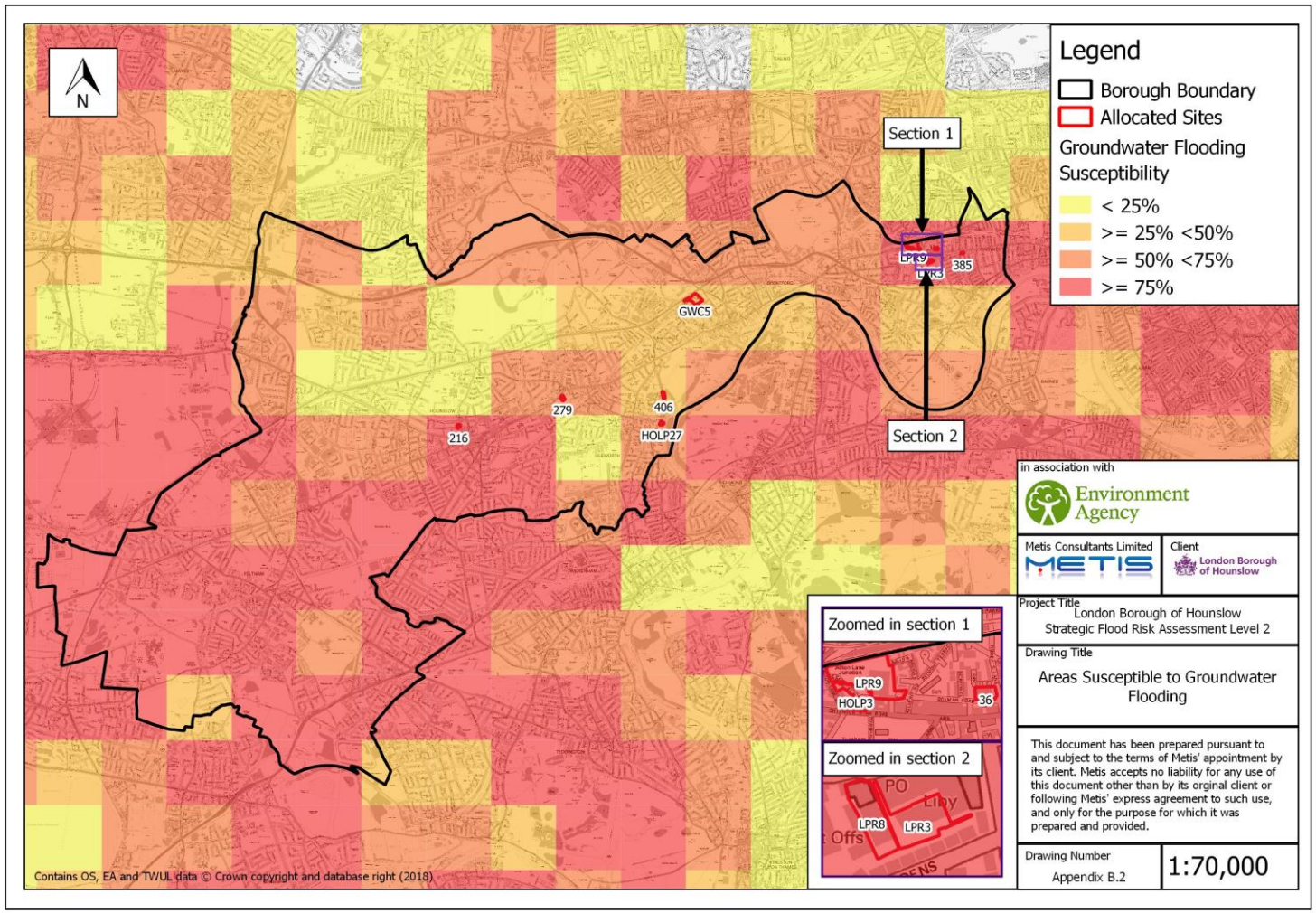
Dataset	Source	Use	Limitations
			It shows the proportion of each 1km grid square where geological and hydrogeological conditions show that groundwater might emerge. It does not show the likelihood of groundwater flooding occurring. The data should not be interpreted as identifying areas where groundwater is actually likely to flow or pond, thus causing flooding.
Geology of Britain (Surface Geology**)**	British Geological Survey	Used for site assessment purposes only	The surface geology map provides superficial and bedrock geology information. The data is based on 1:50 000 and 1:63 360 scale maps. The data set covers most of Great Britain, providing a detailed description of geology on a local to regional level. Lithostratigraphic nomenclature is updated to current usage.
Director General 5 (DG5) Sewer flooding records (No. of instances)	Thames Water 2017	Used for site assessment purposes only	This data shows where Thames Water have received reports of sewer flooding.
Risk of flooding from reservoirs	Environment Agency 2017	Used for site assessment purposes only	The Reservoir Flood Map Outline (extent) shows the largest area that might be flooded if a reservoir were to fail and release the water it holds. Since this is a prediction of a credible worst-case scenario, it's unlikely that any actual flood would be this large. These data are intended for emergency planning only and are not reliable for large scale flood risk assessments. Please note that only flood maps for large reservoirs are displayed. Flood maps are not displayed for smaller reservoirs or for reservoirs commissioned after reservoir mapping began in spring 2009.

Appendix B – Borough-wide flood risk maps

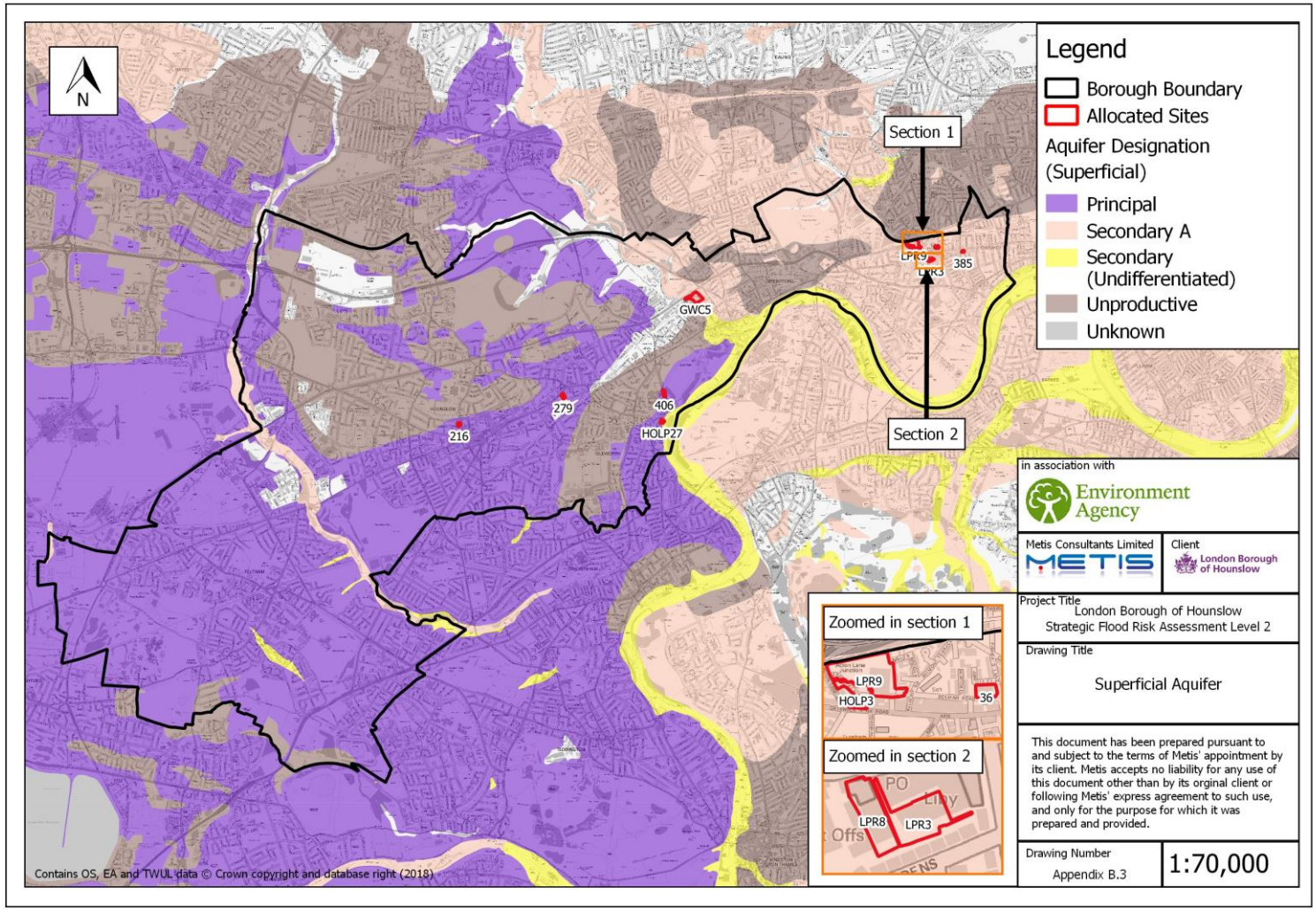
Appendix B.1 – Thames Water DG5 Sewer Flooding Records (No. of Instances)



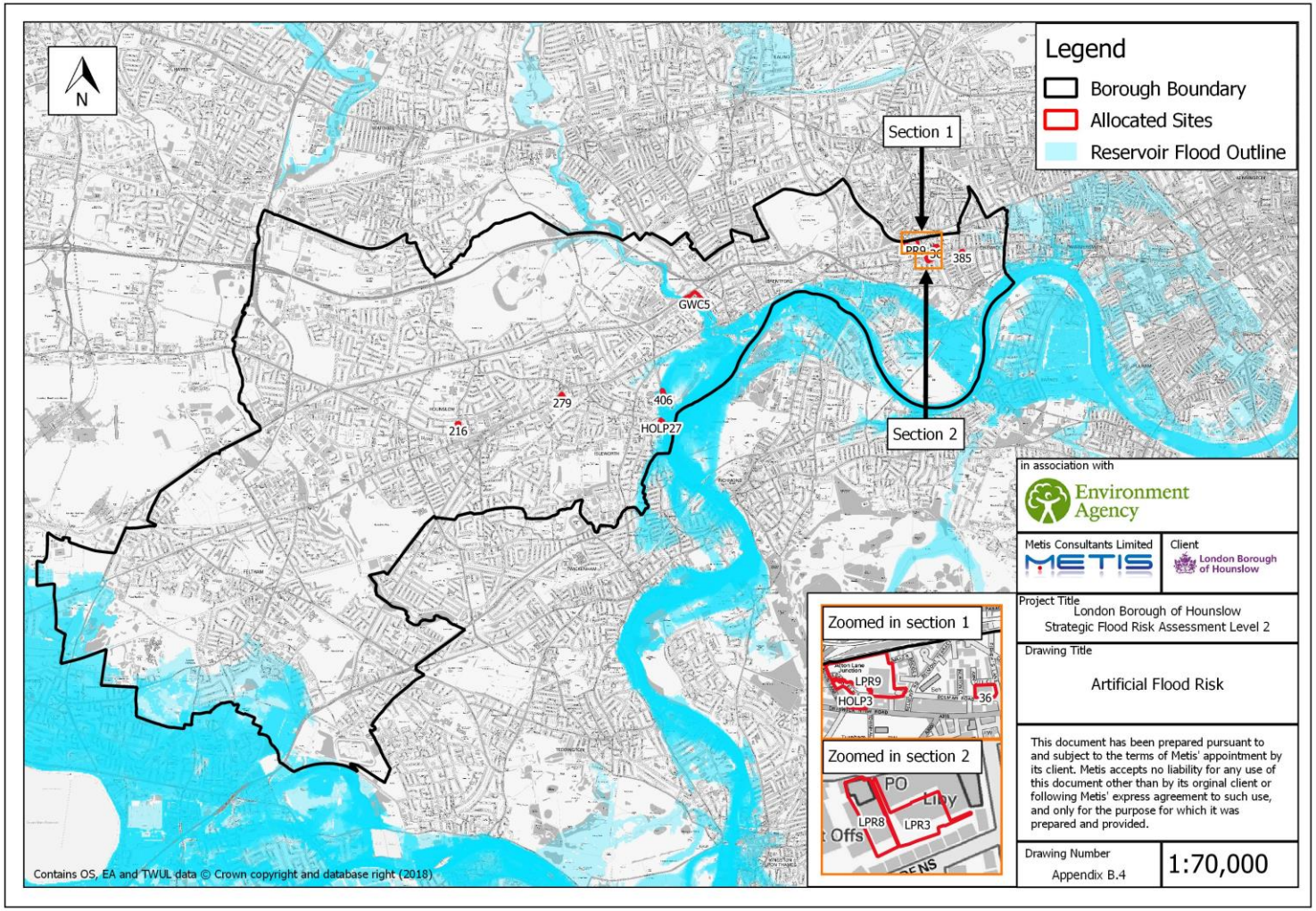
Appendix B.2 – Areas Susceptible to Groundwater Flooding



Appendix B.3 – Superficial Aquifer Designation



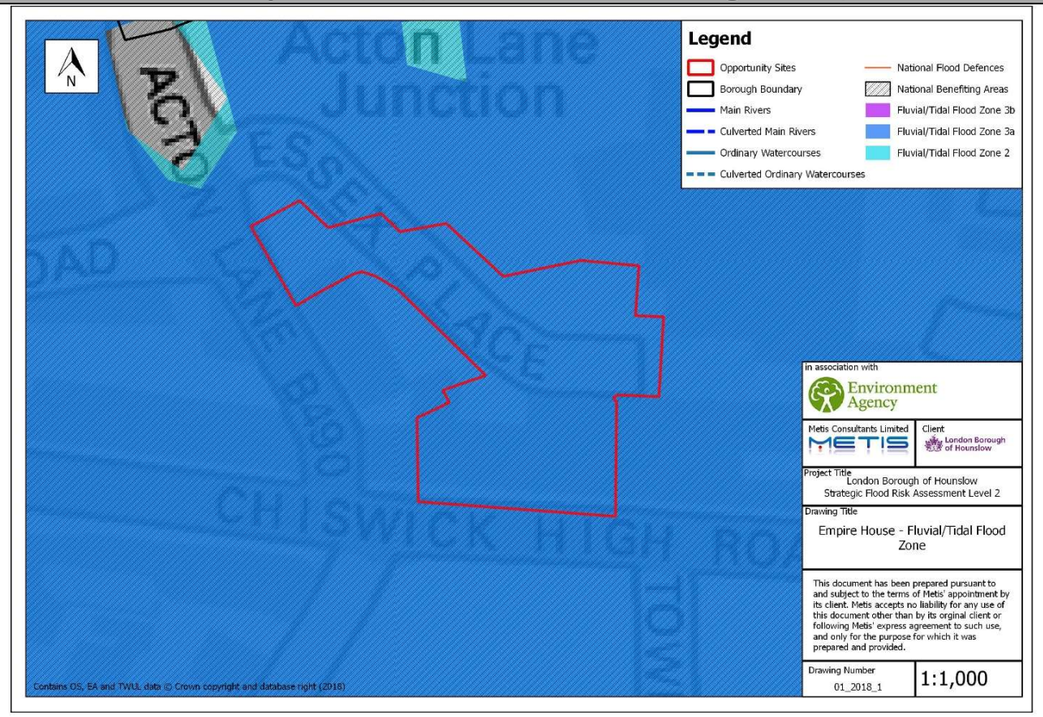
Appendix B.4 – Artificial Flood Risk

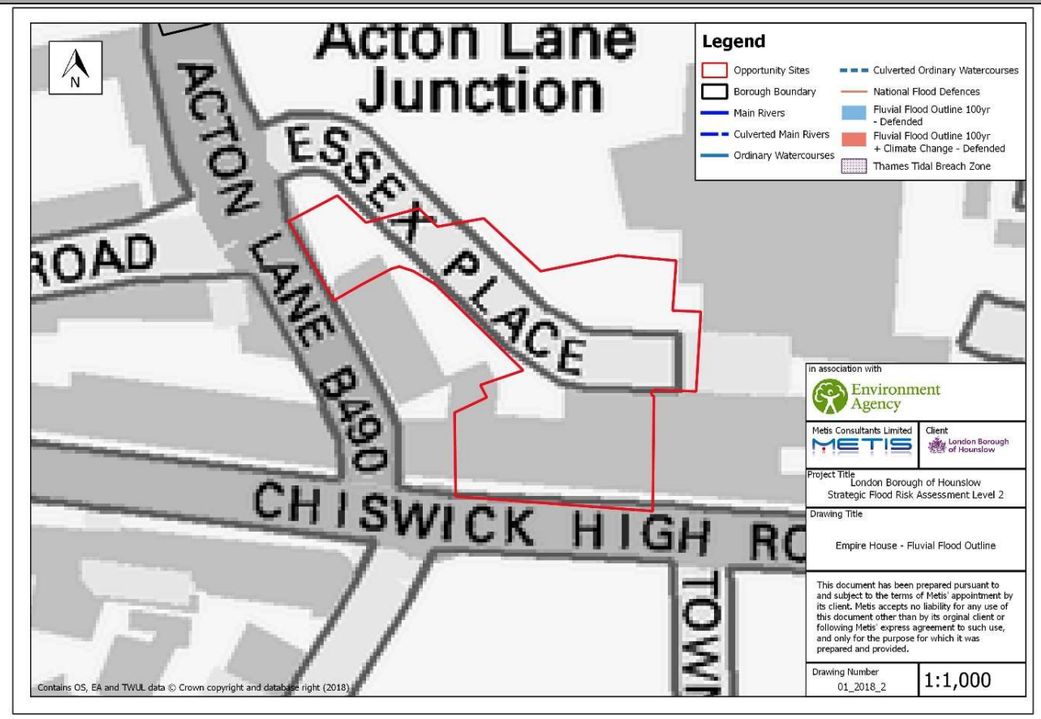


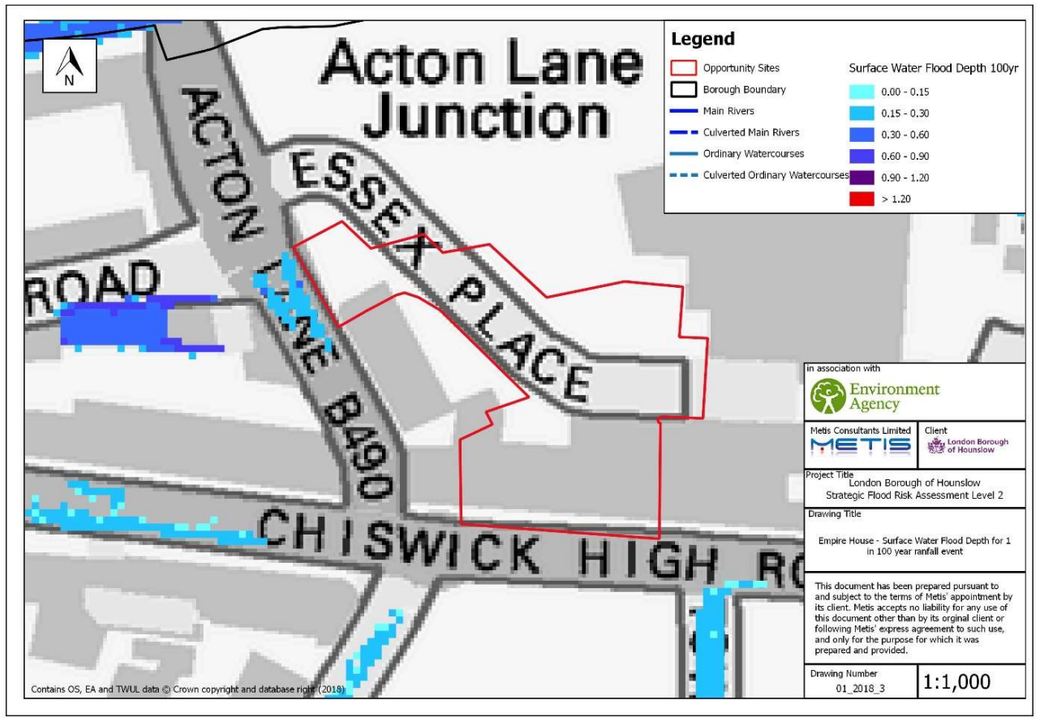
Appendix C – Site assessments

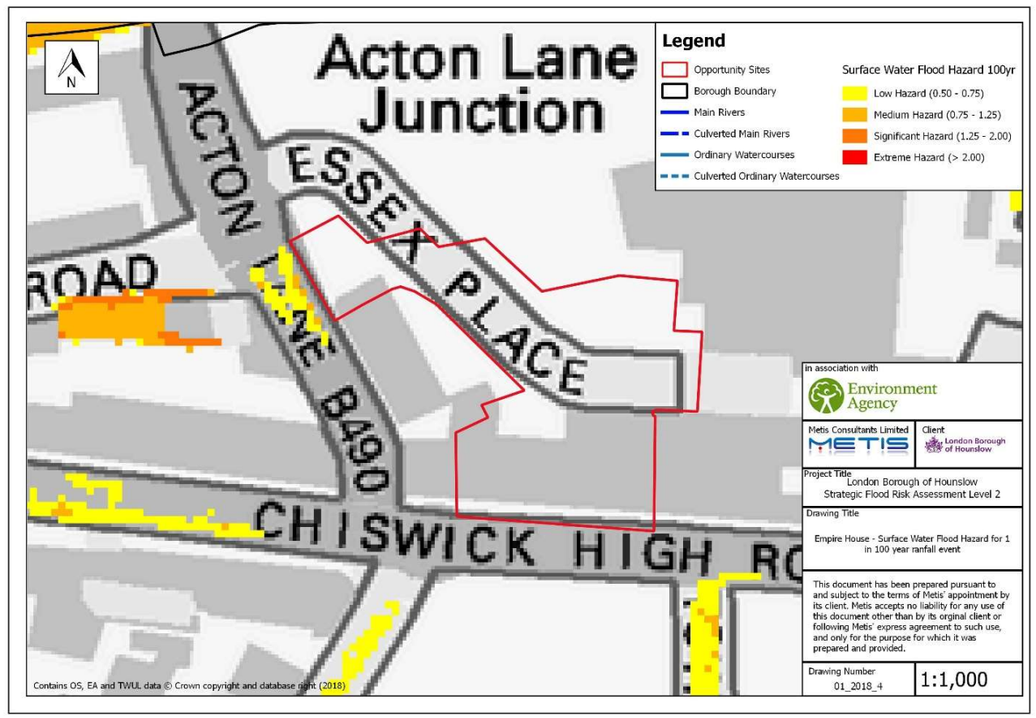
Site Assessment – Empire House, 408-418 Chiswick High Road, W4 5LY

Site ID: 1









Site Assessment – Empire House, 408-418 Chiswick High Road, W4 5LY

Site ID: 1

Site area:	0.5ha
Existing use / vulnerability:	Commercial units and associated car parking / Less vulnerable
Proposed use / vulnerability:	Mixed Use / Essential infrastructure/Highly vulnerable/More vulnerable/Less vulnerable/Water Compatible
Geology:	Kempton Park Gravel Member underlain by London Clay

Risk Assessment:

Fluvial / Tidal

The River Thames (EA Main River) is located approximately 1.3km to the south west of the site at its closest point. The site lies wholly within defended Flood Zone 3a. The site is protected by the Thames Barrier and there is a residual risk associated with tidal flooding. There is low risk from fluvial flooding.

Surface Water + Sewers

Risk of surface water flooding is very low on the site. Roads surrounding the site are at low to medium risk of surface water flooding. There have been 17 incidents of sewer flooding within the postcode area (see Appendix B).

Groundwater

The site is underlain by superficial deposits of Kempton Park Gravel Member and a superficial aquifer. It is also shown to have a high susceptibility to groundwater flooding (see Appendix B). There is a high risk of flooding to the site from the superficial deposits.

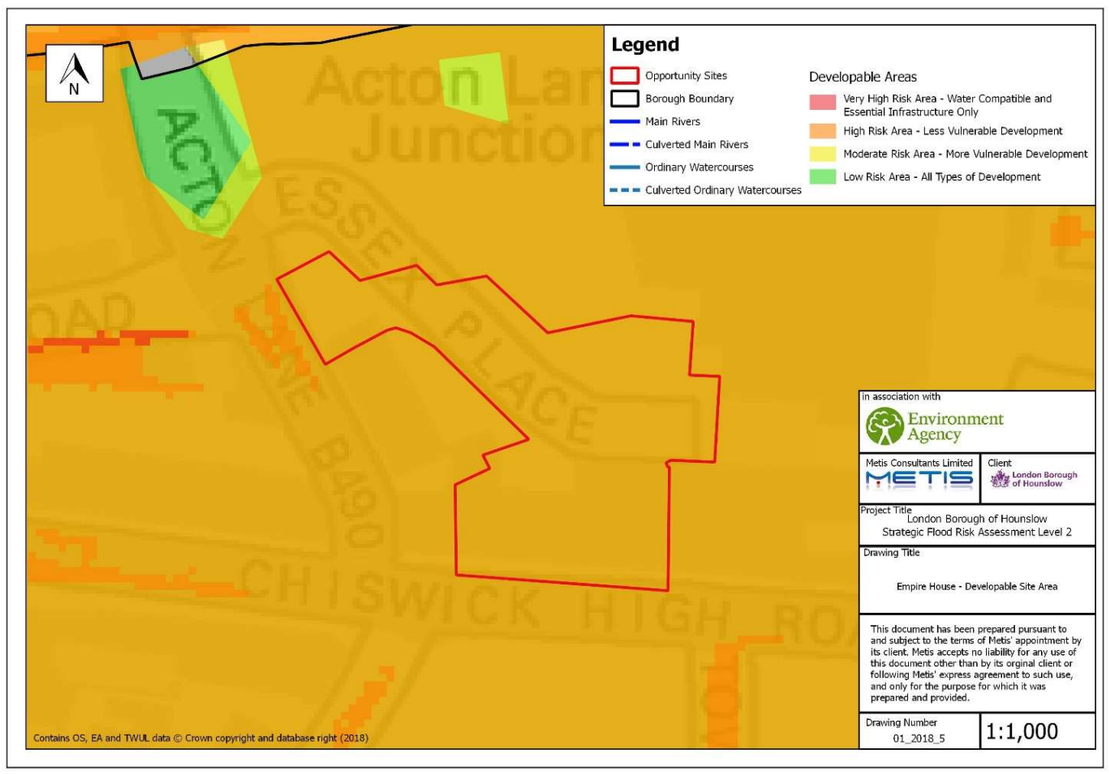
Artificial

The site is at low risk of flooding from artificial sources. There are no reservoirs or other artificial water bodies close to the site.

Climate Change

It is likely that the risk of flooding to the site from fluvial and tidal sources and surface water will increase with climate change.

Developable Site Area



Site Access / Egress:

The entire site is at risk of tidal flooding. Access/egress routes should be located above the predicted flood level. Safe refuge should also be provided at higher levels within the development.

Potential Mitigation Measures:

Fluvial / Tidal

The development should be designed so that site users have safe access / egress routes in the event of a flood. Buildings should be situated above the flood level and constructed using flood resistant and / or resilient techniques. Site users should register with the Environment Agency's Flood Warning Service and be made aware of the site evacuation route / safe refuge location.

Surface Water + Sewers

SuDS measures should be applied on site to firstly minimise the amount of runoff, then attenuate the maximum practical volume of surface water onsite. Site ground conditions should be tested to determine the potential for disposal of surface water via infiltration. Any connections to the public sewer should be done so with consultation and permission from the infrastructure owner (in this case, Thames Water Utilities Ltd).

Groundwater

No basement levels should be developed on this site.

Artificial

No mitigation measures required (site is at low risk of flooding from artificial sources).

Site Specific FRA Requirements

1. Finished floor levels must be situated above the 1% (100 year) predicted maximum tidal flood level plus climate change with a 600mm allowance for freeboard or 300mm above the general ground level of the site – whichever is highest.
2. A site specific Flood Evacuation Plan must demonstrate that the site can be used safely for its lifetime.
3. SuDS must be integrated within the site masterplan to maximise runoff reduction and surface water attenuation as much as reasonably practicable.
4. An overall drainage strategy must demonstrate how greenfield (as a minimum) or lower than greenfield (preferred) runoff can be achieved. This is in line with the London Plan and the Hounslow Local Plan 2015-2030. If this is not reasonably practicable, then this must be clearly explained and justified.
5. The FRA must demonstrate that surface water and fluvial flooding can be managed on site with no increase in flood risk to others.

Planning Considerations

Will development increase flood risk elsewhere?

The site has the potential to be developed without increasing flood risk to others. As the site lies wholly within Flood Zone 3a this may require flood plain compensation and a thorough surface water management strategy integrated within the site masterplan.

How can development reduce flood risk overall?

It is recommended that the development proposals achieve greenfield runoff rates in line with the London Plan and Hounslow Local Plan 2015-2030. This would reduce surface water runoff and potential risk to others compared to the existing development.

How can the development be made safe?

A possible safe fluvial flooding access / egress route is available from the northern boundary of the site. This should be confirmed through a site-specific Flood Evacuation Plan. It is recommended that all finished floor levels are set above predicted flood levels (refer above for details).

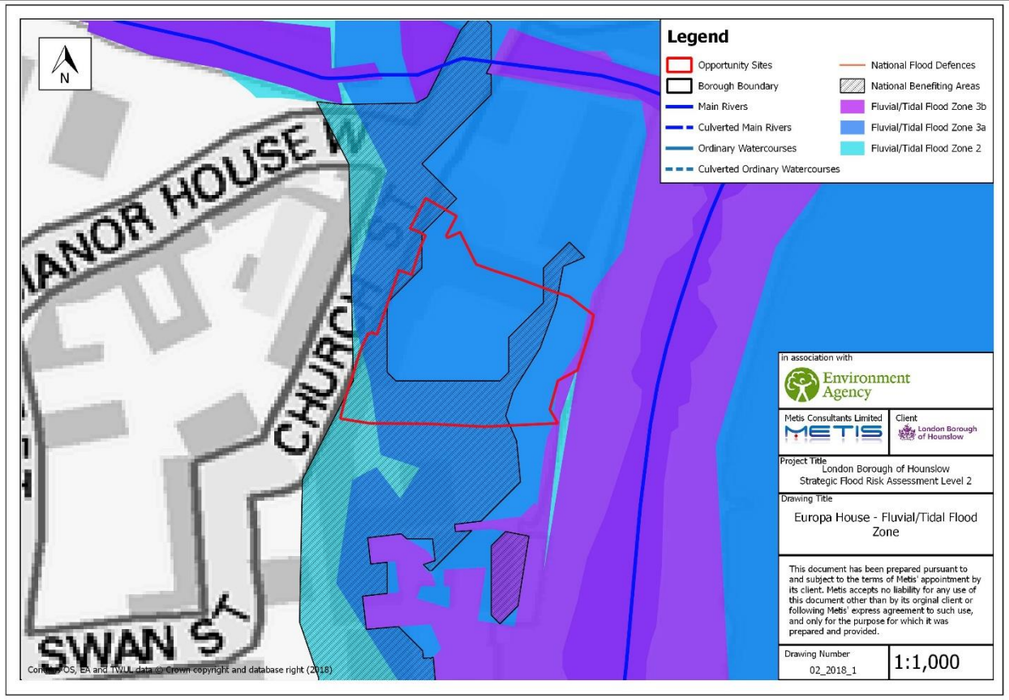
Is there a reasonable prospect of compliance with flood risk aspects of the Exception Test?

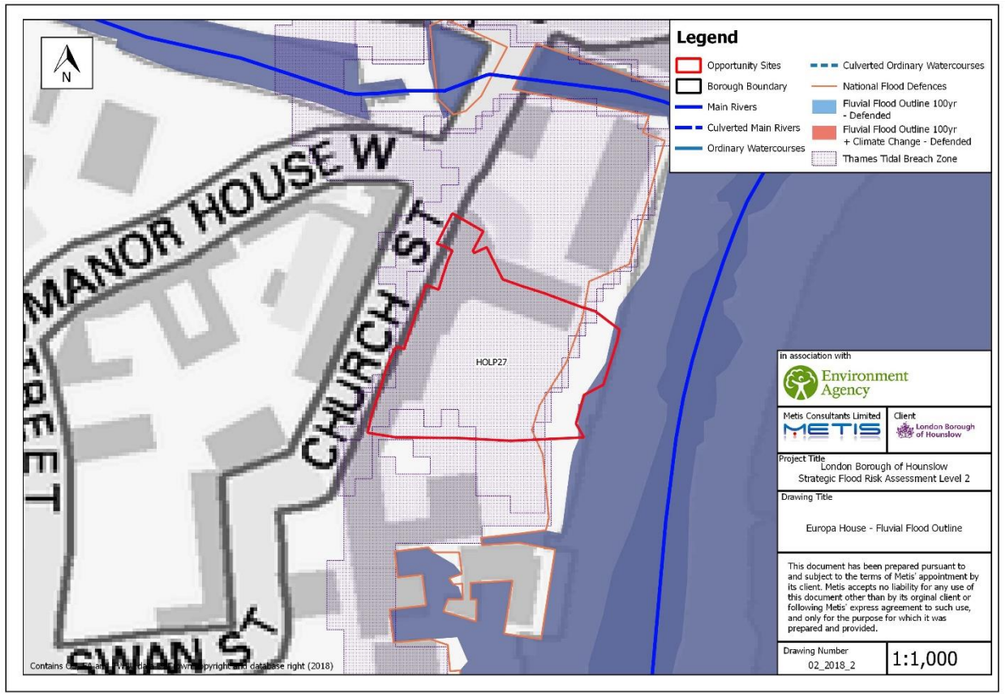
There is a reasonable prospect of compliance with the Exception Test. This can be achieved by:

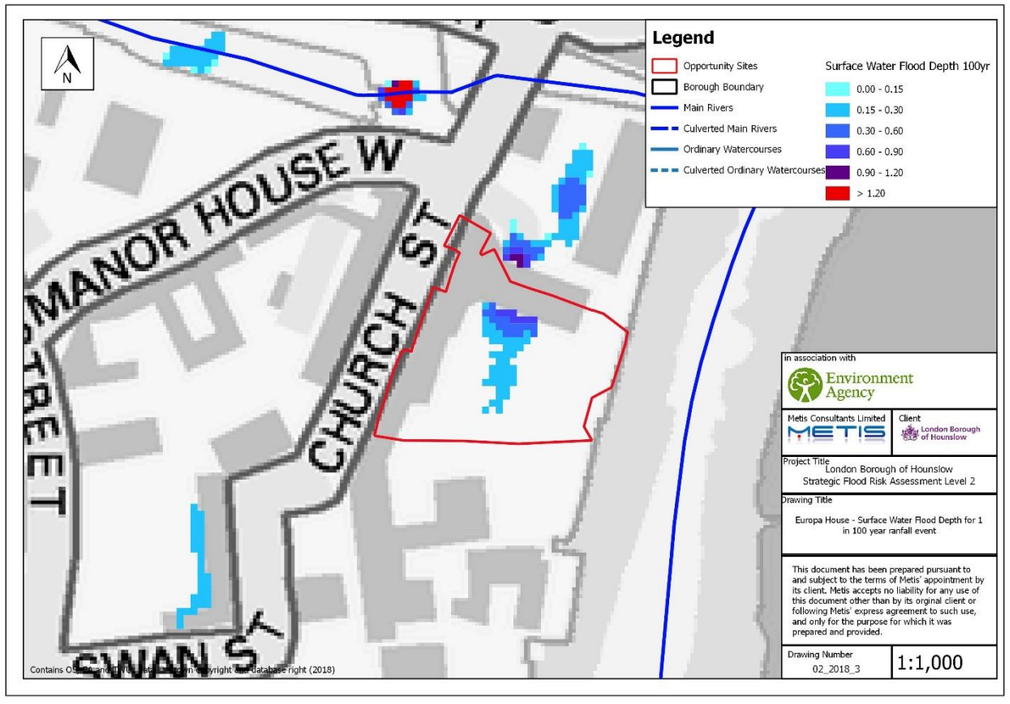
- Demonstrating evidence of the wider sustainability benefits of the site through a Sustainability Appraisal.
- Raising finished floor levels (FFLs) to 600mm above the 1% (100 year) predicted maximum tidal flood level plus climate change or 300mm above the general ground level of the site (whichever is highest).
- Implementing flood resistant or resilient features.
- Incorporating SuDS into the site design.
- The production of a Flood Evacuation Plan and the signing up of site users to Flood Alerts and Flood Warnings.
- Leaving space in developments for flood risk management infrastructure to be maintained and enhanced for the lifetime of the development.

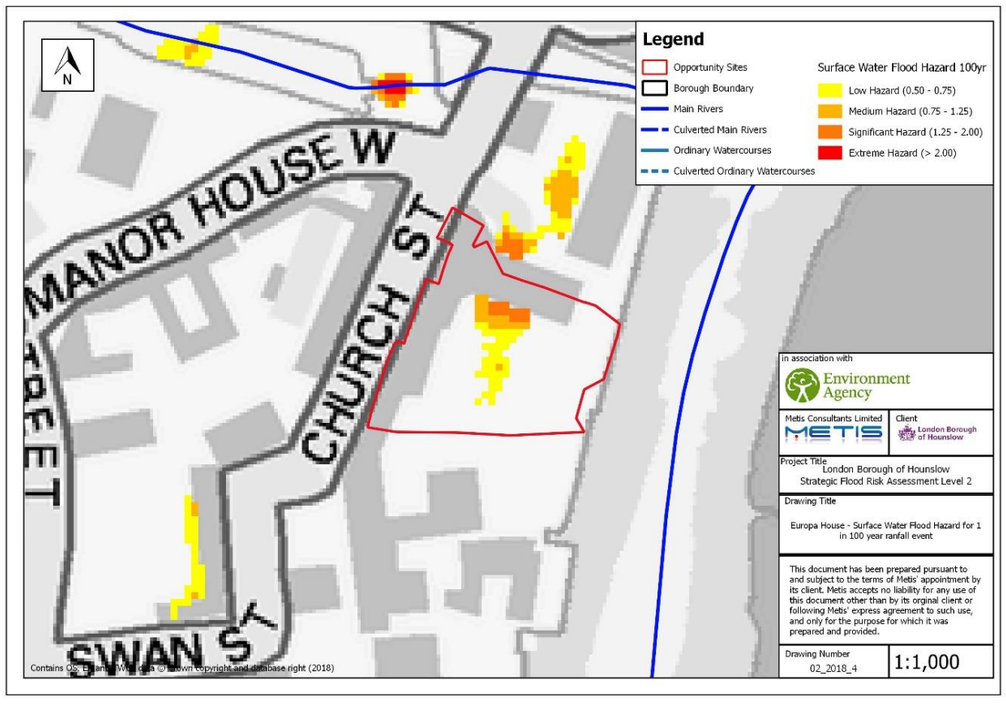
Site Assessment – Europa House, Church Street, Isleworth, TW7 6DA

Site ID: 2









Site Assessment – Europa House, Church Street, Isleworth, TW7 6DA

Site ID: 2

Site area:	0.3ha
Existing use / vulnerability:	Office building with associated car parking / Less vulnerable
Proposed use / vulnerability:	Mixed Use / Essential infrastructure/Highly vulnerable/More vulnerable/Less vulnerable/Water Compatible
Geology:	Kempton Park Gravel Member underlain by London Clay

Risk Assessment:

Fluvial / Tidal

The River Thames is located adjacent to the site's western boundary and the Duke of Northumberland's River is located approximately 50m to the north of the site. The majority of the site is within Flood Zone 3a with the south west corner in Flood Zone 2 and the eastern site boundary in Flood Zone 3b. The site is only partially protected by the Thames Barrier and there is a risk of fluvial and tidal flooding to the site.

Surface Water + Sewers

The centre of the site is at medium to high risk of surface water flooding. Land close to the site's northern boundary is also at medium to high risk of surface water flooding. There have been 27 incidents of sewer flooding within the postcode area (see Appendix B).

Groundwater

The site is underlain by superficial deposits of Kempton Park Gravel Member and a superficial aquifer. It is also shown to have a high susceptibility to groundwater flooding (see Appendix B). There is a high risk of flooding to the site from the superficial deposits.

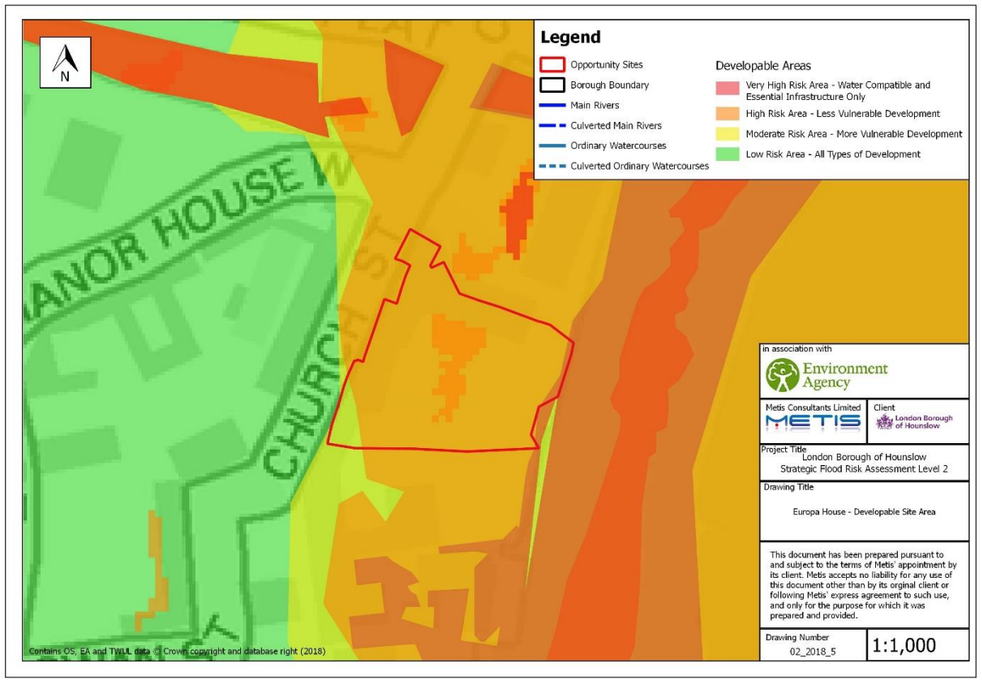
Artificial

The site is at risk of flooding from artificial sources.

Climate Change

It is likely that the risk of flooding to the site from fluvial, tidal and surface water flooding will increase with climate change.

Developable Site Area



Site Access / Egress:

The entire site is at risk of fluvial and tidal flooding. Access/egress routes should be located above the flood level and directed onto Church Street to the west. Safe refuge should also be provided at higher levels within the development.

Potential Mitigation Measures:

Fluvial / Tidal

The development should be designed so that users have safe access / egress routes in the event of a flood. Buildings should be situated above the flood level and constructed using flood resistant and / or resilient techniques. Development should be directed towards the western half of the site where flood depths are likely to be lower and rapid inundation is less likely. Site users should register with the Environment Agency's Flood Warning service and be made aware of the site evacuation routes / safe refuge locations.

Surface Water + Sewers

Although only a small part of the site is at risk of flooding from surface water, the development of the site may cause a change in the localised topography and increase the surface water flood risk. SuDS measures should be applied on site to firstly minimise the amount of runoff, then attenuate the maximum practical volume of surface water onsite. Site ground conditions should be tested to determine the potential for disposal of surface water via infiltration. Any connections to the public sewer should be done so with consultation and permission from the infrastructure owner (in this case, Thames Water Utilities Ltd).

Groundwater

No basement levels should be developed on this site.

Artificial

Site users should register with the Environment Agency's Flood Warning service and be made aware of the site evacuation routes / safe refuge locations. Site users should be made aware of the site's location within the breach zone.

Site Specific FRA Requirements

1. Finished floor levels must be situated above the 1% (100 year) predicted maximum fluvial / tidal flood level plus climate change with a 600mm allowance for freeboard or 300mm above the general ground level of the site – whichever is highest.
2. Only water compatible development should be made in the Flood Zone 3b area.
3. A site specific Flood Evacuation Plan must demonstrate that the site can be used safely for its lifetime.
4. SuDS must be integrated within the site masterplan to maximise runoff reduction and surface water attenuation as much as reasonably practicable.
5. An overall drainage strategy must demonstrate how greenfield (as a minimum) or lower than greenfield (preferred) runoff can be achieved. This is in line with the London Plan and the Hounslow Local Plan 2015-2030. If this is not reasonably practicable, then this must be clearly explained and justified.
6. The FRA must demonstrate that surface water, tidal and fluvial flooding can be managed on site with no increase in flood risk to others.

Planning Considerations

Will development increase flood risk elsewhere?

The site has the potential to be developed without increasing flood risk to others. This may require flood plain compensation for any development in the Flood Zone 2 / 3a areas and a surface water management strategy integrated within the site masterplan.

How can development reduce flood risk overall?

It is recommended that the development proposals achieve greenfield runoff rates in line with the London Plan and Hounslow Local Plan 2015-2030. This would reduce surface water runoff and potential risk to others compared to the existing development.

How can the development be made safe?

A possible safe flooding access / egress route is available from the south west boundary of the site. This should be confirmed through a site-specific Flood Evacuation Plan. It is recommended that all finished floor levels are set above predicted flood levels (refer above for details).

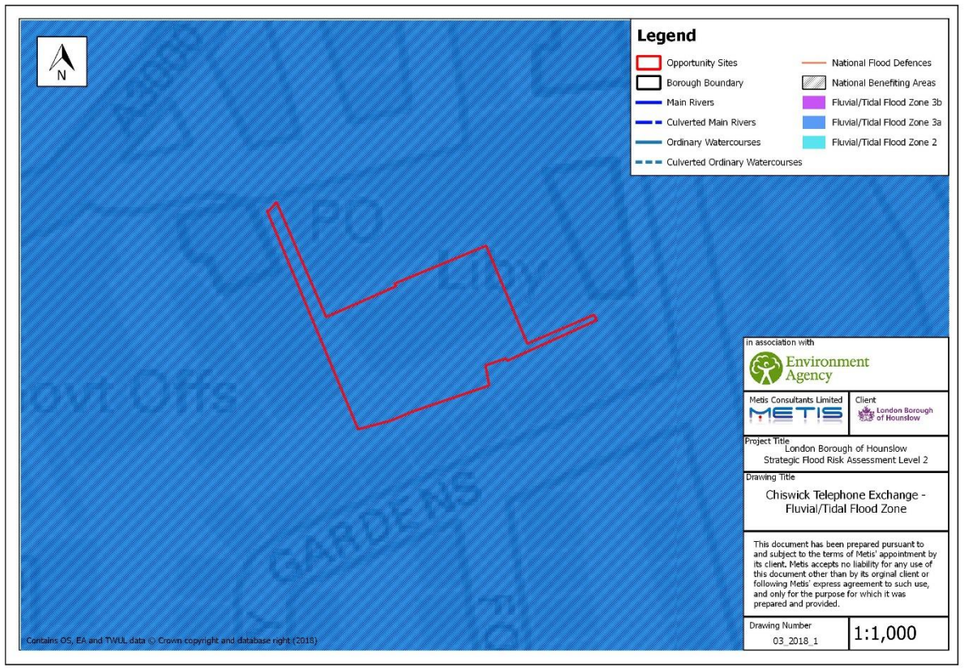
Is there a reasonable prospect of compliance with flood risk aspects of the Exception Test?

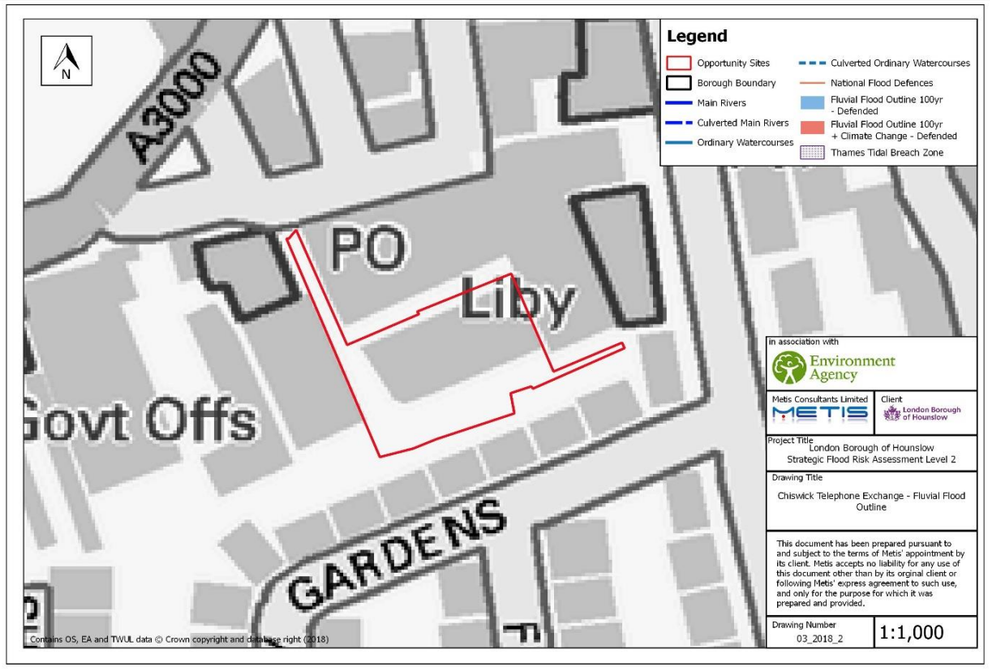
There is a reasonable prospect of compliance with the Exception Test. This can be achieved by:

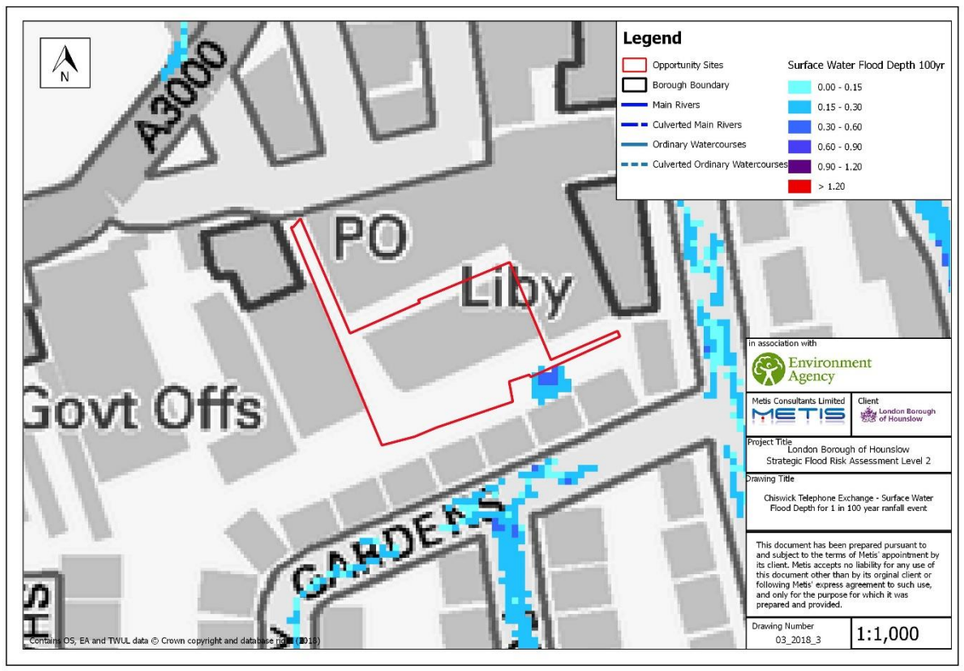
- Demonstrating evidence of the wider sustainability benefits of the site in a Sustainability Appraisal.
- Raising finished floor levels (FFLs) to 600mm above the 1% (100 year) predicted maximum fluvial / tidal flood level plus climate change or 300mm above the general ground level of the site (whichever is highest).
- Implementing flood resistant or resilient features.
- Incorporating SuDS into the site design.
- The production of a Flood Evacuation Plan and the signing up of site users to Flood Alerts and Flood Warnings.
- Leaving space in developments for flood risk management infrastructure to be maintained and enhanced for the lifetime of the development.

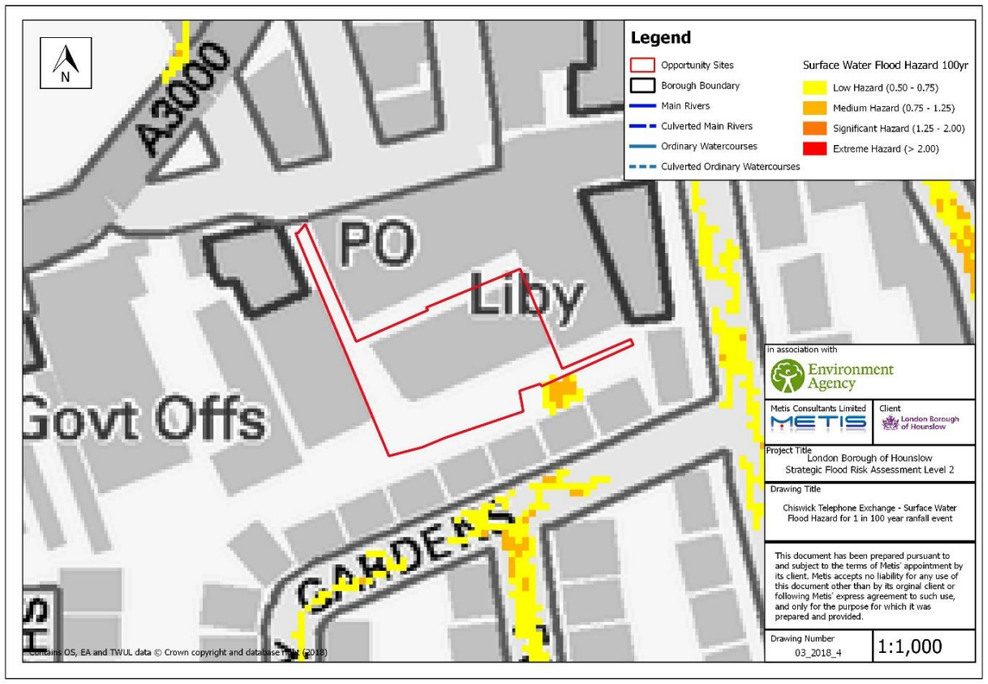
Site Assessment – Chiswick Telephone Exchange, Barley Mow Passage, Chiswick, W4 4PH

Site ID: 3









Site Assessment – Chiswick Telephone Exchange, Barley Mow Passage, Chiswick, W4 4PH

Site ID: 3

Site area:	0.2ha
Existing use / vulnerability:	Commercial units / Less vulnerable
Proposed use / vulnerability:	Residential / More vulnerable
Geology:	Kempton Park Gravel Member underlain by London Clay

Risk Assessment:

Fluvial / Tidal

The River Thames is located approximately 1.1km to the south east of the site. The lies wholly within Flood Zone 3a. The site is protected by the Thames Barrier and there is a residual risk associated with tidal flooding. There is low risk from fluvial flooding.

Surface Water + Sewers

Risk of surface water flooding is very low on the site, with a small area just outside the southern boundary at medium to high risk. Roads surrounding the site are at low to medium risk. There have been two incidents of sewer flooding within the postcode area (see Appendix B).

Groundwater

The site is underlain by superficial deposits of Kempton Park Gravel Member and a superficial aquifer. It is also shown to have a high susceptibility to groundwater flooding (see Appendix B). There is therefore a high risk of flooding to the site from the superficial deposits.

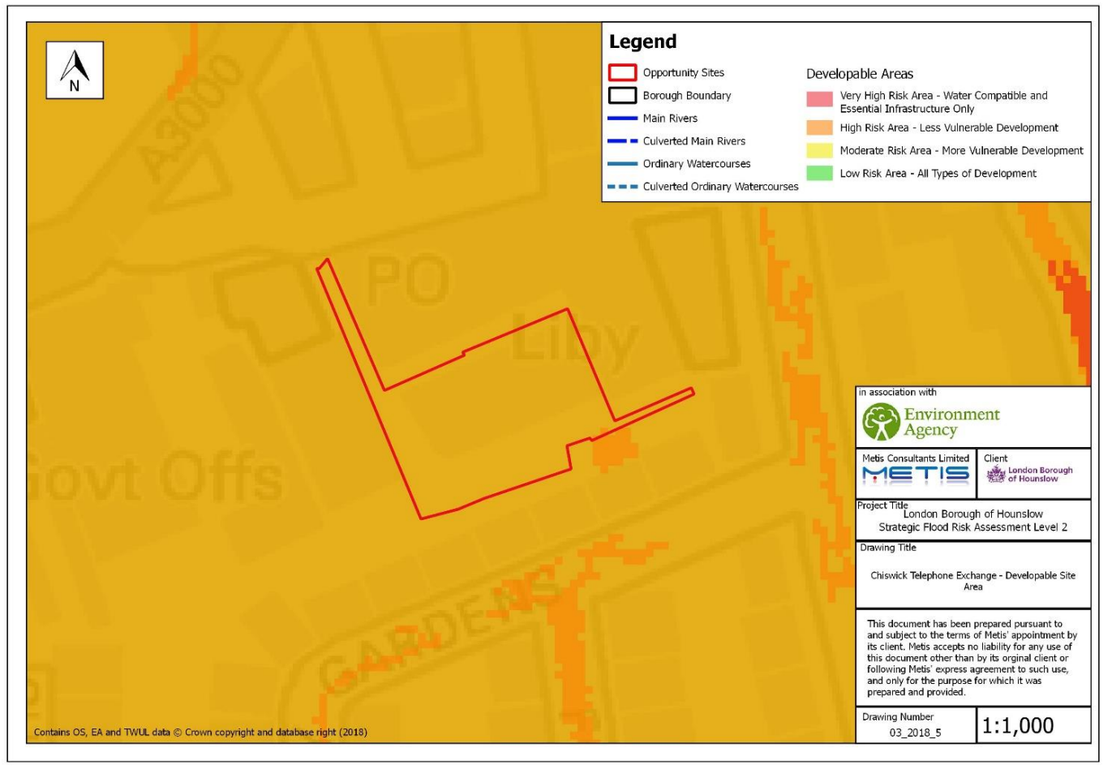
Artificial

This site is at low risk of flooding from artificial sources.

Climate Change

It is likely that the risk of flooding to the site from tidal and surface water sources will increase with climate change.

Developable Site Area



Site Access / Egress:

The entire site is at risk of tidal flooding. Access/egress routes should be located above the flood level. Safe refuge should also be provided at higher levels within the development.

Potential Mitigation Measures:

Fluvial / Tidal

The development should be designed so that site users have safe access / egress routes in the event of a flood. Buildings should be situated above the flood level and constructed using flood resistant and / or resilient techniques. Site users should register with the Environment Agency's Flood Warning Service and be made aware of the site evacuation route / safe refuge location.

Surface Water + Sewers

SuDS measures should be applied on site to firstly minimise the amount of runoff, then attenuate the maximum practical volume of surface water onsite. Site ground conditions should be tested to determine the potential for disposal of surface water via infiltration. Any connections to the public sewer should be done so with consultation and permission from the infrastructure owner (in this case, Thames Water Utilities Ltd).

Groundwater

No basement levels should be developed on this site.

Artificial

No mitigation measures required (site is at low risk of flooding from artificial sources).

Site Specific FRA Requirements

1. Finished floor levels must be situated above the 1% (100 year) predicted maximum tidal flood level plus climate change with a 600mm allowance for freeboard or 300mm above the general ground level of the site – whichever is highest.
2. A site specific Flood Evacuation Plan must demonstrate that the site can be used safely for its lifetime.
3. SuDS must be integrated within the site masterplan to maximise runoff reduction and surface water attenuation as much as reasonably practicable.
4. An overall drainage strategy must demonstrate how greenfield (as a minimum) or lower than greenfield (preferred) runoff can be achieved. This is in line with the London Plan and the Hounslow Local Plan 2015-2030. If this is not reasonably practicable, then this must be clearly explained and justified.
5. The FRA must demonstrate that surface water and fluvial flooding can be managed on site with no increase in flood risk to others.

Planning Considerations

Will development increase flood risk elsewhere?

The site has the potential to be developed without increasing flood risk to others. As the site lies wholly within Flood Zone 3a this may require flood plain compensation and a surface water management strategy integrated within the site masterplan.

How can development reduce flood risk overall?

It is recommended that the development proposals achieve greenfield runoff rates in line with the London Plan and Hounslow Local Plan 2015-2030. This would reduce surface water runoff and potential risk to others compared to the existing development.

How can the development be made safe?

A possible safe fluvial flooding access / egress route is available from the northern boundary of the site. This should be confirmed through a site-specific Flood Evacuation Plan. It is recommended that all finished floor levels are set above predicted flood levels (refer above for details).

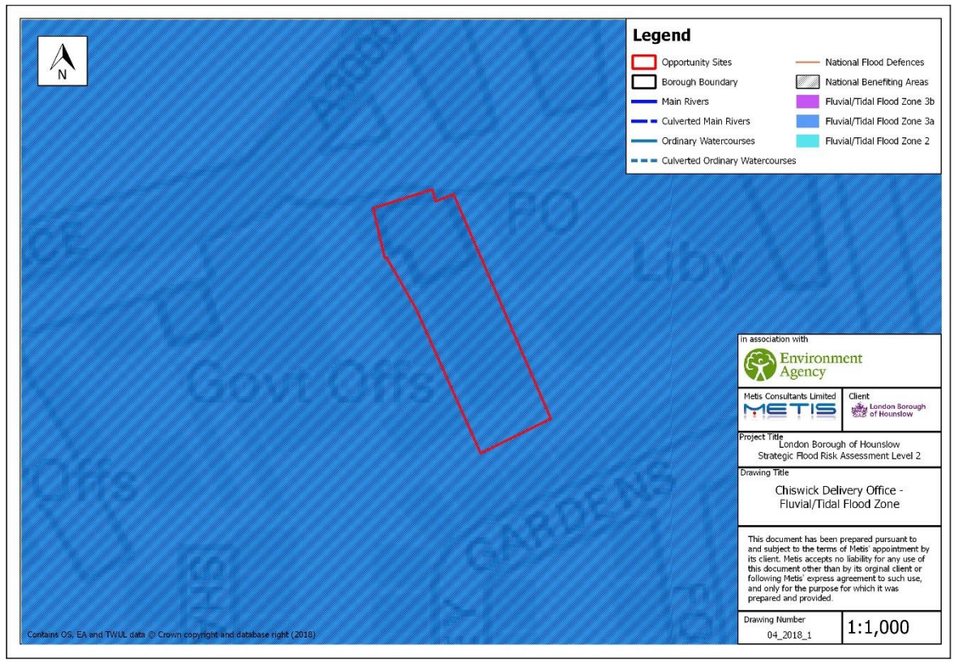
Is there a reasonable prospect of compliance with flood risk aspects of the Exception Test?

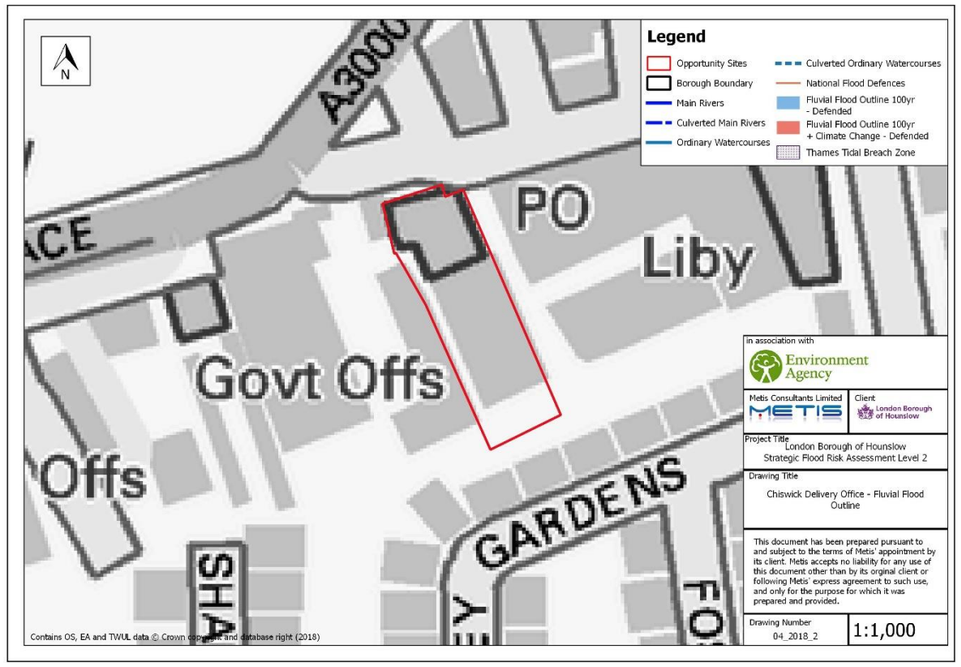
There is a reasonable prospect of compliance with the Exception Test. This can be achieved by:

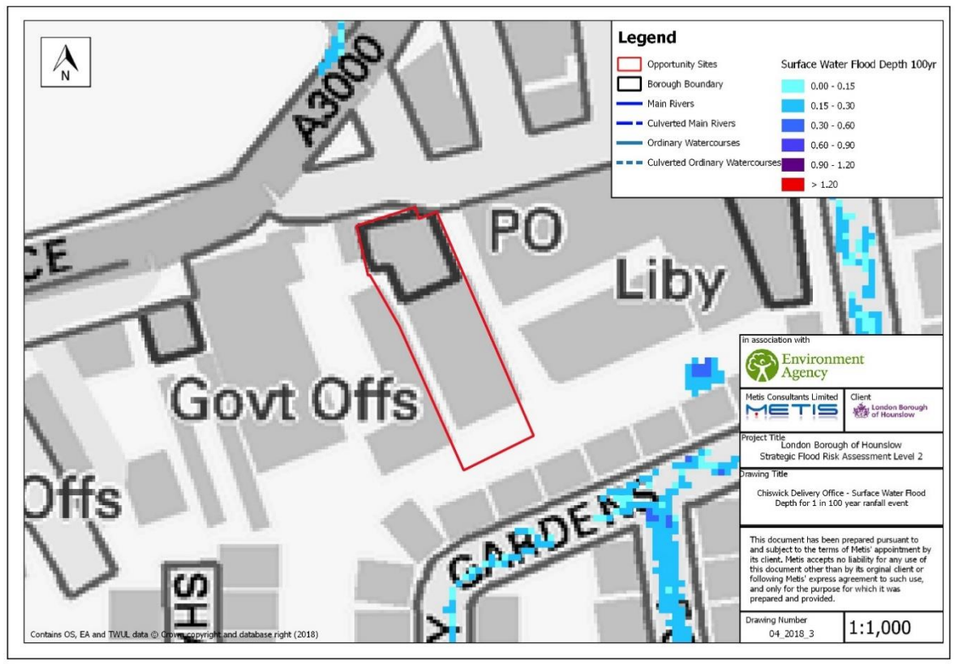
- Demonstrating evidence of the wider sustainability benefits of the site in a Sustainability Appraisal.
- Raising finished floor levels (FFLs) to 600mm above the 1% (100 year) predicted maximum tidalflood level plus climate change or 300mm above the general ground level of the site (whichever is highest).
- Implementing flood resistant or resilient features.
- Incorporating SuDS into the site design.
- The production of a Flood Evacuation Plan and the signing up of site users to Flood Alerts and Flood Warnings.
- Leaving space in developments for flood risk management infrastructure to be maintained and enhanced for the lifetime of the development.

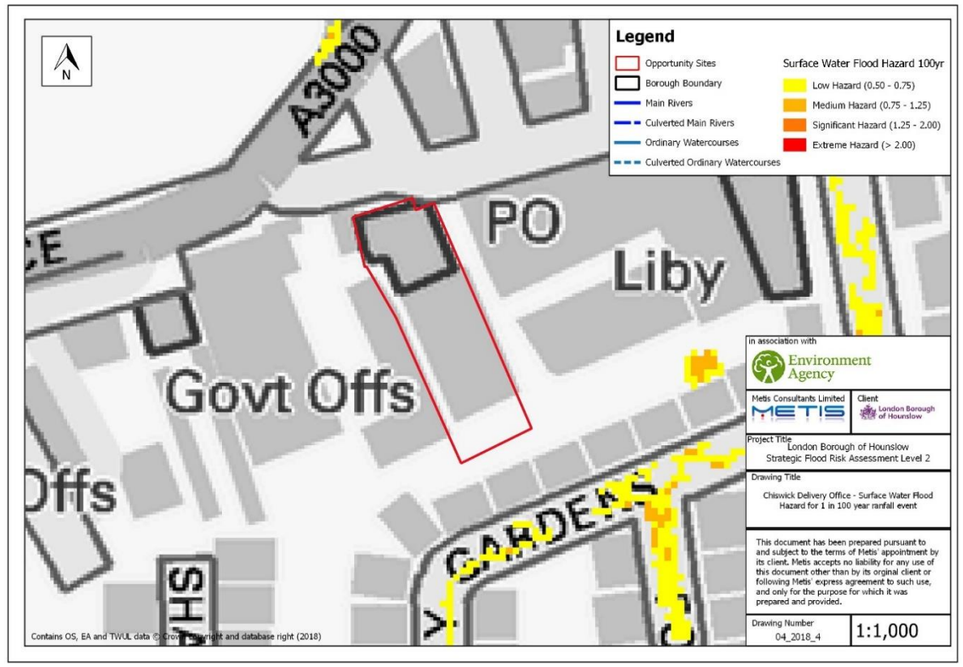
Site Assessment – Post Office and Royal Mail, Chiswick Delivery Office, 1 Heathfield Terrace, W4 4PH

Site ID: 4









Site Assessment – Post Office and Royal Mail, Chiswick Delivery Office, 1 Heathfield Terrace, W4 4PH

Site ID: 4

Site area:	0.2ha
Existing use / vulnerability:	Commercial / Less vulnerable
Proposed use / vulnerability	Mixed Use / Essential infrastructure/Highly vulnerable/More vulnerable/Less vulnerable/Water Compatible
Geology:	Kempton Park Gravel Member underlain by London Clay

Risk Assessment:

Fluvial / Tidal

The River Thames is located approximately 1.1km to the south east of the site. The site lies wholly within Flood Zone 3a. The site is protected by the Thames Barrier and there is a residual risk associated with tidal flooding. There is low risk from fluvial flooding.

Surface Water + Sewers

Risk of surface water flooding is very low on the site. Roads surrounding the site are at low to medium risk. There have been two incidents of sewer flooding within the postcode area (see Appendix B).

Groundwater

The site is underlain by superficial deposits of Kempton Park Gravel Member (BGS online mapping service) and a superficial aquifer. It is also shown to have a high susceptibility to groundwater flooding (see Appendix B). There is a high risk of flooding to the site from the superficial deposits.

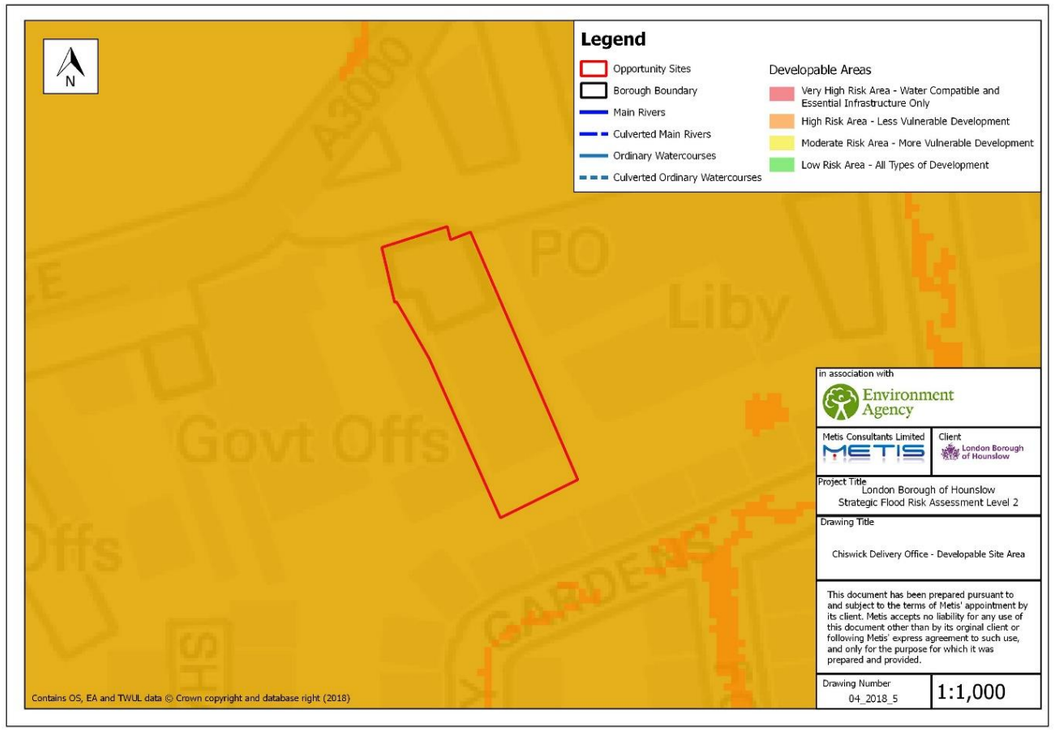
Artificial

This site is at low risk of flooding from artificial sources. There are no reservoirs or other artificial water bodies close to the site.

Climate Change

It is likely that the risk of flooding to the site from fluvial and tidal sources and surface water will increase with climate change.

Developable Site Area



Site Access / Egress:

The entire site is at risk of tidal flooding. Access/egress routes should be located above the flood level. Safe refuge should also be provided at higher levels within the development.

Potential Mitigation Measures:

Fluvial / Tidal

The development should be designed so that users have safe access / egress routes in the event of a flood. Buildings should be situated above the flood level and constructed using flood resistant and / or resilient techniques. Site users should register with the Environment Agency's Flood Warning Service and be made aware of the site evacuation route / safe refuge location.

Surface Water + Sewers

SuDS measures should be applied on site to firstly minimise the amount of runoff, then attenuate the maximum practical volume of surface water onsite. Site ground conditions should be tested to determine the potential for disposal of surface water via infiltration. Any connections to the public sewer should be done so with consultation and permission from the infrastructure owner (in this case, Thames Water Utilities Ltd).

Groundwater

No basement levels should be developed on this site.

Artificial

No mitigation measures required (site is at low risk of flooding from artificial sources).

Site Specific Flood Risk Assessment Requirements

1. Finished floor levels must be situated above the 1% (100 year) predicted maximum tidal flood level plus climate change with a 600mm allowance for freeboard or 300mm above the general ground level of the site – whichever is highest.
2. A site-specific Flood Evacuation Plan must demonstrate that the site can be used safely for its lifetime.
3. SuDS must be integrated within the site masterplan to maximise runoff reduction and surface water attenuation as much as reasonably practicable.
4. An overall drainage strategy must demonstrate how greenfield (as a minimum) or lower than greenfield (preferred) runoff can be achieved. This is in line with the London Plan and the Hounslow Local Plan 2015-2030. If this is not reasonably practicable, then this must be clearly explained and justified.
5. The Flood Risk Assessment must demonstrate that surface water and fluvial flooding can be managed on site with no increase in flood risk to others.

Planning Considerations

Will development increase flood risk elsewhere?

The site has the potential to be developed without increasing flood risk to others. As the site lies wholly within Flood Zone 3a this may require flood plain compensation and a surface water management strategy integrated within the site masterplan.

How can development reduce flood risk overall?

It is recommended that the development proposals achieve greenfield runoff rates. This would reduce surface water runoff and potential risk to others compared to the existing development.

How can the development be made safe?

A possible safe fluvial flooding access / egress route may be available from the northern boundary of the site. This should be confirmed through a site specific Flood Evacuation Plan. It is recommended that all finished floor levels are set above predicted flood levels (refer above for details).

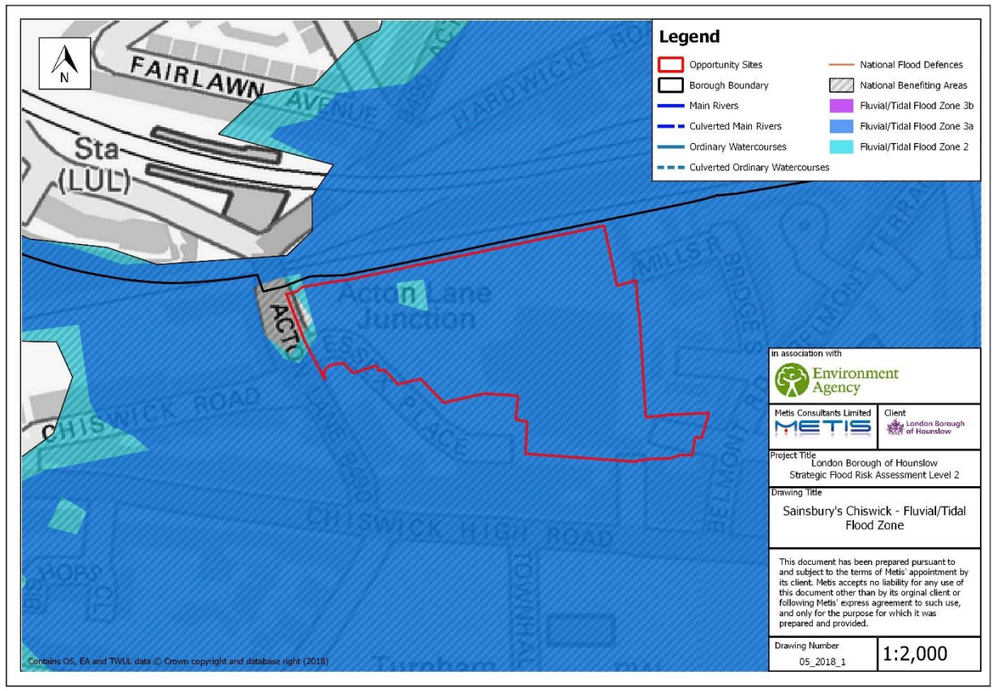
Is there a reasonable prospect of compliance with flood risk aspects of the Exception Test?

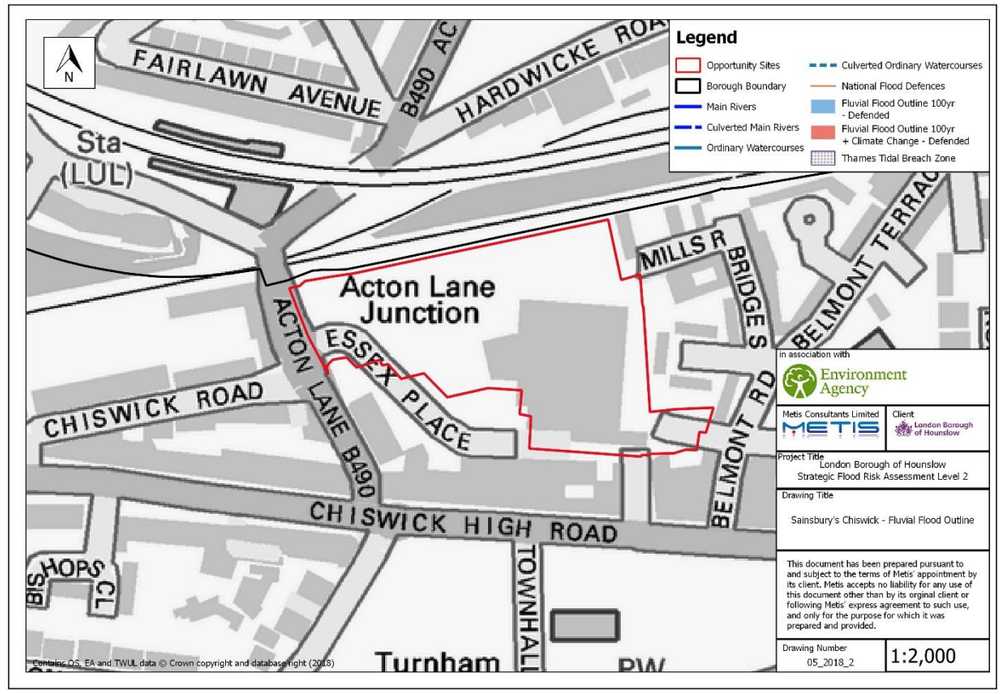
There is a reasonable prospect of compliance with the Exception Test. This can be achieved by:

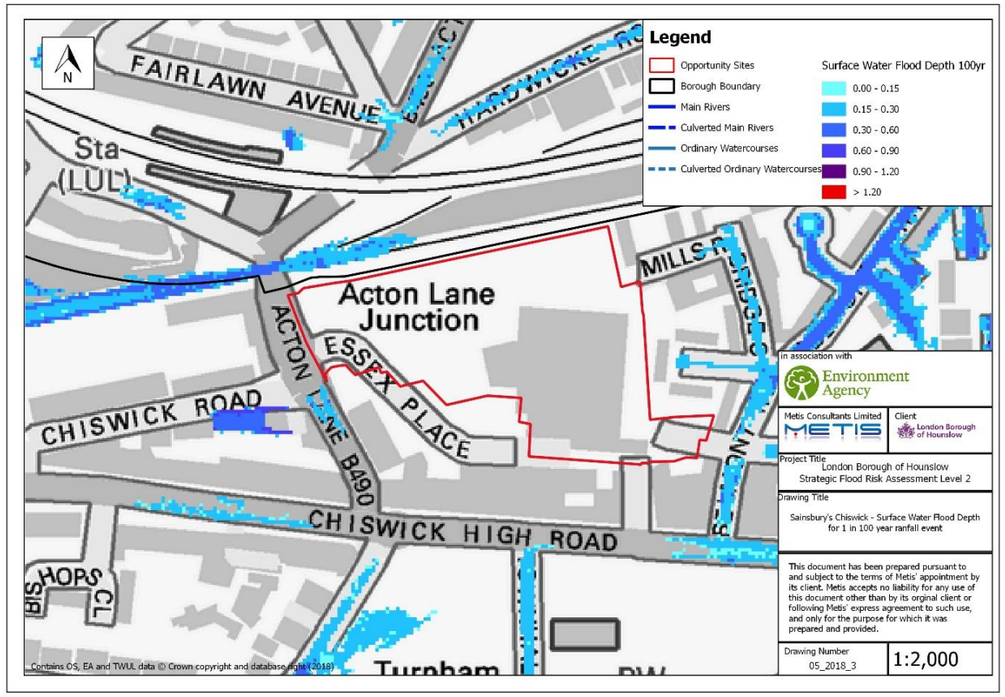
- Demonstrating evidence of the wider sustainability benefits of the site in a Sustainability Appraisal.
- Raising finished floor levels (FFLs) to 600mm above the 1% (100 year) predicted maximum tidal flood level plus climate change or 300mm above the general ground level of the site (whichever is highest).
- Implementing flood resistant or resilient features.
- Incorporating SuDS into the site design.
- The production of a Flood Evacuation Plan and the signing up of site users to Flood Alerts and Flood Warnings.
- Leaving space in developments for flood risk management infrastructure to be maintained and enhanced for the lifetime of the development.

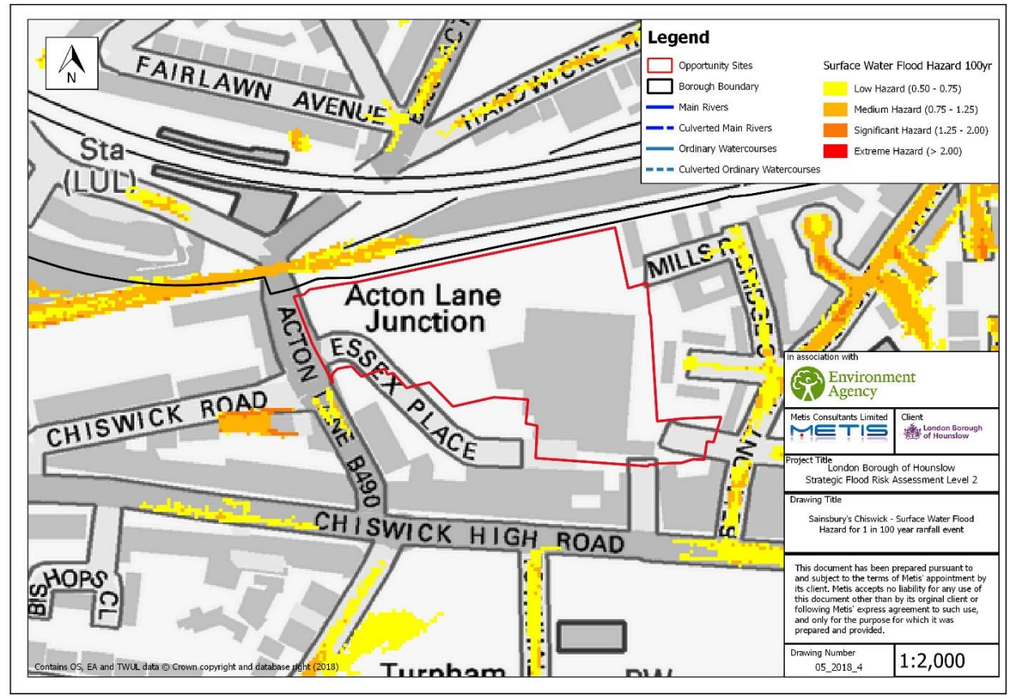
Site Assessment – Sainsbury's, 31 Essex Place, Chiswick, W4 5UT

Site ID: 5









Site Assessment – Sainsbury's, 31 Essex Place, Chiswick, W4 5UT

Site ID: 5

Site area:	1.8ha
Existing use / vulnerability:	Commercial / Less vulnerable
Proposed use / vulnerability	Mixed Use / Essential infrastructure/Highly vulnerable/More vulnerable/Less vulnerable/Water Compatible
Geology:	Kempton Park Gravel Member underlain by London Clay

Risk Assessment:

Fluvial / Tidal

The River Thames is located approximately 1.3km to the south east of the site. The majority of the site lies within Flood Zone 3a, with small localised areas in Flood Zones 1 and 2 on the western boundary and western part of the site. The site is protected by the Thames Barrier and there is a residual risk associated with tidal flooding. There is low risk from fluvial flooding.

Surface Water + Sewers

Risk of surface water flooding is very low on the site. Roads surrounding the site and the railway line to the north west of the site are at low to high risk. There have been 17 incidents of sewer flooding within the postcode area (see Appendix B).

Groundwater

The site is underlain by superficial deposits of Kempton Park Gravel Member and a superficial aquifer. It is also shown to have a high susceptibility to groundwater flooding (see Appendix B). There is a high risk of flooding to the site from the superficial deposits.

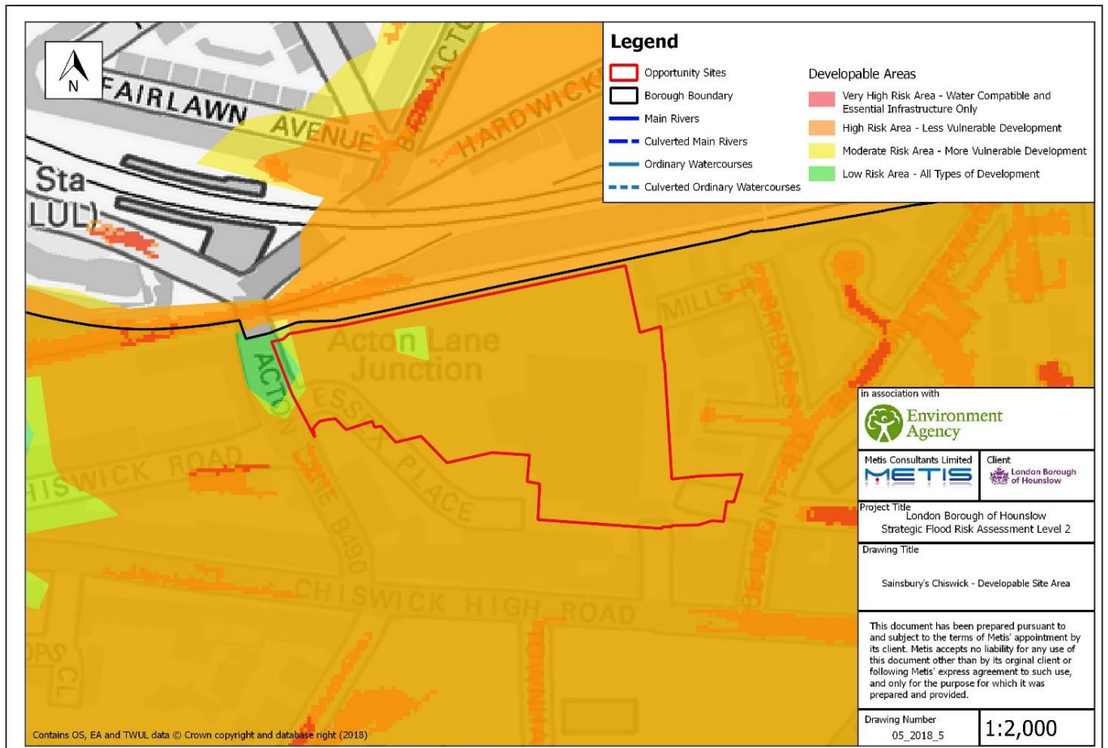
Artificial

This site is at low risk of flooding from artificial sources. There are no reservoirs or other artificial water bodies close to the site.

Climate Change

It is likely that the risk of flooding to the site from tidal and surface water sources will increase with climate change.

Developable Site Area



Site Access / Egress:

Almost the entire site is at risk of tidal flooding except the western site boundary. Access/egress routes should be directed onto Acton Lane to the west, and then to the north. This route should be located above the predicted flood level. Safe refuge should also be provided at higher levels within the development.

Potential Mitigation Measures:

Fluvial / Tidal

The development should be designed so that users have safe access / egress routes in the event of a flood. Buildings should be situated above the flood level and constructed using flood resistant and / or resilient techniques. Site users should register with the Environment Agency's Flood Warning Service and be made aware of the site evacuation route / safe refuge location.

Surface Water + Sewers

SuDS measures should be applied on site to firstly minimise the amount of runoff, then attenuate the maximum practical volume of surface water onsite. Site ground conditions should be tested to determine the potential for disposal of surface water via infiltration. Any connections to the public sewer should be done so with consultation and permission from the infrastructure owner (in this case, Thames Water Utilities Ltd).

Groundwater

No basement levels should be developed on this site.

Artificial

No mitigation measures required (site is at low risk of flooding from artificial sources).

Site Specific FRA Requirements

1. Finished floor levels must be situated above the 1% (100 year) predicted maximum flood level plus climate change with a 600mm allowance for freeboard or 300mm above the general ground level of the site – whichever is highest.
2. A site-specific Flood Evacuation Plan must demonstrate that the site can be used safely for its lifetime.
3. SuDS must be integrated within the site masterplan to maximise runoff reduction and surface water attenuation as much as reasonably practicable.
4. An overall drainage strategy must demonstrate how greenfield (as a minimum) or lower than greenfield (preferred) runoff can be achieved. This is in line with the London Plan and the Hounslow Local Plan 2015-2030. If this is not reasonably practicable, then this must be clearly explained and justified.
5. The Flood Risk Assessment must demonstrate that surface water and fluvial flooding can be managed on site with no increase in flood risk to others.

Planning Considerations

Will development increase flood risk elsewhere?

The site has the potential to be developed without increasing flood risk to others. As the majority of the site lies within Flood Zone 3a this may require flood plain compensation and a surface water management strategy integrated within the site masterplan.

How can development reduce flood risk overall?

It is recommended that the development proposals achieve greenfield runoff rates in line with the London Plan and Hounslow Local Plan 2015-2030. This would reduce surface water runoff and potential risk to others compared to the existing development.

How can the development be made safe?

A possible safe tidal flooding access / egress route is available from the western boundary of the site. This should be confirmed through a site-specific Flood Evacuation Plan. It is recommended that all finished floor levels are set above predicted flood levels (refer above for details).

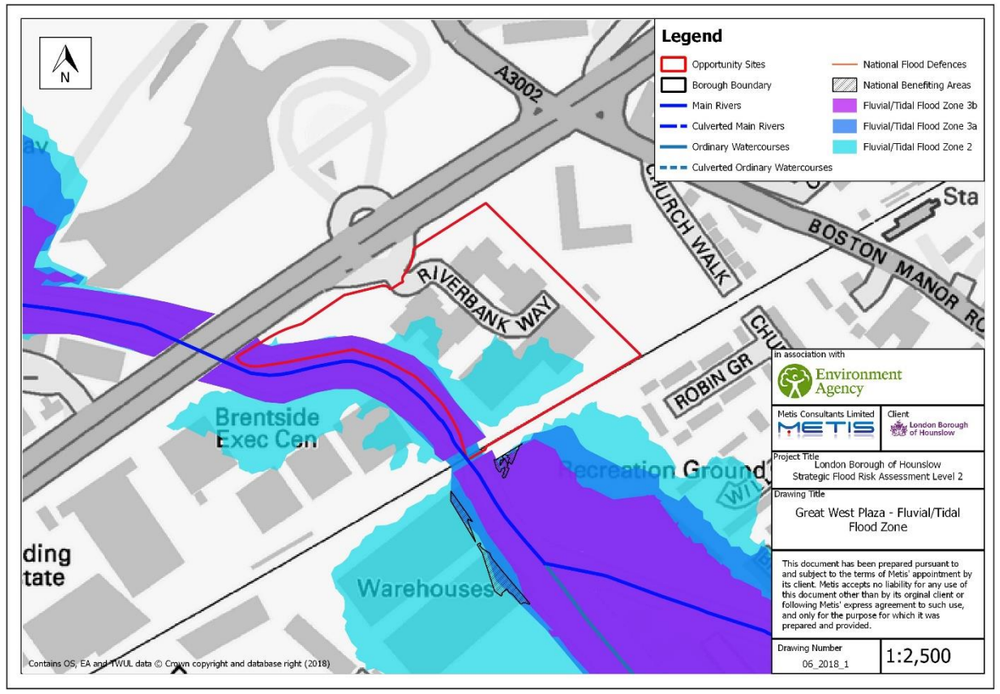
Is there a reasonable prospect of compliance with flood risk aspects of the Exception Test?

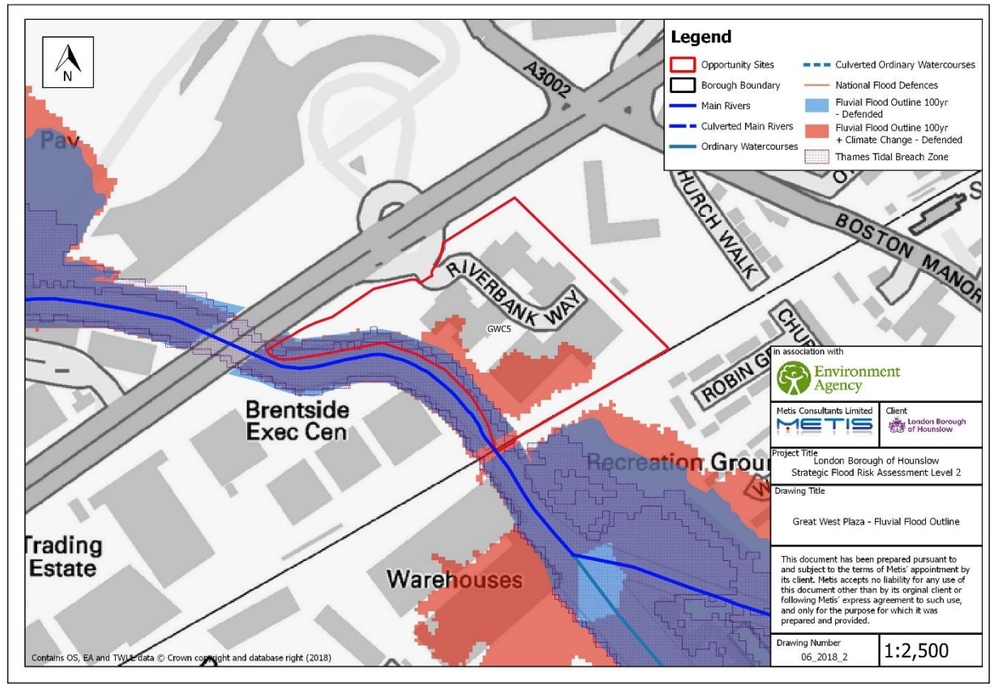
There is a reasonable prospect of compliance with the Exception Test. This can be achieved by:

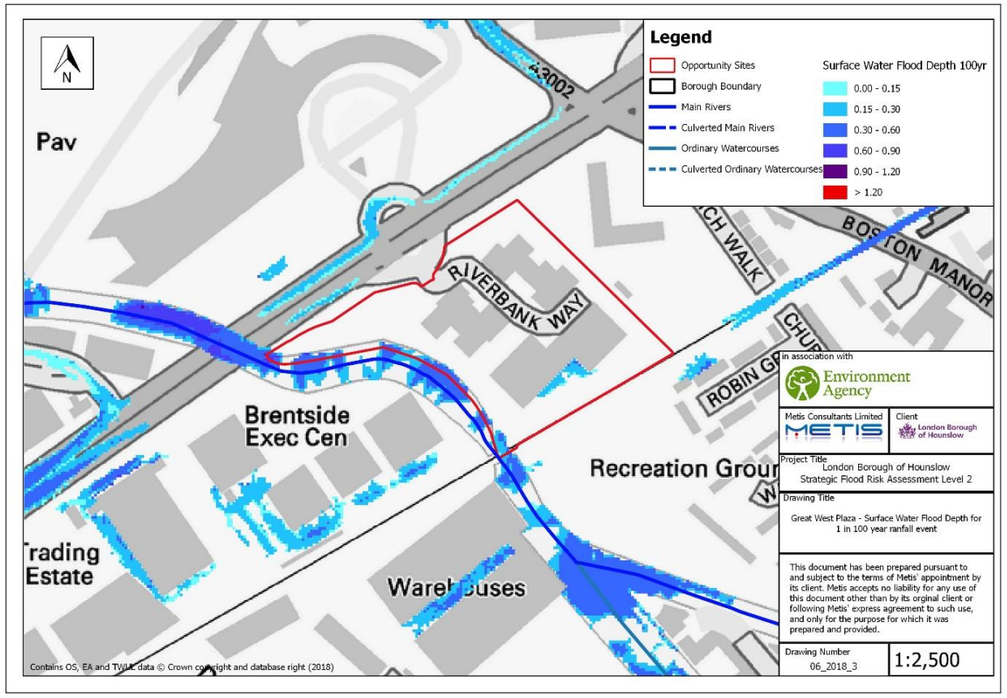
- Demonstrating evidence of the wider sustainability benefits of the site in a Sustainability Appraisal.
- Raising finished floor levels (FFLs) to 600mm above the 1% (100 year) predicted maximum flood level plus climate change or 300mm above the general ground level of the site (whichever is highest).
- Implementing flood resistant or resilient features.
- Incorporating SuDS into the site design.
- The production of a Flood Evacuation Plan and the signing up of site users to Flood Alerts and Flood Warnings.
- Leaving space in developments for flood risk management infrastructure to be maintained and enhanced for the lifetime of the development.

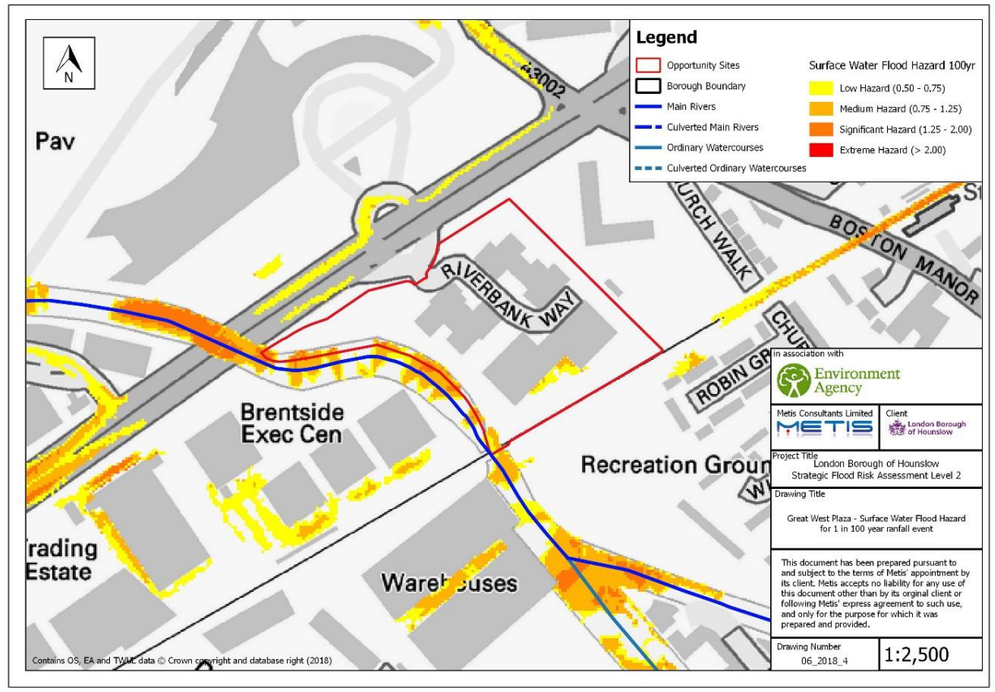
Site Assessment – Great West Plaza, Brentford, TW78 9RE

Site ID: 6









Site Assessment – Great West Plaza, Brentford, TW8 9RE

Site ID: 6

Site area:	2.2ha
Existing use / vulnerability:	Commercial / Less vulnerable
Proposed use / vulnerability	Mixed Use / Essential infrastructure/Highly vulnerable/More vulnerable/Less vulnerable/Water Compatible
Geology:	Kempton Park Gravel Member underlain by London Clay

Risk Assessment:

Fluvial / Tidal

The River Brent is located adjacent to the site's south western boundary and the River Thames is located approximately 1km to the south east of the site. The majority of the site lies within Flood Zone 1 with the southern part of the site in Flood Zone 2. The south western part of the site lies within Flood Zone 3b. The site is at low risk of tidal flooding and ranges from medium to very high risk of fluvial flooding from the River Brent.

Surface Water + Sewers

Risk of surface water flooding is very low across the majority of the site. A small section of the southern part of the site is at low to medium risk of surface water flooding. There have been eight incidents of sewer flooding within the postcode area (see Appendix B).

Groundwater

The site is underlain by superficial deposits of Kempton Park Gravel Member and a superficial aquifer. It is also shown to have a moderate susceptibility to groundwater flooding (see Appendix B). There is a moderate risk of flooding to the site from the superficial deposits.

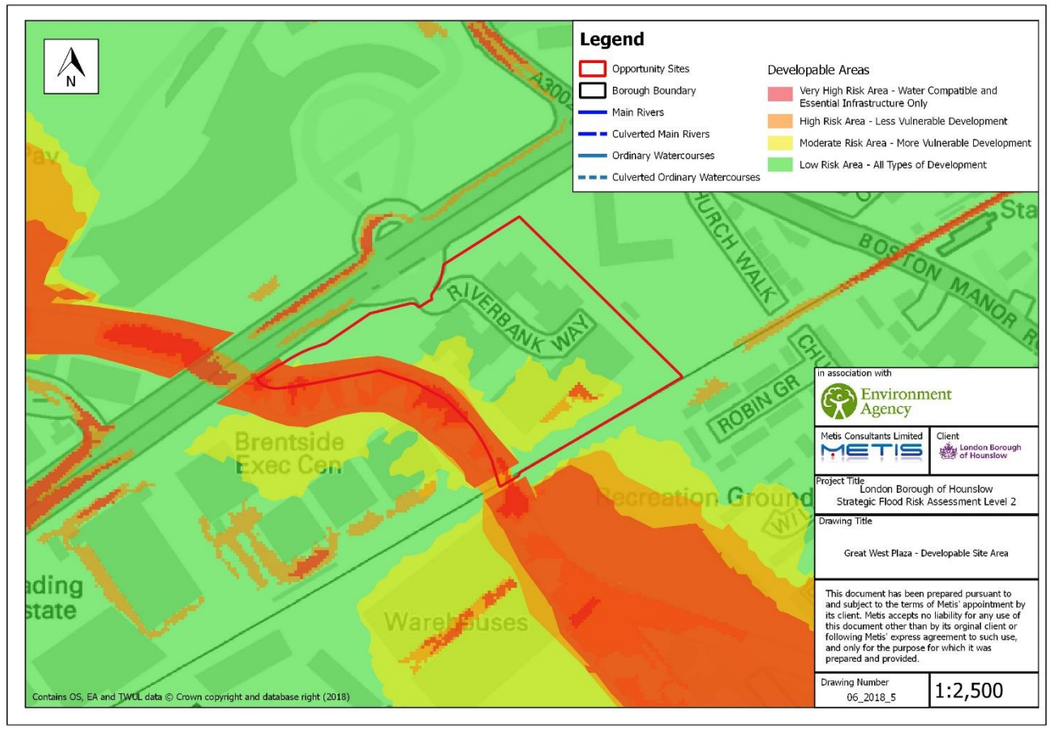
Artificial

The south eastern boundary of the site is at risk of flooding from artificial sources.

Climate Change

It is likely that the risk of flooding to the site from fluvial and surface water sources and surface water will increase with climate change.

Developable Site Area



Site Access / Egress:

The majority of the site lies within Flood Zone 1 and therefore safe access and egress will be available within the development at ground floor level.

Potential Mitigation Measures:

Fluvial / Tidal

Buildings should be situated above the predicted fluvial flood level and constructed using flood resistant and / or resilient techniques. Development should be directed towards the northern half of the site where flood depths are likely to be lower and rapid inundation is less likely. Site users should register with the Environment Agency's Flood Warning service and be made aware of the safe refuge locations on site.

Surface Water + Sewers

SuDS measures should be applied on site to firstly minimise the amount of runoff, then attenuate the maximum practical volume of surface water onsite. Site ground conditions should be tested to determine the potential for disposal of surface water via infiltration. Any connections to the public sewer should be done so with consultation and permission from the infrastructure owner (in this case, Thames Water Utilities Ltd).

Groundwater

No basement levels should be developed on this site.

Artificial

Site users should register with the Environment Agency's Flood Warning service and be made aware of the safe refuge locations on site. Site users should be made aware of the site's location within an area at risk of flooding due to a reservoir failure.

Site Specific FRA Requirements

1. Finished floor levels must be situated above the 1% (100 year) predicted maximum river flood level plus climate change with a 600mm allowance for freeboard or 300mm above the general ground level of the site – whichever is highest.
2. Only 'water compatible' development is permitted within the Flood Zone 3b area.
3. SuDS must be integrated within the site masterplan to maximise runoff reduction and surface water attenuation as much as reasonably practicable.
4. An overall drainage strategy must demonstrate how greenfield (as a minimum) or lower than greenfield (preferred) runoff can be achieved. This is in line with the London Plan and the London Borough of Hounslow Local Plan 2015-2030 If this is not reasonably practicable, then this must be clearly explained and justified.
5. The Flood Risk Assessment must demonstrate that surface water and fluvial flooding can be managed on site with no increase in flood risk to others.

Planning Considerations

Will development increase flood risk elsewhere?

The site has the potential to be developed without increasing flood risk to others. As the site lies partly within Flood Zones 2 and 3b this may require flood plain compensation for any development in these areas and a surface water management strategy integrated within the site masterplan.

How can development reduce flood risk overall?

It is recommended that the development proposals achieve greenfield runoff rates in line with the London Plan and Hounslow Local Plan 2015-2030. This would reduce surface water runoff and potential risk to others compared to the existing development.

How can the development be made safe?

It is recommended that all finished floor levels are set above predicted flood levels (refer above for details).

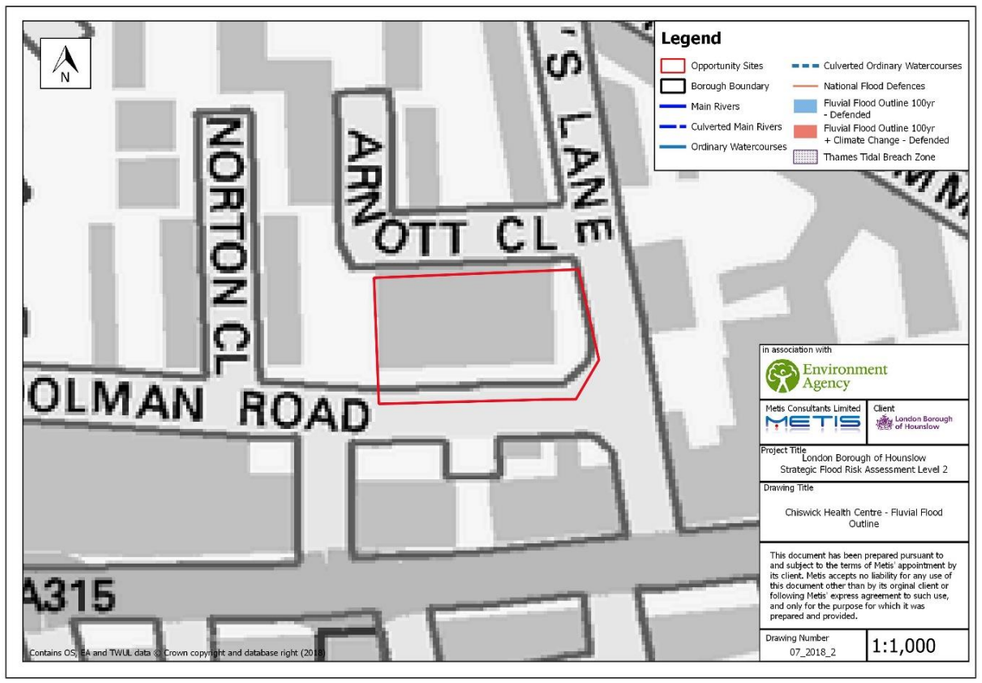
Is there a reasonable prospect of compliance with flood risk aspects of the Exception Test?

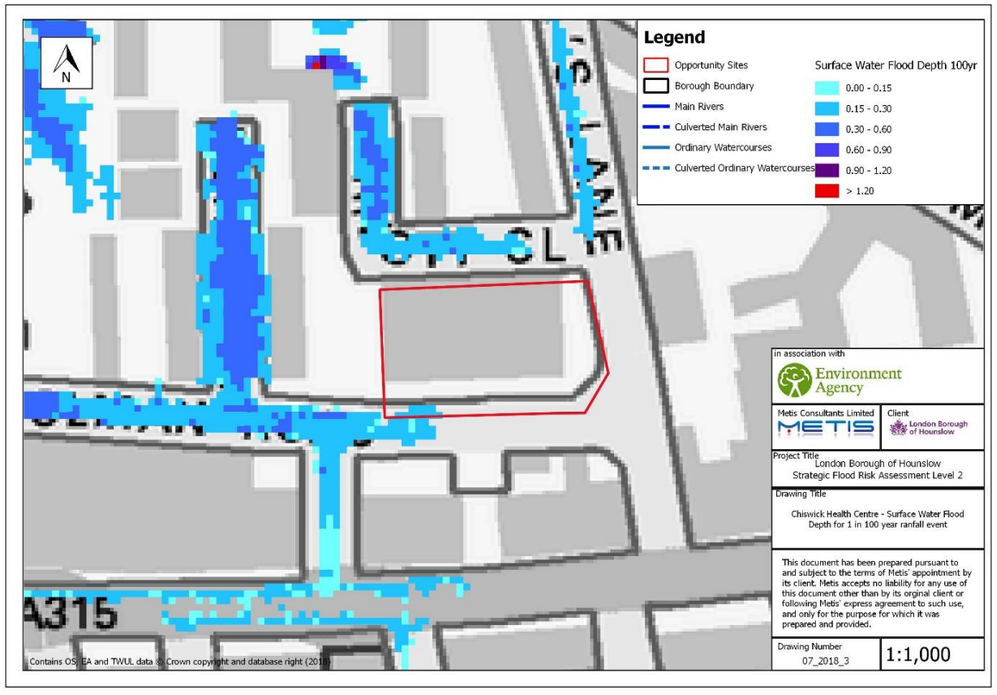
There is a reasonable prospect of compliance with the Exception Test. This can be achieved by:

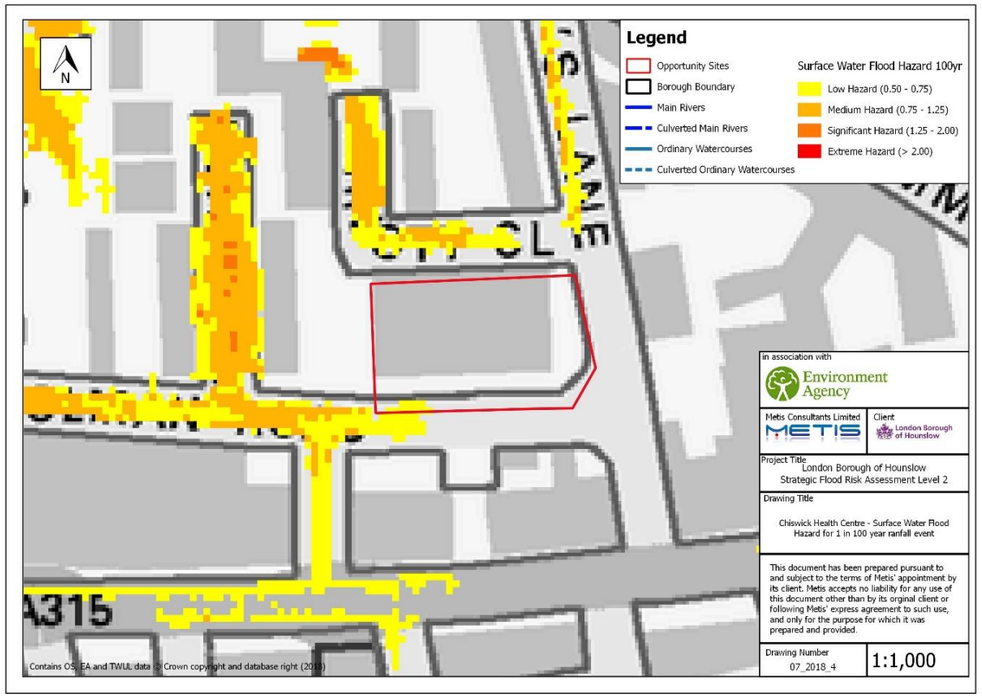
- Demonstrating evidence of the wider sustainability benefits of the site in a Sustainability Appraisal.
- Raising finished floor levels (FFLs) to 600mm above the 1% (100 year) predicted maximum fluvial flood level plus climate change or 300mm above the general ground level of the site (whichever is highest).
- Implementing flood resistant or resilient features.
- Incorporating SuDS into the site design.
- The production of a Flood Evacuation Plan and the signing up of site users to Flood Alerts and Flood Warnings.
- Leaving space in developments for flood risk management infrastructure to be maintained and enhanced for the lifetime of the development.

Site Assessment – Chiswick Health Centre, Fisher's Lane, London, W4 1RX

Site ID: 7







Site Assessment – Chiswick Health Centre, Fisher's Lane, London, W4 1RX

Site ID: 7

Site area:	0.2ha
Existing use / vulnerability:	Healthcare facility / More vulnerable
Proposed use / vulnerability	Healthcare facility / More vulnerable
Geology:	Kempton Park Gravel Member underlain by London Clay

Risk Assessment:

Fluvial / Tidal

The River Thames is located approximately 1.1km to the south east of the site. The site lies wholly within Flood Zone 3a. The site is protected by the Thames Barrier and there is a residual risk associated with tidal flooding. There is low risk from fluvial flooding.

Surface Water + Sewers

Risk of surface water flooding is very low on the site. Roads surrounding the site are at low to medium risk. There have been 22 incidents of sewer flooding within the postcode area (see Appendix B).

Groundwater

The site is underlain by superficial deposits of Kempton Park Gravel Member and a superficial aquifer. It is also shown to have a high susceptibility to groundwater flooding (see Appendix B). There is therefore a high risk of flooding to the site from the superficial deposits.

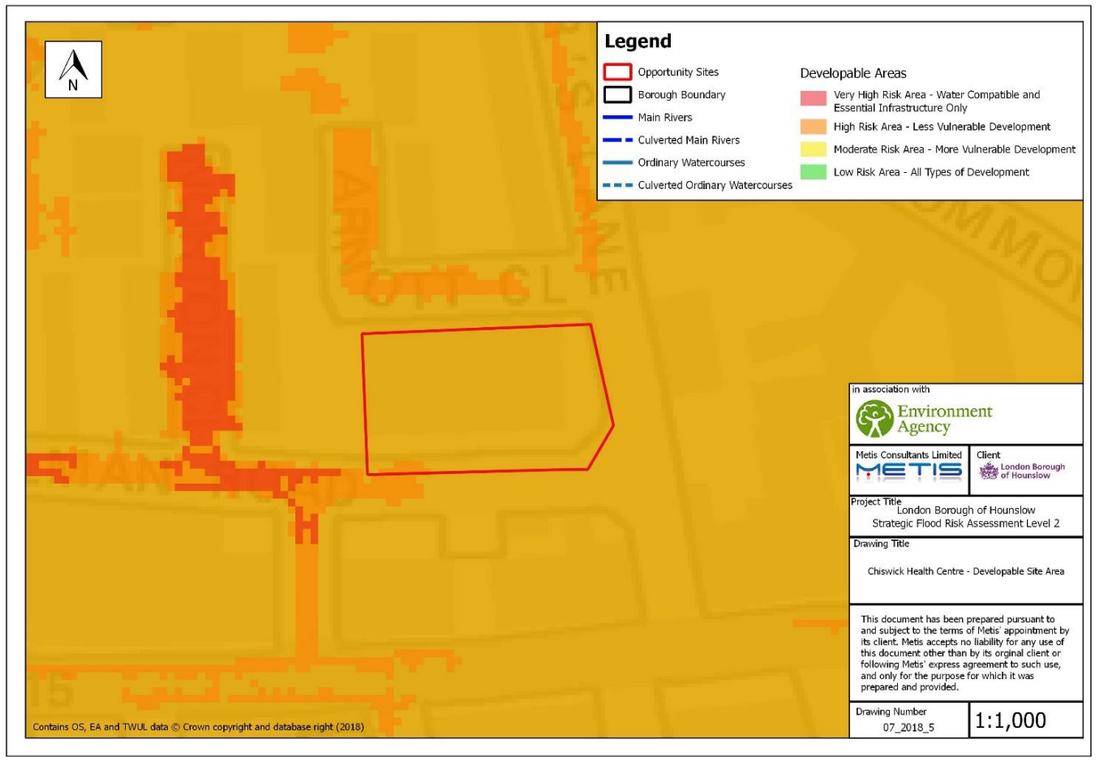
Artificial

This site is at low risk of flooding from artificial sources. There are no reservoirs or other artificial water bodies close to the site.

Climate Change

It is likely that the risk of flooding to the site from tidal and surface water sources will increase with climate change.

Developable Site Area



Site Access / Egress:

The entire site and surrounding area is at risk of tidal flooding. Safe refuge should be provided within the development above the flood level.

Potential Mitigation Measures:

Fluvial / Tidal

The development should be designed so that users have safe access / egress routes. Buildings should be situated above the predicted flood level and constructed using flood resistant and / or resilient techniques. Site users should register with the Environment Agency's Flood Warning Service and be made aware of the site evacuation route / safe refuge location.

Surface Water + Sewers

SuDS measures should be applied on site to firstly minimise the amount of runoff, then attenuate the maximum practical volume of surface water onsite. Site ground conditions should be tested to determine the potential for disposal of surface water via infiltration. Any connections to the public sewer should be done so with consultation and permission from the infrastructure owner (in this case, Thames Water Utilities Ltd).

Groundwater

No basement levels should be developed on this site.

Artificial

No mitigation measures required (site is at low risk of flooding from artificial sources).

Site Specific FRA Requirements

1. Finished floor levels must be situated above the 1% (100 year) predicted maximum tidal flood level plus climate change with a 600mm allowance for freeboard or 300mm above the general ground level of the site – whichever is highest.
2. A site-specific Flood Evacuation Plan must demonstrate that the site can be used safely for its lifetime.
3. SuDS must be integrated within the site masterplan to maximise runoff reduction and surface water attenuation as much as reasonably practicable.
4. An overall drainage strategy must demonstrate how greenfield (as a minimum) or lower than greenfield (preferred) runoff can be achieved. This is in line with the London Plan and the Hounslow Local Plan 2015-2030. If this is not reasonably practicable, then this must be clearly explained and justified.
5. The Flood Risk Assessment must demonstrate that surface water and fluvial flooding can be managed on site with no increase in flood risk to others.

Planning Considerations

Will development increase flood risk elsewhere?

The site has the potential to be developed without increasing flood risk to others. As the site lies wholly within Flood Zone 3a this may require flood plain compensation and a surface water management strategy integrated within the site masterplan.

How can development reduce flood risk overall?

It is recommended that the development proposals achieve greenfield runoff rates in line with the London Plan and Hounslow Local Plan 2015-2030. This would reduce surface water runoff and potential risk to others compared to the existing development.

How can the development be made safe?

A site-specific Flood Evacuation Plan should confirm if a safe fluvial flooding access/egress route is available. It is recommended that all finished floor levels are set above predicted flood levels (refer above for details).

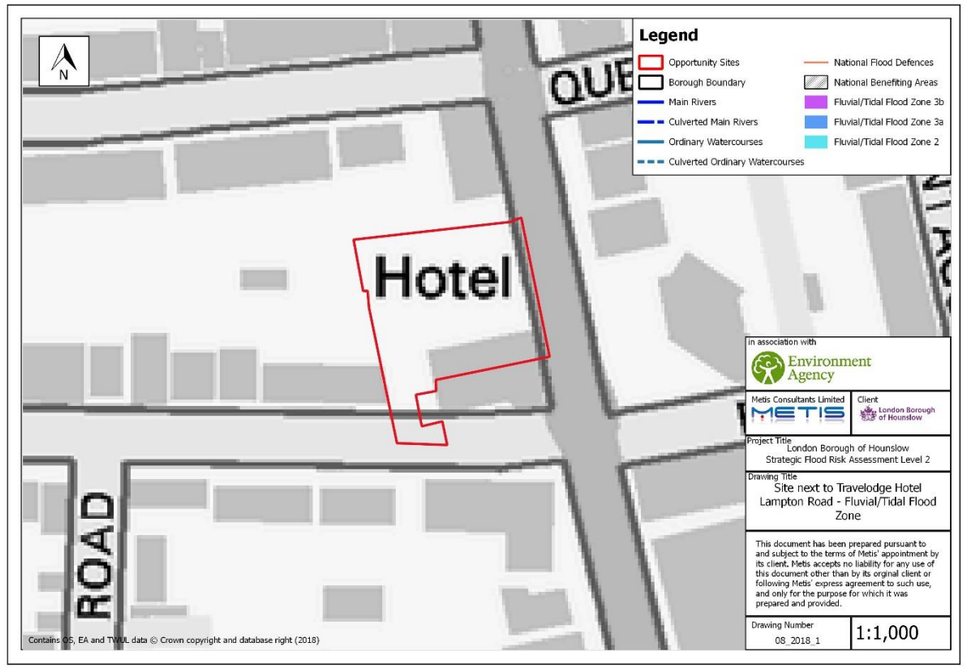
Is there a reasonable prospect of compliance with flood risk aspects of the Exception Test?

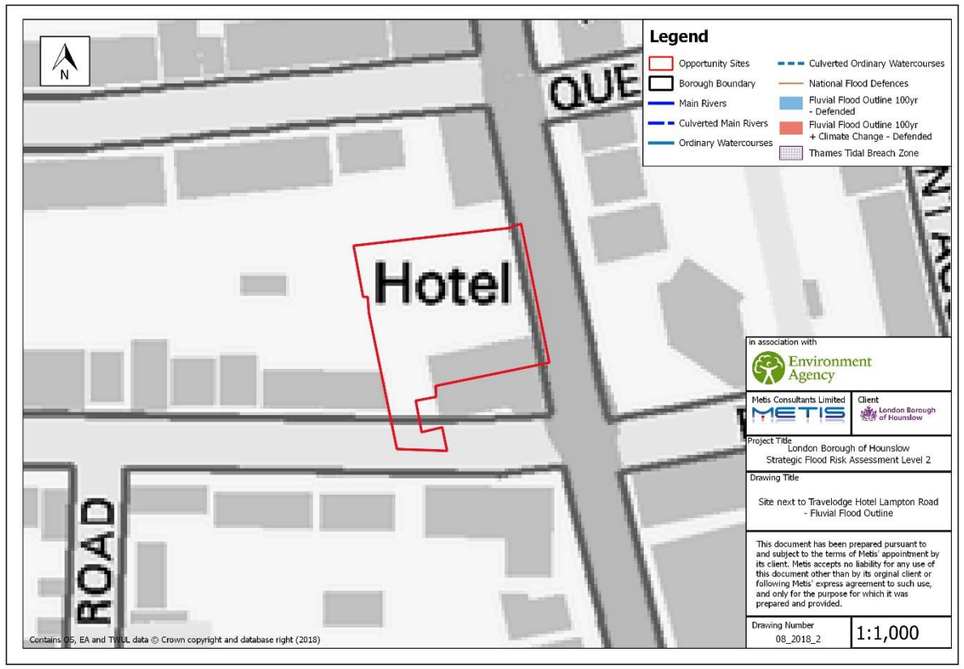
There is a reasonable prospect of compliance with the Exception Test. This can be achieved by:

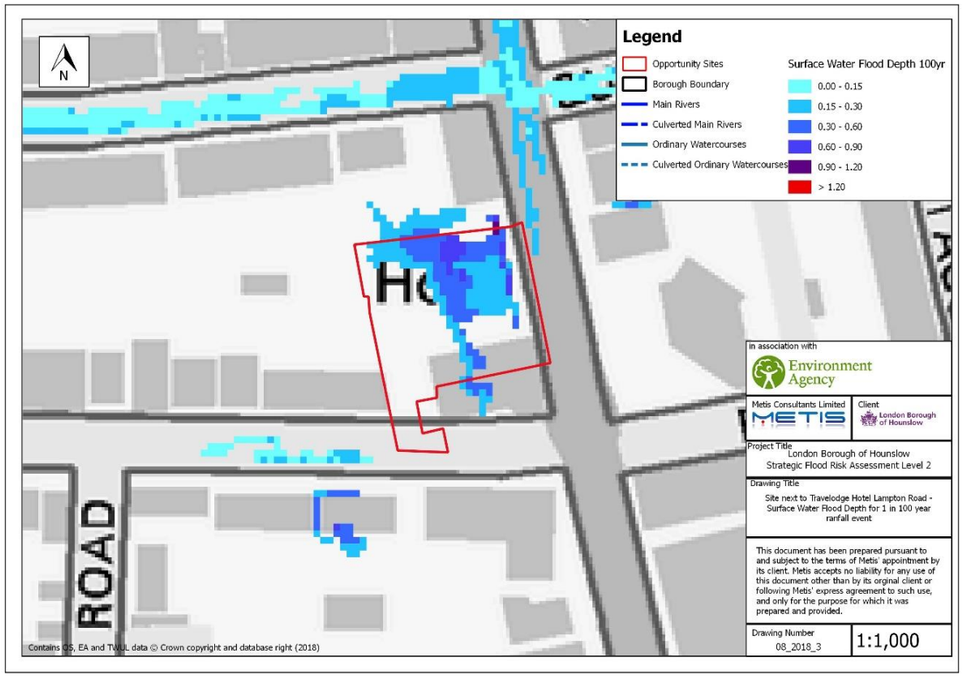
- Demonstrating evidence of the wider sustainability benefits of the site in a Sustainability Appraisal.
- Raising finished floor levels (FFLs) to 600mm above the 1% (100 year) predicted maximum tidal flood level plus climate change or 300mm above the general ground level of the site (whichever is highest).
- Implementing flood resistant or resilient features.
- Incorporating SuDS into the site design.
- The production of a Flood Evacuation Plan and the signing up of site users to Flood Alerts and Flood Warnings.
- Leaving space in developments for flood risk management infrastructure to be maintained and enhanced for the lifetime of the development.

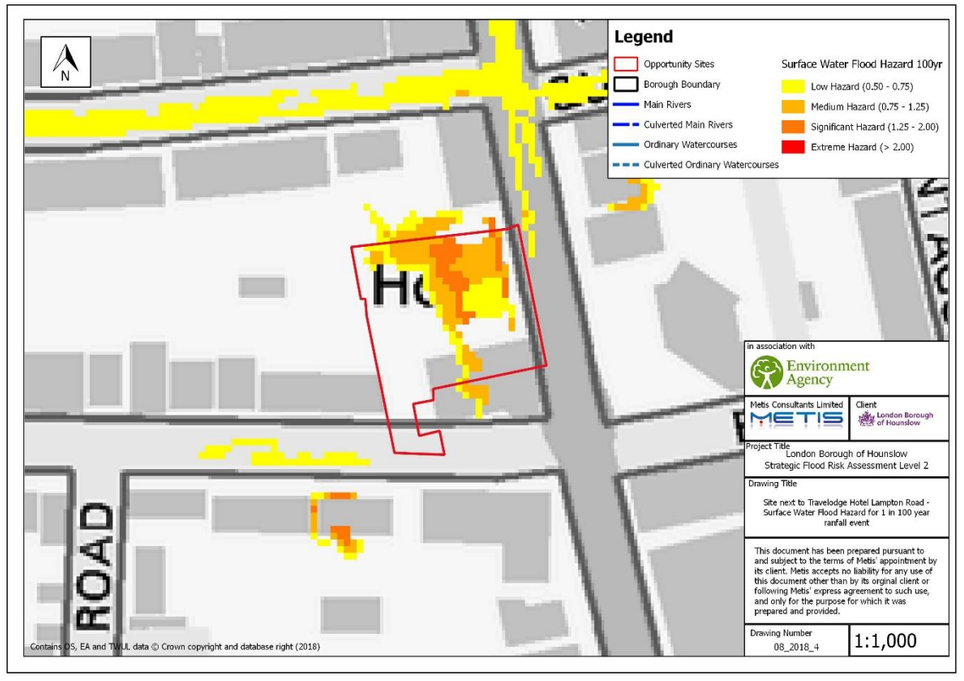
Site Assessment – Site at 26 Lampton Road, Hounslow, TW3 1JH

Site ID: 8









Site Assessment – Site at 26 Lampton Road, Hounslow, TW3 1JH

Site ID: 8

Site area:	0.2ha
Existing use / vulnerability:	Vacant / Less vulnerable
Proposed use / vulnerability	Residential / More vulnerable
Geology:	Taplow Gravel Member underlain by London Clay

Risk Assessment:

Fluvial / Tidal

The site lies wholly within Flood Zone 1 and therefore is at low risk of flooding from fluvial and tidal sources.

Surface Water + Sewers

The risk of surface water flooding is low to high across much of the northern part of the site. The majority of the southern part of the site is at very low risk. There have been three incidents of sewer flooding within the postcode area (see Appendix B).

Groundwater

The site is underlain by superficial deposits of Taplow Gravel Member and a superficial aquifer. It is also shown to have a high susceptibility to groundwater flooding (see Appendix B). There is a high risk of flooding to the site from the superficial deposits.

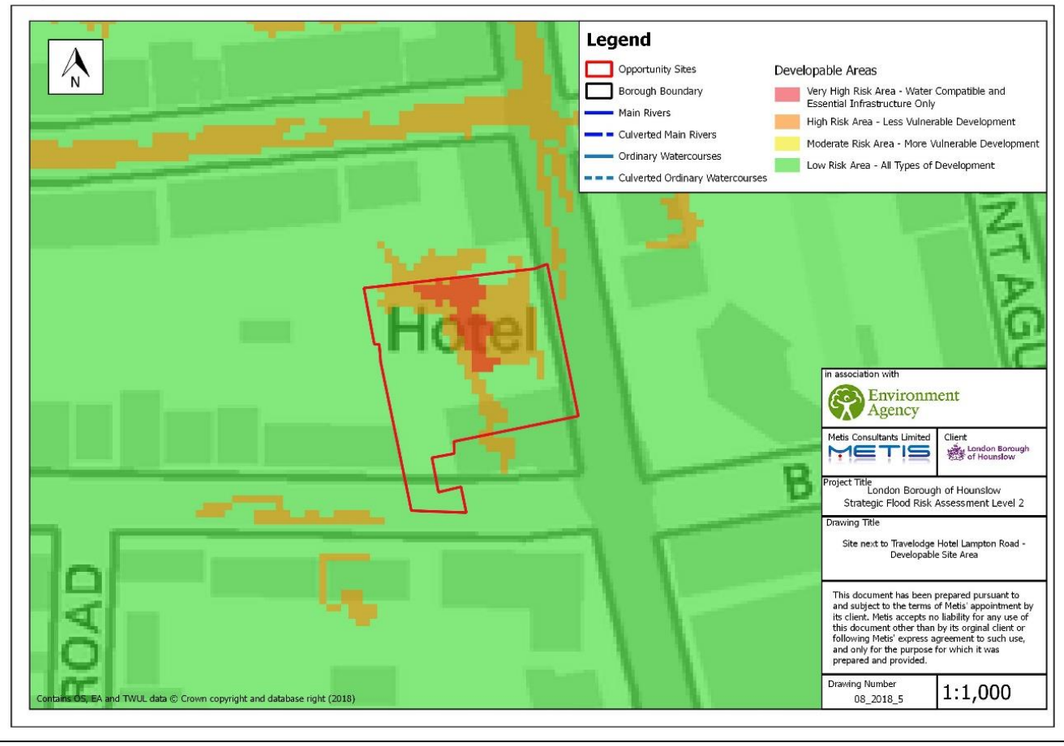
Artificial

This site is at low risk of flooding from artificial sources. There are no reservoirs or other artificial water bodies close to the site.

Climate Change

It is likely that the risk of flooding to the site from surface water will increase with climate change.

Developable Site Area



Site Access / Egress:

As the site lies wholly within Flood Zone 1 there is no need to provide access/egress routes.

Potential Mitigation Measures:

Fluvial / Tidal

No mitigation measures required (site is at low risk of flooding from fluvial or tidal sources)

Surface Water + Sewers

The development of the site may cause a change in the localised topography and increase the surface water flood risk. SuDS measures should be applied on site to firstly minimise the amount of runoff, then attenuate the maximum practical volume of surface water onsite. Site ground conditions should be tested to determine the potential for disposal of surface water via infiltration. Any connections to the public sewer should be done so with consultation and permission from the infrastructure owner (in this case, Thames Water Utilities Ltd).

Groundwater

No basement levels should be developed on this site.

Artificial

No mitigation measures required (site is at low risk of flooding from artificial sources).

Site Specific FRA Requirements

1. SuDS must be integrated within the site masterplan to maximise runoff reduction and surface water attenuation as much as reasonably practicable.

2. An overall drainage strategy must demonstrate how greenfield (as a minimum) or lower than greenfield (preferred) runoff can be achieved. This is in line with the London Plan and the Hounslow Local Plan 2015-2030. If this is not reasonably practicable, then this must be clearly explained and justified.

3. The Flood Risk Assessment must demonstrate that surface water can be managed on site with no increase in flood risk to others.

Planning Considerations

Will development increase flood risk elsewhere?

The site has the potential to be developed without increasing flood risk to others. This can be achieved by integrating a thorough surface water management strategy within the site masterplan.

How can development reduce flood risk overall?

It is recommended that the development proposals achieve greenfield runoff rates in line with the London Plan and Hounslow Local Plan 2015-2030. This would reduce surface water runoff and potential risk to others compared to the existing development.

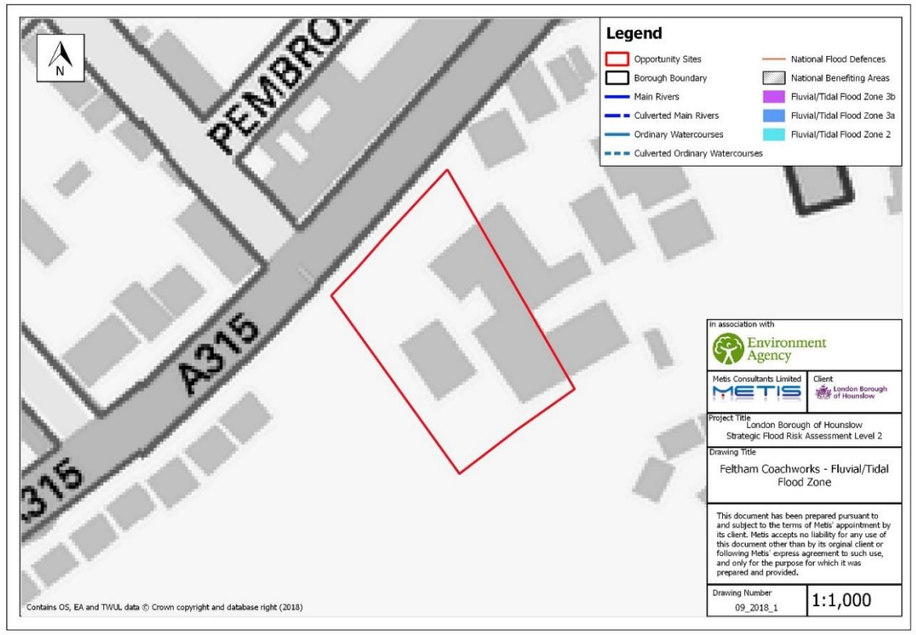
How can the development be made safe?

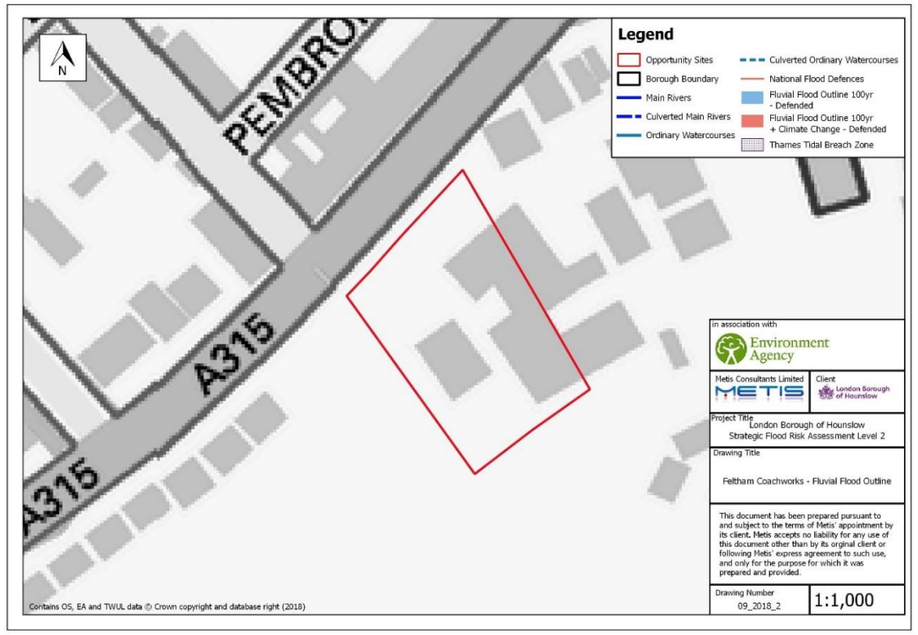
The surface water flood risk is localised and can be safely managed within the site.

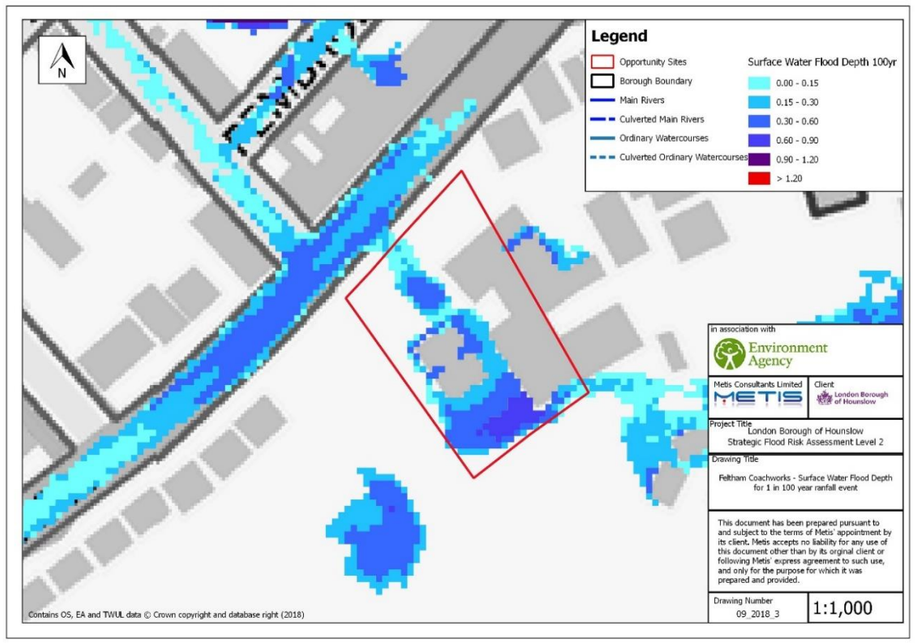
Is there a reasonable prospect of compliance with flood risk aspects of the Exception Test?

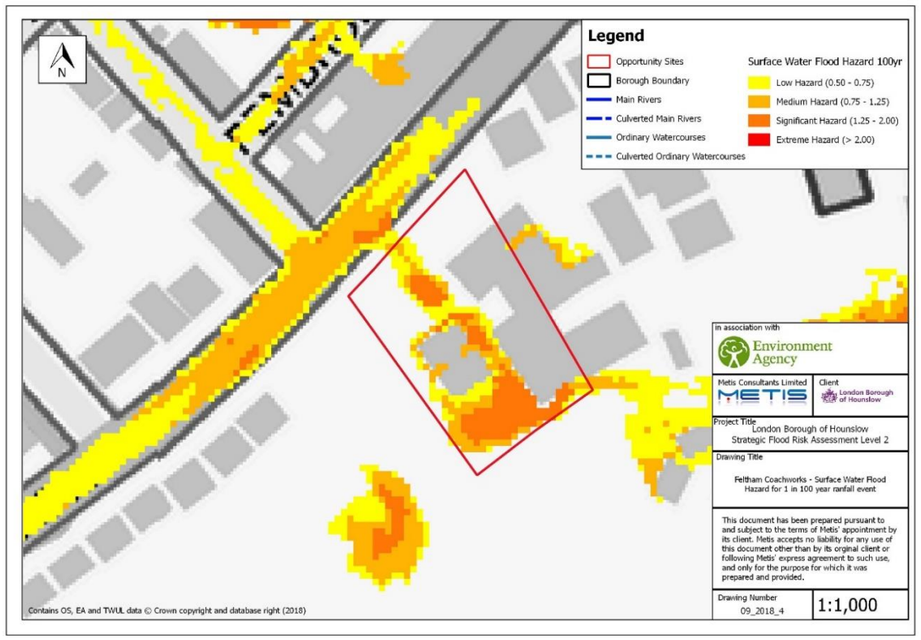
Yes – Surface water flood risk is localised and can be safely managed within the site.

Site Assessment – Feltham Coachworks, 583 London Road, Isleworth, TW7 4EJ	Site ID: 9









Site Assessment – Feltham Coachworks, 583 London Road, Isleworth, TW7 4EJ

Site ID: 9

Site area:	0.4ha
Existing use / vulnerability:	Commercial / Less vulnerable
Proposed use / vulnerability	Mixed Use / Essential infrastructure/Highly vulnerable/More vulnerable/Less vulnerable/Water Compatible
Geology:	Taplow Gravel Member underlain by London Clay

Risk Assessment:

Fluvial / Tidal

The site lies wholly within Flood Zone 1 and therefore is at low risk of flooding from fluvial and tidal sources.

Surface Water + Sewers

The risk of surface water flooding is low to high across much of the southern and western parts of the site. The northern and eastern parts of the site are at very low risk. London Road to the north east is at low to high risk. There have been three incidents of sewer flooding within the postcode area (see Appendix B).

Groundwater

The site is underlain by superficial deposits of Taplow Gravel Member and a superficial aquifer. It is also shown to have a high susceptibility to groundwater flooding (see Appendix B). There is a high risk of flooding to the site from the superficial deposits.

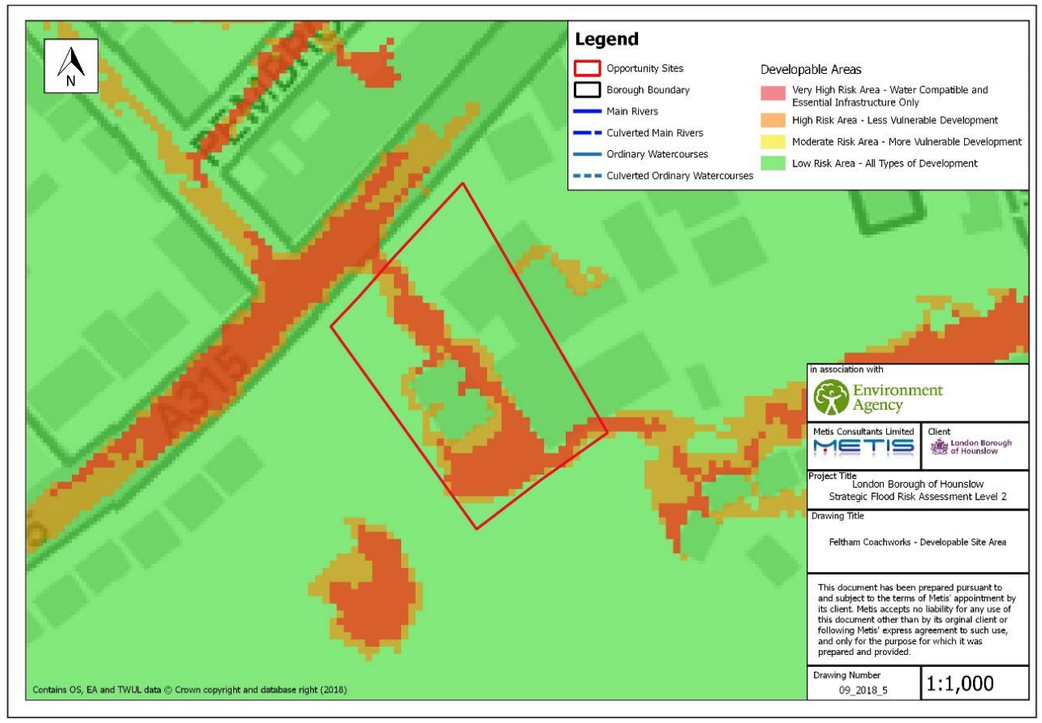
Artificial

This site is at low risk of flooding from artificial sources. There are no reservoirs or other artificial water bodies close to the site.

Climate Change

It is likely that the risk of flooding to the site from surface water will increase with climate change.

Developable Site Area



Site Access / Egress:

As the site lies wholly within Flood Zone 1 there is no need to provide access/egress routes.

Potential Mitigation Measures:

Fluvial / Tidal

No mitigation measures required (site is at low risk of flooding from fluvial or tidal sources).

Surface Water + Sewers

The development of the site may cause a change in the localised topography and increase the surface water flood risk. SuDS measures should be applied on site to firstly minimise the amount of runoff, then attenuate the maximum practical volume of surface water onsite. Site ground conditions should be tested to determine the potential for disposal of surface water via infiltration. Any connections to the public sewer should be done so with consultation and permission from the infrastructure owner (in this case, Thames Water Utilities Ltd).

Groundwater

No basement levels should be developed on this site.

Artificial

No mitigation measures required (site is at low risk of flooding from artificial sources).

Site Specific FRA Requirements

1. SuDS must be integrated within the site masterplan to maximise runoff reduction and surface water attenuation as much as reasonably practicable.
2. An overall drainage strategy must demonstrate how greenfield (as a minimum) or lower than greenfield (preferred) runoff can be achieved. This is in line with the London Plan and the Hounslow Local Plan 2015-2030. If this is not reasonably practicable, then this must be clearly explained and justified.
3. The Flood Risk Assessment must demonstrate that surface water can be managed on site with no increase in flood risk to others.

Planning Considerations

Will development increase flood risk elsewhere?

The site has the potential to be developed without increasing flood risk to others. This can be achieved by integrating a thorough surface water management strategy within the site masterplan.

How can development reduce flood risk overall?

It is recommended that the development proposals achieve greenfield runoff rates in line with the London Plan and Hounslow Local Plan 2015-2030. This would reduce surface water runoff and potential risk to others compared to the existing development.

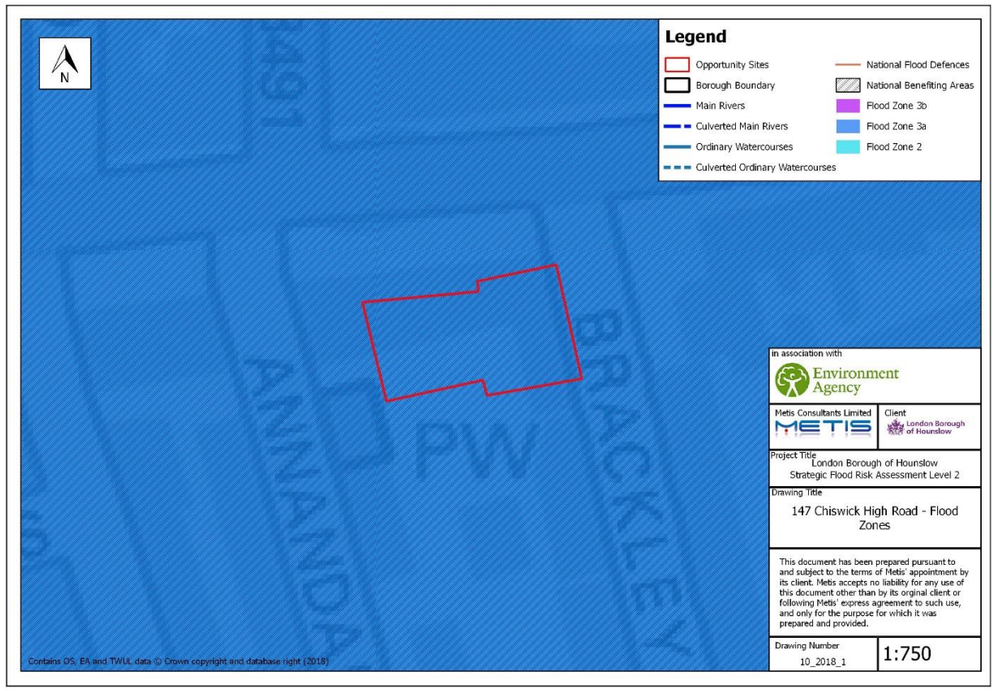
How can the development be made safe?

The surface water flood risk is localised and can be safely managed within the site.

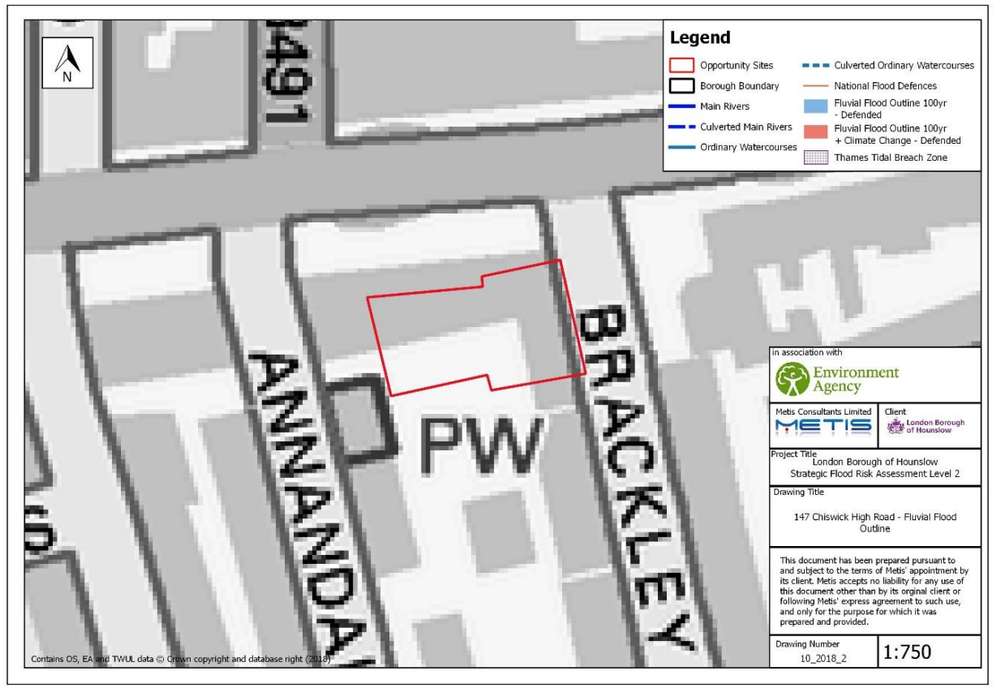
Is there a reasonable prospect of compliance with flood risk aspects of the Exception Test?

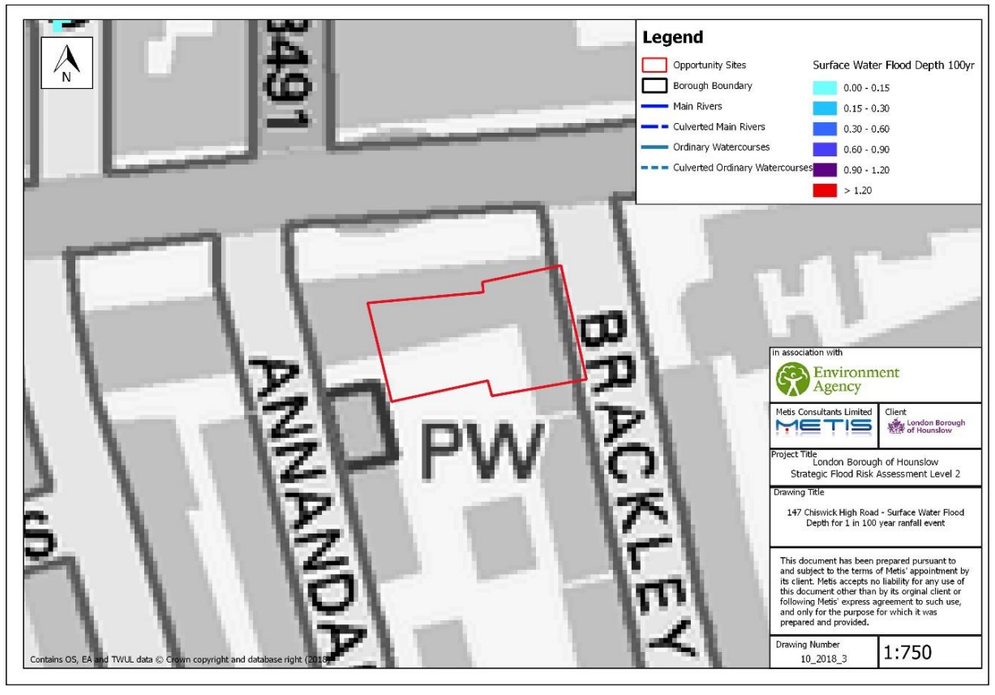
Yes – Surface water flood risk is localised and can be safely managed within the site.

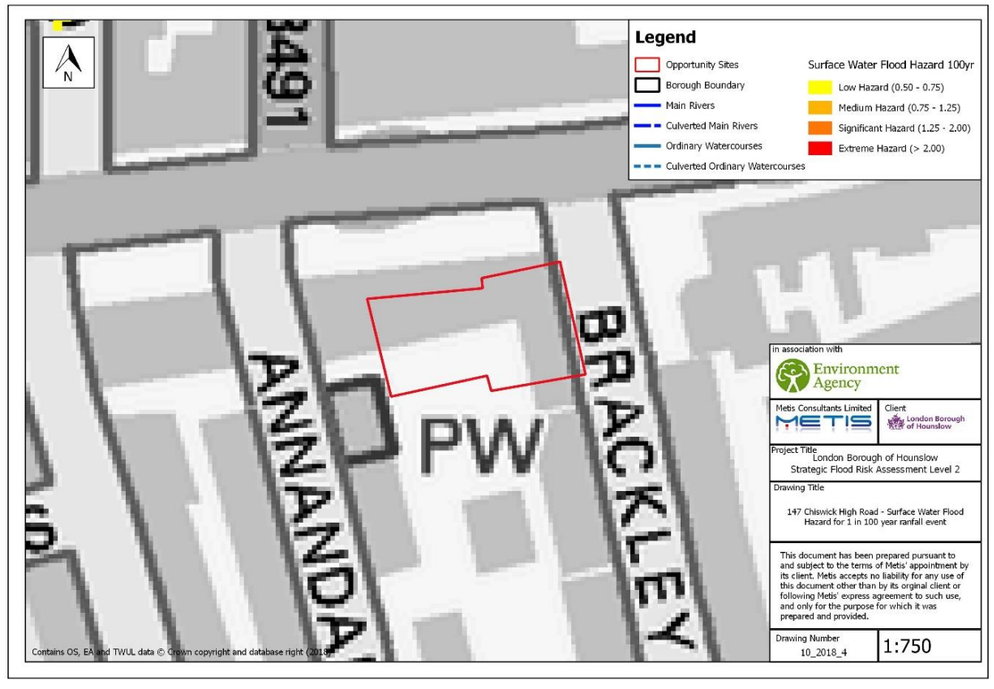
Site Assessment – 147 Chiswick High Road, W4 2DT



Site ID: 10







Site Assessment – 147 Chiswick High Road, W4 2DT

Site ID: 10

Site area:	0.1ha
Existing use / vulnerability:	Commercial / Less vulnerable
Proposed use / vulnerability	Mixed Use / Essential infrastructure/Highly vulnerable/More vulnerable/Less vulnerable/Water Compatible
Geology:	Kempton Park Gravel Member underlain by London Clay

Risk Assessment:

Fluvial / Tidal

The River Thames is located approximately 760m to the south east of the site. The site lies wholly within Flood Zone 3a. The site is protected by the Thames Barrier and there is a residual risk associated with tidal flooding. There is low risk from fluvial flooding.

Surface Water + Sewers

The site and surrounding area is at very low risk of surface water flooding. There have been two incidents of sewer flooding within the postcode area (see Appendix B).

Groundwater

The site is underlain by superficial deposits of Kempton Park Gravel Member and a superficial aquifer. It is also shown to have a high susceptibility to groundwater flooding (see Appendix B). There is a high risk of flooding to the site from the superficial deposits.

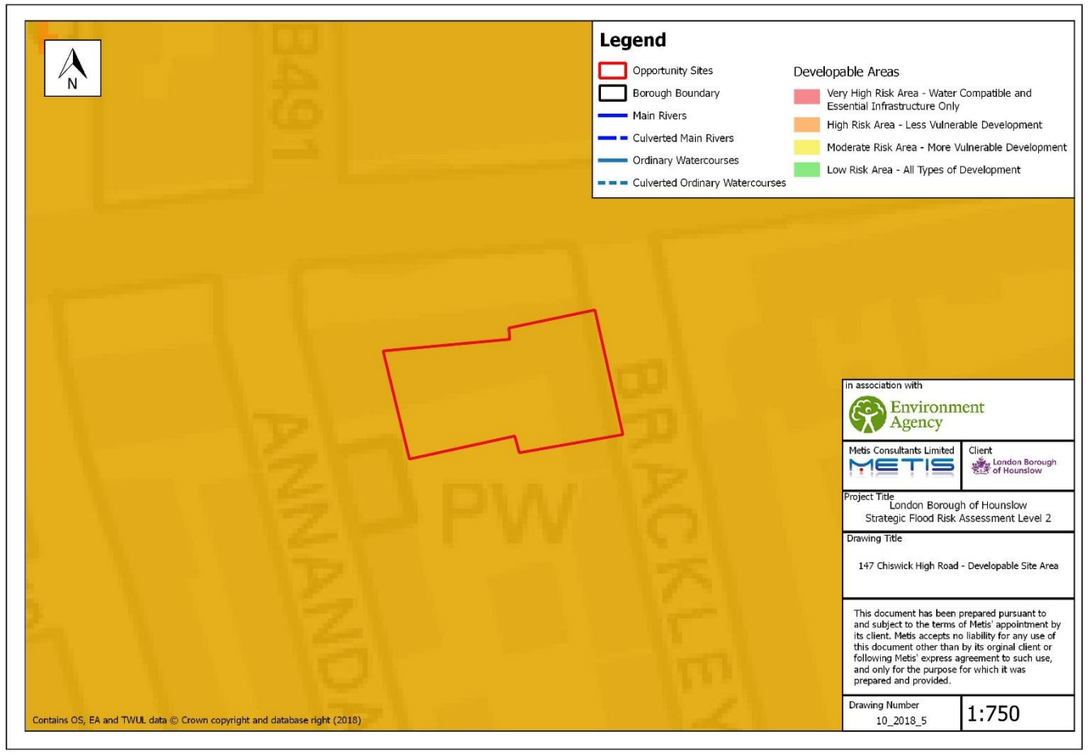
Artificial

This site is at low risk of flooding from artificial sources. There are no reservoirs or other artificial water bodies close to the site.

Climate Change

It is likely that the risk of flooding to the site from tidal and surface water sources will increase with climate change.

Developable Site Area



Site Access / Egress:

The entire site is at risk of tidal flooding. Access/egress routes should be located above the flood level. Safe refuge should also be provided at higher levels within the development.

Potential Mitigation Measures:

Fluvial / Tidal

The development should be designed so that site users have safe access / egress routes. Buildings should be constructed above the flood level using flood resistant and / or resilient techniques. Site users should register with the Environment Agency's Flood Warning Service and be made aware of the site evacuation route / safe refuge location.

Surface Water + Sewers

SuDS measures should be applied on site to firstly minimise the amount of runoff, then attenuate the maximum practical volume of surface water onsite. Site ground conditions should be tested to determine the potential for disposal of surface water via infiltration. Any connections to the public sewer should be done so with consultation and permission from the infrastructure owner (in this case, Thames Water Utilities Ltd).

Groundwater

No basement levels should be developed on this site.

Artificial

No mitigation measures required (site is at low risk of flooding from artificial sources).

Site Specific FRA Requirements

1. Finished floor levels must be situated above the 1% (100 year) predicted maximum tidal flood level plus climate change with a 600mm allowance for freeboard or 300mm above the general ground level of the site – whichever is highest.
2. A site-specific Flood Evacuation Plan must demonstrate that the site can be used safely for its lifetime.
3. SuDS must be integrated within the site masterplan to maximise runoff reduction and surface water attenuation as much as reasonably practicable.
4. An overall drainage strategy must demonstrate how greenfield (as a minimum) or lower than greenfield (preferred) runoff can be achieved. This is in line with the London Plan and the Hounslow Local Plan 2015-2030. If this is not reasonably practicable, then this must be clearly explained and justified.
5. The Flood Risk Assessment must demonstrate that surface water and fluvial flooding can be managed on site with no increase in flood risk to others.

Planning Considerations

Will development increase flood risk elsewhere?

The site has the potential to be developed without increasing flood risk to others. As the site lies wholly within Flood Zone 3a this may require flood plain compensation and a thorough surface water management strategy integrated within the site masterplan.

How can development reduce flood risk overall?

It is recommended that the development proposals achieve greenfield runoff rates in line with the London Plan and Hounslow Local Plan 2015-2030.This would reduce surface water runoff and potential risk to others compared to the existing development.

How can the development be made safe?

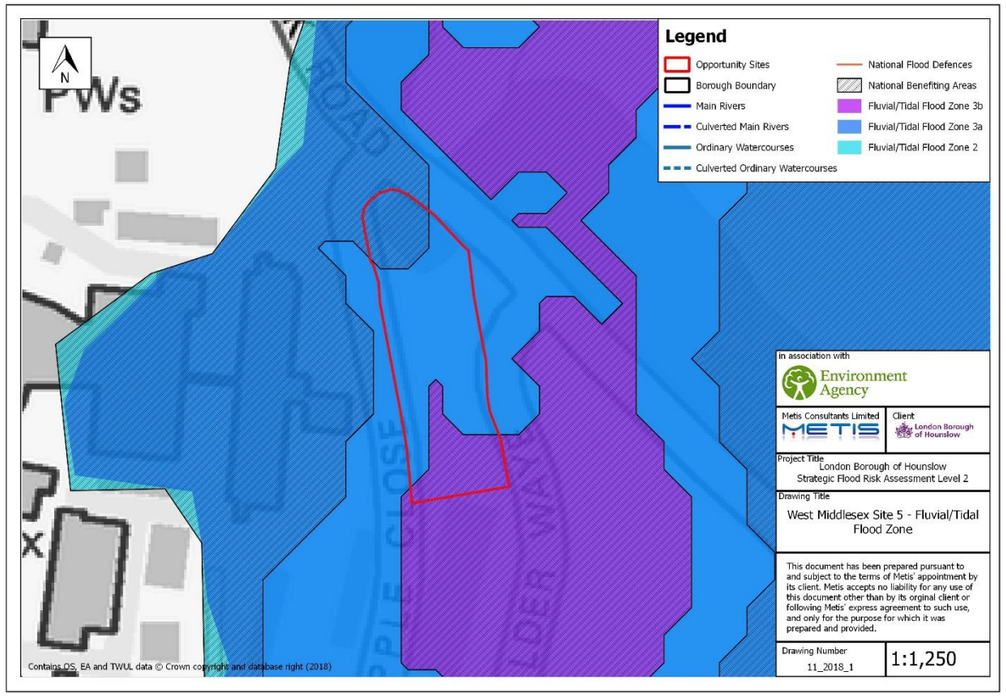
A possible safe fluvial flooding access / egress route is available from the northern boundary of the site. This should be confirmed through a site specific Flood Evacuation Plan. It is recommended that all finished floor levels are set above predicted flood levels (refer above for details).

Is there a reasonable prospect of compliance with flood risk aspects of the Exception Test?

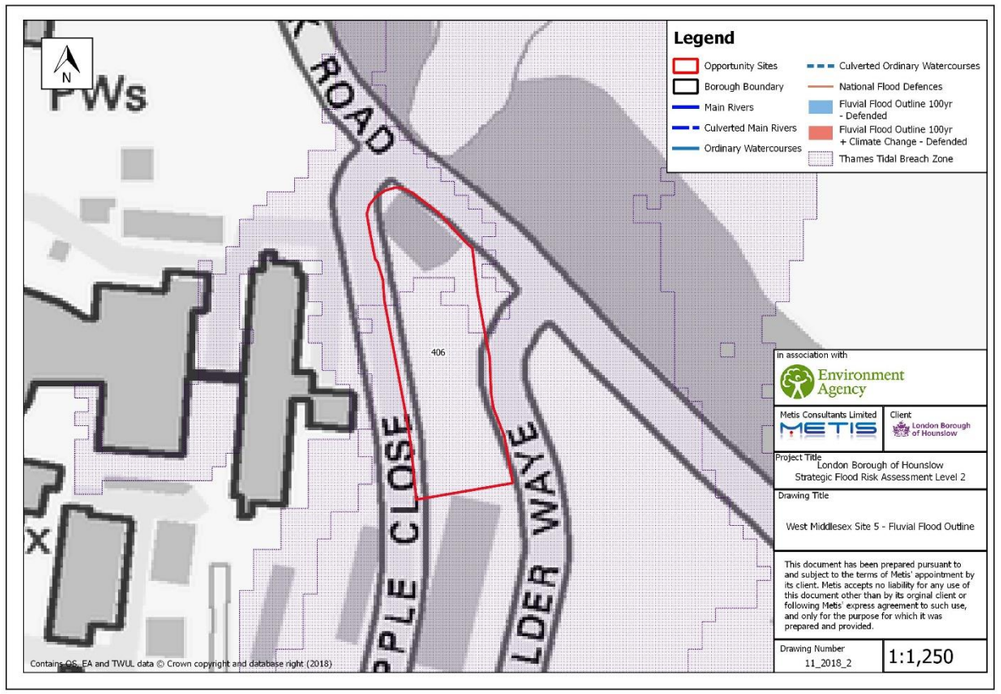
There is a reasonable prospect of compliance with the Exception Test. This can be achieved by:

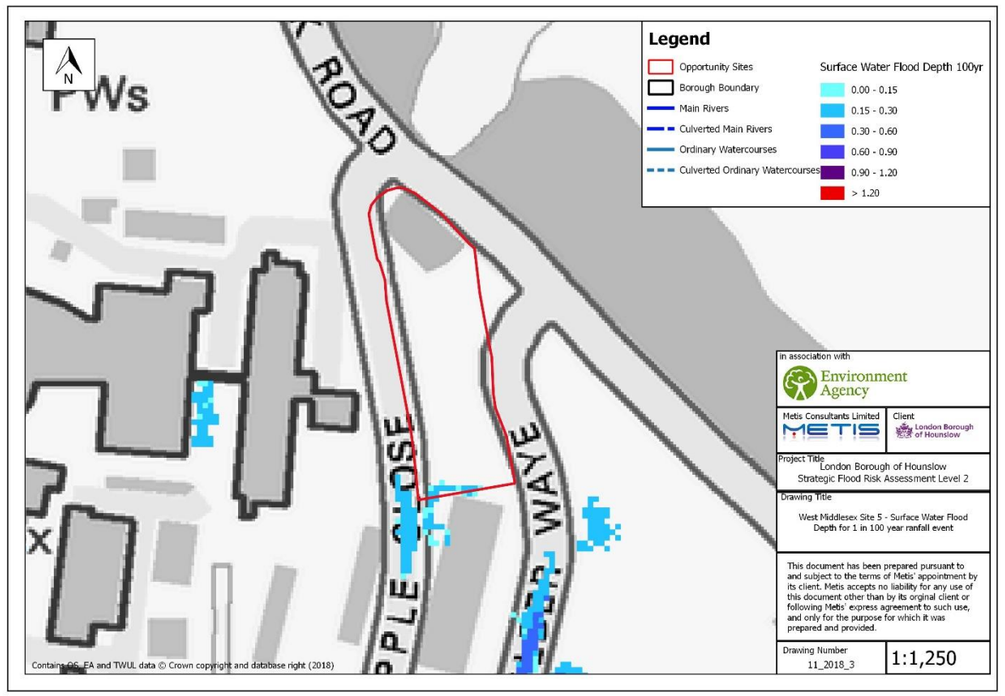
- Demonstrating evidence of the wider sustainability benefits of the site in a Sustainability Appraisal.
- Raising finished floor levels (FFLs) to 600mm above the 1% (100 year) predicted maximum flood level plus climate change or 300mm above the general ground level of the site (whichever is highest).
- Implementing flood resistant or resilient features.
- Incorporating SuDS into the site design.
- The production of a Flood Evacuation Plan and the signing up of site users to Flood Alerts and Flood Warnings.
- Leaving space in developments for flood risk management infrastructure to be maintained and enhanced for the lifetime of the development.

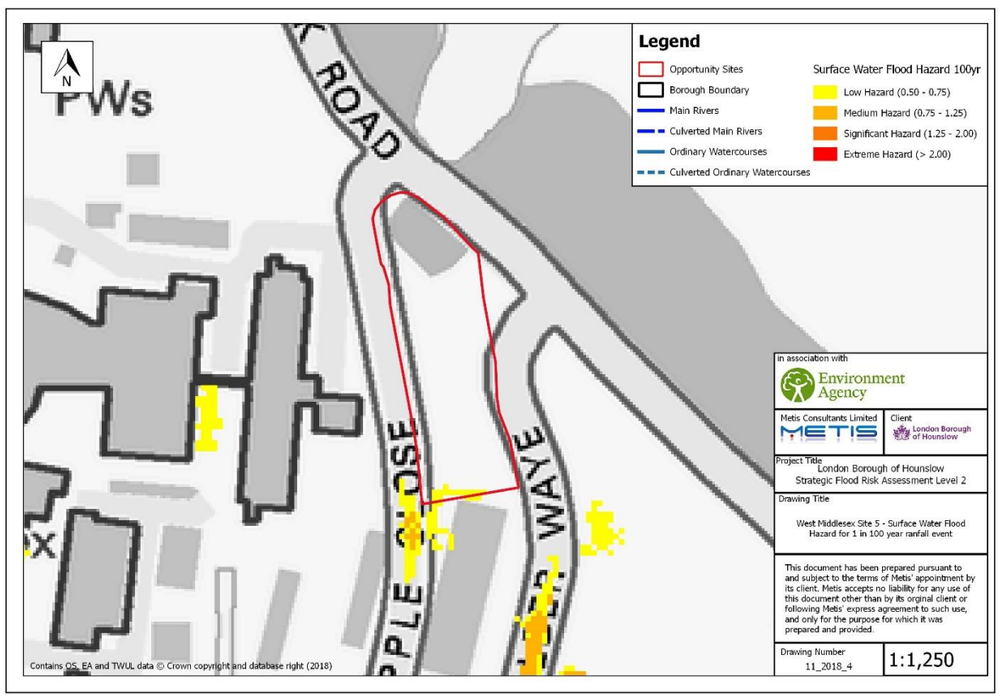
Site Assessment – West Middlesex Site 5, Twickenham Road, Isleworth, TW7 6AF



Site ID: 11







Site Assessment – West Middlesex Site 5, Twickenham Road, Isleworth, TW7 6AF

Site ID: 11

Site area:	0.4ha
Existing use / vulnerability:	Car Park / Less vulnerable
Proposed use / vulnerability	D2 / Less vulnerable
Geology:	Kempton Park Gravel Member underlain by London Clay

Risk Assessment:

Fluvial / Tidal

The River Thames is located approximately 280m to the south east of the site and the Duke of Northumberland's River is located approximately 315m to the south west of the site. The majority of the site is within Flood Zone 3a with the southern part of the site in Flood Zone 3b. Only the small parts of the site are defended and there is a high risk of fluvial and tidal flooding.

Surface Water + Sewers

The majority of the site is at very low risk of surface water flooding with the southern site boundary at medium risk. There have been 27 incidents of sewer flooding in the postcode area (see Appendix B).

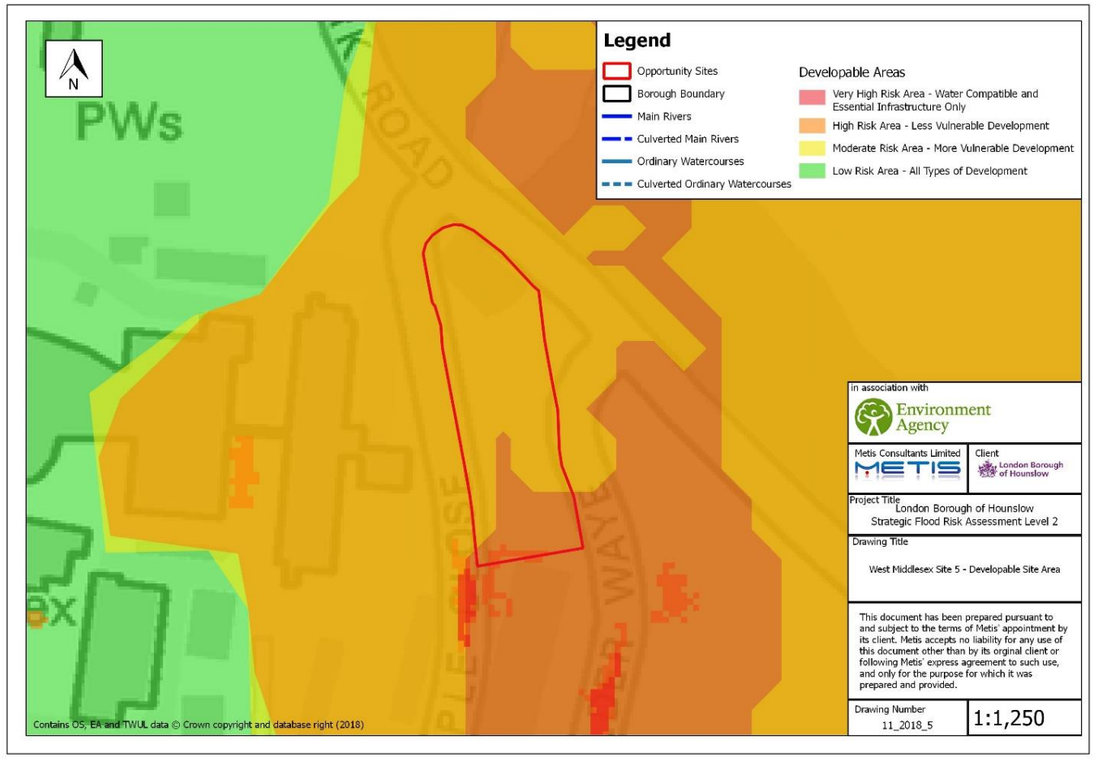
Groundwater

The site is underlain by superficial deposits of Kempton Park Gravel Member and a superficial aquifer. It is also shown to have a moderate susceptibility to groundwater flooding (see Appendix B). There is a moderate risk of flooding to the site from the superficial deposits.

Artificial

The site is at risk of flooding from artificial sources.

Developable Site Area



Site Access / Egress:

The entire site is at risk of fluvial and tidal flooding. Access/egress routes should be located above the flood level and directed to the north west. Safe refuge should also be provided at higher levels within the development.

Potential Mitigation Measures:

Fluvial / Tidal

The development should be designed so that users have safe access / egress routes in the event of a flood. Buildings should be constructed above the flood level and using flood resistant and / or resilient techniques. Development should be directed towards the northern part of the site where flood depths are likely to be lower and rapid inundation is less likely. Site users should register with the Environment Agency's Flood Warning service and be made aware of the site evacuation routes / safe refuge locations.

Surface Water + Sewers

Although only a small part of the site is at risk of flooding from surface water, the development of the site may cause a change in the localised topography and increase the surface water flood risk. SuDS measures should be applied on site to firstly minimise the amount of runoff, then attenuate the maximum practical volume of surface water onsite. Site ground conditions should be tested to determine the potential for disposal of surface water via infiltration. Any connections to the public sewer should be done so with consultation and permission from the infrastructure owner (in this case, Thames Water Utilities Ltd).

Groundwater

No basement levels should be developed on this site.

Artificial

Site users should register with the Environment Agency's Flood Warning service and be made aware of the site evacuation routes / safe refuge locations. Site users should be made aware of the site's location within a reservoir / lake failure inundation zone.

Site Specific FRA Requirements

1. Finished floor levels must be situated above the 1% (100 year) predicted maximum fluvial / tidal flood level plus climate change with a 600mm allowance for freeboard or 300mm above the general ground level of the site – whichever is highest.
2. Only water compatible development should be permitted in the Flood Zone 3b area.
3. A site specific Flood Evacuation Plan must demonstrate that the site can be used safely for its lifetime.
4. SuDS must be integrated within the site masterplan to maximise runoff reduction and surface water attenuation as much as reasonably practicable.
5. An overall drainage strategy must demonstrate how greenfield (as a minimum) or lower than greenfield (preferred) runoff can be achieved. This is in line with the London Plan and the Hounslow Local Plan 2015-2030. If this is not reasonably practicable, then this must be clearly explained and justified.
6. The FRA must demonstrate that flooding from all sources can be managed on site with no increase in flood risk to others.

Planning Considerations

Will development increase flood risk elsewhere?

The site has the potential to be developed without increasing flood risk to others. As the site lies wholly within Flood Zone 3 this may require flood plain compensation and a surface water management strategy integrated within the site masterplan.

How can development reduce flood risk overall?

It is recommended that the development proposals achieve greenfield runoff rates in line with the London Plan and Hounslow Local Plan 2015-2030. This would reduce surface water runoff and potential risk to others compared to the existing development.

How can the development be made safe?

A possible safe flooding access / egress route is available from the northern site boundary. This should be confirmed through a site specific Flood Evacuation Plan. It is recommended that all finished floor levels are set above predicted flood levels (refer above for details).

Is there a reasonable prospect of compliance with flood risk aspects of the Exception Test?

There is a reasonable prospect of compliance with the Exception Test. This can be achieved by:

- Demonstrating evidence of the wider sustainability benefits of the site in a Sustainability Appraisal.
- Raising finished floor levels (FFLs) to 600mm above the 1% (100 year) predicted maximum fluvial / tidal flood level plus climate change or 300mm above the general ground level of the site (whichever is highest).
- Implementing flood resistant or resilient features.
- Incorporating SuDS into the site design.
- The production of a Flood Evacuation Plan and the signing up of site users to Flood Alerts and Flood Warnings.
- Leaving space in developments for flood risk management infrastructure to be maintained and enhanced for the lifetime of the development.

Level 2 Strategic Flood Risk Assessment Extension

Prepared by:	Elijah Salami, Georgios Tzelepis	July 2020
Reviewed by:	Michael Arthur	July 2020
Director approval:	Michael Arthur	July 2020

1. Brief

The London Borough of Hounslow (Hounslow Council) have identified two additional sites which require a Level 2 Strategic Flood Risk Assessment (SFRA):

- Brentside Park
- Profile West Brentford Car Park

As Metis produced Hounslow's 2018 Level 2 SFRA, an extension to this was requested. The two new sites needed to be assessed by the 31st July 2020 to support their allocation in the Local Plan Review.

The two sites have been assessed using the same methodology and overall template as applied to all other site assessments in the 2018 Level 2 SFRA. It is noted that the National Planning Policy Framework Planning Practice Guidance (NPPF PPG) was updated in August 2019 and the 2018 template no longer fulfils all the published requirements. This will be addressed through a wider update to the Level 2 SFRA later in 2020.

2. Methodology

The purpose of a Level 2 SFRA is to assess each 'allocated site' for all sources of flood risk and propose mitigation measures that could be used to achieve the proposed development objectives. A site assessment pro forma was prepared for each site covering the following areas:

- Flood risk assessment
- Developable site area
- Potential mitigation measures
- Site specific FRA requirements
- Site access / egress
- Planning considerations

This is the same approach used for the 2018 Level 2 SFRA. Further details on the methodology applied are provided in the 2018 Level 2 SFRA.

3. Data Sources

Risk assessments for each site were completed by conducting detailed reviews of potential flood risk impacts using data from the Environment Agency, Thames Water, and the London Borough of Hounslow.

Table 3.1: Summary of Data Sources

Figure	Dataset	Description	Source
All Figures	Ordnance Survey BaseMap	Shows the background mapping for all figures.	Ordnance Survey Open Data
	Borough boundary	Shows the Hounslow borough boundary.	Ordnance Survey Open Data
	Additional Sites for SFRA Level 2	Shows the sites reviewed for the Level 2 SFRA extension.	Hounslow Council 2020
	Detailed River Network (Main Rivers & ordinary watercourses)	Shows the classification and pathway of main watercourses and other related water bodies.	Environment Agency 2013
1	National flood defences*	Shows the national spatial flood and linear defences that act to prevent flood water from flowing inland.	Environment Agency 2017
	Areas benefitting from flood defences	Shows those areas that would benefit from the presence of defences in a 1 in 100 (1%) chance of flooding each year from Rivers; or 1 in 200 (0.5 %) chance of flooding each year from the Sea.	Environment Agency 2017
	Flood Zone Map	Shows the flood extents for the various flood zones.	Environment Agency 2017
2	River Brent model data	Shows the 1 in 100 year and 1 in 100 year plus climate change flood extent for the River Brent.	Environment Agency 2017
	Thames Tidal Breach Zone	Shows potential Thames Tidal Breach Zones.	Environment Agency 2017
3	Risk of Flooding from Surface Water Depth: 1 in 100 year event	Shows the maximum depth of flooding from surface water that could result from a flood with a 1% chance of happening in any given year.	Environment Agency 2013
4	Risk of Flooding from Surface Water Hazard: 1 in 100 year event	Shows the flood hazard rating for flooding from surface water that could result from a flood with a 1% chance of happening in any given year.	Environment Agency 2013
5	Developable Areas	Shows the type of infrastructure that can be developed on each site.	Metis 2018

**Shown in Figure 1 and Figure 2*

4. Site Assessments

4.1. Brentside Park, Great West Road, TW9 9DS

All sources of flooding have been assessed as part of assessment and the risk of flooding to the site is summarised as follows:

- **Fluvial / tidal** – The site is at low risk of tidal flooding. Most of the site ranges from low to medium risk of fluvial flooding except for a small area directly adjacent to the River Brent which is at very high risk.
- **Surface water and sewers** – The risk of surface water flooding is low to high across part of the southern and western sides of the site. The rest of the site is at low or very low risk.
- **Groundwater** – There is a moderate risk of flooding from groundwater to the site.
- **Artificial** - The northern and eastern boundaries of the site are at risk of flooding from artificial sources.

Specific mitigation measures and FRA requirement have been included within the site-specific assessment. The site has the potential to be developed without increasing flood risk to others, while guidance has been provided to comply with the flood risk aspects of the Exception Test.

4.2. R/O Profile West, 950 Great West Road, TW8 9ES

All sources of flooding have been assessed as part of assessment and the risk of flooding to the site is summarised as follows:

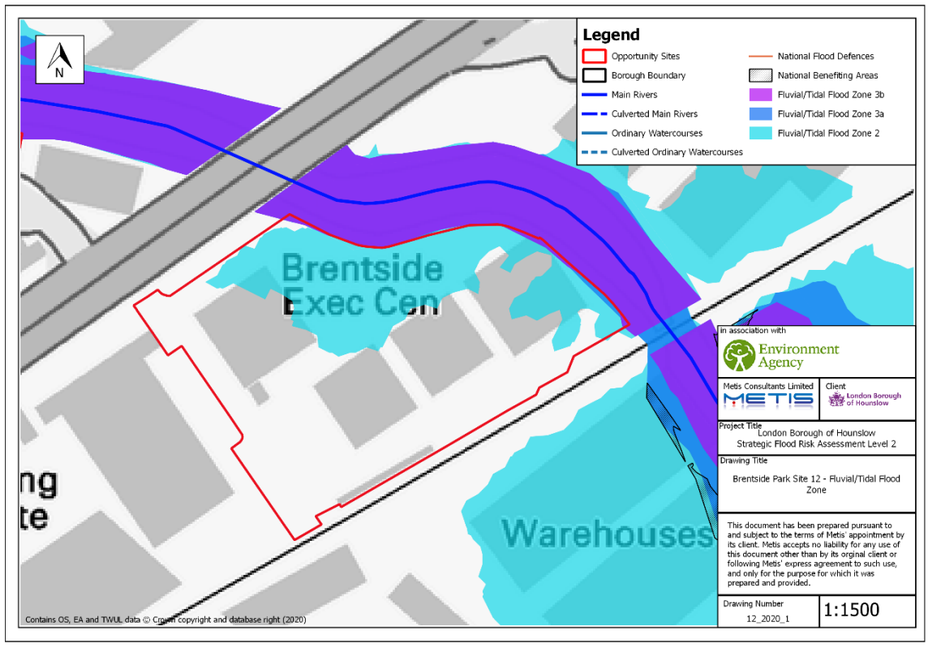
- **Fluvial / tidal** – The site is at low risk of tidal flooding and ranges from low to very high risk of fluvial flooding.
- **Surface water and sewers** – Risk of surface water flooding is very low across most of the site. A very small section of the western part of the site is at low to medium risk of flooding.
- **Groundwater** – There is a moderate risk of flooding from groundwater to the site.
- **Artificial** - The northern and western sides of the site are at risk of flooding from artificial sources.

Specific mitigation measures and FRA requirement have been included within the site-specific assessment. The site has the potential to be developed without increasing flood risk to others, while guidance has been provided to comply with the flood risk aspects of the Exception Test.

5. Recommendations

The risk assessment of all sites should be updated to meet the requirements of the latest NPPF PPG updates. We recommend that for each of the 13x sites (11x 2018 sites and 2x new sites), an additional page is produced which lists this detailed data where it is available. The sections covering safe development and planning considerations should be revised to reflect the new data.

Site Assessment – Brentside Park, Great West Road, TW9 9DS



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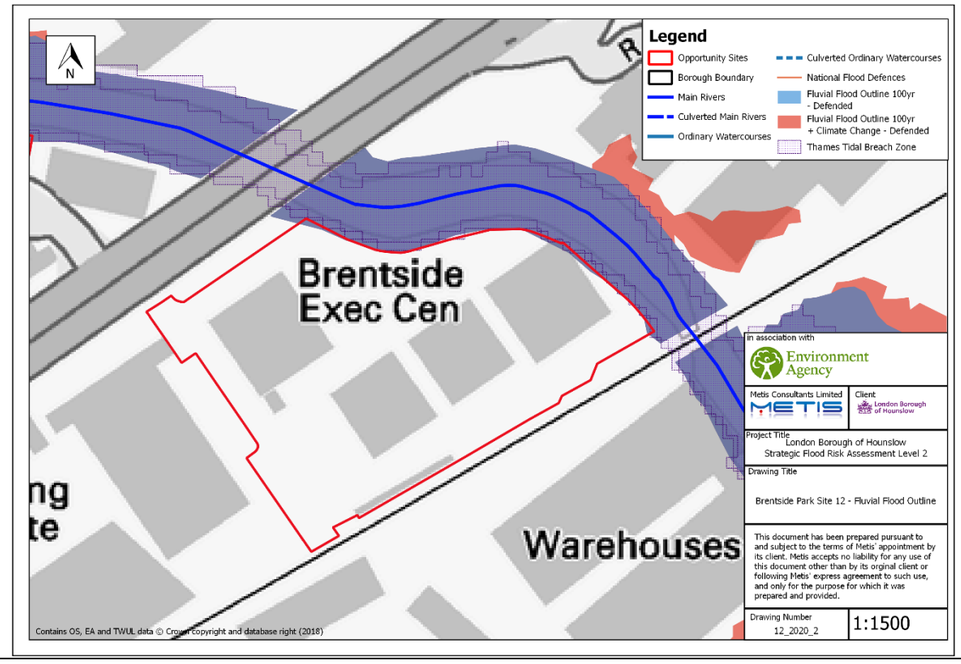
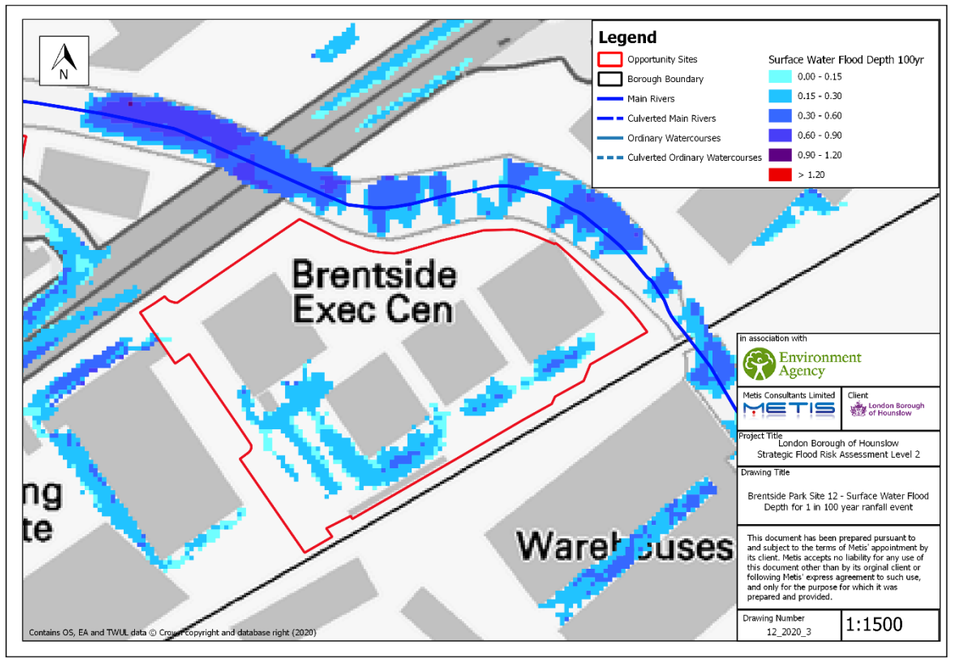
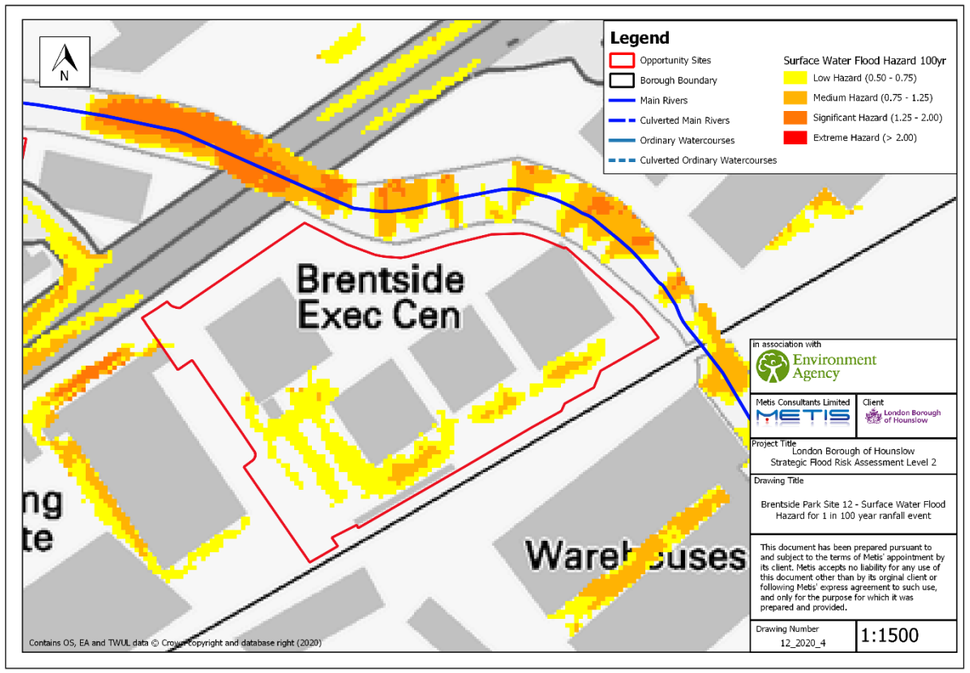






Site Assessment – Brentside Park, Great West Road, TW9 9DS

Site ID: 12

Site area:	1.8 ha
Existing use / vulnerability:	Hospital and Business / More Vulnerable and Less Vulnerable
Proposed use / vulnerability	Residential, Business and Retail (Mixed Use) / More Vulnerable and Less Vulnerable
Geology:	Un-recorded Superficial Geology – Bedrock Geology is London Clay

Risk Assessment:

Fluvial / Tidal

The River Brent is located adjacent to the site's northern and eastern boundaries and the River Thames is located approximately 1.1km to the south east of the site. More than half of the site (southern and western sides) lies within Flood Zone 1 with the rest of the site in Flood Zone 2. The northern and eastern boundaries of the site lie within Flood Zones 3a and 3b. The site is at low risk of tidal flooding. It ranges from low to medium risk of fluvial flooding for the majority of the site and very high risk for a small area directly adjacent to the River Brent.

Surface Water + Sewers

The risk of surface water flooding is low to high across part of the southern and western sides of the site. The northern and eastern parts of the site are at low or very low risk. There have been eight incidents of sewer flooding within the postcode area.

Groundwater

There are no recorded superficial deposits for the majority of the site, excluding a small part in its south eastern side that is underlain by superficial deposits of Langley Silt Member. The site falls in an area that is classified as having >= 25% < 50% susceptibility to groundwater flooding. There is a moderate risk of flooding from groundwater to the site.

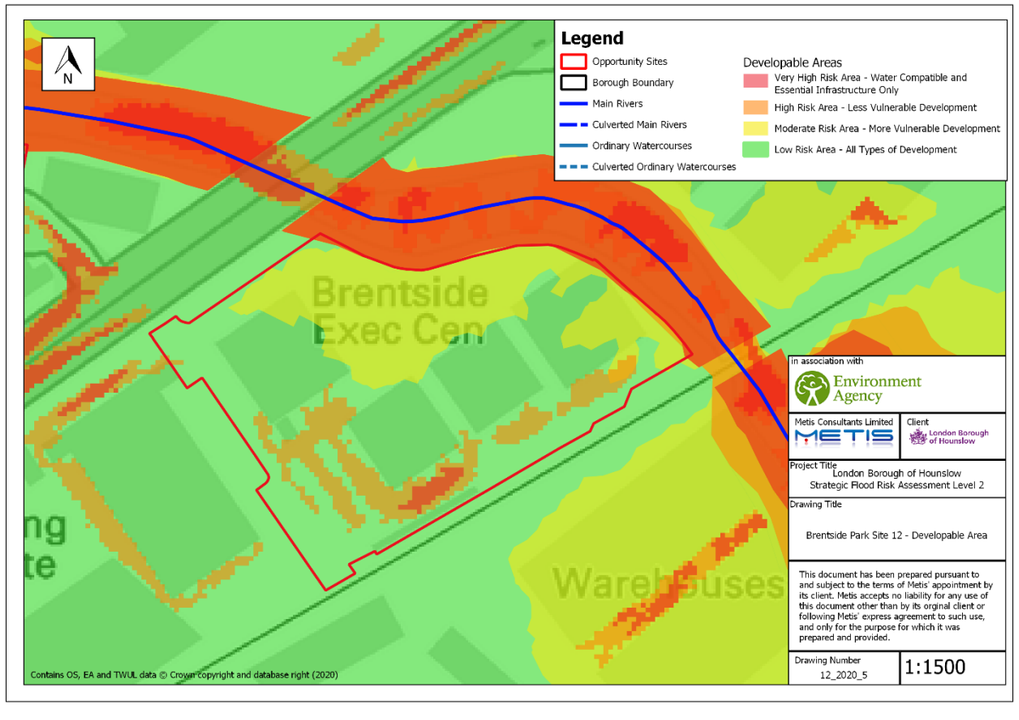
Artificial

The northern and eastern boundaries of the site are at risk of flooding from artificial sources, and specifically reservoir breach. The site could be at risk if one or more of the following reservoirs fail: Wraysbury, King George VI, Queen Mary, Queen Elizabeth II, Queen Mother, Osterley Middle Lake and Welsh Harp Reservoir.

Climate Change

It is likely that the risk of flooding to the site from fluvial and surface water sources will increase with climate change. Flood depths and flow velocities could be higher under climate change.

Developable Site Area



Site Access / Egress:

The southern and western sides of the site lie within Flood Zone 1. A safe access and egress route would need to be directed to Great West Road, through the side road to the west of the site, where the risk is lowest.

Potential Mitigation Measures:

Fluvial / Tidal

Developments cannot take place in Flood Zone 3b extent. Development should be directed towards the southern and western parts of the site. Developments within the Flood Zone 3a + CC extent requires flood plain compensation and finished floor levels of at least 0.3m above the predicted flood level at that point. This provides a minimum 0.3m allowance for freeboard. Where predicted flood depths are less than 0.3m, flood resistance construction of buildings is required. Flood resilient measures should be implemented where predicted flood depths are greater than 0.3m. A Flood Emergency and Evacuation Plans for the site should be developed. Any developments should take place at least 8m away from the River Brent. If developments are proposed within 8m of the River Brent, a flood risk activity permit may be required. Site users should be signed up to EA's Flood Warning Service.

Surface Water + Sewers

For developments outside of the fluvial Flood Zone 3a + CC extent, developments must have finished floor levels must be 0.3m above the predicted 1 in 1000yr event flood depth at any point onsite.

SuDS measures should be applied on site to firstly minimise the amount of runoff, then attenuate the maximum practical volume of surface water onsite. The detailed drainage plan must account for 100% of surface water generated from the site and comply with Policy 5.13 of the London Plan and Non-statutory technical standards for SuDS. Site ground conditions should be tested to determine the potential for disposal of surface water via infiltration. Any connections to the public sewer should be done so with consultation and permission from the infrastructure owner (in this case, Thames Water Utilities Ltd).

Groundwater

No basement dwelling developments should take place. Basements developments, that are not basement dwellings, may be appropriate at some locations onsite, but a site-specific Flood Risk Assessment must be completed and the basement must not have any adverse impacts on flooding locally during a 1 in 100 year fluvial and surface water events. Basements must contain an egress route to a higher floor above the predicted Flood Zone 3a + CC fluvial and 1 in 1000yr surface water flood depths. Basements should be made flood resilient.

Artificial

Local Authority Emergency Planning Officers must be consulted to create a reservoir failure emergency and evacuation plan. Site users should be made aware of the site's location within an area at risk of flooding due to a reservoir failure.

Site Specific FRA Requirements

1. Developments within the Flood Zone 3a + CC extent requires flood plain compensation and finished floor levels of at least 0.3m above the predicted flood level at that point.
2. Developments must have finished floor levels at least 0.3m above the predicted 1 in 1000yr event flood of surface water depth at any point onsite.
3. Only 'water compatible' development is permitted within the Flood Zone 3b area.
4. SuDS must be integrated within the site masterplan to maximise runoff reduction and surface water attenuation as much as reasonably practicable.
5. An overall drainage strategy must demonstrate how greenfield (as a minimum) or lower than greenfield (preferred) runoff can be achieved. This is in line with the London Plan and the London Borough of Hounslow Local Plan 2015-2030 If this is not reasonably practicable, then this must be clearly explained and justified.
6. The Flood Risk Assessment must demonstrate that surface water and fluvial flooding can be managed on site with no increase in flood risk to others.
7. Thames Water must be consulted to confirm if the site has historically flooded.

Planning Considerations

Will development increase flood risk elsewhere?

• Yes - The development must use surface water drainage techniques to manage surface water runoff onsite through above ground SuDS and/or below ground attenuation.

• Developments within the 1 in 1000 year surface water and Flood Zone 3a + CC extents must provide compensatory flood storage that is equal to, or exceeds, the flood depths from these events

How can development reduce flood risk overall?

It is recommended that the development proposals achieve greenfield runoff rates in line with the London Plan and Hounslow Local Plan 2015-2030. This would reduce surface water runoff and potential risk to others compared to the existing development.

How can the development be made safe?

A site-specific Flood Evacuation Plan should confirm if a safe fluvial flooding access/egress route is available. It is recommended that all finished floor levels are set above predicted flood levels (refer above for details).

Is there a reasonable prospect of compliance with flood risk aspects of the Exception Test?

There is a reasonable prospect of compliance with the Exception Test. This can be achieved by:

- Demonstrating evidence of the wider sustainability benefits of the site in a Sustainability Appraisal.
- For developments within the Flood Zone 3a + CC extent development finished floor levels must be at least 0.3m above the predicted flood level at that point onsite.
- For developments outside of the fluvial Flood Zone 3a + CC extent, developments finished floor level must be at least 0.3m above the predicted 1 in 1000yr surface water event flood depth at any point onsite.
- Where predicted flood depths are less than 0.3m, flood resistance construction of developments is required. Flood resilient measures should be implemented where predicted flood depths are greater than 0.3m as maximum flood depths predicted on site are greater than 0.3m with climate change factored in.
- Incorporating SuDS into the site design.
- The production of a Flood Evacuation Plan and the signing up of site users to Flood Alerts and Flood Warnings.
- Leaving space in developments for flood risk management infrastructure to be maintained and enhanced for the lifetime of the development.

Site Assessment - Brentside Park, Great West Road, TW9 9DS

Site ID: 12

Address: Brentside Park, Hounslow TW9 9DS

This page is an addendum to the 2019 (v1.1) Level 2 SFRA Site Assessments. It provides additional risk assessment information in line with the August 2019 update to the NPPF Planning Practice Guidelines for a Level 2 Strategic Flood Risk Assessment. This page should be read in conjunction with the 2019 Level 2 SFRA documentation for the site.

Current Risk Summary					
Fluvial / Tidal			**Groundwater**		
FZ2	31	% of Site	<25%	0	% of Site
FZ3a	1	% of Site	25-50	100	% of Site
FZ3b	0.7	% of Site	50-75	0	% of Site
Surface Water			>75	0	% of Site
30yr	1	% of Site	**Artificial**		
100yr	13	% of Site	Reservoir	Yes	At risk?
1000yr	42	% of Site	Canal	No	At risk?
Sewer Flooding			Other	No	At risk?
No. Incidents	8				

Flood Defences

N/A - the site is not in an area benefitting from flood defences.

FLUVIAL/TIDAL

Risk Assessment (Defended)				
Parameter	**FZ3b**	**FZ3a**	***FZ3a+CC**	**Units**
Speed of inundation	5	4	1.5	Hrs
Min. Depth	0.1	0	0	m
Max. Depth	0.73	1.1	1.8	m
Max. Velocity	0.26	0.39	0.75	m/s
Max Flood Level	6.36	6.88	7.69	m AOD
Max Ground Level	10.36	10.36	10.36	m AOD
Min Ground Level	7.14	7.14	7.14	m AOD
Flood Hazard	Danger for most	Danger for most	Danger for all	N/A
Duration of Flood	13.5+	14.5+	17+	Hrs

* +70% Climate Change Allowance event (upper end allowance extreme case) is reviewed

Risk Assessment (Undefended)			
Parameter	**FZ3a**	***FZ3a+CC**	**Units**
Speed of inundation	4	1.5	Hrs
Min. Depth	0	0	m
Max. Depth	1.1	1.8	m
Max. Velocity	0.39	0.75	m/s
Max Flood Level	6.88	7.69	m AOD
Max Ground Level	10.36	10.36	m AOD
Min Ground Level	7.14	7.14	m AOD
Flood Hazard	Danger for most	Danger for most	N/A
Duration of Flood	14.5+	17+	Hrs

* +70% Climate Change Allowance event (upper end allowance extreme case) is reviewed

Description of Flood Mechanism

- The site sits adjacent to the River Brent with the river located north east of the site. The flooding orginates from the River Brent, innundating site from the north east . The Flood Zone 3a extent only covers a small area towards the north east of the site.
- The flood extent for the climate change scenrio is significantly greater innundating the majority of the north and east of the site. Maximum Flood depths and velocities are also greater during the climate change event.

SURFACE WATER

Risk Assessment				
Parameter	**30yr**	**100yr**	***1000yr**	**Units**
Min. Depth	0.15 - 0.30	0.00 - 0.15	0.00 - 0.15	m
Max. Depth	0.15 - 0.30	0.30 - 0.60	0.30 - 0.60	m
Max. Velocity	0.00 - 0.25	0.25 - 0.50	1.00 - 2.00	m/s
Max. Hazard	0.75 - 1.25	0.75 - 1.25	1.25 - 2.00	N/A

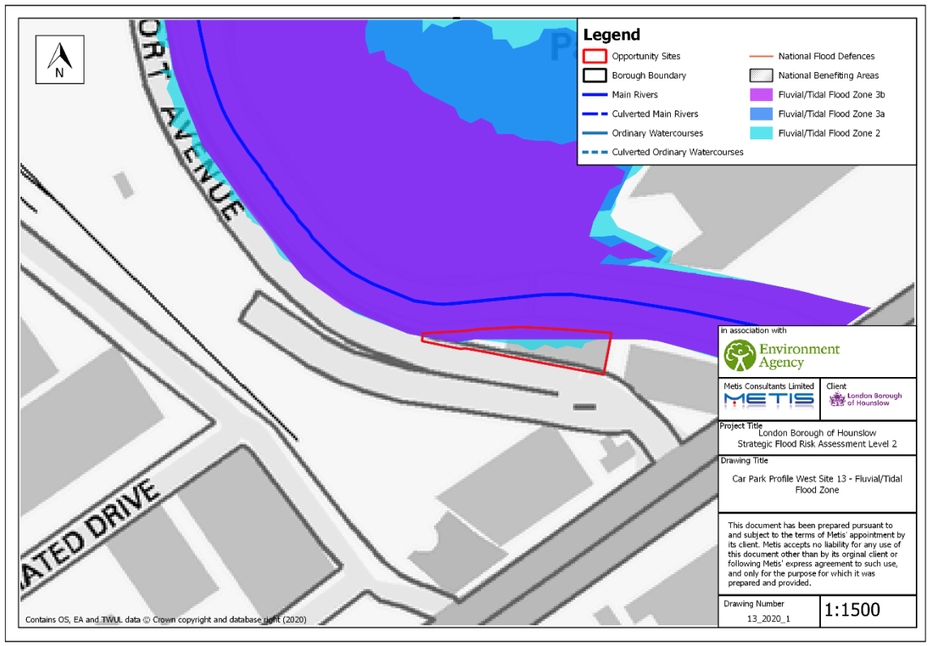
*The 0.1% annual probability extent represents the potential climate change adjusted impact of current risk

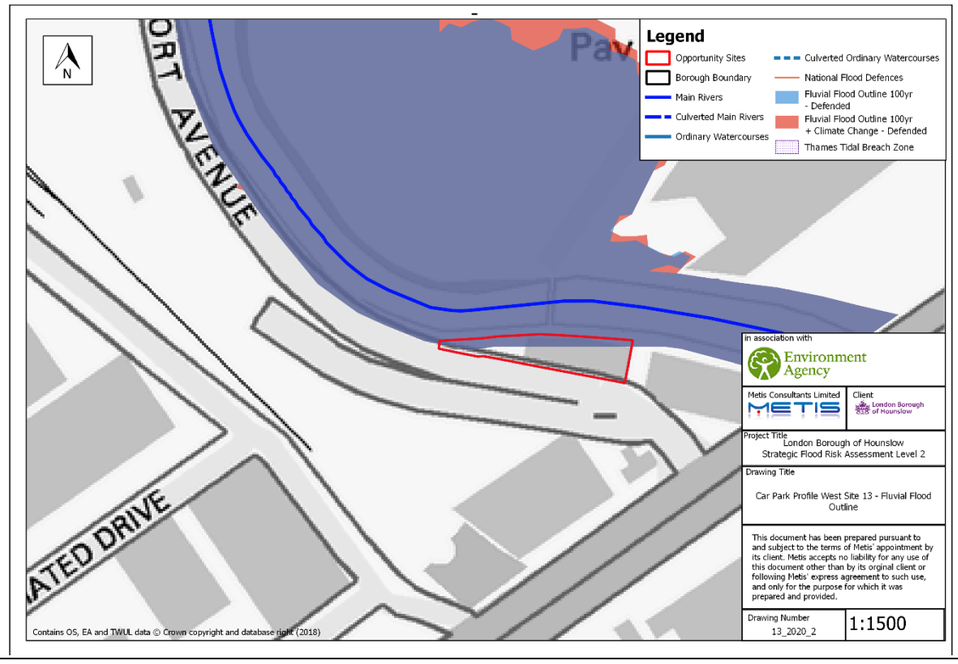
Description of Flood Mechanism

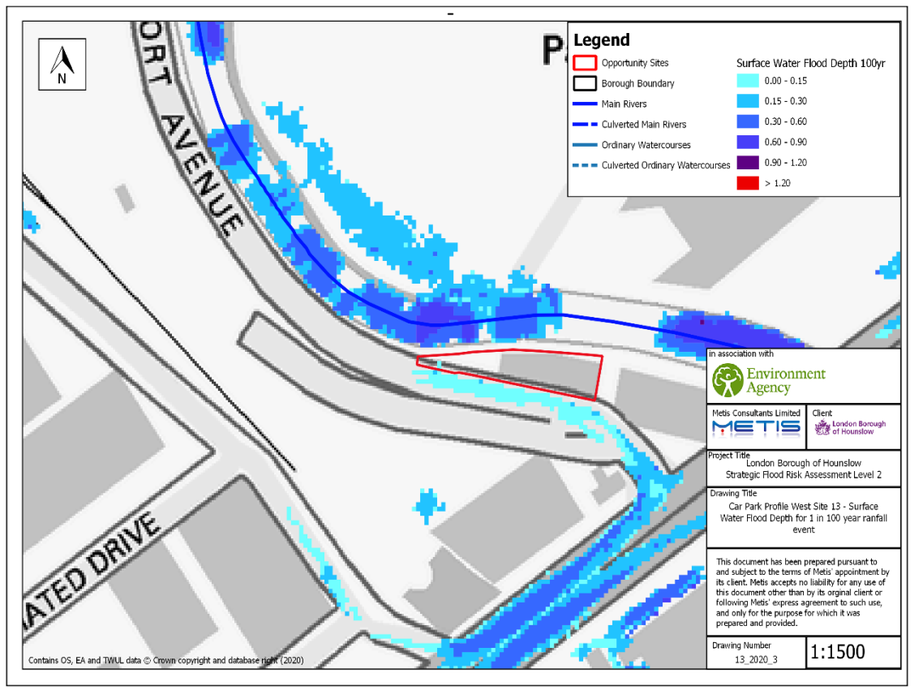
- Surface Water enters the site from Great West Road in the northwest and continues the flow offsite into the River Brent.
- CC will increase the of the maximum velocity and hazard of flooding.

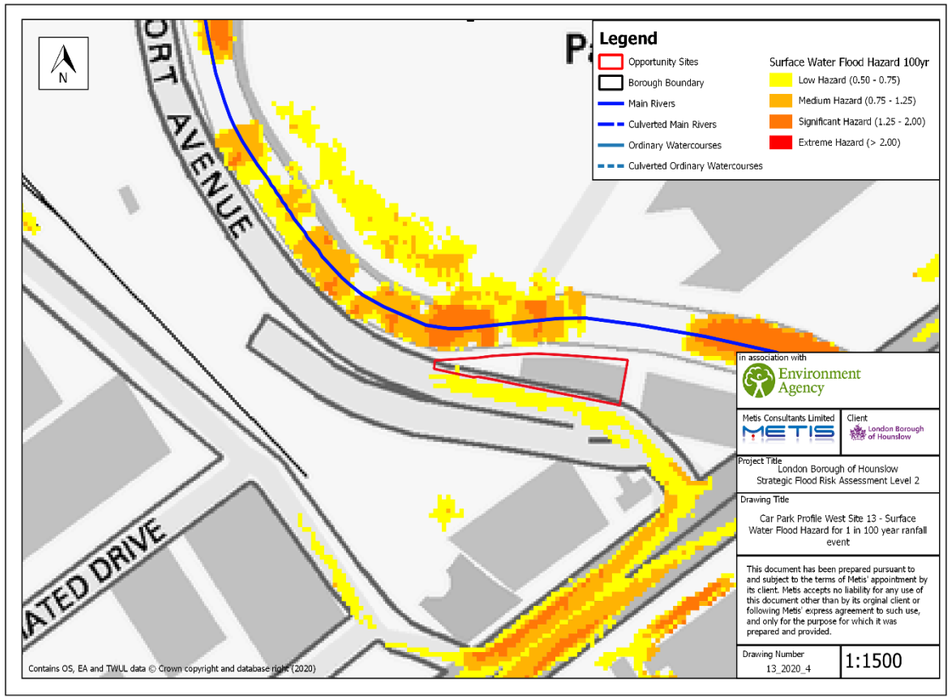
Site Assessment – R/O Profile West, 950 Great West Road, TW8 9ES

Site ID: 13









Site Assessment – R/O Profile West, 950 Great West Road, TW8 9ES

Site ID: 13

Site area:	0.6 ha
Existing use / vulnerability:	Car Park / Less Vulnerable
Proposed use / vulnerability	Residential and Industrial (Mixed Use) / More Vulnerable and Less Vulnerable
Geology:	Un-recorded Superficial Geology – Bedrock Geology is London Clay

Risk Assessment:

Fluvial / Tidal

The River Brent is located adjacent to the site's northern boundary and the River Thames is located approximately 1.3km to the south east of the site. Approximately half of the site (southern side) lies within Flood Zone 1 with a small part in the central part of the site in Flood Zone 2. The northern part of the site lies within Flood Zones 3a and 3b. The site is at low risk of tidal flooding and ranges from low to very high risk of fluvial flooding from the River Brent.

Surface Water + Sewers

Risk of surface water flooding is very low across the majority of the site. A very small section of the western part of the site is at low to medium risk of surface water flooding. There have been eight incidents of sewer flooding within the postcode area.

Groundwater

There are no recorded superficial deposits for the site. It falls in an area that is classified as having >= 25% < 50% susceptibility to groundwater flooding. There is a moderate risk of flooding from groundwater to the site.

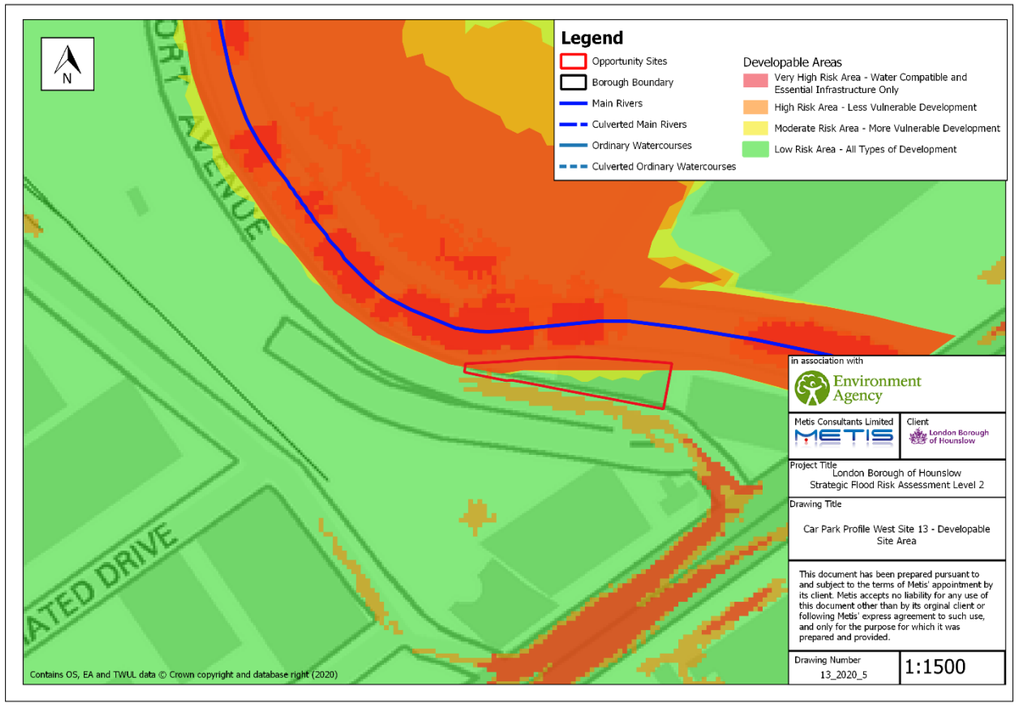
Artificial

The northern and western sides of the site are at risk of flooding from artificial sources, and specifically reservoir breach. The site could be at risk if one or more of the following reservoirs fail: Queen Mary, Queen Elizabeth II, Osterley Middle Lake and Welsh Harp Reservoir.

Climate Change

It is likely that the risk of flooding to the site from fluvial and surface water sources will increase with climate change. Flood depths and flow velocities could be higher under climate change.

Developable Site Area



Site Access / Egress:

The southern side of the site lies within Flood Zone 1. The site borders Transport Avenue to the south. A safe access and egress route would need to be directed to that direction, where the risk is lowest.

Potential Mitigation Measures:

Fluvial / Tidal

Developments cannot take place in Flood Zone 3b extent. Development should be directed towards the southern half of the site. Developments within the Flood Zone 3a + CC extent requires flood plain compensation and finished floor levels of at least 0.3m above the predicted flood level at that point. This provides a minimum 0.3m allowance for freeboard. Where predicted flood depths are less than 0.3m, flood resistance construction of buildings is required. Flood resilient measures should be implemented where predicted flood depths are greater than 0.3m. A Flood Emergency and Evacuation Plans for the site should be developed. Any developments should take place at least 8m away from the River Brent. If developments are proposed within 8m of the River Brent, a flood risk activity permit may be required. Site users should be signed up to EA's Flood Warning Service.

Surface Water + Sewers

For developments outside of the fluvial Flood Zone 3a + CC extent, developments must have finished floor levels must be 0.3m above the predicted 1 in 1000yr event flood depth at any point onsite.

SuDS measures should be applied on site to firstly minimise the amount of runoff, then attenuate the maximum practical volume of surface water onsite. The detailed drainage plan must account for 100% of surface water generated from the site and comply with Policy 5.13 of the London Plan and Non-statutory technical standards for SuDS. Site ground conditions should be tested to determine the potential for disposal of surface water via infiltration. Any connections to the public sewer should be done so with consultation and permission from the infrastructure owner (in this case, Thames Water Utilities Ltd).

Groundwater

No basement dwelling developments should take place. Basements developments, that are not basement dwellings, may be appropriate at some locations onsite, but a site-specific Flood Risk Assessment must be completed and the basement must not have any adverse impacts on flooding locally during a 1 in 100 year fluvial and surface water events. Basements must contain an egress route to a higher floor above the predicted Flood Zone 3a + CC fluvial and 1 in 1000 year surface water flood depths. Basements should be made flood resilient.

Artificial

Local Authority Emergency Planning Officers must be consulted to create a reservoir failure emergency and evacuation plan. Site users should be made aware of the site's location within an area at risk of flooding due to a reservoir failure.

Site Specific FRA Requirements

1. Developments within the Flood Zone 3a + CC extent requires flood plain compensation and finished floor levels of at least 0.3m above the predicted flood level at that point. Developments must have finished floor levels at least 0.3m above the predicted 1 in 1000yr event flood of surface water depth at any point onsite.
2. Only 'water compatible' development is permitted within the Flood Zone 3b area.
3. SuDS must be integrated within the site masterplan to maximise runoff reduction and surface water attenuation as much as reasonably practicable.
4. An overall drainage strategy must demonstrate how greenfield (as a minimum) or lower than greenfield (preferred) runoff can be achieved. This is in line with the London Plan and the London Borough of Hounslow Local Plan 2015-2030 If this is not reasonably practicable, then this must be clearly explained and justified.
5. The Flood Risk Assessment must demonstrate that surface water and fluvial flooding can be managed on site with no increase in flood risk to others.
6. Thames Water must be consulted to confirm if the site has historically flooded.

Planning Considerations

Will development increase flood risk elsewhere?

• Yes - The development must use surface water drainage techniques to manage surface water runoff onsite through above ground SuDS and/or below ground attenuation.

• Developments within the 1 in 1000 year surface water and Flood Zone 3a + CC extents must provide compensatory flood storage that is equal to, or exceeds, the flood depths from these events.

How can development reduce flood risk overall?

It is recommended that the development proposals achieve greenfield runoff rates in line with the London Plan and Hounslow Local Plan 2015-2030. This would reduce surface water runoff and potential risk to others compared to the existing development.

How can the development be made safe?

A site-specific Flood Evacuation Plan should confirm if a safe fluvial flooding access/egress route is available. It is recommended that all finished floor levels are set above predicted flood levels (refer above for details).

Is there a reasonable prospect of compliance with flood risk aspects of the Exception Test?

There is a reasonable prospect of compliance with the Exception Test. This can be achieved by:

- Demonstrating evidence of the wider sustainability benefits of the site in a Sustainability Appraisal.
- For developments within the Flood Zone 3a + CC extent, developments finished floor levels must be at least 0.3m above the predicted flood level at that point.
- For developments outside of the fluvial Flood Zone 3a + CC extent, developments finished floor levels must be at least 0.3m above the predicted 1 in 1000yr event flood depth at any point onsite.
- Where predicted flood depths are less than 0.3m, flood resistance construction of developments is required. Flood resilient measures should be implemented where predicted flood depths are greater than 0.3m as maximum flood depths predicted on site are greater than 0.3m with climate change factored in.
- Incorporating SuDS into the site design.
- The production of a Flood Evacuation Plan and the signing up of site users to Flood Alerts and Flood Warnings.
- Leaving space in developments for flood risk management infrastructure to be maintained and enhanced for the lifetime of the development.

Site Assessment - R/O Profile West, 950 Great West Road, TW8 9ES

Site ID: 13

Address: West Brentfield Car Park, Hounslow, TW8 9ES

This page is an addendum to the 2019 (v1.1) Level 2 SFRA Site Assessments. It provides additional risk assessment information in line with the August 2019 update to the NPPF Planning Practice Guidelines for a Level 2 Strategic Flood Risk Assessment. This page should be read in conjunction with the 2019 Level 2 SFRA documentation for the site.

Current Risk Summary					
Fluvial / Tidal			**Groundwater**		
FZ2	48	% of Site	<25%	0	% of Site
FZ3a	34	% of Site	25-50	100	% of Site
FZ3b	34	% of Site	50-75	0	% of Site
Surface Water			>75	0	% of Site
30yr	0	% of Site	**Artificial**		
100yr	1	% of Site	Reservoir	Yes	At risk?
1000yr	3	% of Site	Canal	No	At risk?
Sewer Flooding			Other	No	At risk?
No. Incidents	8				

Flood Defences

N/A - the site is not in an area benefitting from flood defences.

FLUVIAL/TIDAL

Risk Assessment (Defended)				
Parameter	**FZ3b**	**FZ3a**	***FZ3a+CC**	**Units**
Speed of inundation	4.5**	4**	1.5**	Hrs
Min. Depth	0.33	0.89	0	m
Max. Depth	1.67	2.22	3.07	m
Max. Velocity	0.61	0.86	1.34	m/s
Max Flood Level	6.44	7	7.85	m AOD
Max Ground Level	9.28	9.28	9.28	m AOD
Min Ground Level	5.78	5.78	5.78	m AOD
Flood Hazard	Danger for all	Danger for all	Danger for all	N/A
Duration of Flood	14+**	14.5+**	17+**	Hrs

* +70% Climate Change Allowance event (upper end allowance extreme case) is reviewed

Risk Assessment (Undefended)			
Parameter	**FZ3a**	***FZ3a+CC**	**Units**
Speed of inundation	4**	1.5**	Hrs
Min. Depth	0.89	0	m
Max. Depth	2.22	3.07	m
Max. Velocity	0.86	1.34	m/s
Max Flood Level	7	7.85	m AOD
Max Ground Level	9.28	9.28	m AOD
Min Ground Level	5.78	5.78	m AOD
Flood Hazard	Danger for all	Danger for all	N/A
Duration of Flood	14.5+**	17+**	Hrs

* +70% Climate Change Allowance event (upper end allowance extreme case) is reviewed

Description of Flood Mechanism

- The site sits adjacent to the River Brent, innundating the site from the north. The flood extent covers the northern and a portion of the western part of the site for the 1 in 20 year and 1 in 100 year event.
- The flood risk extent for the climate change event is slighlty greater innundating the north and centre of the site. The east, south and west of the site lie outside the Flood Zone 3a + CC extent.
- The maximum flood depth and velocity are also higher under the climate change event.

**The site boundary extends into the river channel, placing it by default into Flood Zone 3b (1 in 20 year) and 3a (1 in 100 year). However, as the site is at predicted risk of flooding, we have assessed the flood inundation and flood duration based on when flooding exceeds the river channel extent and further encroaches onto the site. All other data has been assessed based on the overlap of the Hounslow and site extents.

SURFACE WATER

Risk Assessment				
Parameter	**30yr**	**100yr**	***1000yr**	**Units**
Min. Depth	N/A	0.00 - 0.15	0.00 - 0.15	m
Max. Depth	N/A	0.00 - 0.15	0.15 - 0.30	m
Max. Velocity	N/A	0.50 - 1.00	0.50 - 1.00	m/s
Max. Hazard	N/A	0.50 - 0.75	0.50 - 0.75	N/A

*The 0.1% annual probability extent represents the potential climate change adjusted impact of current risk

Description of Flood Mechanism

- Overland flow path flows along Great West Road to the east of the site and then continues to flow in a north westerly direction along Transport Ave which lies adjcacent to the south of the site. The overland flow path then discharges into the River Brent to the north west of the site.
- CC will increase the extent of the max depth but not the velocity and hazard onsite.