Prologis UK Ltd

FORMER GSK SITE, STOCKLEY PARK, HILLINGDON

Flood Risk Assessment

2215-FRA-001
JUNE 2020

CONFIDENTIAL

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Flood Risk Assessment

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EXECUTIVE SUMMARY

This Flood Risk Assessment (FRA) has been prepared by WSP on behalf of Prologis UK Ltd (hereafter referred to as 'the Client'), to accompany a full planning application for the redevelopment of the former GSK site, Stockley Park, Hillingdon (hereafter referred to as 'the Application Site').

The 6.3 hectare (ha) site currently comprises three commercial buildings with associated parking, which are occupied by the pharmaceutical company GlaxoSmithKline (GSK). Full planning permission is sought to redevelop the Site, to comprise two industrial units, providing industrial floorspace and ancillary offices with associated parking, access arrangements, landscaping and infrastructure.

This FRA has been written in accordance with the requirements of the National Planning Policy Framework (NPPF) and other relevant National and Local Policy and Guidance documents.

The Site is wholly located in Flood Zone 1, according to the Environment Agency's Flood Maps for Planning. Flood risk to the Site from coastal / tidal, fluvial, sewer and drainage infrastructure, and artificial sources are assessed to be Negligible to Low. Flood risk to the Site from groundwater sources is considered to be Medium.

To mitigate the risk of groundwater flooding to the Site, it is recommended that the proposed development should be designed with minimal risk of groundwater interference, including the use of appropriate construction techniques and mitigation measures. Furthermore, basements and underground car parks are not proposed as part of the proposed development. Should any below ground works be proposed at the Site, re-evaluation would be required.

The risk of flooding from pluvial sources to the Application Site is classified as low, however by developing the Application Site, the risk of pluvial / overland flows from the proposed development could increase due to an increase in impermeable surfaces. A Surface Water Drainage Strategy (SWDS) is therefore proposed to manage this risk.

The SWDS has been prepared by a separate consultant, RPS Group (refer to Report No. PPEWL-RPS-XX-SI-XX-CA-C-0300) and should be read in conjunction with this FRA. The strategy incorporates the use of Sustainable Drainage Systems (SuDS), to provide additional benefits for events up to and including the 1% annual probability event, including a 40% allowance for climate change. A foul water strategy has also been prepared by RPS Group, where a packaged pump system is proposed as a gravity connection cannot be provided to the nearest Thames Water manhole, 400m west of the Application Site.

In consideration of the presented drainage strategy, the risk of flooding posed to the Site and the risk posed by the development itself are considered to be Negligible to Low.

Safe and dry access and egress will be provided via the primary access to the site via Ironbridge Road North, to the west of the Site.

Based on findings of this Flood Risk Assessment, the requirements of the National Planning Policy Framework have been achieved with respect to flooding and drainage. The proposed development will not be at risk from flooding, and furthermore, it will not cause an increase in flood risk to others over its lifetime.

1 INTRODUCTION

1.1 APPOINTMENT AND BRIEF

1.1.1 WSP was appointed by Prologis UK Ltd. to complete a site-specific Flood Risk Assessment (FRA), as part of the supporting documentation for a full planning application for the re-development of the former GSK site, Stockley Park, Hillingdon

1.1.2 The 6.3 ha site currently comprises three commercial buildings with associated parking, occupied by the pharmaceutical company GSK. A location plan is provided in **Appendix A-1** (Drawing 62215-LOC-001).

1.1.3 WSP has prepared this report in accordance with the instructions of their client, Prologis UK Ltd., for their sole and specific use relating solely to the above site. Any person who uses any information contained herein does so at their own risk and shall hold WSP harmless in any event.

1.1.4 Whilst this report was prepared using the reasonable skill and care ordinarily exercised by engineers practicing under similar circumstances and reasonable checks have been made on data sources and the accuracy of the data, WSP accepts no liability in relation to the report should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to WSP. In any event, WSP shall not be liable for any loss or damages arising under or in connection to the use of this report.

1.2 AIMS AND OBJECTIVES

1.2.1 The aim of this National Planning Policy Framework (NPPF) compliant FRA is to identify flood risks to the Site and those that may arise from the proposed development. Where risks are identified, mitigation measures are proposed to manage the risks over the lifetime of the development, including accounting for the effects of climate change. This includes presentation of a Surface Water Drainage Strategy (SWDS) for the proposed development.

1.2.2 To achieve this aim, the following objectives have been completed:

- A desk study and data research including review of:
  - The National Planning Policy Framework (NPPF) (2019);
  - The NPPF Flood Risk and Coastal Change Planning Practice Guidance (PPG);
  - Non-Statutory Sustainable Drainage Technical Standards, DEFRA (2015);
  - The SuDS Manual (CIRIA C753), CIRIA (2015);
  - Flood Risk Assessments: Climate Change Allowances (2019);
  - Thames River Basin Management Plan (2015);
  - Thames Estuary 2100 (TE2100) (2012);
  - The London Plan (2016);
  - The London Plan: Intend to Publish (Draft 2019);
  - London Borough of Hillingdon Local Plan: Part 1 – Strategic Policies (2012);
  - London Borough of Hillingdon Local Plan: Part 2 (Draft) (2019);
  - West London Strategic Flood Risk Assessment (SFRA) (2018);
  - London Borough of Hillingdon Local Flood Risk Management Strategy (LFRMS) (2016);
  - London Borough of Hillingdon Surface Water Management Plan (SWMP) (2013);

- London Borough of Hillingdon Preliminary Flood Risk Assessment (PFRA) (2011);
- London Borough of Hillingdon Sustainable Drainage: Design and Evaluation Guide (2017); and,
- Greater London Authority: London Sustainable Drainage Proforma (2019).

- Consultation with regulatory bodies and third parties, including:
  - The Environment Agency;
  - London Borough of Hillingdon;
  - Canal and River Trust; and
  - Thames Water.

(Copies of correspondence received and exchanged with these stakeholders are provided in **Appendix B**).

1.2.3 The following technical studies have been undertaken to support the evidence base for this FRA:

- An assessment of flooding to the Site and proposed development from fluvial, pluvial, groundwater, sewers and man-made infrastructure.
- An assessment of the opportunities and constraints presented by the water environment to development.
- An assessment of the impact of the proposed development on local flood risks.
- An assessment of the residual flood risk to the proposed development and neighbouring property from local flood sources.

1.2.4 A separate drainage strategy has been prepared by RPS Group to support the FRA (refer to Report No. PPEWL-RPS-XX-SI-XX-CA-C-0300) which has assessed the following:

- An estimate of surface water flows based on the current conditions at the Application Site and known existing drainage systems;
- Estimation of post development surface flows based on the development proposals and attenuation requirements; and,
- Estimation of foul flows generated from the proposed development including an assessment of pump failure.

2 POLICY AND GUIDANCE

2.1 NATIONAL PLANNING POLICY / GUIDANCE

NATIONAL PLANNING POLICY FRAMEWORK (2019)

2.1.1 The NPPF requires that an FRA should be undertaken:

- For all developments greater than 1 Hectare (ha) in size in Flood Zone 1;
- All proposals for new development (including minor development and change of use) in Flood Zones 2 and 3, or in an area within Flood Zone 1 which has a critical drainage problem;
- Where proposed development or a change of use (e.g. from commercial to residential) to a more vulnerable class may be subject to other sources of flooding (e.g. surface water drains, reservoirs).

2.1.2 The NPPF requires an FRA to be undertaken to demonstrate that the proposed development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

2.1.3 The NPPF also requires development to be allocated towards areas at lowest risk of flooding (the Sequential Test), and if necessary, the development proposals would be subject to satisfying the requirements of the Exception Test.

FLOOD RISK AND COASTAL CHANGE PLANNING PRACTICE GUIDANCE (PPG)

2.1.4 The NPPF is supported by the National Planning Practice Guidance (PPG). The Flood Risk and Coastal Change PPG states that an FRA must outline the following:

- whether a proposed development is likely to be affected by current or future flooding from any source;
- whether it will increase flood risk elsewhere; and,
- whether the measures proposed to deal with these effects and risks are appropriate.

2.1.5 The NPPF Flood Risk and Coastal Change Planning Practice Guidance (PPG) states that the lifespan of commercial development should be considered as 50 years and therefore climate change has been considered for this timescale.

2.1.6 Within Table 2 (Flood Risk Vulnerability Classification) of the NPPF and the *Flood Risk and Coastal Change* Planning Practice Guidance (PPG) (Communities and Local Government, 2014), the proposed development would be classified as *'Less Vulnerable'* (i.e. general industry/other services).

2.1.7 Table 3 (Flood Risk Vulnerability and Flood Zone Compatibility) of the PPG, states that *'Less Vulnerable*' development is appropriate in Flood Zone 1.

FLOOD RISK ASSESSMENTS: CLIMATE CHANGE ALLOWANCES (UPDATED MARCH 2020)

2.1.8 A summary of the Environment Agency's climate change allowances is provided in Chapter 3. The revised guidance was first published in February 2016, and last updated in March 2020, with updates to the following:

- Updated sea level rise allowances using UKCP18 projections;

- Updated guidance on how to apply peak river flow allowances, so that the approach is the same for Flood Zones 2 and 3;
- Additional guidance on how to:
    - Calculate flood storage compensation;
    - Use peak rainfall allowances to help design drainage systems;
    - Account for the impact of climate change on storm surge; and,
    - Assess the design access and escape routes for less vulnerable development.

NON-STATUTORY SUSTAINABLE DRAINAGE TECHNICAL STANDARDS (MARCH 2015)

2.1.9 The Non-Statutory Sustainable Drainage Technical Standards document sets out the technical standards for Sustainable Drainage Systems (SuDS).

2.1.10 The standards state that for greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body should never exceed the peak greenfield runoff rate for the same event.

2.1.11 For brownfield developments, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100-year, 6-hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event. The runoff volume should never exceed the existing brownfield runoff volume for the same event.

- The drainage system must be designed so that unless an area is designated to hold and/or convey water as part of the design:
    - Flooding does not occur on any part of the Site, for events up to and including rainfall events with a 3.3% chance of occurring in any given year; and,
    - Flooding does not occur during rainfall events with a 1% chance of occurring in any given year, in any part of a building or utility plant susceptible to water.

2.1.12 The design of the Site must ensure that, where reasonably practicable, flows resulting from rainfall, in excess of a 1% annual probability rainfall event, are managed in exceedance routes that minimise risks to people and property.

2.1.13 Pumping should only be used to facilitate drainage for those parts of the site where it is not reasonably practicable to drain water by gravity.

2.1.14 The mode of construction of any communication with an existing sewer or drainage system must be such that the making of the communication would not be prejudicial to the structural integrity and functionality of the system. Any drainage which does occur must be minimised and restricted before the drainage system is classified as complete.

2.2 LOCAL POLICY

THE LONDON PLAN (MARCH 2016)

2.2.1 The London Plan is a strategic planning document produced for the Mayor of London, the London Boroughs and the Corporation of the City of London. This spatial development strategy should be adhered to for any planning decisions in London.

2.2.2 The plan emphasises that proposed developments should take account of the wider issues associated with sustainable construction (**Policy 5.3**), climate change, and flood risk (**Policy 5.12**), and should avoid having any impact on sites of European importance for nature conservation.

2.2.3 The most relevant policies within the current 2016 plan are listed below:

- **Policy 5.10 'Urban Greening'** supports development plans that incorporate plans for urban greening and planting in the public realm.
- **Policy 5.11 'Green Roofs and Development Site Environs'** states that major development should be designed to include roof and site planning, to deliver sustainable urban drainage.
- **Policy 5.12 'Flood Risk Management'** states that:

  'Development proposals must comply with the Flood Risk Assessment and management requirements as set out in the NPPF and the associated technical guidance on flood risk over the development's lifetime and have regard of measures proposed in Thames Estuary 2100 and Catchment Flood Management Plans.'

- **Policy 5.13 'Sustainable Drainage'** states that:

2.2.4 'Development should utilise SuDS unless there are practical reasons for not doing so, and should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible in line with the following drainage hierarchy:

  - → *Store rainwater for later use;*
  - → *Use infiltration techniques, such as porous surfaces in non-clay areas;*
  - → *Attenuate rainwater in ponds or open water features for gradual release;*
  - → *Attenuate rainwater by storing in tanks or sealed water features for gradual release;*
  - → *Discharge rainwater direct to a watercourse;*
  - → *Discharge rainwater to a surface water sewer/drain; or,*
  - → *Discharge rainwater to the combined sewer.*

THE LONDON PLAN: INTEND TO PUBLISH (DRAFT 2019)

2.2.5 A new London Plan has been drafted and is expected to be finalised in 2020. Chapter 9 'Sustainable Infrastructure' of the draft document includes several policies relating to flood risk and water management. Any new or replacement policies, relevant to the proposed development, are outlined below.

- **Policy G5 'Urban Greening'** refers to urban greening as a fundamental element of building design and introduces the 'Urban Greening Factor' to identify the amount of urban greening required in developments.
- **Policy SI 12 'Flood Risk Management'** largely reiterates the aims of Policy 5.12 in the current 2016 London Plan, but places a greater emphasis on creating space for water in development and using natural flood management measures where possible.
- **Policy SI 13 'Sustainable Drainage'** reiterates the drainage hierachy in Policy 5.13, with a greater emphasis on drainage with multiple benefits being preferred.
- **Policy D11 'Safety, Security and Resilience to Emergency'** states that development proposals should maximise building resilience and minimise potential physical risks that arise from flood related hazards.

- **Policy GG6 'Increasing Efficiency and Resilience'** states that buildings and infrastructure should be designed to adapt to climate change, utilise water efficiently and reduce flooding impacts.

WEST LONDON STRATEGIC FLOOD RISK ASSESSMENT (SFRA) (MARCH 2018)

2.2.6 West London's Strategic Flood Risk Assessment (SFRA) provides an overview of flood risk within six London boroughs, including the London Borough of Hillingdon (LBH). It provides an update to the individual borough SFRAs, completed in 2008.

2.2.7 Interactive mapping within the SFRA confirms the Site is not within a Critical Drainage Area (CDA) or an area with records of Thames Water Sewer flooding (based on 2017 data).

2.2.8 The interactive mapping does indicate that the Site is within an area with permeable superficial deposits (according to the Greater London Authority mapping) and is within an area with between a 50% and 75% susceptibility to groundwater flooding (according to Environment Agency mapping).

LONDON BOROUGH OF HILLINGDON LOCAL PLAN: PART 1 – STRATEGIC POLICIES (NOVEMBER 2012)

2.2.9 The LBH Local Plan: Part 1 – Strategic Policies is the key strategic planning document for Hillingdon and contains several policies related to Flood Risk and Sustainable Drainage.

- **Policy EM1** '**Climate Change Adaptation and Mitigation'** emphasises the requirement for development to be located outside of flood risk areas, and for development to consider the whole water cycle in its design.
- **Policy EM6** '**Flood Risk Management'** highlights the requirement for SuDS to be incorporated into all new development, which may require developer contributions to ensure long term maintenance.

2.2.10 The document also specifies that SuDS should be designed to accommodate the 1 in 100-year event plus a 30% allowance for climate change.

LONDON BOROUGH OF HILLINGDON LOCAL FLOOD RISK MANAGEMENT STRATEGY (LFRMS) (FEBURARY 2016)

2.2.11 LBH, as the Lead Local Flood Authority (LLFA), is required to develop a Local Flood Risk Management Strategy (LFRMS) for its area, under the Flood and Water Management Act 2010. The aim of the LFRMS is to produce a plan to reduce and manage flood risk in a way that will benefit people, property and the environment.

2.2.12 The LFRMS does not refer to the Site specifically but provides an overview of sources of flooding within the Borough, and the importance of SUDS in developments.

2.2.13 The Borough suffers from all sources of flooding, and is particularly vulnerable to surface water flooding, which often occurs in conjunction with sewer flooding. Fluvial flooding is a risk across the Borough, due to the extensive development of the floodplain, and fast response of the watercourses to rainfall. The extensive coverage of permeable superficial deposits across the borough, underlain by impermeable clay, creates a complex issue of groundwater flooding.

LONDON BOROUGH OF HILLINGDON SURFACE WATER MANAGEMENT PLAN (SWMP) (JANUARY 2013)

2.2.14 The Surface Water Management Plan (SWMP) outlines the preferred surface water management strategy for the LBH.

2.2.15 The SWMP confirms that the Site is not located within a Critical Drainage Area and there are no recorded incidents of sewer, pluvial or fluvial flooding.

2.2.16 The mapping within the SWMP also indicates that the Site is within an area with permeable superficial deposits but is not located near to any historic records of groundwater flooding. Furthermore, that the Site is within an area with Uncertain SUDS suitability, and is located adjacent to a historic landfill site, to the east.

LONDON BOROUGH OF HILLINGDON PRELIMINARY FLOOD RISK ASSESSMENT (PFRA) (MAY 2011)

2.2.17 The LBH Preliminary Flood Risk Assessment (PFRA) provides a coarse assessment for identifying potential Flood Risk Areas within the Borough using a precautionary approach.

2.2.18 West Drayton, where the Site is located, is currently excluded from the indicative Flood Risk Areas, as flooding in this area is considered unlikely to result in “significant harmful consequences”.

LONDON BOROUGH OF HILLINGDON SUSTAINABLE DRAINAGE: DESIGN AND EVALUATION GUIDE (JANUARY 2017)

2.2.19 This guide provides an overview of SuDS and their benefits, and what LBH require from developers, to support planning applications for new developments.

2.2.20 The guidance is comprehensive but does not deviate from standard SuDS best practice. There is an objective for flows from brownfield sites to be reduced to greenfield rates.

GREATER LONDON AUTHORITY: LONDON SUSTAINABLE DRAINAGE PROFORMA (2019)

2.2.21 The London Sustainable Drainage Proforma was introduced in April 2019 by London’s 33 LLFAs and is required to be submitted alongside Planning Applications to set a clear standard for surface water drainage strategies in London.

3 BACKGROUND

3.1 SITE LOCATION

3.1.1 The Site is located at Stockley Park, Ironbridge Road North, within West Drayton, Uxbridge. The approximate Ordnance Survey (OS) grid reference for the Site is (507566, 180118), and the nearest postcode is UB11 1BT. Refer to Drawing No. 62215-LOC-001 in **Appendix A-1** for the Site Location plan.

3.1.2 The Site is approximately 6.3 ha in size and is a brownfield site, comprising of three commercial office buildings with associated parking and landscaping, including ponds.

3.1.3 The Site is bordered by Horton Road and Stockley Park to the north, Stockley Road to the east, industrial parks to the west, and the Grand Union Canal to the south.

3.2 DEVELOPMENT PROPOSALS

3.2.1 It is understood that full planning permission is sought to redevelop the Site to provide two industrial units providing industrial floorspace (Use Class B1c/B2/B8) and ancillary offices together with associated parking, access arrangements, landscaping and infrastructure.

3.2.2 A Site Layout Plan (Drawing No. 30928 – PL – 201A) and Landscape Concept Plan (Drawing No. 1982-19-05B) is provided in **Appendix C-1.**

3.3 TOPOGRAPHY

3.3.1 Inspection of Environment Agency LiDAR Data (1m resolution) indicates that the Site varies from approximately 31m Above Ordnance Datum (m AOD) along the southern boundary of the Site, to approximately 37m AOD in the north west corner of the Site. The Site generally slopes towards its southern boundary where levels continue to fall towards the canal, which is at approximately 30m AOD.

3.3.2 A topographical survey was undertaken by Greenhatch Group in June 2019 and confirms the levels on Site as provided by the LiDAR data. A copy is provided in **Appendix C-2**. The lowest elevations are found towards the southern boundary of the Site, at approximately 31- 32m AOD. The centre of the Site is largely flat, with levels at approximately 34 - 35m AOD. An increase in elevation is identified towards the north western corner of the Site, to approximately 35 – 37m AOD.

3.4 GEOLOGY AND HYDROGEOLOGY

3.4.1 British Geological Survey (BGS) maps[1]) indicate that Site is underlain by bedrock of London Clay Formation – Clay, Silt and Sand. Superficial deposits are also present across the entire Site, with the Lynch Hill Gravel Member - Sand and Gravel, present across the majority of the Site. A small amount of the Langley Silt Member – Clay and Silt, is present in the south eastern corner of the Site.

[1] [1] British Geological Survey (2019) Geoindex Onshore, accessed 7th January 2020. Available at: http://www.bgs.ac.uk/GeoIndex/

3.4.2 BGS mapping also indicates that artificial deposits are present at the Site. The Site itself is comprised of Worked Ground (Undivided), described by the BGS as an area that has been excavated by manmade processes. Adjacent to the Site, to both the north and west, are areas of infilled ground, where excavated ground has been backfilled with materials of variable composition. Extracts of the BGS geology mapping are provided on Drawings No. 62215-BGS-001, 62215-BGS-002, 62215-BGS-003 in **Appendix A-3** for reference.

3.4.3 Additional information regarding the ground conditions at the Site are found in a Phase 2 Geo-environmental and geotechnical assessment, undertaken by WSP in 2019[2]. A ground investigation undertaken in February 2019 supports the findings of the BGS mapping, and indicates that the Site is comprised of the following, in metres of thickness below ground level:

- Hardstanding: 0.08m;
- Made Ground (sand and limestone aggregate): 0.08 to 0.42m;
- Made Ground (infilled material): 0.2 to 5.70m;
- Made Ground (reworked material): 0.2 to 4.6m;
- Langley Silt Member: 0.4 to 1.0m;
- Lynch Hill Gravel Member: 0.3 to 2.70m;
- London Clay Formation: to a maximum depth of 16.95m below ground level (base not found).

3.4.4 Groundwater monitoring was undertaken as part of the ground investigation in February 2019. Monitoring was undertaken in 12 wells across the Site. Groundwater was encountered in 11 of these wells, mainly within the Made Ground. The shallowest recording was at 0.49 m below ground level (bgl), towards the south of the Site, whilst the deepest recording was at 4.95mbgl in the centre of the Site. Relevant excerpts of the report have been reproduced in **Appendix C-3**.

3.4.5 The Environment Agency's Magic Map Application[3] indicates that the bedrock geology of the Site is not a designated aquifer and is classified as an 'unproductive' stratum. Unproductive Strata are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow. The London Clay Formation is classified as "rocks with essentially no groundwater" by the Environment Agency.

3.4.6 The superficial deposits are, however, designated as a 'Principal Aquifer'. These are defined by the Environment Agency as '*Layers of rock or drift deposits that have high intergranular and/or fracture permeability, meaning they usually provide a high level of water storage'*.

3.4.7 Magic Map also indicates that the Site is not located within, or in close proximity to, a Groundwater Source Protection Zone (SPZ). However, the Site is located within a Medium to High Groundwater Vulnerability Zone (GVZ). These are zones defined as '*areas able to easily transmit pollution to groundwater. They are characterised by high-leaching soils and the absence of low-permeability superficial deposits'.*

[2] WSP (2019), Prologis Park West London Expansion Land: Phase 2 Geo-environmental and geotechnical assessment.
[3] Environment Agency (2020), Magic Map Application, accessed 7th January 2020. Available at: https://magic.defra.gov.uk/MagicMap.aspx

3.5 IDENTIFICATION OF EXISTING WATERCOURSES

3.5.1 There are no known watercourses within the Site or in its vicinity.

3.1 IDENTIFICATION OF OTHER WATER FEATURES

3.1.1 The Grand Union Canal is located approximately 20m from the southern boundary of the Site.

3.1.2 There are also a number of ponds in close proximity to the Site, including two on the Site itself. Both ponds within the site boundary are unnamed and measure approximately 40m in length. According to the Geo-environmental assessment[2], the pond located to the east of the Site is a SuDS feature, attenuating surface water runoff from the car park, whilst the pond in the north of the Site is for aesthetic purposes.

3.1.3 A larger unnamed pond, approximately 200m in length, is present on the industrial park to the west of the Site, and a further unnamed pond is present within the southern boundary of Stockley Country Park to the north of the Site, measuring approximately 150m in length.

3.2 EXISTING FLOOD DEFENCES

3.2.1 The Environment Agency's Flood Map for Planning indicates that the Application Site does not benefit from any formal fluvial flood defences.

3.3 EXISTING SEWER AND DRAINAGE INFRASTRUCTURE

3.3.1 The Site is classified as a brownfield site and is assumed to discharge into the Thames Water sewer network, however this has not been confirmed.

3.3.2 Inspection of the Thames Water Asset Plans (**Appendix C-4**), obtained in November 2019, indicates a Thames Water surface water sewer present in the south western corner of the Site. This sewer appears to collect highway drainage, as well as existing site drainage, and outfall into the Grand Union Canal.

3.3.3 The nearest foul sewer is located approximately 400m to the west of the Site along Horton Road, and flows away from the Site. At the time of writing, records of existing private drainage on the Site were not made available, but it is assumed that private drainage is present, to serve the existing office development.

3.4 HISTORIC FLOOD RECORDS

3.4.1 Table 3-1 – 3-1 summarises the flood records obtained through consultation and liaison with the various regulatory bodies and stakeholders contacted in the production of this FRA. Copies of this correspondence can be found in **Appendix B**.

Table 3-1 – Historic Flood Records

Information Source	Flood Records/Details
Environment Agency	The Environment Agency has confirmed that they hold no records of historical flooding at the Site.
London Borough of Hillingdon	LBH confirmed all relevant information was listed on their website and after conducting a review no historic flood information for this site was found. The West London Strategic Flood Risk Assessment mapping does not show any historic flood incidents within the Application Site[4].
Thames Water	Thames Water have confirmed that there have been no incidents of flooding, as a result of surcharging public sewers, at the Site.
Canals and Rivers Trust (CRT)	The Canals and Rivers Trust has confirmed that there are no records of overtopping or breaching of the canal in this area.

[4] West London Strategic Flood Risk Assessment Mapping https://westlondonsfra.london/mapping-tool/

4 CLIMATE CHANGE ALLOWANCES

4.1.1 The NPPF Flood Risk and Coastal Change Planning Practice Guidance (PPG) states that, for commercial developments, it is reasonable to assume a typical lifespan of 50 years.

4.1.2 In February 2016, the Environment Agency released 'Flood Risk Assessments: Climate Change Allowances' guidance to support the NPPF (updated in March 2020). Considering the nature of flood risks to, and arising from the proposed development, it is appropriate to consider the impact of climate change on peak rainfall intensity.

4.1.3 Allowances for peak rainfall intensity will need to inform the drainage design for the proposed development to ensure that it is designed to account for the effects of climate change. The guidance states that FRAs should consider both the central and upper end allowances to understand the range of impacts that may occur because of climate change. Over 50 years, these allowances are considered to be a 20% and 40% increase in peak rainfall intensity respectively, for the Thames River Basin District.

5 OVERVIEW OF FLOOD RISK

5.1 INTRODUCTION

5.1.1 The following section provides an overview of flood risk to the Site, along with flood risk to and from the proposed development. An assessment has been undertaken for each source that could affect the proposed development in accordance with the NPPF Flood Risk and Coastal Change Planning Practice Guidance (PPG).

5.1.2 Flood risks have been qualitatively assessed on the following basis:

- Negligible risk (e.g. coastal flood risk posed to inland areas);
- Very Low risk (e.g. Flood Zone 1 or <0.1% annual probability of flooding from surface water);
- Low risk (e.g. Flood Zone 2 or between 0.1% and 1.0% annual probability of flooding from surface water);
- Medium risk (e.g. Flood Zone 3a or between 1.0% and 3.3% annual probability of flooding from surface water); and
- High risk (e.g. Flood Zone 3b or 3.3% annual probability of flooding from surface water).

5.2 FLOODING FROM COASTAL AND TIDAL SOURCES

5.2.1 Tidal flooding occurs when sea levels rise above the level of the land or beyond the operational level of flood defences.

5.2.2 The Environment Agency's Flood Map for Planning[5], shows that the Site is not in the proximity of a tidal section of watercourse or the coast; consequently, the risk of flooding posed to and from the Site and the proposed development from this source is considered to be Negligible and no mitigation is required.

5.3 FLOODING FROM FLUVIAL SOURCES

5.3.1 Fluvial flooding occurs when flows within watercourses exceed the capacity of the watercourse, causing out of bank flows.

5.3.2 The Environment Agency Flood Map for Planning[5] shows that the Site is wholly located within Flood Zone 1, i.e. land with an annual risk of flooding from rivers of less than 0.1%.

5.3.3 As the Site is not considered to be at risk from fluvial flooding, and this form of flooding will not impact safe access and egress from the Site, no mitigation measures will be required, and the risk of fluvial flooding to and from the proposed development is considered to be Very Low.

5.4 FLOODING FROM PLUVIAL / OVERLAND FLOW SOURCES

5.4.1 During extreme storms, the ground may become saturated, generating greater overland flows. In addition, during these extreme conditions, sewers which carry away surface water may not be able

[5] Environment Agency (2020), Flood Map for Planning, accessed 7th January 2020. Available at: https://flood-map-for-planning.service.gov.uk/

become to accommodate the overland flows, or they may become blocked with debris. All of these contribute to surface water flooding.

5.4.2 The Environment Agency's Risk of Flooding from Surface Water mapping[6], shows most of the site to have a 'very low risk' of surface water flooding, with an annual probability of surface water flooding of less than 0.1%.

5.4.3 Isolated areas of low – high surface water flood risk are present in the centre of the existing car park and are likely to be associated with a low point on Site; and around each of the existing ponds.

5.4.4 Low risk represents an annual probability of surface water flooding of between 0.1% (1 in 1,000) and 1.0% (1 in 100), whilst a medium risk represents an annual probability of surface water flooding of between 1% and 3.3% (1 in 30). High risk represents an annual probability of surface water flooding of greater than 3.3%, and a flood depth of over 900mm.

5.4.5 A low - high risk flow path is present to the south of the Site, and is associated with the Grand Union Canal; however the flow route is confined to the canal itself. A low – high risk area surface water flooding is also present to the north of the Site, along Horton Road, and is considered to be associated with a low point in the topography at approximately 33m AOD. The Environment Agency's Risk of Flooding from Surface Water mapping indicates that flood depths in this location are approximately between 300-900mm. Ground levels in the northern section of the Application Site are sufficiently above this surface water flood depth at 34.2m AOD.

5.4.1 Therefore, the risk of flooding from overland flow sources to the Application Site (pre-development) is considered to be low.

5.4.2 By developing the Application Site, the risk of pluvial / overland flows from the proposed development could increase. This is due to an increase in impermeable surfaces covering the Application Site, which would result in greater volumes and rates of surface water discharging from the Application Site.

5.4.3 Prior to the implementation of a Surface Water Drainage Strategy (SWDS) the risk of the proposed development exacerbating flood risk from pluvial / overland flow flooding to neighbouring property is considered to be Medium.

5.4.4 The SWDS for the proposed development, a summary of which is provided in **Section 8,** will incorporate sufficient attenuation to restrict run-off from the development to Greenfield runoff rates, in line with national and local policy requirements (refer to RPS Report No. PPEWL-RPS-XX-SI-XX-CA-C-0300. The SWDS will therefore mitigate the potential for the proposed development to exacerbate flood risk as a result of pluvial / overland flow sources. Therefore, the risk of the proposed development increasing flood risk from this source to the (post-development) Site is considered to be Low.

[6] Environment Agency (2020), Long Term Flood Risk, accessed 7th January 2020. Available at https://flood-warning-information.service.gov.uk/long-term-flood-risk/map

5.5 FLOODING FROM GROUNDWATER SOURCES

5.5.1 Groundwater flooding occurs when water stored below ground reaches the surface. It is commonly associated with porous underlying geology, such as chalk, sands and gravels.

5.5.2 The Site is underlain by bedrock of London Clay Formation (Clay, Silt and Sand). Superficial deposits within the site are predominately Lynch Hill Gravel Member – Sand and Gravel. However, Langley Silt Member – Clay and Silt can also be found towards the south east of the Site.

5.5.3 The aquifer designation of the bedrock beneath the Site is classified as 'unproductive' strata. This means that the bedrock is considered to have a low permeability and has negligible significance for water supply or river base flow. The London Clay Formation is also classified as "rocks with essentially no groundwater" by the Environment Agency.

5.5.4 The aquifer designation of the superficial deposits beneath the Site, however, is a 'Principal Aquifer'. These are defined by the Environment Agency as '*layers of rock or drift deposits that have high intergranular and/or fracture permeability, meaning they usually provide a high level of water storage'.*

5.5.5 The results of the monitoring shows that groundwater is confined to the shallow superficial deposits by the impermeable nature of the London Clay Formation beneath. Groundwater flood risk at the Site is therefore derived from the interconnected superficial deposits at the Site and in the vicinity.

5.5.6 The risk of flooding from this source is considered to be Medium, given the shallow groundwater levels encountered during monitoring, and the presence of the permeable superficial deposits.

5.5.7 The proposed development should be designed to ensure minimal risk of groundwater interference. Appropriate construction techniques and mitigation measures should effectively manage the potential groundwater flood risk. Basements and underground car parks are not proposed as part of the proposed development. Should any below ground works be proposed at the Site, re-evaluation of the risk would be required.

5.5.8 During the groundwater monitoring undertaken during February 2019, groundwater was encountered at shallow levels across the Site, in 11 boreholes and window samples. Groundwater contour mapping included within the report indicates a dominant flow direction towards the south of the Site but suggests that there is no hydraulic connectivity between the canal and the Site.

5.5.9 The risk of the proposed development increasing flood risk from this source to the Site is considered to be Low, however a recommendation is made within the Geo-environmental report[2] that *'further groundwater level data is needed to fully establish the hydrogeology at the Site'*.

5.6 FLOODING FROM SEWER AND DRAINAGE INFRASTRUCTURE SOURCES

5.6.1 Historic flood records provided by Thames Water confirm that there have been no known incidents of flooding at the Site as a result of surcharging of public sewers.

5.6.2 The West London SFRA interactive mapping indicates the Site is within an area with no records of Thames Water Sewer flooding (based on 2017 data). In addition, there are very few sewers within close proximity to the Site. Little information is known, however, about any presence or condition of any private drainage at the Site, which may also pose a flood risk.

5.6.3 Site runoff is believed to drain via a private on-site network into the Thames Water surface water sewer located in the south east of the Site, before discharging into the Grand Union Canal. It is proposed that the surface water discharge from the proposed development will use the same outfall. The proposed development however will have a SWDS in place to restrict flows to Greenfield runoff rates and will be designed to accommodate the 1% AEP event plus 40% climate change allowance.

5.6.4 The risk to the existing Site and of the proposed development exacerbating flood risk to neighbouring property once a drainage scheme has been implemented is considered to be Low.

5.7 FLOODING FROM ARTIFICIAL SOURCES

5.7.1 The Environment Agency's Long-Term Flood Risk Mapping[5] indicates that the Site does not lie within the inundation area of any reservoirs.

5.7.2 The southern boundary of the Site is located approximately 20m to the north of the Grand Union Canal. CRT has confirmed that it is not aware of any records of overtopping or breaching in this area. The water level of the canal is between 29.3 and 29.5 mAOD. The ground level at the southern end of the Site is approximately 2 - 3m higher than this level and therefore, the flood risk from this source to the site is considered to be Low.

6 SEQUENTIAL AND EXCEPTION TEST

6.1 INTRODUCTION

6.1.1 The purpose of the NPPF Sequential Test is to ensure that land use planning takes due regard of flood risks, to ensure that areas at low or no risk of flooding are developed in preference to areas at higher risk.

6.2 VULNERABILITY CLASSIFICATION

6.2.1 Vulnerability classifications are defined within Table 3 of the PPG Flood Risk and Coastal Change. The purpose of the vulnerability classification is to identify appropriate land use activities relative to the level of flood risk.

6.2.2 Within Table 2 (Flood Risk Vulnerability Classification) of the NPPF Planning Practice Guidance, the proposed development is classified as '*Less Vulnerable'* as the site will consist of commercial development and office space.

6.3 FLOOD ZONE DEFINITION

6.3.1 According to the Environment Agency's *Flood Map for Planning*, the proposed development is located wholly within Flood Zone 1.

6.4 COMPATIBILITY TEST

6.4.1 The Flood Risk and Coastal Change PPG identifies different land use vulnerabilities that are appropriate within each of the Flood Maps for Planning flood risk classifications. As can be seen in **Table 6-1**, the proposed development (Less Vulnerable commercial development) is considered appropriate in Flood Zone 1. As a result, the Sequential Test is considered to be satisfied and the Exception Test is not required.

Table 6-1 - Flood risk and vulnerability and flood zone compatibility (PPG Table 3)

Flood Zone	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Zone 1	Development is appropriate	Development is appropriate	Development is appropriate	Development is appropriate	Development is appropriate
Zone 2	Development is appropriate	Exception test required	Development is appropriate	Development is appropriate	Development is appropriate
Zone 3A	Exception test required	Development should not be permitted	Exception test required	Development is appropriate	Development is appropriate
Zone 3B	Exception test required	Development should not be permitted	Development should not be permitted	Development should not be permitted	Development is appropriate

7 FLOOD RISK MANAGEMENT MEASURES

7.1 BRIEF CONSIDERATIONS

7.1.1 Following a review of the flood risks to and arising from the proposed development, the following section discusses the mitigation measures necessary to ensure the proposed development remains safe over its lifetime and does not exacerbate flood risk to neighbouring property (including allowances for the effects of climate change).

7.2 MITIGATION MEASURES

POST DEVELOPMENT FLOOD MITIGATION

7.2.1 The risk of the proposed development exacerbating flood risks from tidal / coastal, fluvial, sewer and drainage infrastructure and artificial sources to neighbouring properties is assessed to be Negligible to Low. Therefore, no measures are considered necessary to mitigate against these sources.

Groundwater Flood Risk Management

7.2.2 The risk of flooding from this source is considered to be Medium, given the shallow groundwater levels encountered during monitoring, and the presence of the permeable superficial deposits.

7.2.3 The proposed development should be designed with minimal risk of groundwater interference. Appropriate construction techniques and mitigation measures should effectively manage the potential groundwater flood risk. Basements and underground car parks are not proposed as part of the proposed development. Should any below ground works be proposed at the Site, re-evaluation of the risks would be required.

Surface Water / Pluvial Flood Risk Management

7.2.4 Prior to the implementation of a SWDS, the risk of the proposed development exacerbating flood risk from pluvial / overland flow flooding to neighbouring property is considered to be Medium.

7.2.5 The SWDS proposed by RPS Group demonstrates that the proposed development can be drained using SuDS techniques for events up to the 1% annual probability storm event, including an allowance for climate change (40% increase on peak rainfall intensity).

7.2.6 In consideration of the drainage strategy presented by RPS, the risk of the proposed development exacerbating flood risks from pluvial / overland sources is considered to be Low.

FINISHED FLOOR LEVELS

7.2.7 Finished floor levels are presented on RPS Group Drawing No. PPWLE-RPS-SI-XX-DR-C-1600 (refer to **Appendix C-1**) where the proposed finished floor levels have been set a minimum of 150mm above external finished levels.

7.2.8 Finished site levels should be engineered, where possible, to prevent ponding. Gradients of external areas should be designed to fall away from dwellings such that overland flow routes resulting from events exceeding design events will follow the path of least resistance and be channelled away from proposed and existing properties. The potential accumulation of standing water will therefore be minimised and thus not pose a significant risk.

SAFE ACCESS AND EGRESS

7.2.9 Safe access and egress will be provided via Ironbridge Road North which bounds the west of the Application Site.

8 SURFACE WATER DRAINAGE STRATEGY

8.1 SUMMARY OF SURFACE WATER DRAINAGE STRATEGY

8.1.1 The proposed SWDS has been prepared by RPS Group as a separate document (refer to Report No. PPWLE-RPS-XX-XX-RP-C-0300) and it should be read in conjunction with this FRA. It is to be noted that WSP has not undertaken a detailed technical review of the drainage strategy, however this section provides a brief summary of the strategy report.

8.1.2 The strategy states that the existing site is believed to drain via a private network into the existing onsite Thames Water surface water sewer at manhole 6902 which is located in the south east corner of the Site, before discharging to Grand Union Canal.

8.1.3 Surface water run-off from the proposed development will be restricted to a greenfield runoff rate of 2 l/s/ha. The total discharge rate from both proposed units is 12.5 l/s.

8.1.4 Attenuation will be provided in the form of below ground attenuation tanks under each unit before combining into one drain to discharge to the existing Thames Water manhole, with the ultimate discharge point being into the Grand Union Canal via an existing outfall. The strategy states that due to the ground conditions, such as the perched groundwater, infiltration is not considered viable.

8.1.5 The surface water drainage strategy has been designed to accommodate run off from all storms up to and including the 1% AEP with a 40% allowance for climate change.

8.1.6 The strategy also states that any localised flooding will be contained on site. Consequently, neither people nor property would be at risk during an exceedance event.

9 FOUL WATER DRAINAGE STRATEGY

9.1 SUMMARY OF FOUL WATER DRAINAGE STRATEGY

9.1.1 The proposed foul water strategy has been prepared by RPS Group as a separate document (refer to Report No. PPWLE-RPS-XX-XX-RP-C-0300) and it should be read in conjunction with this FRA. It is to be noted that WSP has not undertaken a detailed technical review of the drainage strategy, however this section provides a brief summary of the strategy report.

9.1.2 The strategy states that the nearest connection for foul drainage is identified as a Thames Water manhole reference no. 1305 situated 400m to the west of the site.

9.1.3 The surrounding topography does not allow for a gravity connection, therefore a packaged pump station is required to pump flows to the existing Thames Water manhole.

9.1.4 The strategy states that peak foul flows from the proposed development will not exceed 3.7 l/s.

10 CONCLUSIONS

10.1.1 This Flood Risk Assessment has been prepared on behalf of Prologis UK Ltd. to support a full planning application for the redevelopment of the former GSK site, Stockley Park, Hillingdon, to include two new industrial units, providing industrial floorspace and ancillary offices with associated parking, access arrangements, landscaping and infrastructure.

10.1.2 The existing 6.3 ha site currently comprises three commercial buildings with associated parking, occupied by the pharmaceutical company GSK.

10.1.3 Stakeholder consultation was undertaken as part of this FRA with the London Borough of Hillingdon, as the LLFA, the Environment Agency, Thames Water and the Canals and Rivers Trust. The London Borough of Hillingdon, Environment Agency, Thames Water and the Canals and Rivers Trust have all confirmed they have no records of flooding at the Site.

10.1.4 Flood risk to the proposed development from coastal / tidal, fluvial, sewage & drainage infrastructure and artificial sources is assessed to be negligible to low and no specific flood mitigation measures are required to manage the risks from these sources.

10.1.5 Flood risk to the proposed development from groundwater sources is considered to be Medium. To mitigate the risk of groundwater flooding at the Site, it is recommended that the proposed development should be designed with minimal risk of groundwater interference, including appropriate construction techniques and mitigation measures where necessary. Basements and underground car parks are not proposed as part of the proposed development. Should any below ground works be proposed at the Site, however, re-evaluation of the risks would be required.

10.1.6 The risk of flooding from pluvial sources to the Application Site is classified as low, however by developing the Application Site, the risk of pluvial / overland flows from the proposed development could increase due to an increase in impermeable surfaces. A Surface Water Drainage Strategy (SWDS) is therefore proposed to manage this risk.

10.1.7 The proposed SWDS, prepared by RPS Group, includes two attenuation tanks which have been designed to accommodate events up to the 1% AEP event, including an allowance for climate change (40% increase on peak rainfall intensity). It is proposed that surface water will discharge from the attenuation tanks into the Grand Union Canal to the south of the Site, via an existing Thames Water surface water sewer in the south east corner of the Site.

10.1.8 The strategy states that any localised flooding will be contained on site. Consequently, neither people nor property would be at risk during an exceedance event. In consideration of the presented drainage strategy, the risk of the proposed development exacerbating flood risks from pluvial / overland sources is considered low.

10.1.9 A foul water strategy has also been prepared by RPS Group, where a packaged pump system is proposed as a gravity connection cannot be provided to the nearest Thames Water manhole, 400m west of the Application Site.

10.1.10 Safe and dry access and egress will be provided via the primary access to the site via Ironbridge Road North, to the west of the Site.

10.1.11 The Flood Risk Assessment and proposed mitigation measures show that the proposed development, and its users, will be safe from all sources of flood risk over its lifetime. Proposals for the site are therefore considered to be acceptable in terms of the requirements of the NPPF.

Appendix A

LOCATION DRAWINGS

Appendix A.1

LOCATION PLAN

507000
507500
508000
180500
180000
N
Horton Road
Grand Unio
0 100 200 300 400 500 600 m

KEY:
- Indicative Site Boundary
- Site Location

REV	DATE	DRW	DESCRIPTION	CHK	APP
A	29/10/19	GL	FIRST ISSUE	AF	SK

STATUS: FOR INFORMATION ONLY

Mountbatten House, Basing View,
Basingstoke, HANTS, RG21 4HJ
Tel: +44 (0) 1256 318 800
Fax: +44 (0) 1256 318 70
www.wsp.com

CLIENT: PROLOGIS UK LTD.

ARCHITECT: -

PROJECT: PROLOGIS PARK EXPANSION LAND

TITLE: SITE LOCATION PLAN

DRAWN:	CHECKED:	APPROVED:

QGIS FILE:	SCALE @A3:	DATE:
62215-LOC-001.qgz	1:6000	30/10/19

PROJECT No:	DRAWING No:	REV:
70062215	62215-LOC-001	A

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Appendix A.2

FLOOD MAP PACK

FLOOD RISK PACK

Client:
Prologis UK LTD.

Project Reference:
70062215 - Prologis Park Expansion Land

Site Reference:
Prologis Park Expansion Land

Site Location
507570, 180117

Site Area:
6.01 hectares

Map Pack Scale:
1:10,000

CONTENTS:

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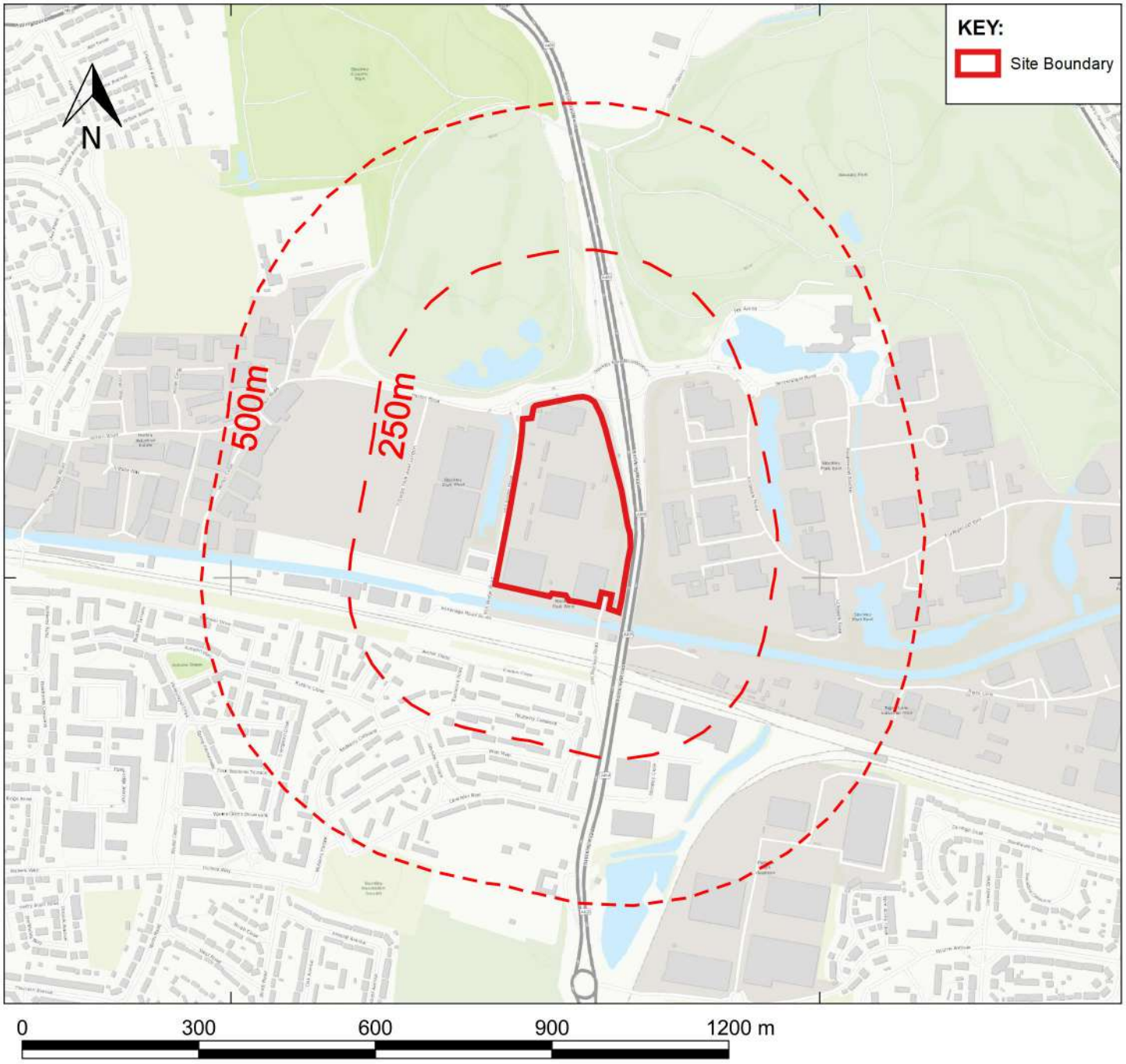
SITE LOCATION



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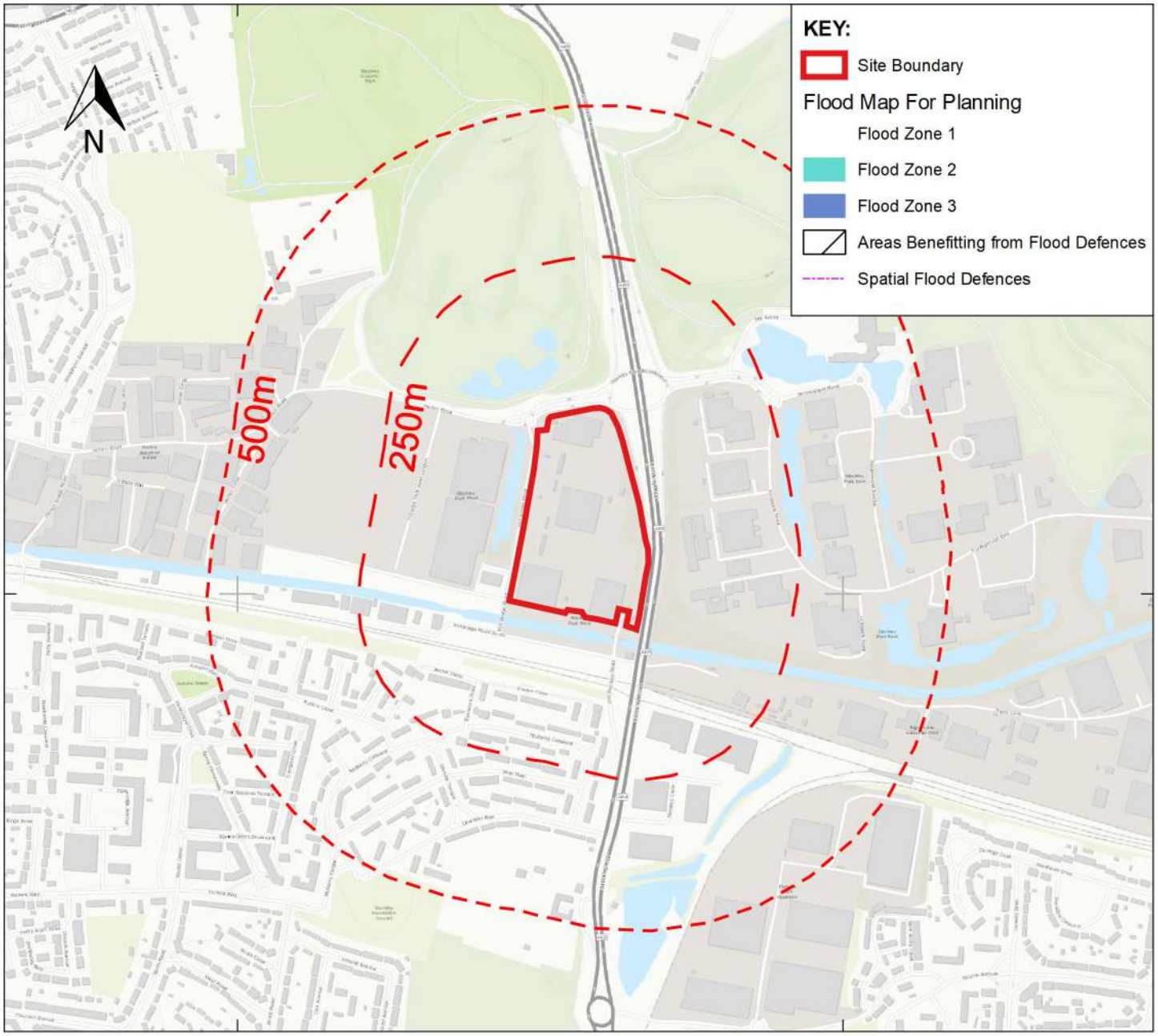
ENVIRONMENT AGENCY FLOOD MAP FOR PLANNING



Flood zone maps are modelled using local and national river and sea data. This information provides an indication of the likelihood of flooding and is intended for planning use only.

Flood Zone 1 - Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3).

Flood Zone 2 - Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)

Flood Zone 3 - Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)

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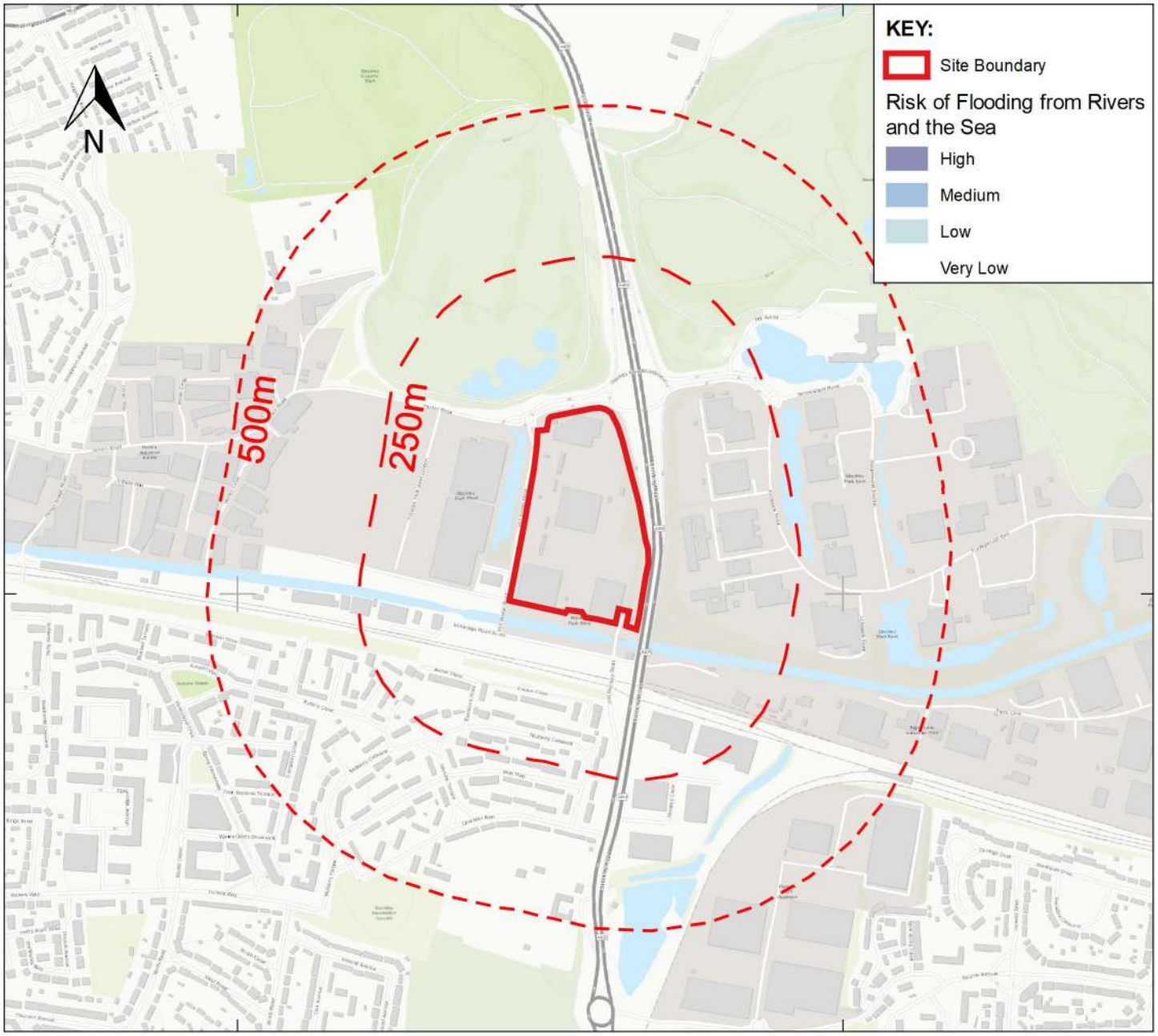
ENVIRONMENT AGENCY RISK OF FLOODING FROM RIVERS AND THE SEA



High risk means that each year this area has a chance of flooding of greater than 3.3%.

Medium risk means that each year this area has a chance of flooding of between 1% and 3.3%.

Low risk means that each year this area has a chance of flooding of between 0.1% and 1%.

Very low risk means that each year this area has a chance of flooding of less than 0.1%.

This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped, or fail.

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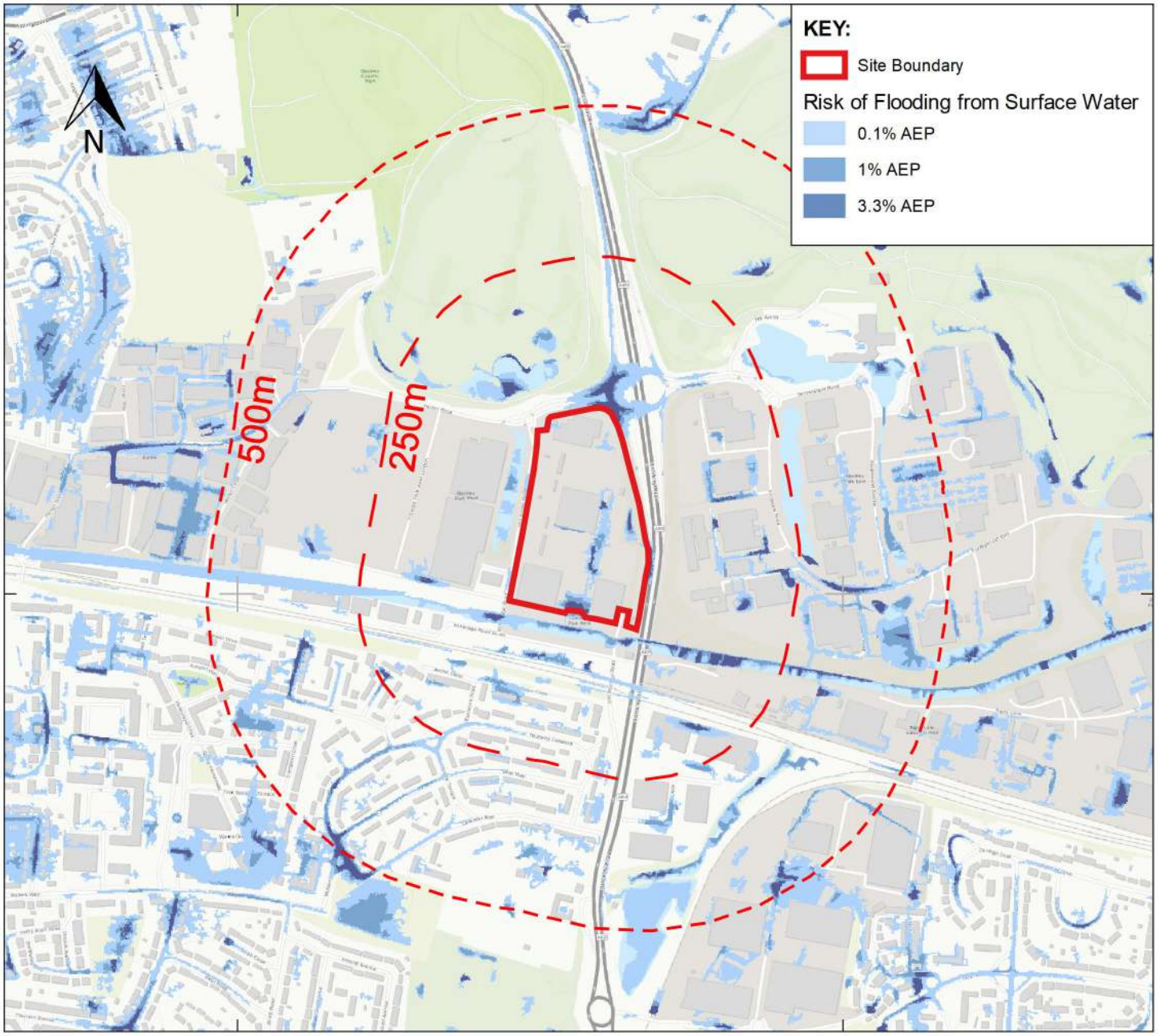
ENVIRONMENT AGENCY RISK OF FLOODING FROM SURFACE WATER



High risk means that each year this area has a chance of flooding of greater than 3.3%.

Medium risk means that each year this area has a chance of flooding of between 1% and 3.3%.

Low risk means that each year this area has a chance of flooding of between 0.1% and 1%.

Very low risk means that each year this area has a chance of flooding of less than 0.1%.

Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding.

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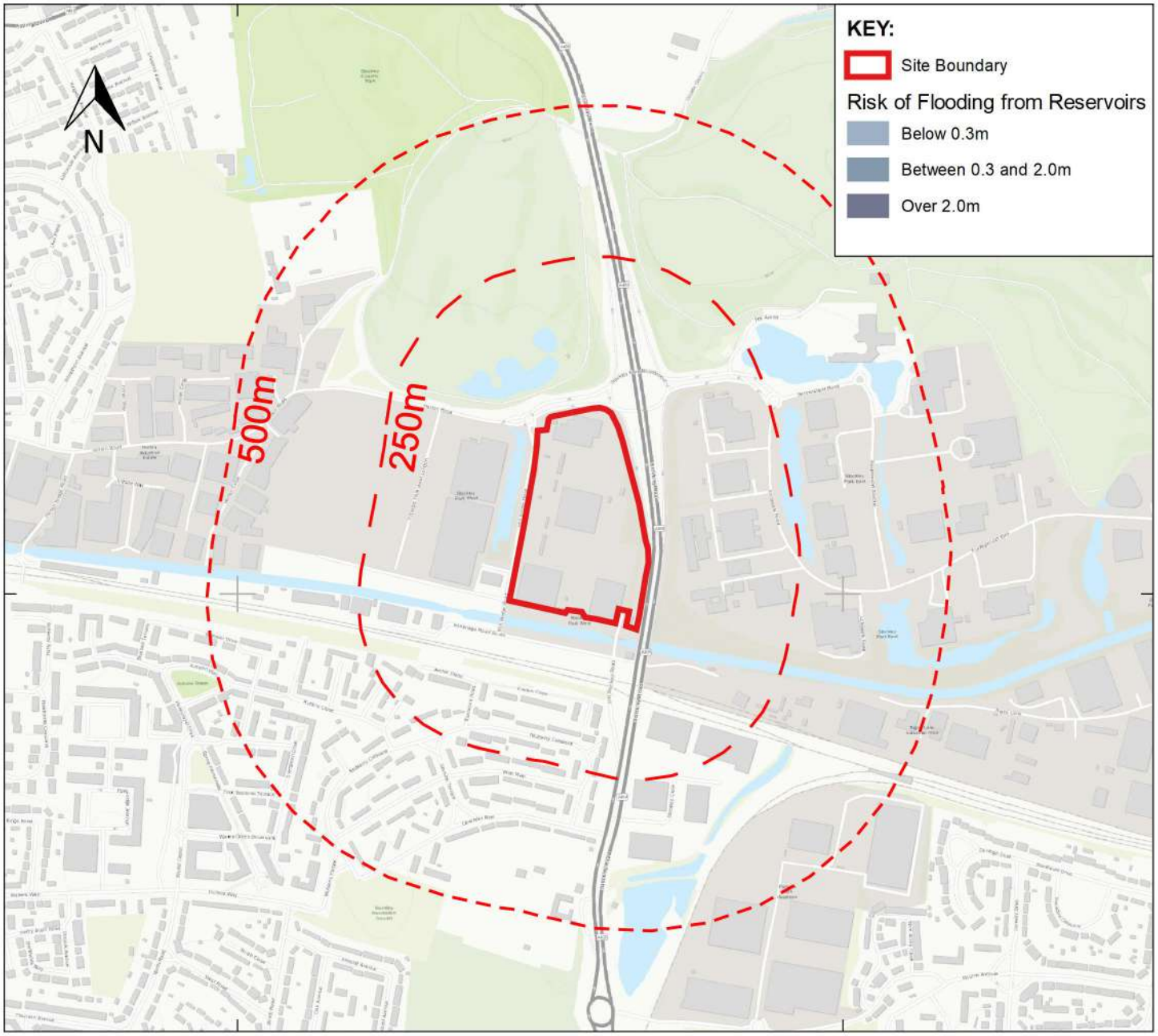
ENVIRONMENT AGENCY RISK OF FLOODING FROM RESERVOIRS



If a location is at risk, flooding from reservoirs is extremely unlikely. There has been no loss of life in the UK from reservoir flooding since 1925.

An area is considered at risk if peoples' lives could be threatened by an uncontrolled release of water from a reservoir.

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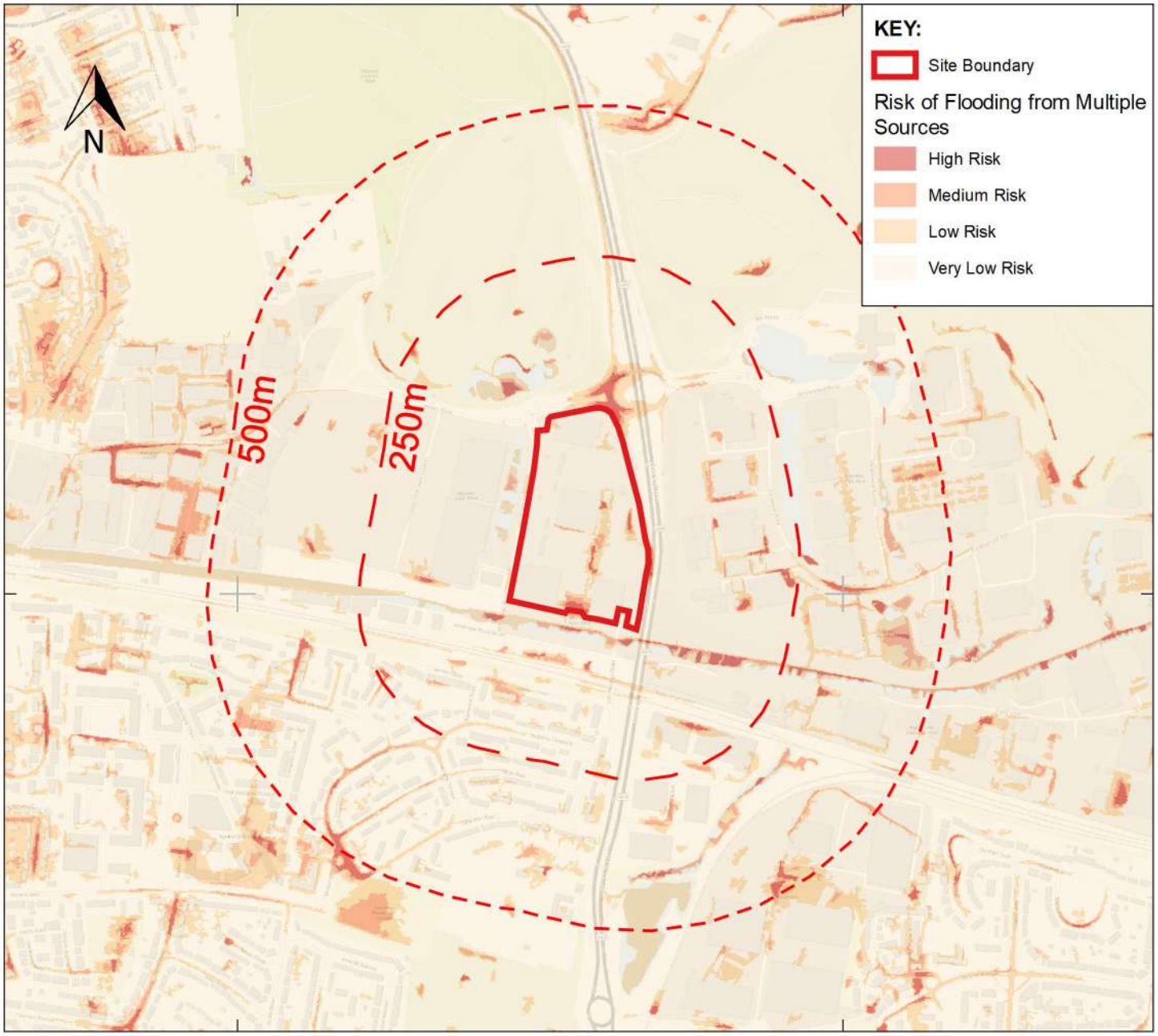
ENVIRONMENT AGENCY RISK OF FLOODING FROM MULTIPLE SOURCES



High risk means that each year this area has a chance of flooding of greater than 3.3%.

Medium risk means that each year this area has a chance of flooding of between 1% and 3.3%.

Low risk means that each year this area has a chance of flooding of between 0.1% and 1%.

Very low risk means that each year this area has a chance of flooding of less than 0.1%.

This dataset is not suitable for identifying whether an individual property will flood. The Risk of Flooding from Multiple Sources (RoFMS) information is a national scale assessment. It gives an indication of what areas of land may be at risk of flooding from more than one source. This first version of the assessment considers flooding from rivers, the sea and surface water.

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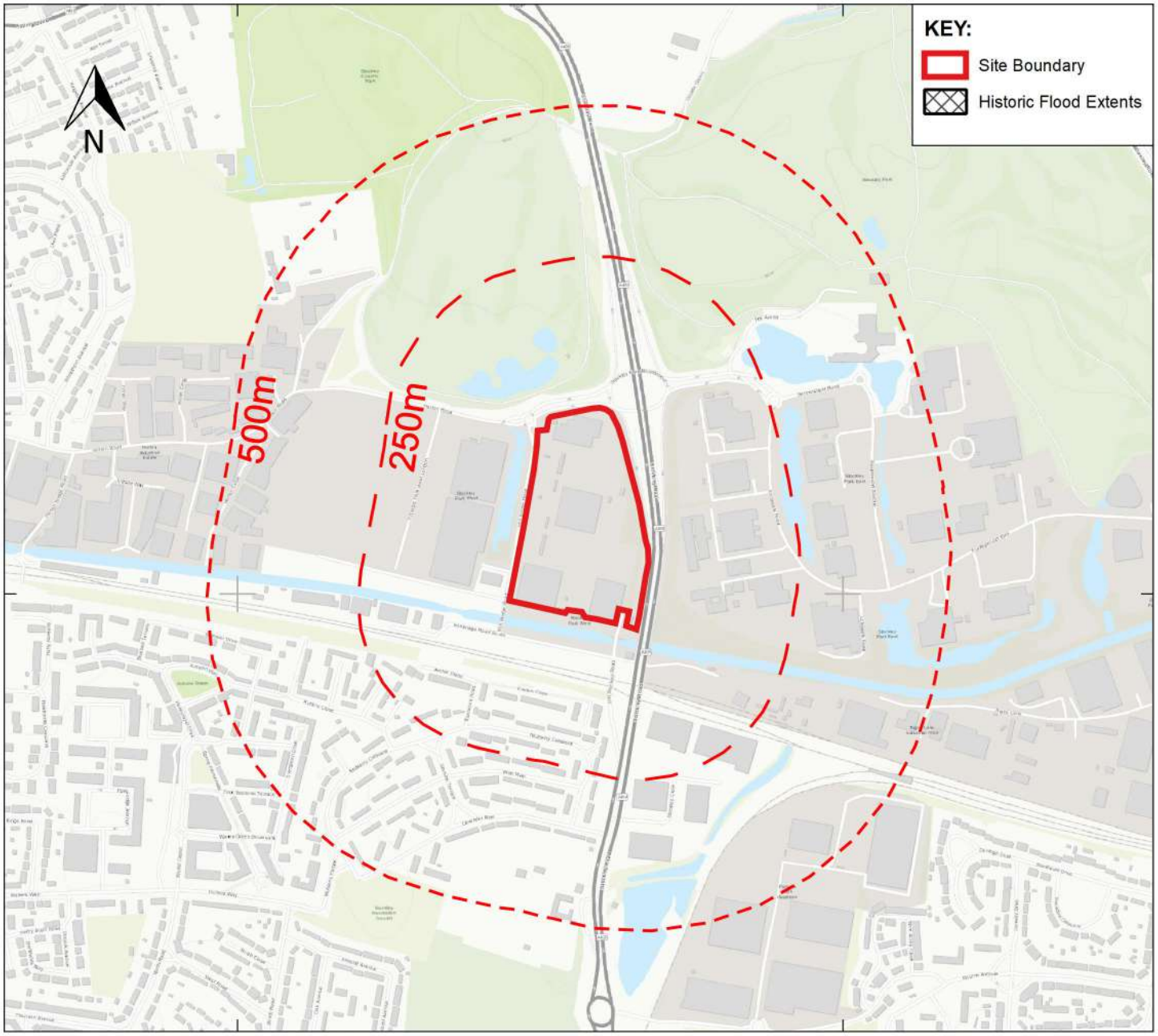
ENVIRONMENT AGENCY HISTORIC FLOOD MAP



The Historic Flood Map is a GIS layer showing the maximum extent of all individual Recorded Flood Outlines from river, the sea and groundwater springs and shows areas of land that have previously been subject to flooding in England. Records began in 1946 when predecessor bodies to the Environment Agency started collecting detailed information about flooding incidents, although limited details may be held about flooding incidents prior to this date.

The absence of coverage by the Historic Flood Map for an area does not mean that the area has never flooded, only that we do not currently have records of flooding in this area. It is also possible that the pattern of flooding in this area has changed and that this area would now flood under different circumstances. The Historic Flood Map will take into account of the presence of defences, structures, and other infrastructure where they existed at the time of flooding. It will include flood extents that may have been affected by overtopping, breaches or blockages. Flooding shown to the land and does not necessarily indicate that properties were flooded internally.

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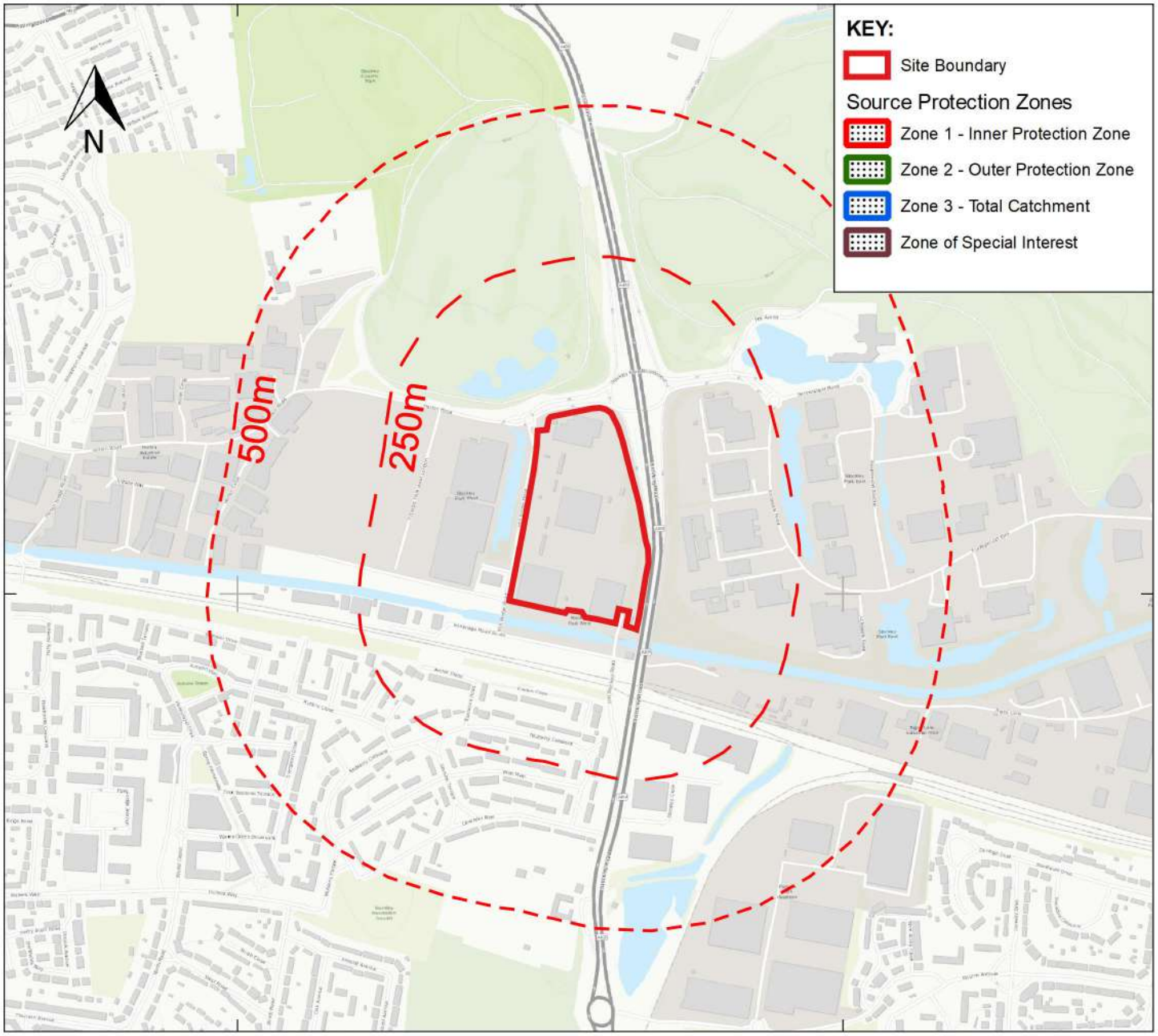
ENVIRONMENT AGENCY SOURCE PROTECTION ZONES



Inner zone (Zone 1) - Defined as the 50 day travel time from any point below the water table to the source. This zone has a minimum radius of 50 metres;

Outer zone (Zone 2) - Defined by a 400 day travel time from a point below the water table. The previous methodology gave an option to define SPZ2 as the minimum recharge area required to support 25 per cent of the protected yield. This option is no longer available in defining new SPZs and instead this zone has a minimum radius of 250 or 500 metres around the source, depending on the size of the abstraction;

Total catchment (Zone 3) - Defined as the area around a source within which all groundwater recharge is presumed to be discharged at the source.

Special interest (Zone 4) - A fourth zone SPZ4 or 'Zone of Special Interest' was previously defined for some sources. SPZ4 usually represented a surface water catchment which drains into the aquifer feeding the groundwater supply (i.e. catchment draining to a disappearing stream).

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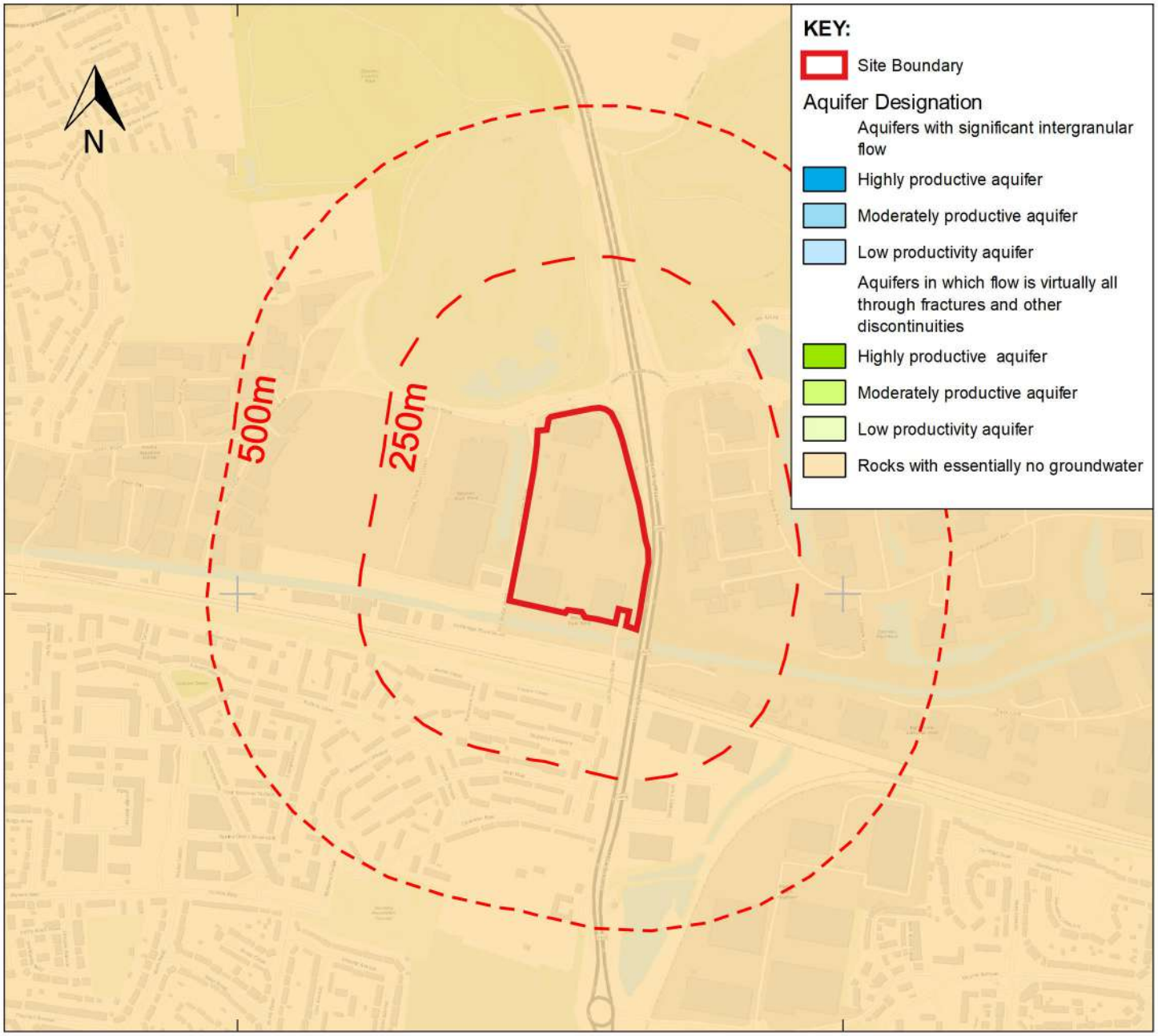
ENVIRONMENT AGENCY 1:625,000 SCALE AQUIFER DESIGNATION



The hydrogeological map indicates aquifer potential in generalised terms using a threefold division of geological formations:

1. those in which intergranular flow in the saturated zone is dominant
2. those in which flow is controlled by fissures or discontinuities
3. less permeable formations including aquifers concealed at depth beneath covering layers

Highly productive aquifers are distinguished from those that are only of local importance or have no significant groundwater. Within each of these classes the strata are grouped together according to age or lithology.

The 1:625 000 scale data may be used as a guide to the aquifers at a regional or national level, but should not be relied on for local information.

Created by: UKGXL031 - 2019-12-18 10:09:29
\\uk.wspgroup.com\central data\Projects\700622xx\70062215 - Prologis Park Expansion Land\03 WIP\EI EIA and Flood Risk\03 Drawings\GIS\Flood Map Pack\70062215 - Prologis Park Expansion Land.qgs

Appendix A.3

GEOLOGICAL DRAWINGS

507000
507500
508000
180500
180000
N
Road
Stockley Park
Green
Horton Road
Grand Un
0 100 200 300 400 500 600 m

KEY:

Indicative Site Boundary

BGS 1:50k Bedrock

London Clay Formation - Clay, Silt And Sand

REV	DATE	DRW	DESCRIPTION	CHK	APP
A	17/12/19	GL	FIRST ISSUE	AF	SK

STATUS: FOR INFORMATION ONLY

Mountbatten House, Basing View,
Basingstoke, HANTS, RG21 4HJ
Tel: +44 (0) 1256 318 800
Fax: +44 (0) 1256 318 70
www.wsp.com

CLIENT: PROLOGIS UK LTD.

ARCHITECT: -

PROJECT: PROLOGIS PARK EXPANSION LAND

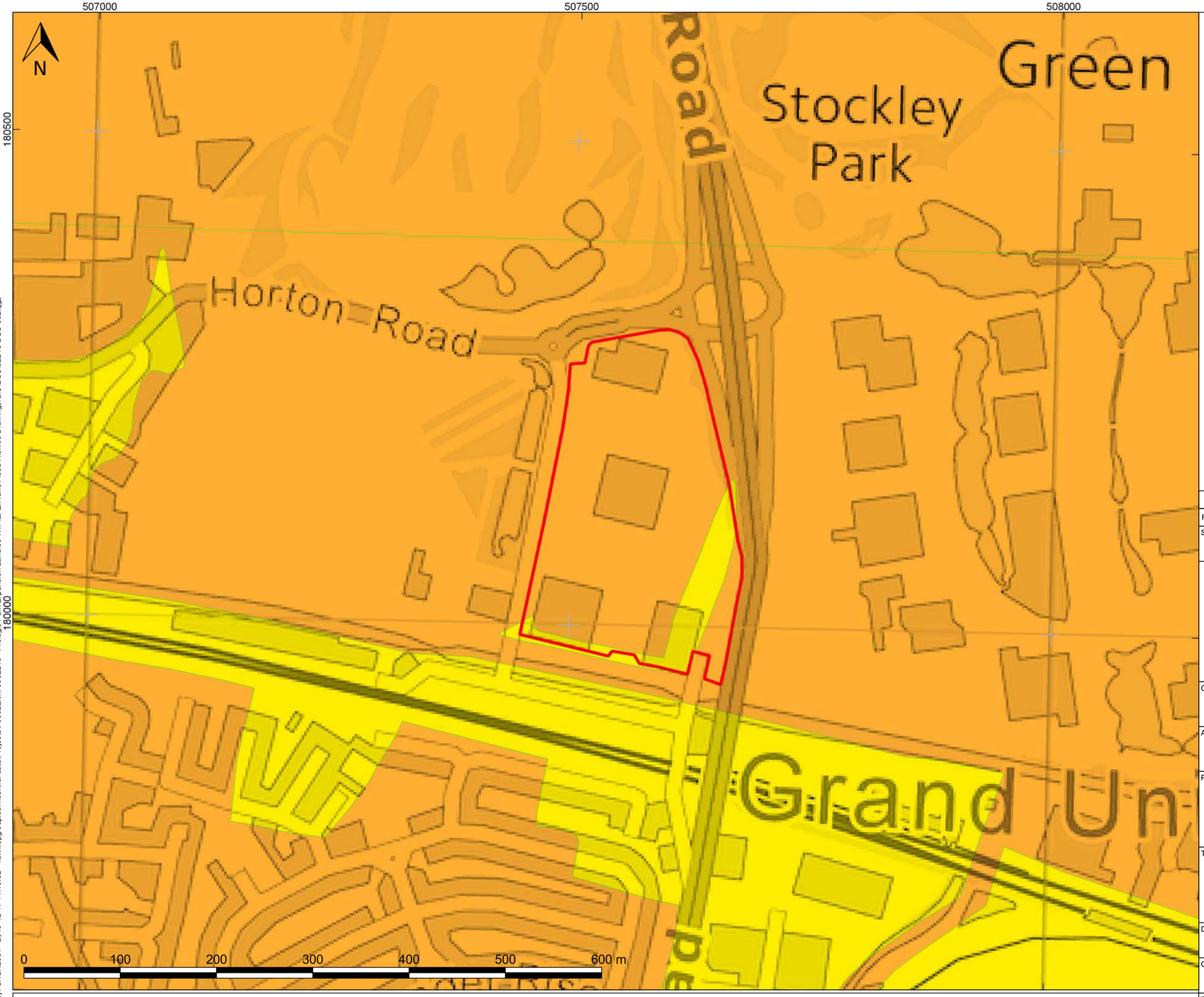
TITLE: BRITISH GEOLOGICAL SURVEY - BEDROCK GEOLOGY

DRAWN:	CHECKED:	APPROVED:

QGIS FILE:	SCALE @A3:	DATE:
62215-BGS-001.qgz	1:6000	17/12/19

PROJECT No:	DRAWING No:	REV:
70062215	62215-BGS-001	A

Created by: UKGXL031 - 2019-12-17 11:03:47 - \\uk.wspgroup.com\central data\Projects\700622xx\700622\5 - Prologis Park Expansion Land\03 WIP\EI EIA and Flood Risk\03 Drawings\GIS\BGS\62215-BGS-001.qgz



KEY:

Indicative Site Boundary

BGS Superficial

Lynch Hill Gravel Member - Sand and Gravel

Langley Silt Member -Clay and Silt

REV	DATE	DRW	DESCRIPTION	CHK	APP
A	17/12/19	GL	FIRST ISSUE	AF	SK

STATUS: FOR INFORMATION ONLY

Mountbatten House, Basing View,
Basingstoke, HANTS, RG21 4HJ
Tel: +44 (0) 1256 318 800
Fax: +44 (0) 1256 318 70
www.wsp.com

CLIENT: PROLOGIS UK LTD.

ARCHITECT: -

PROJECT: PROLOGIS PARK EXPANSION LAND

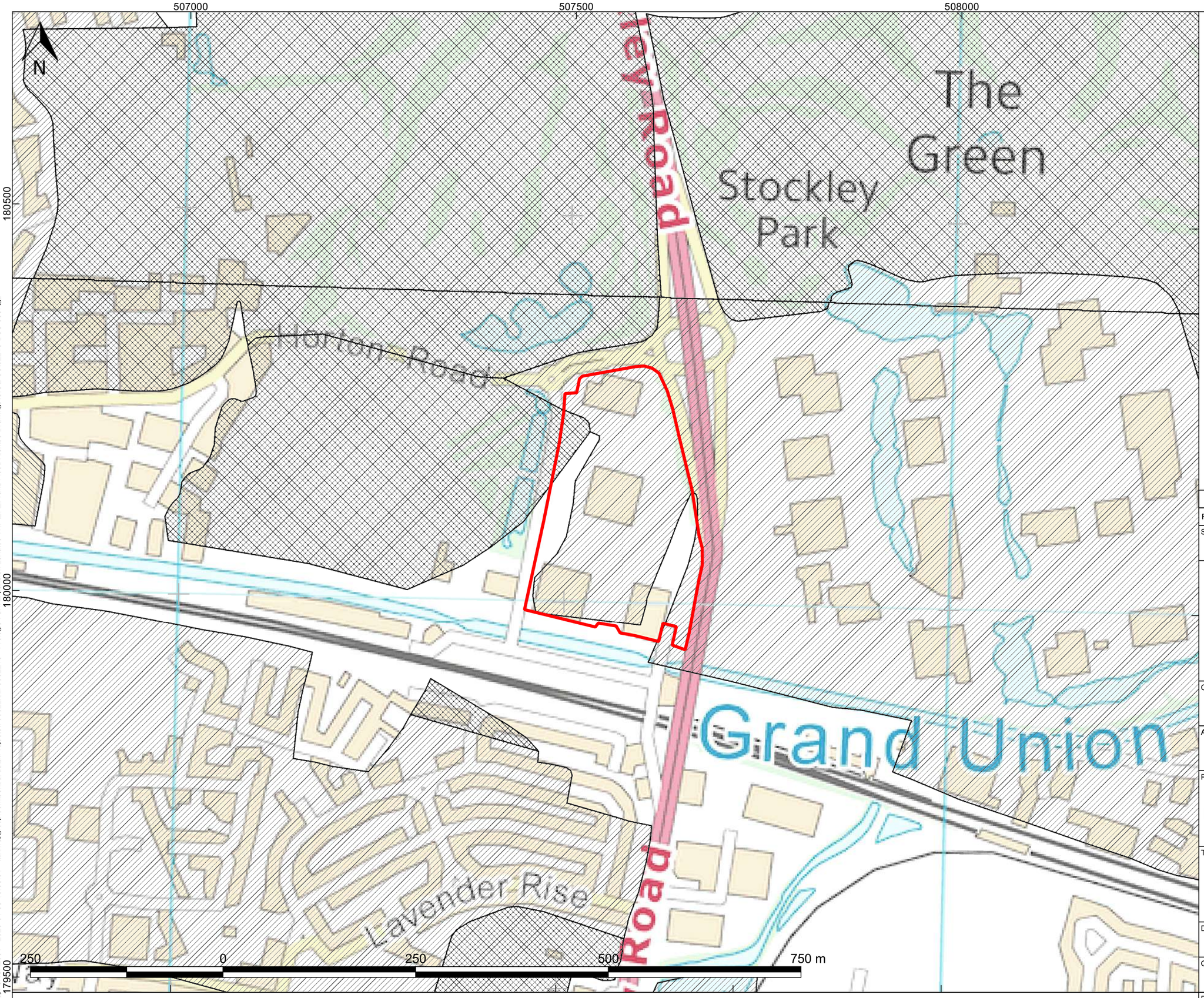
TITLE: BRITISH GEOLOGICAL SURVEY - SUPERFICIAL DEPOSITS

DRAWN:	CHECKED:	APPROVED:

QGIS FILE:	SCALE @A3:	DATE:
62215-BGS-002.qgz	1:6000	17/12/19

PROJECT No:	DRAWING No:	REV:
70062215	62215-BGS-002	A

Created by: UKGXL031 - 2019-12-17 11:18:52 - \\uk.wspgroup.com\central data\Projects\700622xx\700622xx\70062215 - Prologis Park Expansion Land\03 WIP\EI EIA and Flood Risk\03 Drawings\GIS\BGS\62215-BGS-002.qgz



KEY:

- Indicative Site Boundary

BGS 1:50k Artificial Ground

- Infilled Ground - Artificial Deposit
- Worked Ground (Undivided) - Void

REV	DATE	DRW	DESCRIPTION	CHK	APP
A	07/01/20	GL	FIRST ISSUE	AF	BV

STATUS: FOR INFORMATION ONLY

Mountbatten House, Basing View,
Basingstoke, HANTS, RG21 4HJ
Tel: +44 (0) 1256 318 800
Fax: +44 (0) 1256 318 70
www.wsp.com

CLIENT: PROLOGIS UK LTD.

ARCHITECT: -

PROJECT: PROLOGIS PARK EXPANSION LAND

TITLE: BRITISH GEOLOGICAL SURVEY - ARTIFICIAL GROUND

DRAWN:	CHECKED:	APPROVED:

QGIS FILE:	SCALE @A3:	DATE:
62215-BGS-003.qgz	1:7500	08/01/20

PROJECT No:	DRAWING No:	REV:
70062215	62215-BGS-003	A

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Appendix B

STAKEHOLDER CONSULTATION

Appendix B.1

ENVIRONMENT AGENCY

From: NET Enquiries <HNLenquiries@environment-agency.gov.uk>
Sent: 21 November 2019 13:44
To: Lamb, Georgie
Subject: HNL149998/AS - Enquiry regarding Prologis Park Expansion Land
Attachments: Stockley Park Groundwater 1992-2019.csv

Dear Georgie

Thank you for your request dated 30 October 2019 to use Environment Agency data.

The information on Flood Zones in the area relating to Prologis Park Expansion Land is as follows:

The property is in an area located within Flood Zone 1 shown on our Flood Map for Planning (Rivers and Sea).

Note - This information relates to the area that the above named site is in and is not specific to the property/proposed development itself.

Because this site does not fall within an area at risk of flooding from rivers or the sea, we do not hold any detailed flood modelling data that would impact your site. As such we are unable to provide a flood risk product.

We do not hold records of historic flood events from rivers and/or the sea affecting the area local to this site. However, please be aware that this does not necessarily mean that flooding has not occurred here in the past, as our records are not comprehensive.

This address is in an area at High risk of surface water flooding.

Following the Flood and Water Management Act 2010, Lead Local Flood Authorities are responsible for the management of groundwater and surface water flooding. They also maintain a register of property flooding incidents. You may want to seek further advice from the LLFA London Borough of Hillingdon who may have further informaiton.

Please find attached groundwater level data for the nearest borehole to your site. The borehole is drilled through the tertiary deposits into the Upper Chalk.

You can view groundwater flooding issues here https://www.gov.uk/government/collections/groundwater-current-status-and-flood-risk

We have no critical drainage areas at this site.

With regards to the Grand Union Canal, you will need to contact the Canal and Rivers Trust directly. They own and maintain canals and hold data on them . They also provide some of their data online here http://data-canalrivertrust.opendata.arcgis.com/

If you have requested this information to help inform a development proposal, then you should note the information on GOV.UK on the use of Environment Agency Information for Flood Risk Assessments

https://www.gov.uk/planning-applications-assessing-flood-risk
https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion

You can also view and print surface water flood maps online at: http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=ufmfsw#x=357683&y=355134&scale=2

This information is provided subject to the Open Government Licence, which you should read.

We respond to requests for recorded information that we hold under the Freedom of Information Act 2000 (FOIA) and the associated Environmental Information Regulations 2004 (EIR).

Data Available Online

Many of our flood datasets are available online:

You can view and download flood risk maps from our website at: http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=floodmap#x=357683&y=355134&scale=2

Flood Map For Planning (Flood Zone 2, Flood Zone 3, Flood Storage Areas, Flood Defences, Areas Benefiting from Defences)

Risk of Flooding from Rivers and Sea

Historic Flood Map

Current Flood Warnings

Open data

I hope that we have correctly interpreted your request. If you are not satisfied with our response to your request for information you can contact us within 2 calendar months to ask for our decision to be reviewed.
Kind regards

Annette Smith
Customers and Engagement Officer
Environment Agency, Hertfordshire and North London
Alchemy, Bessemer Road, Welwyn Garden City, Hertfordshire, AL7 1HE
Tel: 0203 025 8975
Int: 58975

My usual working hours are 9.30am to 16.30pm, Tuesdays and Thursdays, and 9.30am to 14.30pm Wednesdays.

From: Lamb, Georgie [mailto:Georgie.Lamb@wsp.com]
Sent: 30 October 2019 16:33
To: Enquiries, Unit <enquiries@environment-agency.gov.uk>
Cc: Hope, Jasmine <Jasmine.Hope@wsp.com>
Subject: 191101/KG13 Prologis Park Expansion Land - Flood Assessment Enquiry

Dear Sir / Madam

Prologis Park Expansion Land
Flood Risk Assessment – Enquiry

We have been instructed by our client to carry out an assessment of flood risk at the above site.

We are writing to request the Environment Agency provide any flood risk and flood defence data and information with respect to the above site and any other pertinent information or opinion regarding development at the application site.

The site is shown to be located within Flood Zone 1. The OS grid reference for the site is 507566, 180118 and the nearest post code is UB11 1BT. Please find enclosed a location map for your reference.

Please could the Environment Agency provide the following information, where available:

1. Please could the Environment Agency provide Product 4 data. We understand that there is no detailed hydraulic model for the site – If this is not correct, please can you provide this as well?
2. Historical records of flooding at or within the vicinity of the site from all sources of flooding. If the Environment Agency does not hold any records, please can you confirm that the site has no record of flooding in the past.
3. Details of any flood defences in the area that might influence flooding at the site / surrounding area.
4. Please could the Environment Agency confirm whether they have any specific water quality requirements for surface water runoff within the site area of Drayton, Uxbridge.
5. Groundwater levels on or within 500m of the site (including details of the strata in which the groundwater level observations are made).
6. Does the Environment Agency have any critical drainage areas that cover the development site and have these been notified to the London Borough of Hillingdon as LLFA?
7. We are aware of the proximity of the site to the Grand Union Canal. Are the Environment Agency able to provide any flood risk information associated with the canal, or any other pertinent information.
8. Any additional flood data the Environment Agency considers useful for the above site.

We trust the above is clear, however, should you have any queries or require any further information from WSP to be able to answer the above queries, please do not hesitate to get in contact.

Kind Regards,

Georgie Lamb
Graduate Engineer

T+ 44 (0)1256 318644

Mountbatten House, Basing View,
Basingstoke, Hampshire,
RG21 4HJ

wsp.com

Appendix B.2

LONDON BOROUGH OF HILLINGDON

From: Victoria Boorman <flooding@hillingdon.gov.uk>

Sent: 03 January 2020 16:16

To: Lamb, Georgie; Planning .

Subject: Re: Prologis Park Expansion Land - Flood Assessment Enquiry

Dear Georgie Lamb

Please refer to the Council website for the queries you raise.

regards

Vicky Boorman

Flood and Water Management Specialist

https://hillingdon.gov.uk/flooding

On Mon, 4 Nov 2019 at 12:03, Planning . <planning@hillingdon.gov.uk> wrote:

> FYI
>
> ---------- Forwarded message ---------
> From: **Lamb, Georgie** <Georgie.Lamb@wsp.com>
> Date: Fri, 1 Nov 2019 at 16:42
> Subject: Prologis Park Expansion Land - Flood Assessment Enquiry
> To: planning@hillingdon.gov.uk <planning@hillingdon.gov.uk>
> Cc: Hope, Jasmine <Jasmine.Hope@wsp.com>
>
> Dear Sir / Madam,
>
> **Prologis Park Expansion Land**
>
> **Flood Risk Assessment – Enquiry**
>
> We have been instructed by our client to carry out an assessment of flood risk at the above site.
>
> We are writing to request any flood risk and flood defence data and information with respect to the above site and any other pertinent information or opinion regarding development at the application site.
>
> From a review of data on the Environment Agency's Website we understand the site lies within Flood Zone 1. The OS grid reference for the site is 507566, 180118 and the nearest post code is UB11 1BT. Please find enclosed a location map for your reference.
>
> Please can you provide us with the following:
>
> Historic records of flooding at the site or in close proximity to the site;
> Details of any flood defence structure at the site or in the surrounding area; and,
> Drainage and water quality requirements (see below).
>
> Please could London Borough of Hillingdon provide advice on how they would expect the Climate Change guidance to be applied with regards to surface water attenuation requirements? Typically, we have been designing attenuation systems for the 100 year + 20%CC event and testing for the 100 year + 40%CC event.

Please could London Borough of Hillingdon provide us with any specific SuDS guidance which is not already available on the website, and confirm whether they have any specific water quality requirements for surface water run off?

In addition, we are aware of the proximity of the site to the Grand Union Canal. Are London Borough of Hillingdon able to provide any flood risk information associated with the canal, or any other pertinent information.

We trust the above to be satisfactory, however, should you have any queries or require any further information from WSP to be able to answer the above queries, please do not hesitate to get in contact.

Kind Regards,

Georgie Lamb

Graduate Engineer

T+ 44 (0)1256 318644

Mountbatten House, Basing View,

Basingstoke, Hampshire,

RG21 4HJ

wsp.com

Appendix B.3

THAMES WATER

Sewer Flooding
History Enquiry

Property Searches

WSP

Basing View

Search address supplied	Glaxo Smithkline Uk Ltd 1-3 Stockley Park Iron Bridge Road Uxbridge UB11 1BT
Your reference	Prologis Park Expansion Land
Our reference	SFH/SFH Standard/2019_4102536
Received date	**31 October 2019**
Search date	**31 October 2019**

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0845 070 9148

Sewer Flooding
History Enquiry

Property Searches

Search address supplied: Glaxo Smithkline Uk Ltd,1-3,Stockley Park,Iron Bridge Road,Uxbridge,UB11 1BT

This search is recommended to check for any sewer flooding in a specific address or area

TWUL, trading as Property Searches, are responsible in respect of the following:-

(i) any negligent or incorrect entry in the records searched;

(ii) any negligent or incorrect interpretation of the records searched;

(iii) and any negligent or incorrect recording of that interpretation in the search report

(iv) compensation payments

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0845 070 9148

Sewer Flooding
History Enquiry

Thames Water Property Searches

History of Sewer Flooding

Is the requested address or area at risk of flooding due to overloaded public sewers?

The flooding records held by Thames Water indicate that there have been no incidents of flooding in the requested area as a result of surcharging public sewers.

For your guidance:

- A sewer is "overloaded" when the flow from a storm is unable to pass through it due to a permanent problem (e.g. flat gradient, small diameter). Flooding as a result of temporary problems such as blockages, siltation, collapses and equipment or operational failures are excluded.
- "Internal flooding" from public sewers is defined as flooding, which enters a building or passes below a suspended floor. For reporting purposes, buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes.
- "At Risk" properties are those that the water company is required to include in the Regulatory Register that is presented annually to the Director General of Water Services. These are defined as properties that have suffered, or are likely to suffer, internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant reference period (either once or twice in ten years) as determined by the Company's reporting procedure.
- Flooding as a result of storm events proven to be exceptional and beyond the reference period of one in ten years are not included on the At Risk Register.
- Properties may be at risk of flooding but not included on the Register where flooding incidents have not been reported to the Company.
- Public Sewers are defined as those for which the Company holds statutory responsibility under the Water Industry Act 1991.
- It should be noted that flooding can occur from private sewers and drains which are not the responsibility of the Company. This report excludes flooding from private sewers and drains and the Company makes no comment upon this matter.
- For further information please contact Thames Water on Tel: 0800 316 9800 or website www.thameswater.co.uk

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0845 070 9148

Appendix B.4

CANALS AND RIVERS TRUST

Canal & River Trust

Georgie Lamb
Mountbatten House
Basing View
Basingstoke
Hampshire,
RG21 4HJ

Your Ref

Our Ref GU-208 MW 5/11/19

5th November 2019

RE: FLOOD RISK ASSESSMENT - GU-208 - PROLOGIS PARK, GU11 1BT

Dear Georgie

Further to your e-mail dated 31st October, I have checked our records and I can confirm the following:

- The Canal & River Trust (the Trust) is not aware of any records of overtopping from, or breaches of the waterway where the canal passes this site.
- All the Trust's assets are subject to a regular cycle of inspections.
- This canal adjacent to this site is a 43km long pound bounded by the canal locks Cowley Lock **(E 505141, N 182210)**, Norwood Top Lock **(E 513690, N 179359)** and Hampstead Road Locks **(E 528685, N 184088)**. The controlling weir for the pound is Bulls Weir, located at coordinates **E 510473, N 179146**.
- The height of the controlling weir in this pound is **29.458m AOD**. The normal operating range of the water level in the pound is between +50mm over weir and -150mm under weir; i.e., **29.308m AOD to 29.508m AOD**. There are other flood weirs at different points and different heights in the pound.
- Water is fed manually into the pound via a by-pass sluice at the Cowley Lock

For further advice on flood risk assessments I have included some generic guidance (see appendix A).

Please note that the Canal & River Trust is unable to comment on the flood risk to individual properties or developments and interpretation of the information provided in this letter is your responsibility.

I trust this is satisfactory, however if you do require any further information please do not hesitate to contact me.

Yours sincerely

Mr Michael Wheeler B.Eng(Hons) I.Eng ACIWEM
Senior Water Engineer (South)

Appendix A - Guidance Note for Flood Risk Assessments

The main incidents of uncontrolled loss of water from our waterways are overtopping and breaching as a result of inundation from adjacent water courses, vandalism or structural failure.

Canal & River Trust maintains water levels using reservoirs, feeders and boreholes, and thereafter manages the water by transferring it within the canal system. The level of the water in canals is normally determined predominantly by the level and size of weirs. Water levels in river navigations are affected by the flow in the river and will fluctuate more widely than canals.

When surface water enters our waterways, the level of the water rises. Eventually the water level will reach a point where it discharges from our waterways through control structures. Where the capacity of these control structures is exceeded, overtopping may result.

Breaches which may lead to flooding can occur on our waterways. There can be a number of causes for these including: culvert collapse, animal burrowing and overtopping. Canal & River Trust operates a comprehensive asset management system which enables us to manage the risks of such events occurring.

Breaches occur on average at a rate of three per year over the whole of the Canal & River Trust owned canal network (that's over 2,000 miles of canal).

Appendix C

INFORMATION RECEIVED

Appendix C.1

PROPOSED DEVELOPMENT PLANS