

Flood Risk Assessment

May 2024



Musgrave House, Widewater Place, Denham, UB9 6NS

The KSIMC of London



Document History

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1 Executive Summary

- 1.1 The development site is at Musgrave House, Widewater Place, Moor Hall Road, Denham, UB9 6NS. It is almost completely impermeable, consisting of a large building with associated car parking.
- 1.2 The proposed development will convert the existing building into 36 residential units.
- 1.3 The site is located within Flood Zone 1 on the Environment Agency (EA) flood map, which indicates a 'low' risk of flooding from fluvial and tidal sources. 'Low' risk areas have an annual probability of flooding of less than 0.1% (or 1 in 1000).
- 1.4 The Environment Agency and West London SFRA surface water flood maps show that the building is not at risk of surface water flooding but in the low risk scenario the surrounding car park is, to depths less than 300mm.
- 1.5 As the car park is at risk of surface water flooding, a notice should be installed in a communal area making residents aware of the risk and what to do in the rare event of flooding. The building will provide safe refuge during any flooding to the car park.
- 1.6 This document was reviewed in May 2024 following change of ownership to ensure that policy and flood risk have been updated to accurately reflect the site at present day. All mapping used in this report has been reviewed against current available datasets to confirm that all flood models and data sources are up to date.

2 Introduction

- 2.1 This Flood Risk Assessment (FRA) has been prepared in support of an application by The KSIMC of London for a proposed permitted development application at Musgrave House, Widewater Place, Moor Hall Road, Denham, UB9 6NS. A location plan is included in **Appendix A**.
- 2.2 The proposed development consists of the internal reconfiguration of the building to create 36 residential units over three floors comprised of:
- 3 x 3-bedroom units
 - 20 x 2-bedroom units
 - 13 x 1-bedroom units
- 2.3 Proposed development plans are included in **Appendix B**.
- 2.4 The site is shown to be at a low risk of a fluvial (river) flood event being located within the Flood Zone 1 on the Flood Map for Planning. Flood Zone 1 is defined as having less than a 0.1% Annual Expected Probability (AEP) of river flooding. The EA Flood Map has been enclosed in Appendix C.
- 2.5 The contents of this FRA are based on the advice set out in the National Planning Policy Framework (NPPF) published in September 2023, Annex 3: Flood risk vulnerability classification, also from the NPPF and PPG 'Guidance for Flood Risk and Coastal Change', updated in August 2022.
- 2.6 This document includes:
- Section 2 – provides an introduction;
 - Section 3 - describes relevant policy;
 - Section 4 - site description, including site levels, proximity to watercourses etc.;
 - Section 5 - outline potential sources of flooding;
 - Section 6 – mitigation measures and access/egress details;
 - Section 7 – provides a summary and conclusions.

3 Policy Context

Introduction

3.1 This section sets out the policy context. This report is based on the advice set out in the National Planning Policy Framework (NPPF) last updated December 2023 and the Planning Practical Guidance (PPG) updated in August 2022.

3.2 Paragraph 173 footnote 59 of the NPPF states:

“A site-specific flood risk assessment should be provided for all developments in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.”

3.3 The flood zones are defined as:

- Flood Zone 1 - less than a 0.1% (1 in 1000) annual probability of river or tidal flooding.
- Flood Zone 2 - between a 0.1% and 1% (1 in 1000 and 1 in 100) annual probability of river flooding; or between a 0.1% and 0.5% (1 in 1000 and 1 in 200) annual probability of flooding from tidal sources.
- Flood Zone 3a- This zone comprises land assessed as having a 1% (1 in 100) or greater annual probability of river flooding; and for tidal flooding at least a 0.5% (1 in 200) annual probability of flooding from tidal sources.
- Flood Zone 3b - This zone comprises land where water has to flow or be stored in times of flood. This classification is usually classified as land which had a 3.33% (1 in 30) annual probability of flooding.

3.4 Paragraph 165 discusses the suitability of development location, particularly with regards to future risks induced by climate change:

“Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere”.

3.5 Paragraph 166 of the National Planning Policy Framework (NPPF) sets out how:

“Strategic policies should be informed by a strategic flood risk assessment and should manage flood risk from all sources. They should consider cumulative impacts in, or affecting, local areas susceptible to flooding, and take account of advice from the Environment Agency and other relevant flood risk management authorities, such as lead local flood authorities and internal drainage boards”.

3.6 Paragraphs 175 NPPF discusses the application of sustainable drainage systems:

“Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate. The systems used should:

- a) Take account of advice from the lead local flood authority;*
- b) Have appropriate proposed minimum operational standards;*
- c) Have maintenance arrangements in place to ensure an acceptable standard of operation of the lifetime of the development; and*
- d) Where possible, provide multifunctional benefits.”*

3.7 The Flood Map for Planning shows the site to be located in Flood Zone 1, at ‘low’ risk of flooding from fluvial sources. This is considered to be an area with less than 1 in 1000 annual chance of flooding. All flood water is contained within the banks of the Fray’s River however, as there is a bridge directly over the river the mapping doesn’t differentiate between the bridge over the river and the river bed itself. The EA Flood Map has been enclosed in Appendix C.

3.8 It should be noted that within the PPG office use buildings are deemed to be a “less vulnerable” land use in terms of flood risk.

The London Plan (2021)

3.9 The London Plan provides an overall strategic plan for the development of London over the next 20-25 years. It sets out the integrated economic, environmental, transport and social framework and is legally part of each of London’s Local Planning Authorities’ Development Plan. This ensures that all planning decisions within Greater London take into account this plan.

3.10 Policy SI 12 Flood Risk Management states:

“A. Current and expected flood risk from all sources (as defined in paragraph 9.2.12) across London should be managed in a sustainable and cost-effective way in collaboration with the Environment Agency, the Lead Local Flood Authorities, developers and infrastructure providers.

B. Development Plans should use the Mayor’s Regional Flood Risk Appraisal and their Strategic Flood Risk Assessment as well as Local Flood Risk Management Strategies, where necessary, to identify areas where particular and cumulative flood risk issues exist and develop actions and policy approaches aimed at reducing these risks. Boroughs should cooperate and jointly address cross-boundary flood risk issues including with authorities outside London.

C. Development proposals should ensure that flood risk is minimised and mitigated, and that residual risk is addressed. This should include, where possible, making space for water and aiming for development to be set back from the banks of watercourses.

D. Developments Plans and development proposals should contribute to the delivery of the measures set out in Thames Estuary 2100 Plan. The Mayor will work with the Environment Agency and relevant local planning authorities, including authorities outside London, to safeguard an appropriate location for a new Thames Barrier.

E. Development proposals for utility services should be designed to remain operational under flood conditions and buildings should be designed for quick recovery following a flood.

F. Development proposals adjacent to flood defences will be required to protect the integrity of flood defences and allow access for future maintenance and upgrading. Unless exceptional circumstances are demonstrated for not doing so, development proposals should be set back from flood defences to allow for any foreseeable future maintenance and upgrades in a sustainable and cost-effective way.

G. Natural flood management methods should be employed in development proposals due to their multiple benefits including increasing flood storage and creating recreational areas and habitat.”

3.11 Policy SI 13: Sustainable Drainage states:

“A. Lead Local Flood Authorities should identify – through their Local Flood Risk Management Strategies and Surface Water Management Plans – areas where there are particular surface water management issues and aim to reduce these risks. Increases in surface water runoff outside these areas also need to be identified and addressed.

B. Development proposals should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible. There should also be a preference for green over grey features, in line with the following drainage hierarchy:

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

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

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

3.12 As the proposals are for the conversion of the existing buildings there are no changes proposed to the existing drainage.

3.13 This flood risk assessment has considered this policy in depth to ensure that the proposals fully comply with the requirements of the 2021 London Plan.

Hillingdon Local Plan Part 1 (2012)

3.14 The Hillingdon Local Plan Part 1 was adopted in November 2012 and sets out the policies for development in the Borough up until 2026.

3.15 Policy EM1: Climate Change Adaptation and Mitigation includes but is not limited to:

“The Borough will ensure that climate change adaptation is addressed at every stage of the development process by:

10. Locating and designing development to minimise the probability and impacts of flooding.

11. Requiring major development proposals to consider the whole water cycle impact which includes flood risk management, foul and surface water drainage, and water consumption.

13. Promoting the use of living walls and roofs, alongside sustainable forms of drainage to manage surface water run-off and increase the amount of carbon sinks.”

3.16 Policy EM6: Flood Risk Management states:

“The Council will require new development to be directed away from Flood Zones 2 and 3 in accordance with the principles of the National Planning Policy Framework (NPPF).

The subsequent Hillingdon Local Plan: Part 2 -Site Specific Allocations LDD will be subjected to the Sequential Test in accordance with the NPPF. Sites will only be allocated within Flood Zones 2 or 3 where there are overriding issues that outweigh flood risk. In these instances, policy criteria will be set requiring future applicants of these sites to demonstrate that flood risk can be suitably mitigated.

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

3.17 Implementation of Policy EM6: how we will achieve this:

“The Council will implement Policy EM6 by:

- *Working with the Environment Agency, British Waterways, Natural England and other partners to develop a management plan for the Grand Union Canal and other Blue Ribbon Networks where they are not currently in place.*
- *Developing flood risk policies including SUDS in the Hillingdon Local Plan: Part 2- Development Management Policies LDD.”*

The Hillingdon Local Plan Part 2 (2020)

3.18 The Hillingdon Local Plan Part 2 was adopted by the Council in January 2020 and provides a development strategy for the borough up until 2026.

3.19 Policy DME1 1: Living Walls and Roofs and on-site Vegetation states:

All development proposals are required to comply with the following: i) All major development should incorporate living roofs and/or walls into the development. Suitable justification should be provided where living walls and roofs cannot be provided; and ii) Major development in Air Quality Management Areas must provide onsite provision of living roofs and/or walls. A suitable offsite contribution may be required where onsite provision is not appropriate.

3.20 Policy DMEI 9 Management of Flood Risk states:

"A) Development proposals in Flood Zones 2 and 3a will be required to demonstrate that there are no suitable sites available in areas of lower flood risk. Where no appropriate sites are available, development should be located on the areas of lowest flood risk within the site. Flood defences should provide protection for the lifetime of the development. Finished floor levels should reflect the Environment Agency's latest guidance on climate change.

B) Development proposals in these areas will be required to submit an appropriate level Flood Risk Assessment (FRA) to demonstrate that the development is resilient to all sources of flooding.

C) Development in Flood Zone 3b will be refused in principle unless identified as an appropriate development in Flood Risk Planning Policy Guidance. Development for appropriate uses in Flood Zone 3b will only be approved if accompanied by an appropriate FRA that demonstrates the development will be resistant and resilient to flooding and suitable warning and evacuation methods are in place.

D) Developments may be required to make contributions (through legal agreements) to previously identified flood improvement works that will benefit the development site.

E) Proposals that fail to make appropriate provision for flood risk mitigation, or which would increase the risk or consequences of flooding, will be refused."

3.21 Policy DMEI 10 Water Management, Efficiency and Quality' states:

"A) Applications for all new build developments (not conversions, change of use, or refurbishment) are required to include a drainage assessment demonstrating that appropriate sustainable drainage systems (SuDS) have been incorporated in accordance with the London Plan Hierarchy (Policy 5.13: Sustainable drainage).

B) All major new build developments, as well as minor developments in Critical Drainage Areas or an area identified at risk from surface water flooding must be designed to reduce surface water run-off rates to no higher than the pre-development greenfield run-off rate in a 1:100 year storm scenario, plus an appropriate allowance for climate change for the worst storm duration. The assessment is required regardless of the changes in impermeable areas and the fact that a site has an existing high run-off rate will not constitute justification.

C) Rain Gardens and non householder development should be designed to reduce surface water run-off rates to Greenfield run-off rates.

D) Schemes for the use of SuDS must be accompanied by adequate arrangements for the management and maintenance of the measures used, with appropriate contributions made to the Council where necessary.

E) Proposals that would fail to make adequate provision for the control and reduction of surface water run-off rates will be refused.

F) Developments should be drained by a SuDS system and must include appropriate methods to avoid pollution of the water environment. Preference should be given to utilising the drainage options in the SuDS hierarchy which remove the key pollutants that hinder improving water quality in Hillingdon. Major development should adopt a 'treatment train' approach where water flows through different SuDS to ensure resilience in the system.

Water Efficiency

G) All new development proposals (including refurbishments and conversions) will be required to include water efficiency measures, including the collection and reuse of rainwater and grey water.

H) All new residential development should demonstrate water usage rates of no more than 105 litres/person/day.

I) It is expected that major development proposals will provide an integrated approach to surface water run-off attenuation, water collection, recycling, and reuse.

Water and Wastewater Infrastructure

J) All new development proposals will be required to demonstrate that there is sufficient capacity in the water and wastewater infrastructure network to support the proposed development. Where there is a capacity constraint the local planning authority will require the developer to provide a detailed water and/or drainage strategy to inform what infrastructure is required, where when and how it will be delivered."

West London Strategic Flood Risk Assessment (SFRA) 2018

3.22 The West London SFRA was published in 2018 with the overarching aim "to provide the evidence base for ensuring development is steered away from areas identified most at risk from various flood sources, reducing the risk of flooding to its residents and buildings."

3.23 The most relevant part of the SFRA for this report is Section 4 specifically 4.2.3. Part of which can be seen below.

3.24 The first paragraph of 4.2.3 relating to Site-Specific Flood Risk Assessments (FRA) states:

"Site-specific FRAs should be proportionate to the degree of flood risk, making the best use of available information. They should also be appropriate to the scale, nature and location of the development. For example, developments such as single house extensions would generally require a less detailed assessment as they tend not to significantly increase the number of people present in an area at risk of flooding. Conversely, new developments comprising of multiple houses in a similar location would generally require FRAs with greater detail."

3.25 The West London SFRA provides an interactive map for site-specific assessments of flood risk, these are detailed below for the site:

- The site is confirmed to be in Flood Zone 1.

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- In terms of surface water, the site does not experience flooding in a 3.3% AEP storm event with extents only found beyond the north and east site boundaries. Surface water flooding is projected to occur in both 1% and 0.1% AEP events, with the former having extents mostly along the site boundaries, while the latter model indicates surface water flooding within the access roads and parking areas surrounding the buildings, but not within the buildings.
 - The site is outside the extents of fluvial flooding from the Upper Colne for both the 1 in 100 year (1% AEP) and 1 in 100 year + 20% Climate Change events
 - The site is also located outside the outlines of previous historic flood events (i.e., 2017)
 - The site is not located in any Flood Warning or Flood Alert Areas.
 - The site is positioned in a 1km² quartile that is defined as having between 25% and 50% susceptibility to groundwater flooding.
 - While there are artificial flood extents that reach close to the site's south boundary the site is not indicated to be at risk of flooding from artificial sources.
 - In reference to source protection zones, the site is located within Zone I (inner protection zone) - This zone has a 50 day travel time of pollutant to source with a 50 metres default minimum radius.
 - The closest flood defence to the site is located approximately 600m south of the site. None of the site is noted to be influenced by having reduced flood risk due to flood defences.
- 3.26 This site-specific FRA has been produced to provide an assessment which is proportionate to the degree of the flood risk.

London Borough of Hillingdon Surface Water Management Plan (SWMP) (2013)

- 3.27 The London Borough of Hillingdon SWMP was published in 2013 as part of the Drain London Project. The document outlines the preferred surface water management strategy in Hillingdon and considers flooding from sewers, drains, groundwater and runoff from land and identifies Critical Drainage Areas (CDA).
- 3.28 This site was not identified as being within a CDA within the SWMP.

4 Existing Site Assessment

Site Description

- 4.1 The development site is at Musgrave House, Widewater Place, Moor Hall Road, Denham, UB9 6NS. It is almost completely impermeable, consisting of a large building with associated car parking.
- 4.2 The site is on the north side of Moor Hall Road and is the west facing building within Widewater Place and is surrounded by two other large office blocks with associated car parking. A location plan is contained in **Appendix A**.
- 4.3 The proposed development will convert the existing Musgrave House building for residential development comprise of 36 residential units. The proposed development plans are included at **Appendix B**.

Local Watercourses

- 4.4 The Grand Union Canal is located along the western boundary of the site and the River Colne which is classified as a main river by the Environment Agency is located approximately 750m further west. The proposals will have no impact on either of these waterways as the proposals do not result in any additional built development.

Site Levels

- 4.5 A topographical survey covering the site and Musgrave House is included in **Appendix D**. The survey shows the wider site to be relatively flat, with levels typically between 37.60m AOD and 38.00m AOD. It is noted that the area surrounding Musgrave House is higher than the levels on the car park, at between 38.22m AOD and 38.41m AOD. The thresholds at entrances around the building are set at 38.30m AOD and above.
- 4.6 The topographical survey also identifies a number of surface water drainage channels across the car park. The drainage channels are located away from buildings which would help to manage the surface water flood risk and direct water away from the buildings.

Geology

- 4.7 In reference to the British Geological Survey (BGS)'s online mapping, the site is located in an area with the dominant bedrock geology being the Seaford Chalk Formation and Newhaven Chalk Formation (undifferentiated), with the superficial geology in the area being alluvium (clay, silt, sand & gravel).
- 4.8 There are no recorded boreholes within close proximity to the site.

Sewer Records

- 4.9 A Thames Water Asset Location Map is included within **Appendix E**, this map shows that there are two surface water sewers which bound the site, one beyond the site's north boundary, and



one along the southern border in close proximity to Chaplin house; both of which outfall to nearby watercourses. There is also a foul water sewer located just beyond the site's eastern boundary before flowing southwards.

5 Potential Sources of Flooding

Fluvial

- 5.1 A copy of the Environment Agency's Flood Map is enclosed in **Appendix C**. The mapping shows that the site is wholly located within Flood Zone 1, an area at 'very low' risk of flooding from fluvial or tidal sources. Areas in Flood Zone 1 have a less than 1 in 1000 probability of flooding each year.
- 5.2 The risk from fluvial flooding is therefore deemed to be very low.

Surface Water

- 5.3 Surface water flooding refers to flooding caused when the intensity of rainfall, particularly in urban areas, can create runoff which temporarily overwhelms the capacity of the local drainage systems including sewers, rivers and watercourses or does not infiltrate into the ground. The water ponds on the ground and flows towards low-lying land. This source of flood risk is also known as 'pluvial'.
- 5.4 A high-risk scenario indicates a greater than 1 in 30 probability each year (3.3% AEP) of surface water flooding each year, i.e. the most frequently occurring scenario. The site is not shown to be at risk of flooding during this event.
- 5.5 A medium risk scenario indicates a probability of surface water flooding between 3.3% AEP and 1 in 100 each year (1% AEP). In a medium risk scenario, there are very minor areas of flood risk shown within the car parking area and access road however there is no risk to any of the buildings.
- 5.6 A low risk scenario indicates a probability of surface water flooding between 1% and 0.1% AEP – i.e., the least frequent but worst-case scenario. In a low risk scenario, the majority of the car park and access road is shown to be at risk of depths below 300mm. Each of the three buildings within the site are set wholly outside of the flood risk.
- 5.7 The EA's surface water flood risk map and the West London SFRA mapping can be seen in **Appendix F**.
- 5.8 The flood depths shown on the EA's surface water map provides an overview of the risk but the depth bands are very wide. Therefore, a site-specific analysis of the surface water flood risk and flow paths was carried out using the topographic survey (**Appendix D**). A visual comparison with the EA's surface water map and the topographic survey suggested that surface water flooding would not occur above a level of 38.00m AOD. A study of the topographical survey demonstrated that close to the building around Musgrave House, there was no flooding. Beyond this, on the car park, there could be up to 200mm flooding. The typical depth on the car park is 200mm to 300mm. The deepest areas of surface water are restricted to the areas surrounding the drainage channels, where depths of up to 400mm could occur.
- 5.9 Surface water flow paths around Musgrave House show that water would be directed to the west, away from the building. The surface water analysis drawing is included in **Appendix G**.
- 5.10 Given the above, the risk of surface water flooding to the building is considered to be low.

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Groundwater

- 5.11 The West London SFRA mapping shows that the site has between than 25% and 50% susceptibility to groundwater flooding.
- 5.12 As the finished floor levels of the building are higher than surrounding ground levels and the SWMP confirms that there are no recorded flooding incidents within the vicinity, the risk of groundwater flooding to the site is considered to be low.

Artificial

- 5.13 The West London SFRA (2018) show the site is not within the extents of flooding from artificial sources, therefore the risk from artificial sources can be deemed low.

Sewer Flooding

- 5.14 Sewer flooding generally results from localised short-term intense rainfall events overloading the capacity of the private and public drainage or due to failures within the public sewer.
- 5.15 The SFRA mapping shows that there have been no instances of sewer flooding at this location.
- 5.16 Therefore, due to the lack of recorded instances of sewer flooding within the area the risk from sewer flooding is low.

6 Mitigation Measures

- 6.1 As discussed in Section 5, the proposed buildings are located wholly within Flood Zone 1 and at low risk of surface water flooding however, there is a surface water flood extent surrounding the site within the car parking.

Finished Floor Levels

- 6.2 The surface water depths discussed in Section 5 shows that the car parks surrounding the three buildings of Widewater Place are at risk of flooding.
- 6.3 However, the surface water flood maps and site-specific analysis carried out clearly shows that the areas directly surrounding Musgrave House are not impacted by the surface water flood extent for the low risk (i.e. worst case) scenario and are a considerable distance from any of the small areas of ponding shown during the medium risk scenario. All thresholds to the building are set above 38.00m AOD and surface water is unlikely to enter the building in any scenario.
- 6.4 The buildings were designed with raised thresholds and there is no evidence within the Council's SFRA or SWMP that this area has flooded historically.

Flood Evacuation Plan

- 6.5 The onset of surface water flooding can occur quickly, and it is important to warn residents of the risk within the car park and when leaving or entering the building during an event like this. Surface water analysis has estimated that 200mm to 300mm could occur on the car park to the west of the building. It is recommended that a flood notice is permanently located within the lobby for the residents within the block and within a notice board or other suitable area in the car park. An example of such a notice is included in Figure 1 below.

FLOOD WARNING NOTICE

In rare circumstances this car park is at risk of surface water flooding. There are currently no warning systems for surface water flooding.

Do not attempt to walk or drive through flood water. Seek refuge within the building if it is not safe to go outside and exercise caution at all times.

CARS CAN BECOME UNSTABLE IN 300mm OF FLOODWATER!

IN THE EVENT OF AN
EMERGENCY CALL 999

Figure 1: Example of Flood Warning Notice

Safe Access/Egress

- 6.6 As mentioned previously, the proposed buildings will remain above the flood level for the low risk scenario which is the only scenario in which the surrounding area is shown to flood. As such, all residents will have safe refuge in the event of flooding however, they need to be made aware that there is a risk of flooding within the car park. In the event that flooding does occur on site, it is recommended that due to the unpredictable nature of surface water flooding that residents do not leave the site until the floodwater has receded.
- 6.7 If residents are leaving or returning to the site during extreme rainfall events then access should be gained to the car park coming from a westerly direction on Moor Hall Road as the stretch of road to the east of the site entrance is shown to flood to greater depths. All vehicular/foot traffic should also exit the site to the west. However, it is recommended that all unnecessary travel is avoided during times of flooding as the safest place for residents and visitors is to remain within the building during a flood event.

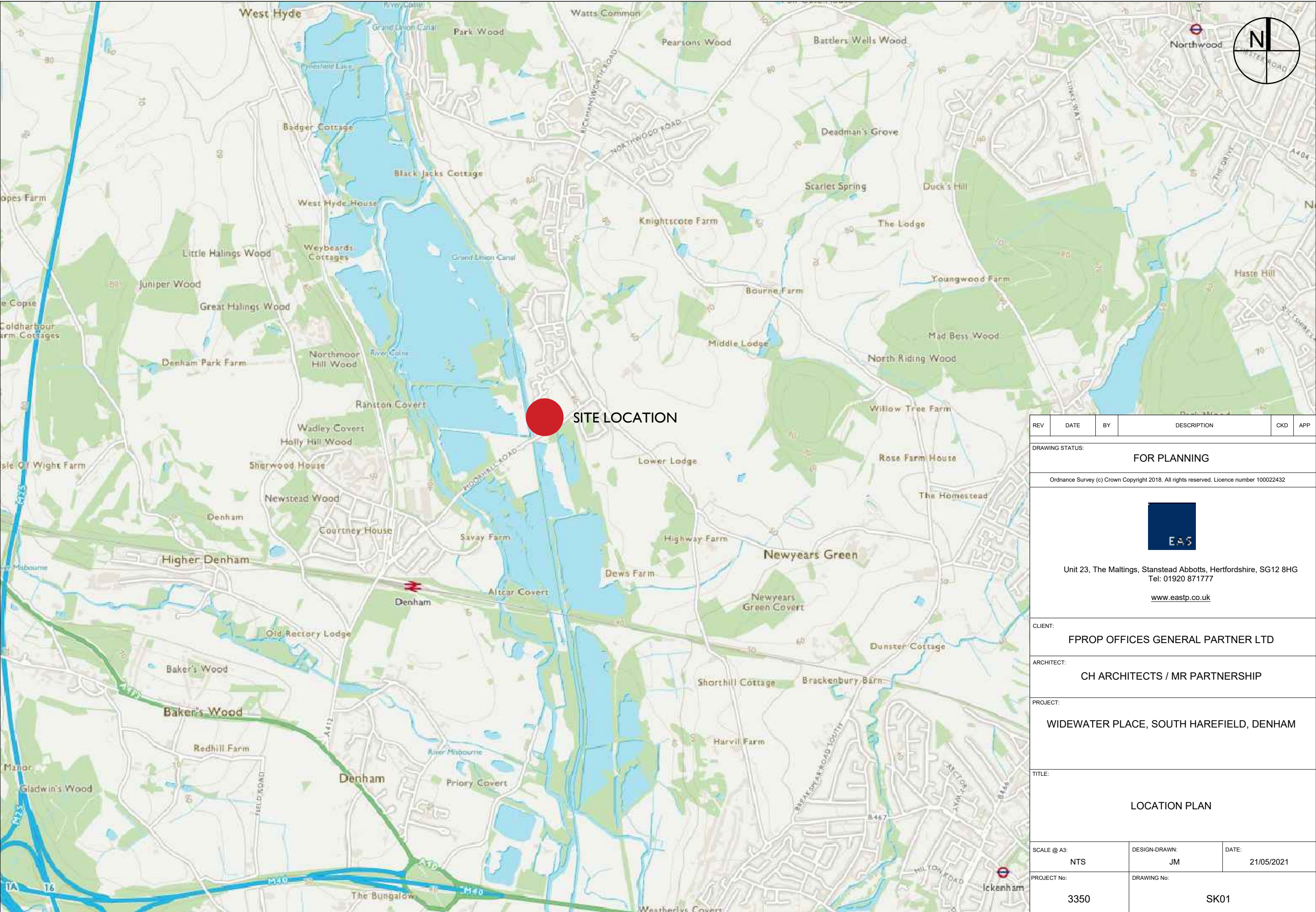
7 Conclusions

- 7.1 The site currently consists of an office block, there will be no external modifications only internal to convert the building to provide 36 self-contained residential units.
- 7.2 The site is located within Flood Zone 1 on the EA flood map, which indicates a 'low' risk of flooding from fluvial and tidal sources. 'Low' risk areas have an annual probability of flooding of less than 0.1% (or 1 in 1000).
- 7.3 The EA Flood Risk from Surface Water map and the West London SFRA flood mapping show that Musgrave House is at very low risk of surface water flooding due to the raised thresholds around the building, but there is surface water flooding on the car park with potential depths of 200mm to 300mm in the low risk (worst case) scenario.
- 7.4 As the car park is at risk of surface water flooding, a notice should be installed in a communal area making residents aware of the risk and what to do in the rare event of flooding.
- 7.5 There is to be no increase in building roof area or hardstandings and therefore no amendments to the existing surface water drainage are required.
- 7.6 Overall, the site is at low risk of flooding from all sources of flood risk. The proposed development is considered to be suitably and sustainably located and is in line with local and national policies.
- 7.7 It is concluded that there are no reasons on flood risk as to why permission not be granted.

8 Appendices

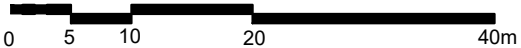
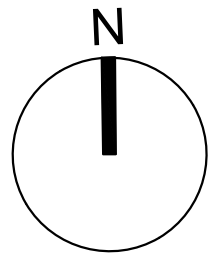
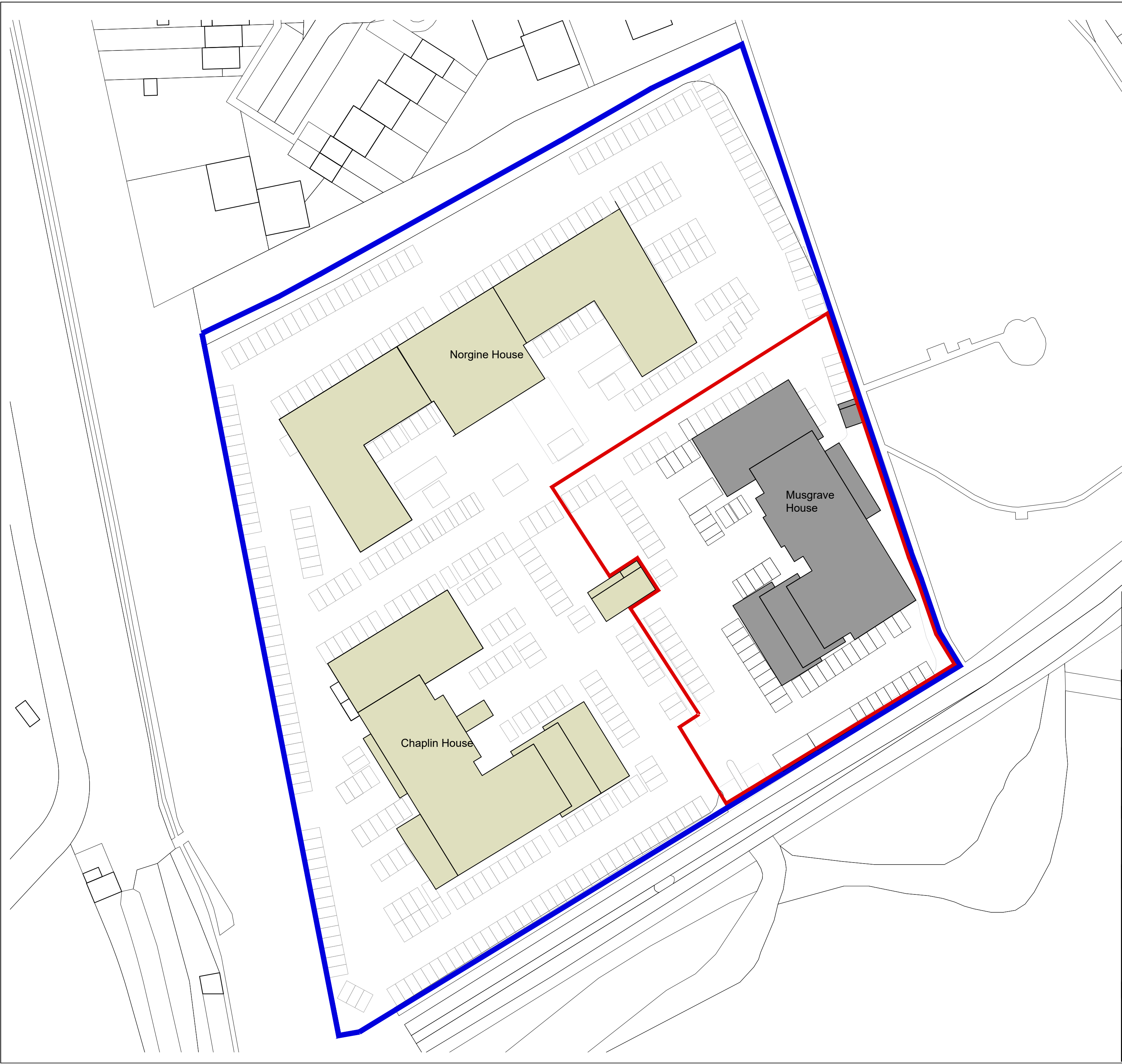
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Appendix: A – Location Plan



REV	DATE	BY	DESCRIPTION	CKD	APP
DRAWING STATUS:					
FOR PLANNING					
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 Unit 23, The Maltings, Stanstead Abbots, Hertfordshire, SG12 8HG Tel: 01920 871777 www.eastp.co.uk					
CLIENT:					
FPROP OFFICES GENERAL PARTNER LTD					
ARCHITECT:					
CH ARCHITECTS / MR PARTNERSHIP					
PROJECT:					
WIDEWATER PLACE, SOUTH HAREFIELD, DENHAM					
TITLE:					
LOCATION PLAN					
SCALE @ A3:			DESIGN-DRAWN:	DATE:	
NTS			JM	21/05/2021	
PROJECT No:			DRAWING No:		
3350			SK01		

Appendix: B – Proposed Development Plans



PROPOSED

THIS DRAWING IS NOT TO BE SCALED, ONLY FIGURED DIMENSIONS ARE TO BE FOLLOWED (UNLESS THE DRAWING IS PART OF A PLANNING APPLICATION). CONTRACTORS ARE TO CHECK ALL DIMENSIONS BEFORE WORK COMMENCES, AND REFER ANY APPARENT DISCREPANCY TO THE ARCHITECT.

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PROJECT **Musgrave House, Widewater Place
Moorhall road, Uxbridge
London W1**

DRAWING **Proposed
Location Plan - Musgrave House**



41-42 FOLEY STREET, LONDON W1W 7TS
T: +(0) 207 253 2526 / +(0)207 631 5405
E: mail@ch-architects.com / info@mrpartnership.co.uk
www.ch-architects.com / www.mrpartnership.co.uk

DATE: 24/05/2021	SCALE: 1:1250@A4	DRAWN: CAD
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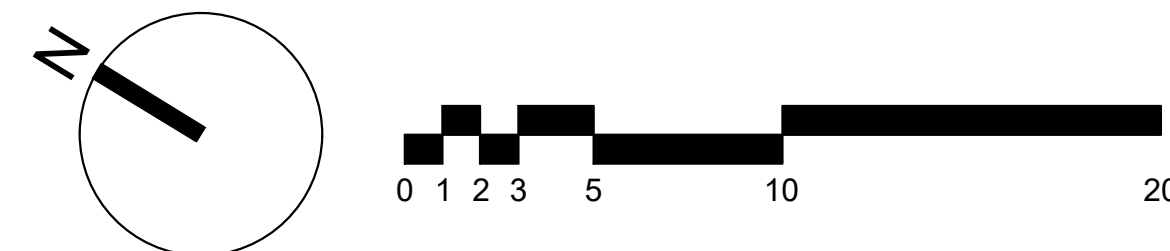
DWG No: 3155_061	REV. No: /
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FILE: 3155-SITE PLANS-MUSGRAVE.dwg



NOTE:

The flats fully comply with the Nationally Described Space Standards (NDSS)



15.09.2021	NOTE TO OUTSIDE DOORS ADDED	A
THIS DRAWING IS NOT TO BE SCALED, ONLY FIGURED DIMENSIONS ARE TO BE FOLLOWED (UNLESS THE DRAWING IS PART OF A PLANNING APPLICATION). CONTRACTORS ARE TO CHECK ALL DIMENSIONS BEFORE WORK COMMENCES, AND REFER ANY APPARENT DISCREPANCY TO THE ARCHITECT.		
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PROJECT	Musgrave House, Widewater Place Moorhall road, Uxbridge London W1	
DRAWING	Proposed Ground Floor, First and Second Floor Plan	
CH+MRP ARCHITECTS 41-42 FOLEY STREET, LONDON W1W 7TS T: +(0) 207 253 2526 / +(0)207 631 5405 E: mail@ch-architects.com / info@mrpartnership.co.uk www.ch-architects.com / www.mrpartnership.co.uk		
DATE:	11/05/2021	SCALE: 1:200@A1 1:200@A1
DWG No:	3155_20_106	DRAWN: CAD
REV. No:		A
FILE: 3155-PLANS-MUSGRAVE HOUSE-20210915.dwg		

Appendix: C – EA Flood Map for Planning

Flood map for planning

Your reference
MusgraveHouse

Location (easting/northing)
505106/188834

Created
18 May 2021 14:02

Your selected location is in flood zone 1, an area with a low probability of flooding.

This means:

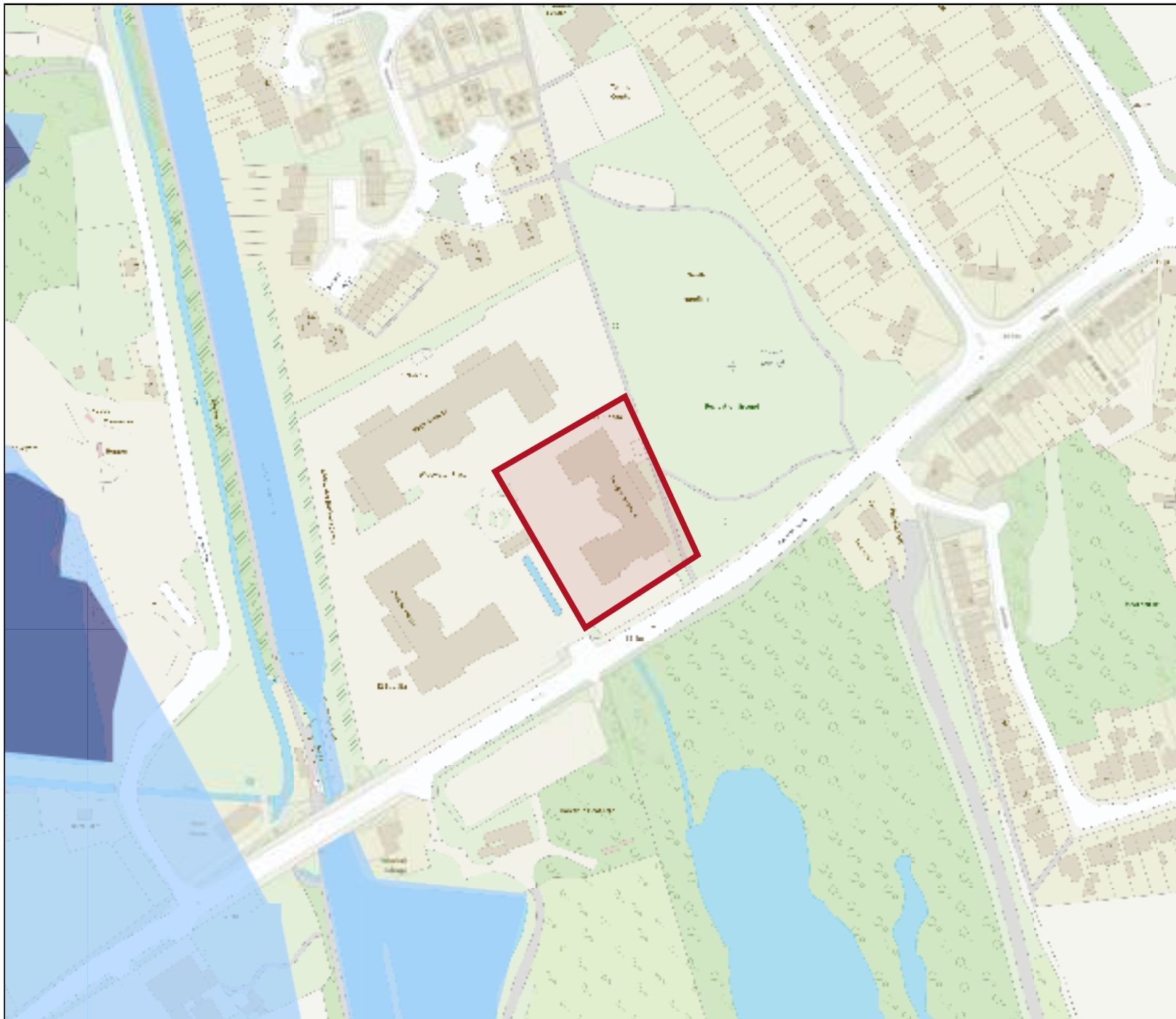
- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage problems

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

The Open Government Licence sets out the terms and conditions for using government data.
<https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>



Flood map for planning

Your reference

MusgraveHouse

Location (easting/northing)

505106/188834

Scale

1:2500

Created

18 May 2021 14:02

-  Selected area
-  Flood zone 3
-  Flood zone 3: areas benefitting from flood defences
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Flood storage area


 0 20 40 60m

Appendix: D – Topographic Survey



Abbreviations			
AB	Air Brick	IR	Iron Railings
AV	Air Valve	JB	Junction Box
BS	Balustrade	KD	Kitchen Cabinet
BGP	Break Glass Point	LB	Litter Bin
BR	Brick	LP	Lamp Post
BO	Bollard	LW	Light Well
BS	Bus Stop	MT	Mantle
C	Chimney	MK	Marker
BT	British Telecom cover	MT	Meter
CB	Cable Box	MY	Mercury
CL	Cover Level	CH	Overhead
CL	Chain Link	PM	Parking Meter
CO	Column	PS	Post Box
CONC	Concrete	PR	Post & Rail
CONC	Concrete	PT	Post
CPL	Coping Level	PW	Post & Wire
CPS	Concrete Paving Slab	RE	Road Sign
CTV	Cable Television Cover	RET	Retaining
OK	Drop Kerb	RSE	Road Sign
DR	Door Height	RSS	Railroad Steel Station
EP	Electricity Pole	RSJ	Railroad Steel Joint
ER	Earthing Rod	RWP	Rain Water Pipe
FB	Flower Bed	SC	Stop Cook
FC	False Ceiling	SVP	Soil Vent Pipe
FE	Fire Escape	TDB	Telephone Call Box
FR	Fire Hydrant	TBM	Temp. Bench Mark
FRR	Fire Hose Reel	TP	Telephone Pole
FL	Flag Pole	TL	Traffic Light
GP	Gate Post	TK	Tank
GU	Gully	UTL	Unable To Lift
GV	Gas Valve	V	Vent
H	Cell to Head Height	VP	Vent Pipe
HT	Height	WM	Water Meter
IC	Insulation Cover	WP	Water Pipe
IL	Invert Level	WSC	Water Stop Cook
		WV	Water Valve

Notes			
Ceiling Height	+20.00	Arch	
Floor Level	+20.00	Station	
Ceiling Level	+20.00	CL	
Sub Level	+20.00	SL	
False Ceiling Level	+20.00	FC	
Floor to cill height	c-1234	Fence	
Cill to head height	h-1234	Foul pipe	
Door height	DH 2000	Storm pipe	

Survey Coordinates and Grid			
Please note that the grid shown on this drawing is as follows:			
☐	Arbitrary		
☐	Arbitrary but related to building line		
☐	Arbitrary but approx. related to North		
☐	Best fit to an Ordnance Survey Digital Sheet		
☐	Related to the Ordnance Survey National Grid		

Levels			
Please note that the levels shown on this drawing are as follows:			
☐	Arbitrary and related to a temporary bench mark		
☐	Related to an Ordnance Survey Bench Mark		
☐	Related to the Ordnance Survey National GPS Network		
Level positions are indicated by a cross or the decimal point			
Bench Mark			
Type	Ordnance Survey		
Position	G.P.S		
Value			

Trees			
All trees sizes are approximate and should be checked on site before using information. Where guaranteed tree species become important the services of a tree expert should be employed			
Notation : diameter of trunk / Height / Spread			

Drainage			
Where drainage covers have been fitted data has been recorded for each individual manhole from the surface and connections to other manholes, pipes or gullies are assumed. Where information is required by accessing the manhole or tracing to other manholes then a services trace will be needed.			

Notes			

Revision	Date	By



CADPLAN
PRECISION MEASUREMENTS

Land Surveys - Measured Building Surveys - 3D Laser Scanning
Utility Surveys - Lease Plans - 3D Models - Rights of Light Surveys

Cob Tree House Oldbury Lane Ighiteam Kent TN15 9DA
Tel: 01732 469100 Fax: 01732 469101 E: post@cadplan.co.uk

Client
Fprop Offices General Partner Limited

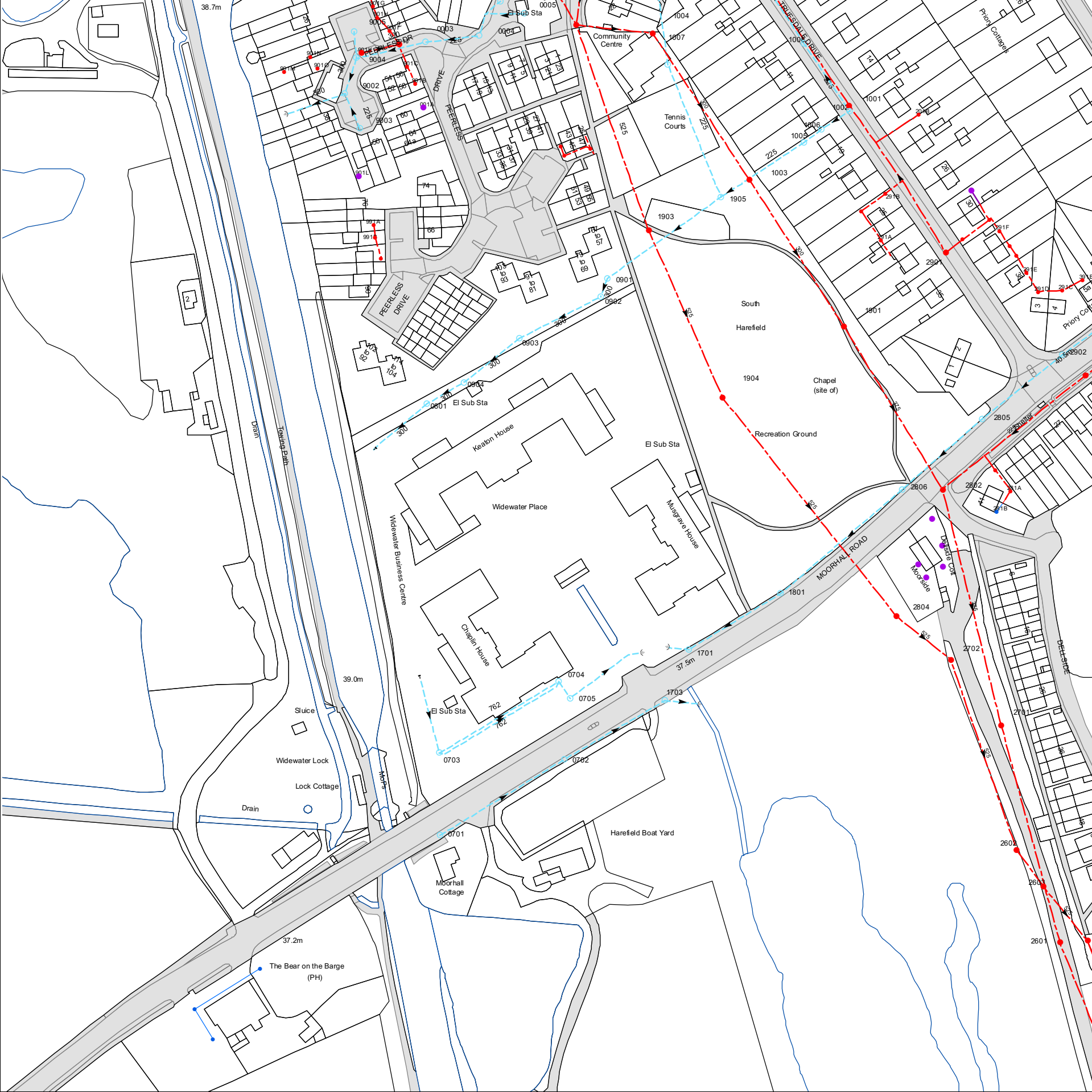
Project
Widewater Place
Moorhall Road
Harefield

Drawing Title
Topographic Survey

Sheet/Scale	Date	Drawn	Checked
A0@1:200	24/06/21	B.J.V.	C.S.D.
Project No.	Drawing No.	Preliminary	Revision
9716	07		

Appendix: E – Thames Water Sewer Mapping

CommercialDW Drainage and Water Enquiry Sewer Map- CDWS/CDWS Standard/2017_ 3596622



The width of the displayed area is 500m

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates no survey information is available.

Manhole Reference	Manhole Cover Level	Manhole Invert Level
0902	n/a	n/a
0901	n/a	n/a
1903	38.22	35.08
1901	38.02	34.97
291G	n/a	n/a
291A	n/a	n/a
0701	n/a	n/a
0702	n/a	n/a
0703	n/a	n/a
1703	n/a	n/a
0705	n/a	n/a
0704	n/a	n/a
1701	n/a	n/a
1801	n/a	n/a
0801	n/a	n/a
1904	37.87	34.92
0904	n/a	n/a
0903	n/a	n/a
991A	n/a	n/a
991B	n/a	n/a
991C	n/a	n/a

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.



Sewer Key - Commercial Drainage and Water Enquiry

Public Sewer Types (Operated & Maintained by Thames Water)

	Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.
	Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.
	Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.
	Trunk Surface Water
	Trunk Foul
	Storm Relief
	Trunk Combined
	Vent Pipe
	Bio-solids (Sludge)
	Proposed Thames Surface Water Sewer
	Proposed Thames Water Foul Sewer
	Gallery
	Foul Rising Main
	Surface Water Rising Main
	Combined Rising Main
	Sludge Rising Main
	Proposed Thames Water Rising Main
	Vacuum

Notes:

- 1) All levels associated with the plans are to Ordnance Datum Newlyn.
- 2) All measurements on the plans are metric.
- 3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
- 4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
- 5) 'na' or '0' on a manhole level indicates that data is unavailable.

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

	Air Valve
	Dam Chase
	Fitting
	Meter
	Vent Column

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

	Control Valve
	Drop Pipe
	Ancillary
	Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

	Outfall
	Undefined End
	Inlet

Other Symbols

Symbols used on maps which do not fall under other general categories

	Public/Private Pumping Station
	Change of characteristic indicator (C.O.C.I.)
	Invert Level
	Summit

Areas

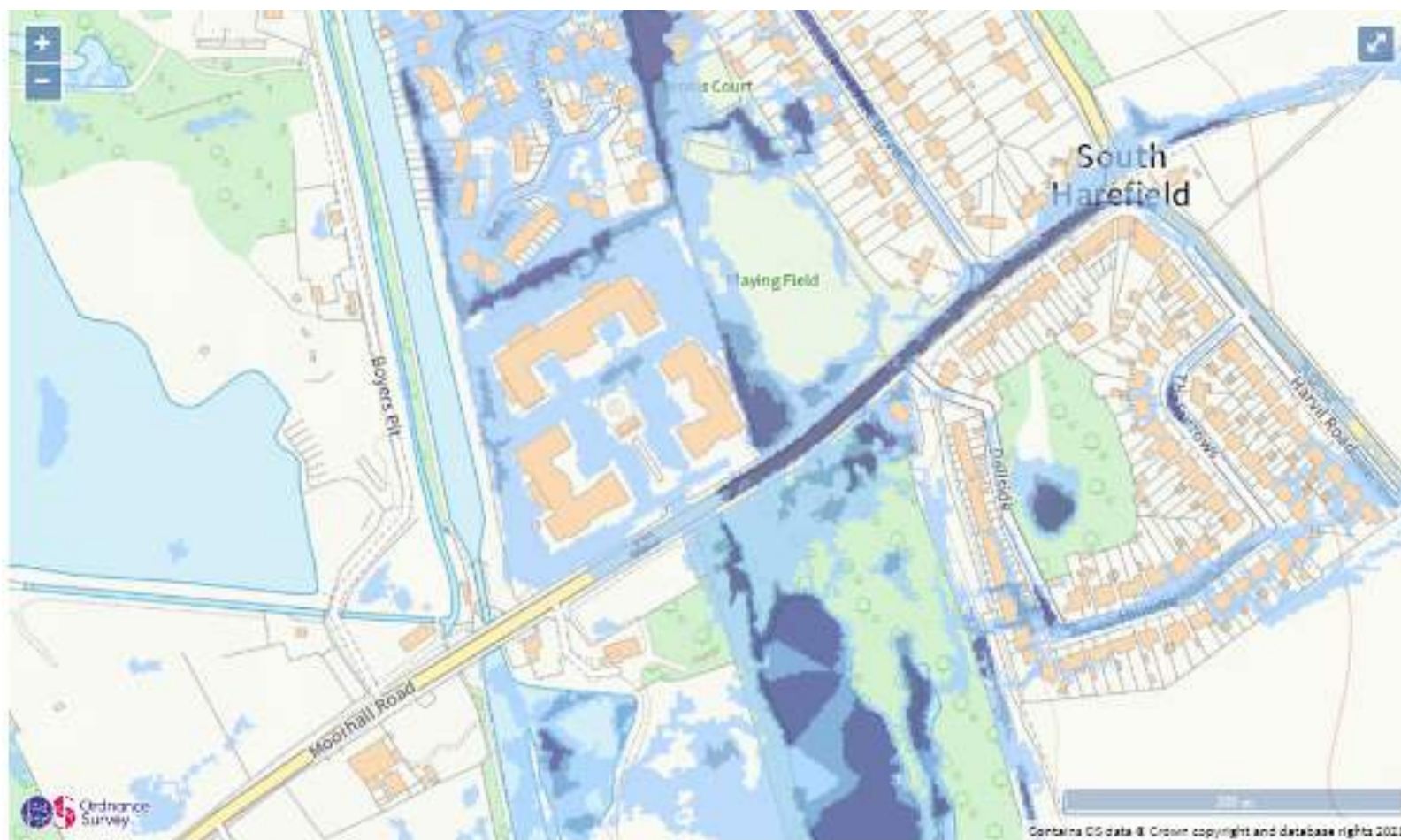
Lines denoting areas of underground surveys, etc.

	Agreement
	Operational Site
	Chamber
	Tunnel
	Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

	Foul Sewer		Surface Water Sewer
	Combined Sewer		Gully
	Culverted Watercourse		Proposed
			Abandoned Sewer

Appendix: F – EA Surface Water Flood Map and West London SFRA Flood Maps



Extent of flooding from surface water

Source: <https://flood-warning-information.service.gov.uk/long-term-flood-risk/map?easting=528554&northing=286932&map=SurfaceWater>

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3.3% Extent



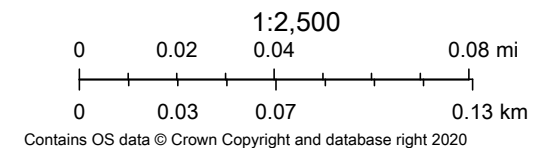
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 Borough Boundary

 Study Area Boundary

 uFMfSW 1 in 30 flood extent

Risk_of_Flooding_from_Surface_Water_Extent_3_3_percent_annual_chance



3.3% Depth



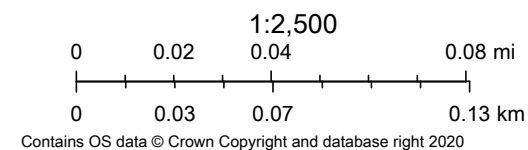
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- Borough Boundary
- Study Area Boundary

DEPTH (Six bands)

- Below 150mm
- 150-300mm
- 300-600mm
- 600-900mm
- 900-1200mm
- Over 1200mm

Risk_of_Flooding_from_Surface_Water_Depth_3_3_percent_annual_chance



1% Extent

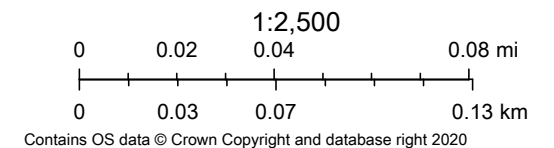


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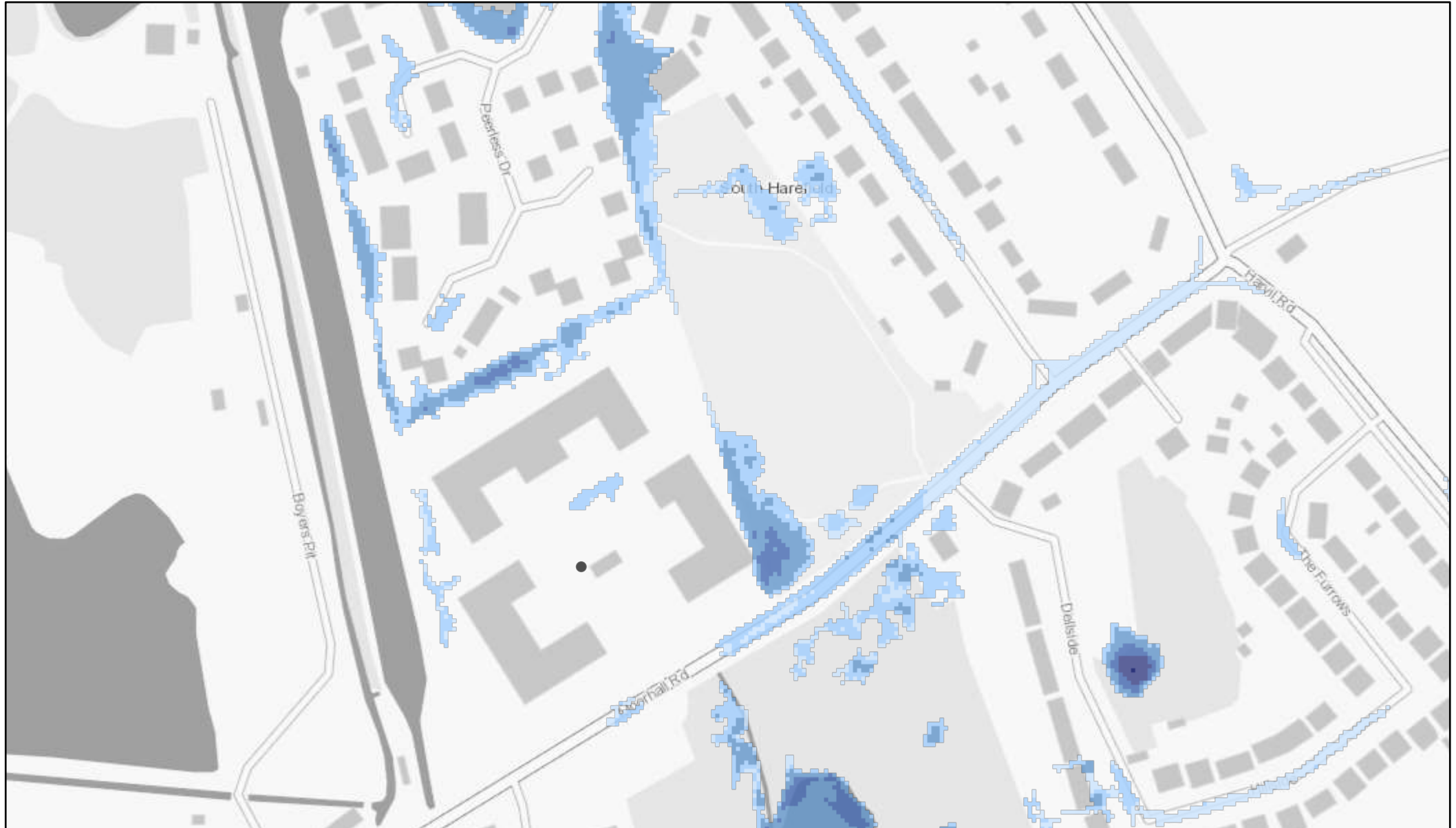
-  Borough Boundary
-  Study Area Boundary

 uFMSW 1 in 100 flood extent

Risk_of_Flooding_from_Surface_Water_Extent_1_percent_annual_chance



1% Depth



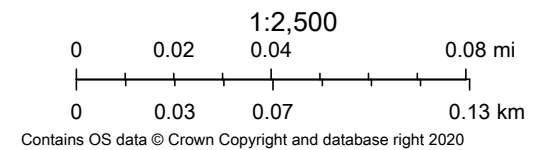
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-  Borough Boundary
-  Study Area Boundary

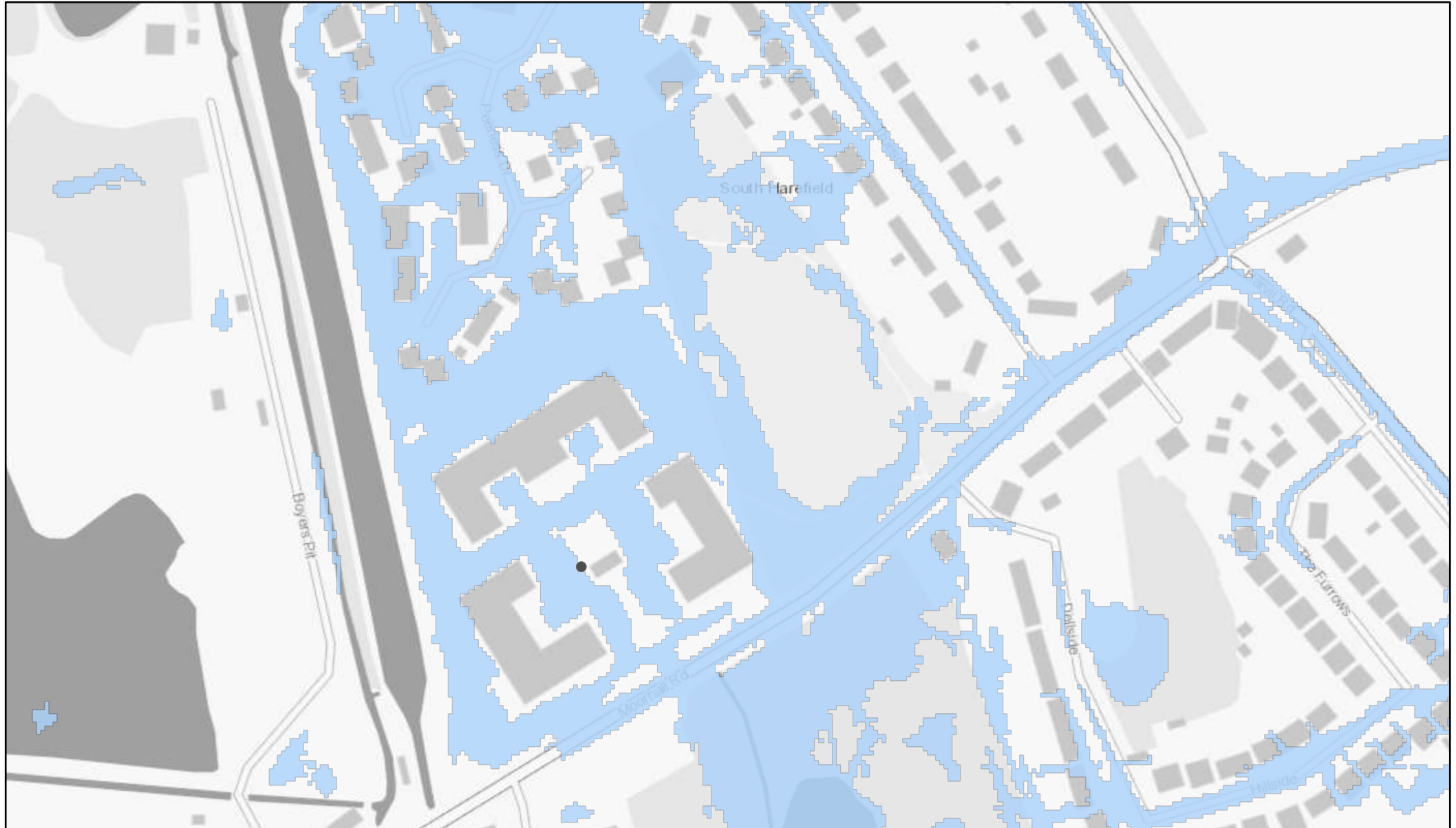
DEPTH (Six bands)

-  Below 150mm
-  150-300mm
-  300-600mm
-  600-900mm
-  900-1200mm
-  Over 1200mm

Risk_of_Flooding_from_Surface_Water_Depth_1_percent_annual_chance



0.1% Extent

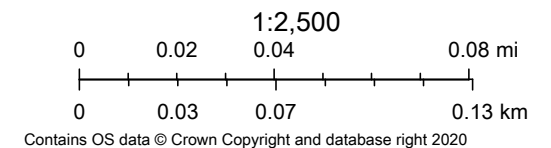


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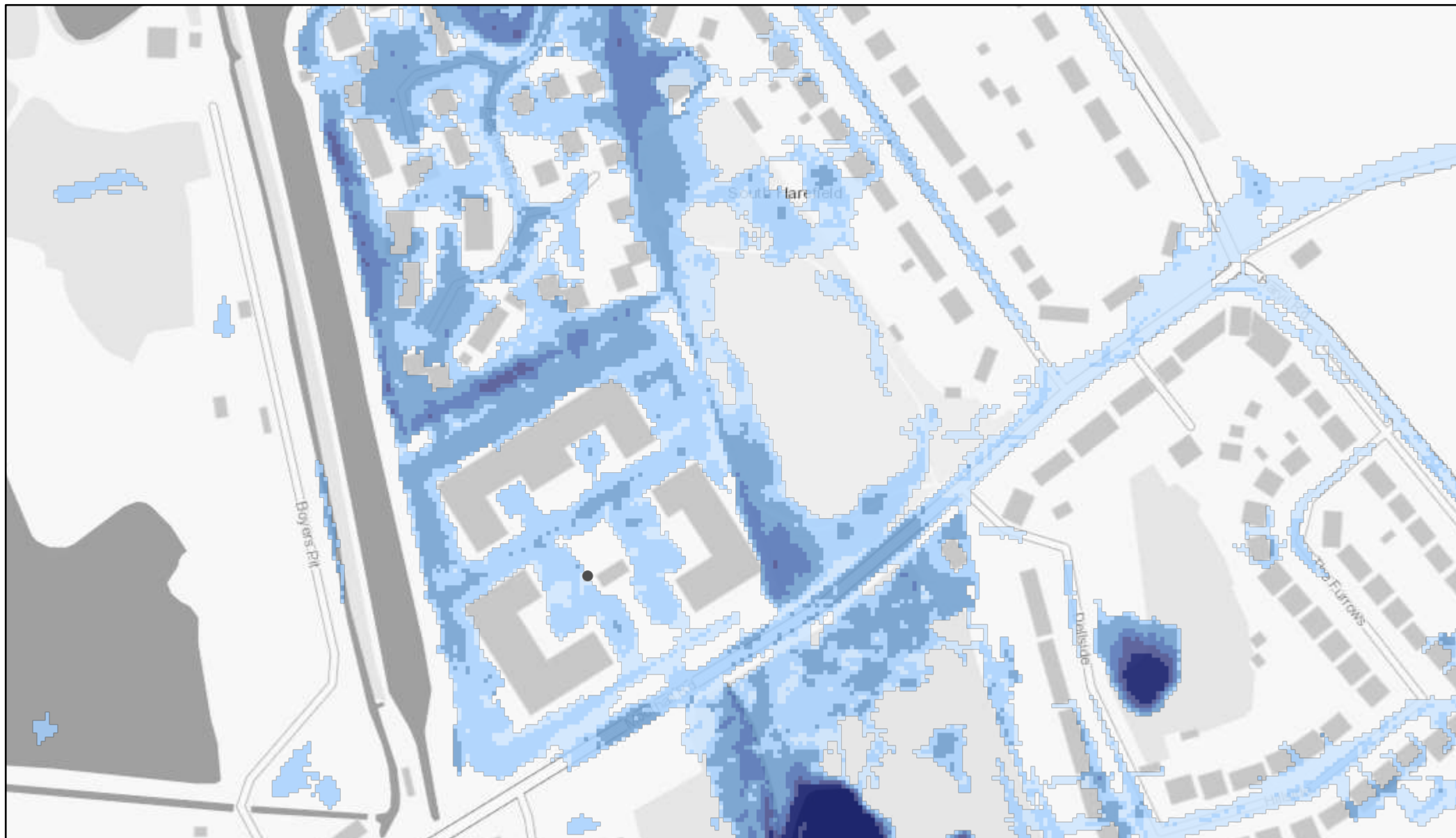
-  Borough Boundary
-  Study Area Boundary

 uFMISW 1 in 1000 flood extent

Risk_of_Flooding_from_Surface_Water_Extent_0_1_percent_annual_chance



0.1% Depth



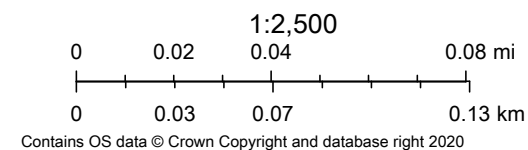
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- Borough Boundary
- Study Area Boundary

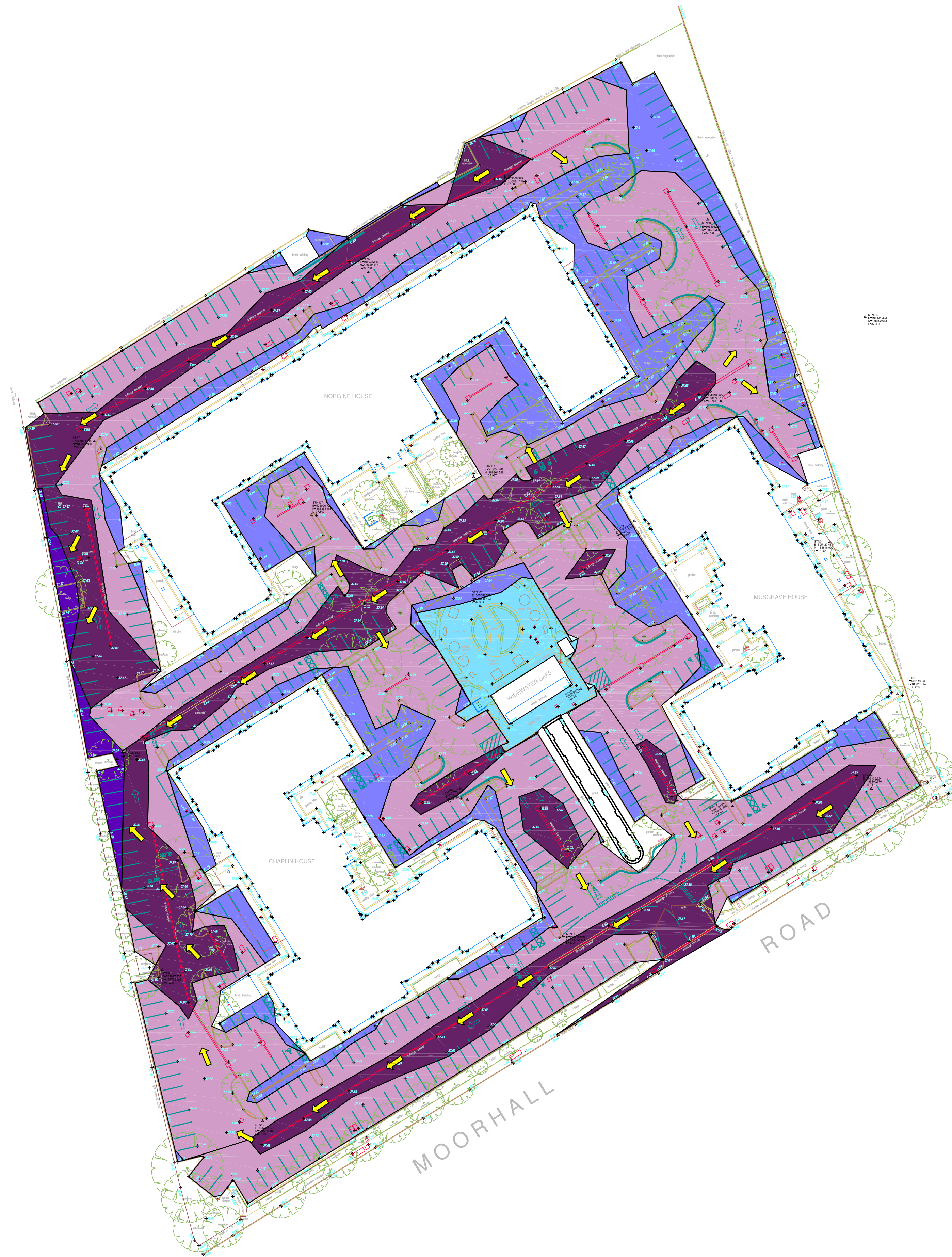
DEPTH (Six bands)

- Below 150mm
- 150-300mm
- 300-600mm
- 600-900mm
- 900-1200mm
- Over 1200mm

Risk_of_Flooding_from_Surface_Water_Depth_0_1_percent_annual_chance



Appendix: G – Surface Water Risk Analysis



KEY:

- FLOOD DEPTH OF 400-550mm
- FLOOD DEPTH OF 300-399mm
- FLOOD DEPTH OF 200-299mm
- FLOOD DEPTH OF 100-199mm
- FLOOD DEPTH OF 1-99mm
- NO FLOODING
- DIRECTION OF FLOW OF SURFACE WATER FLOODING

NOTE: FLOOD DEPTHS HAVE BEEN ESTIMATED USING AN ASSUMED SURFACE WATER FLOOD LEVEL OF 38.00m AOD

REV	DATE	BY	DESCRIPTION	CHK	APP
DRAWING STATUS:					
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 Unit 23, The Mallings, Stanstead Abbots, Hertfordshire, SG12 8HG Tel: 01920 871777 www.easftp.co.uk					
CLIENT:			FPROP		
ARCHITECT:					
PROJECT:			WIDEWATER PLACE DENHAM		
TITLE:			SURFACE WATER FLOOD DEPTHS		
SCALE @ A1:		DESIGN-DRAWN:		DATE:	
1:500		MC		21/07/2021	
PROJECT No:		DRAWING No:			
3350				SK02	