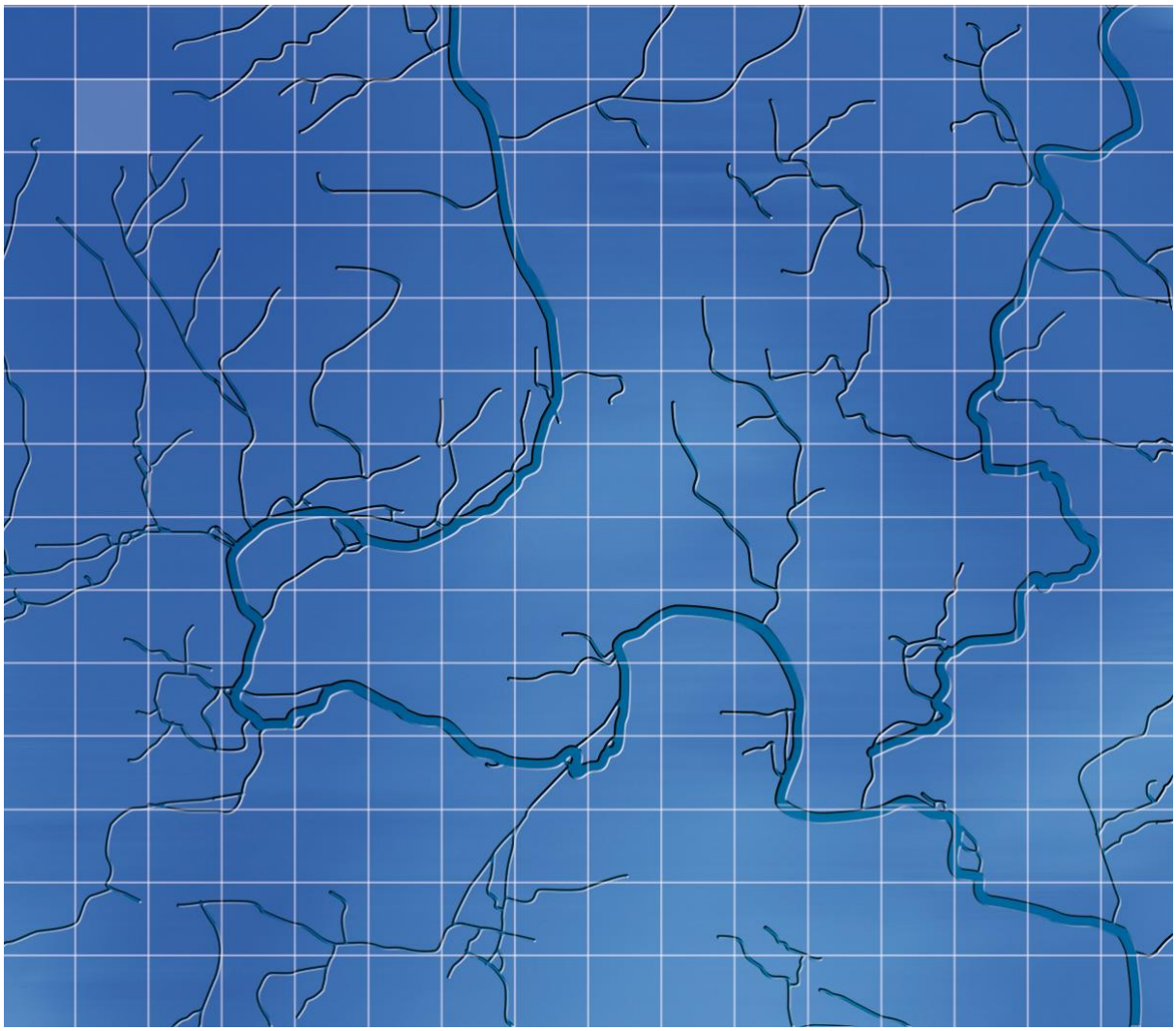
Oxford City Council

October 2025

Oxford Science Park (588)

Level 2 Strategic Flood Risk Assessment



Oxford City Council

Oxford Science Park (588) Level 2 Strategic Flood Risk Assessment

Document issue details

WHS10237

Version	Issue date	Issue status	Prepared By	Approved By
1.0	24/10/2025	Draft	Tirion Lewis (*Graduate Consultant*)	Daniel Hamilton (*Principal Consultant*)

For and on behalf of Wallingford HydroSolutions Ltd.

This report has been prepared by WHS with all reasonable skill, care and diligence within the terms of the Contract with the client and taking account of both the resources allocated to it by agreement with the client and the data that was available to us. We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above. This report is confidential to the client and we accept no responsibility of any nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.

The WHS Quality & Environmental Management system is certified as meeting the requirements of ISO 9001:2015 and ISO 14001:2015 providing environmental consultancy (including monitoring and surveying), the development of hydrological software and associated training.

Registered Office Maclean Building, Benson Lane, Wallingford OX10 8BB
www.hydrosolutions.co.uk

Oxford Science Park (588) Level 2 SFRA
Flood Risk Overview

Fluvial Flood Risk	**M**
Pluvial Flood Risk	**L**
Other Sources of Flood Risk	**M**
Confidence in Assessment	**M**

Flood Risk

The site is at risk from primarily fluvial flood sources.

The EA Flood Map for Planning shows 29.8% of the site is located within Flood Zone 2, 13.2% of the site is located in Flood Zone 3a and 11.1% of the site located in Flood Zone 3b. The Risk of Flooding from Rivers and Sea (RoFRS) depth data shows that inundation depths at the site range between less than 0.2m to 1.2m, following the Littlemore Brook and its tributary which run through the north and east of the site respectively.

The risk of surface water flooding is considered to be low with flooding isolated to topographic depressions and no surface water flow routes through the site.

The risk from other sources of flooding is considered to be moderate due to potential groundwater flood risk.

The overall confidence in the assessment is moderate. This is based on the fact that the EA's latest national scale modelling has informed the assessment of flood risk.

Conclusions and Recommendations

The development proposed is employment and is categorised as *Less Vulnerable Development.* Less vulnerable development is permissible in Flood Zones 2 and 3a. However, a sequential approach to the siting of the development should be used, with development prioritised first within Flood Zone 1 prior to consideration of any siting within Flood Zone 2 or 3a. The design must ensure that areas of the site that may be located within Flood Zone 3b in the future are avoided altogether.

In total approximately 33% or 9 ha of land lies within the fluvial flood zones when accounting for climate change. The at-risk areas are mainly concentrated in the north of the site. It should therefore be possible to locate the majority of infrastructure in Flood Zone 1, namely in the open areas along the eastern and northern site boundaries. This is provided there are no constraints (non-flood related) which require development to be located in at-risk areas, for example existing development onsite.

Contents

1 Introduction

1.1 Background

Wallingford HydroSolutions Ltd has been commissioned by Oxford City Council (OCC) to undertake a Level 2 Strategic Flood Risk Assessment (SFRA) at Oxford Science Park (reference: 588) in accordance with the National Planning Policy Framework (NPPF), Planning Practice Guidance (PPG) and associated guidance from the Environment Agency (EA).

Where there is a risk of flooding at the site, this risk has been quantified with the latest available datasets and any associated limitations with the assessment have been identified.

Where applicable, recommendations for improving our understanding of flood risk and/or mitigating the risk has also been included in this report.

1.2 Assessment of Flood Risk

For the site, a detailed assessment of the nature of flood hazard was undertaken. This included using the relevant fluvial modelling data to assess:

- The proportion of the site inundated for a range of return periods
- The speed of onset
- Flood depth
- Flood velocity
- Flood Hazard

The sites were assessed against a range of return periods, however the design event, the 100-year (plus central climate change) event, was considered most important for planning purposes.

In addition to the analysis of modelling data, the location, standard and condition of existing flood defences was assessed. Other sources of flooding were also reviewed at each site. This included an assessment of surface water flooding and an assessment of groundwater flooding based on available hydrogeological information from BGS and Soilscapes. Potential access/egress routes were identified with respect to the risk posed from all sources of flooding.

Following a review of flood risk, flood defences and the identification of access/egress routes, an assessment was made on whether a future site-specific FRA would be able to show that the site can be allocated for development. The assessment takes into account the flood risk vulnerability of the development, the scale of development proposed along with any requirements for the Exception Test. In this context, any mitigative actions in the form of ground raising and compensatory storage are identified.

The site assessments also include guidance for the preparation of FRAs, including information about the use of SuDS.

1.3 Report Structure

This FRA follows the structure summarised below:

1 - Introduction (this section)

2 - Site Description

3 - Flood Risk

4 – Detailed Review of Primary Flood Risk

5 – Development Viability and FRA Recommendations

2 Site Description

2.1 General Location Plan

Oxford Science Park (588) is a 27.3 ha site located in the south of Oxford off Grenoble Road, see Figure 1. Current land use at the site office buildings with associated roads, car parks and open spaces.

Proposed development at the site is further employment infrastructure comprising a total of 100,000 m^2.

2.2 Topography

Based on 1m LiDAR data, the site slopes towards the Littlemore Brook that runs across the northern part of the site, see Figure 2. The southeast of the site slopes towards a small tributary of the Littlemore Brook. The ground levels within the site boundary range from 55.1 to 69.7 m AOD. The average ground level is approximately 60.3 m AOD.

2.3 Nearby Watercourses

The Littlemore Brook, a tributary of the River Thames, flows from east to west in the north of the site, see Figure 1. A small tributary of the Littlemore Brook flows from south to north in the east of the site, see Figure 1. In the west of the site there are a series of small ponds close to the Littlemore Brook, there is also a larger pond in the centre of the site, these are assumed to be manmade.

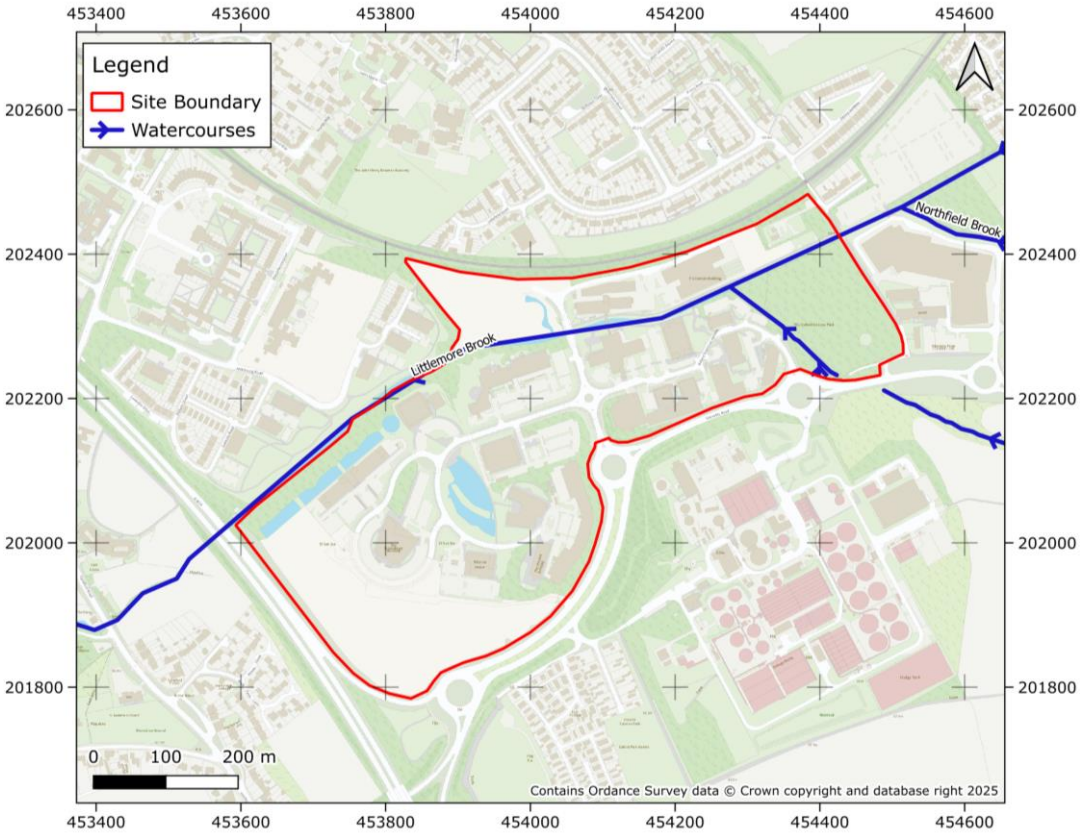


Figure 1 - Site Location

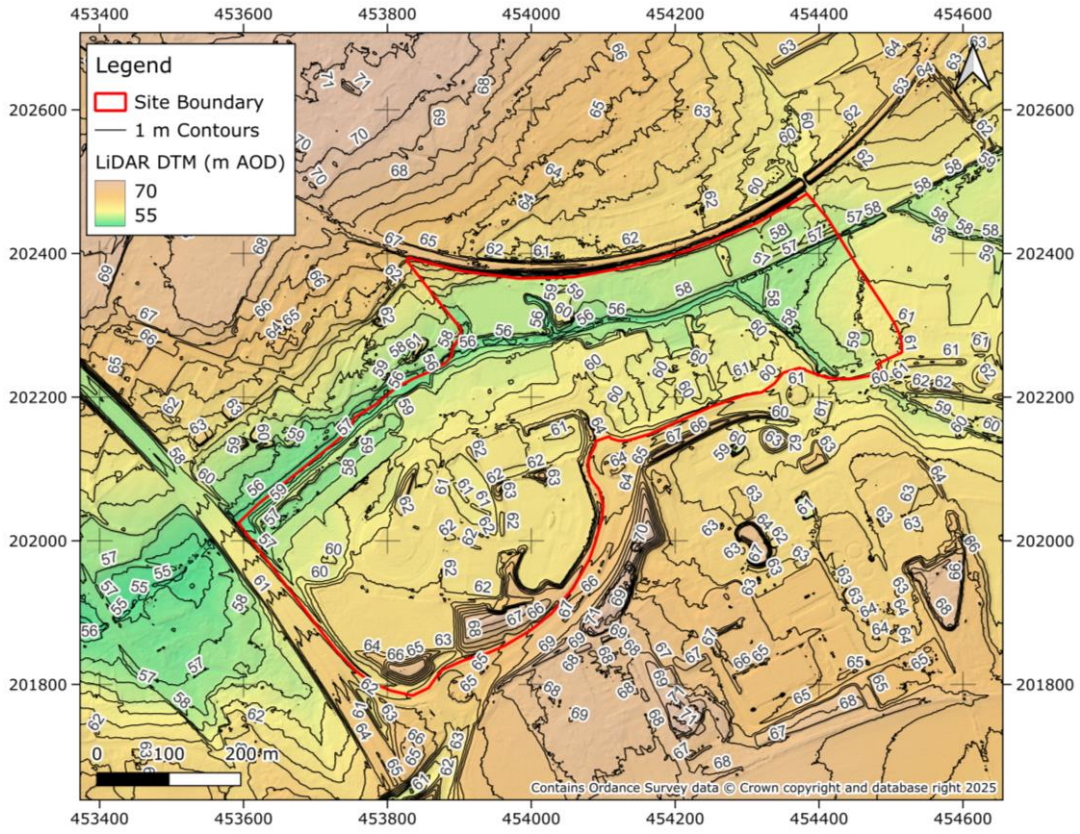


Figure 2 – Topography

3 Flood Risk

3.1 Historical Flooding

The EA has one record of historical flooding at the site. This occurred between November 2013 and February 2014 and was associated with Littlemore Brook and the series of ponds located at the site, see Figure 3.

3.2 Fluvial Flood Risk

In the existing Flood Map for Planning (FMfP), 29.8% of the site is located within Flood Zone 2 (0.1% AEP), and 13.2% is located within Flood Zone 3a (1% AEP), see Figure 4. These Flood Zones consider the undefended scenario whereas Flood Zone 3b (3.3% AEP) considers the defended scenario. This extent shows 11.1% of the site to be located within Flood Zone 3b.

The EA climate change fluvial outputs for the 0.1% AEP and 1.0% AEP undefended extents have also been assessed, these show 32.8% of the site inundated during the 0.1% AEP event and 29.3% of the site inundated during the 1.0% AEP event. The climate change extent for the 3.3% AEP defended event was also assessed, it shows 12.4% if the site to be inundated, see Figure 5.

Fluvial flood risk is considered to be moderate and is assessed in more detail in section 4.

3.3 Flood Defence Infrastructure

No flood defence infrastructure is located on or near the site nor is the site located in a flood storage area.

3.4 Surface Water Flood Risk

The EA's surface water flood maps show 3.6% of the site to be inundated during a 3.3% AEP event, 7.1% is inundated during a 1.0% AEP event, and 12.9% is inundated during a 0.1% AEP event, see Figure 6. The surface water flood risk occurs in isolated areas across the site.

When considering the effects of climate change, the proportion of the site at risk for each event increases to 6.0%, 9.0%, and 15.9% respectively, see Figure 7.

Overall, the surface water flood risk to the site is low with flooding isolated to topographic depressions and no surface water flow routes through the site.

3.5 Groundwater Flooding

The site is underlain by a bedrock of sandstone in the form of the Beckley Sand Member. It is expected to permit moderate amounts of infiltration. Superficial deposits of alluvium, river terrace and peat are found in the south of the site; these are expected to have variable permeabilities. There is no recorded superficial deposits at the site. The underlying soils are freely draining slightly acidic loamy soils.

Based on the data available the water table is expected to be mobile meaning that there may be a moderate risk of groundwater flooding, however more data is required at the planning stage to confirm this.

3.6 Reservoir Flood Risk

The site is not located in or near an area at risk of reservoir flooding, see Figure 8.

3.7 Flood Warning Service

The site is not located within an EA Flood Warning Area.

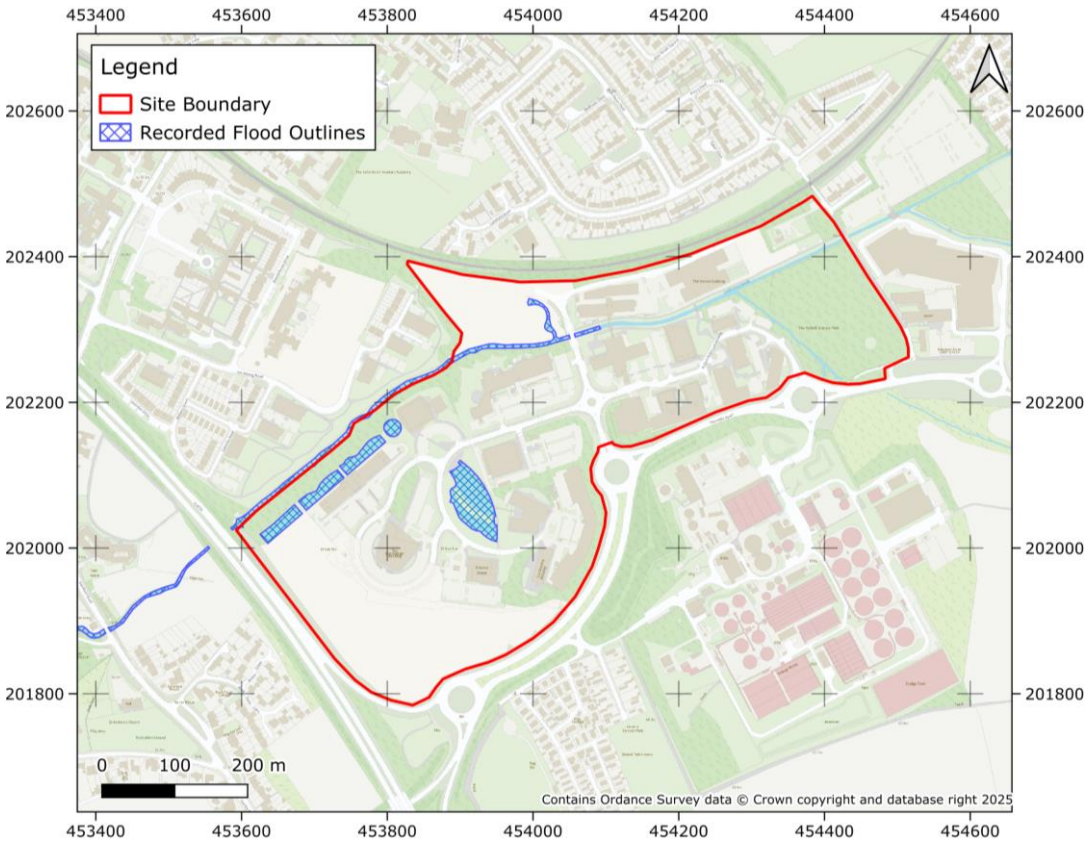


Figure 3 - Recorded Flood Outlines

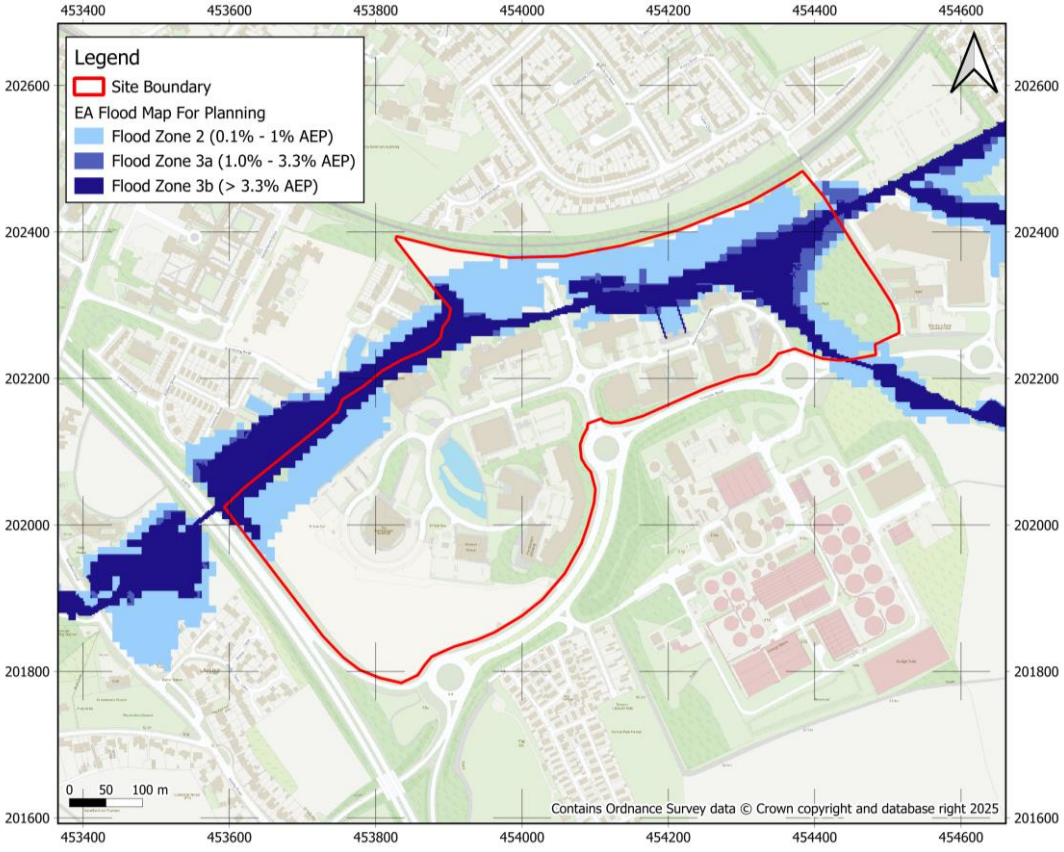


Figure 4 - Fluvial Flood Map

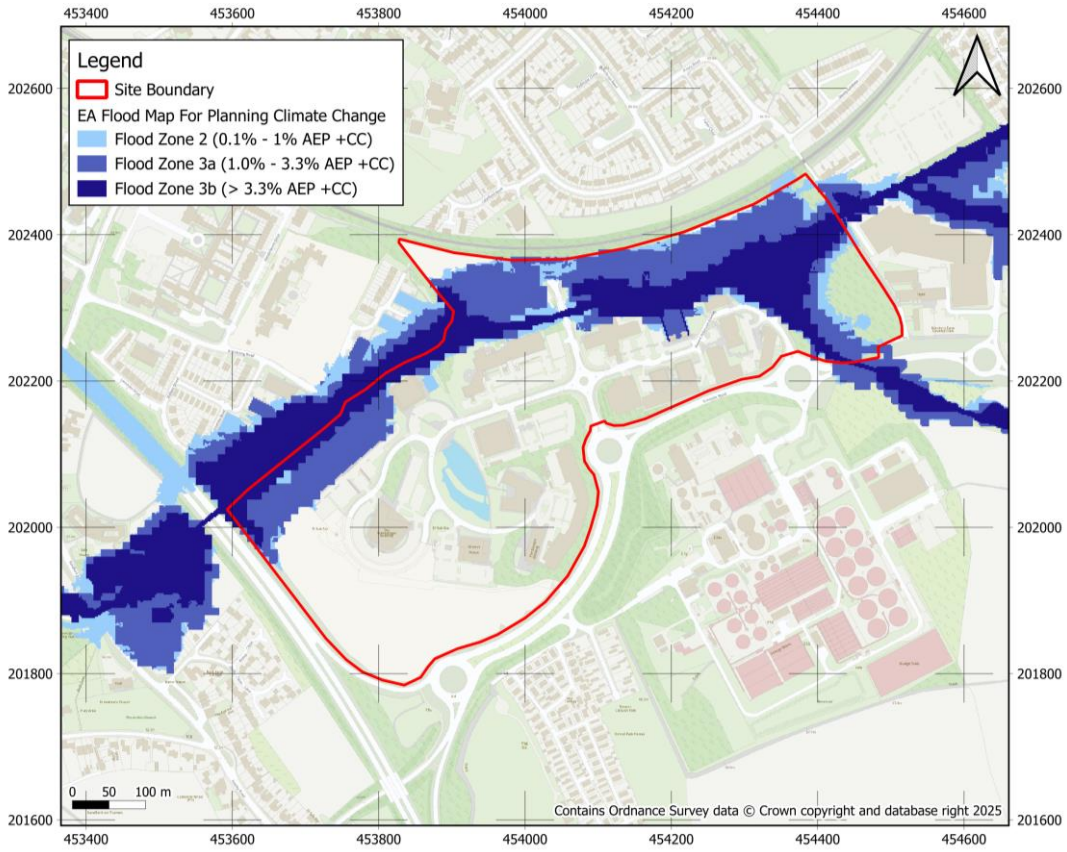


Figure 5 – Fluvial Climate Change Flood Map

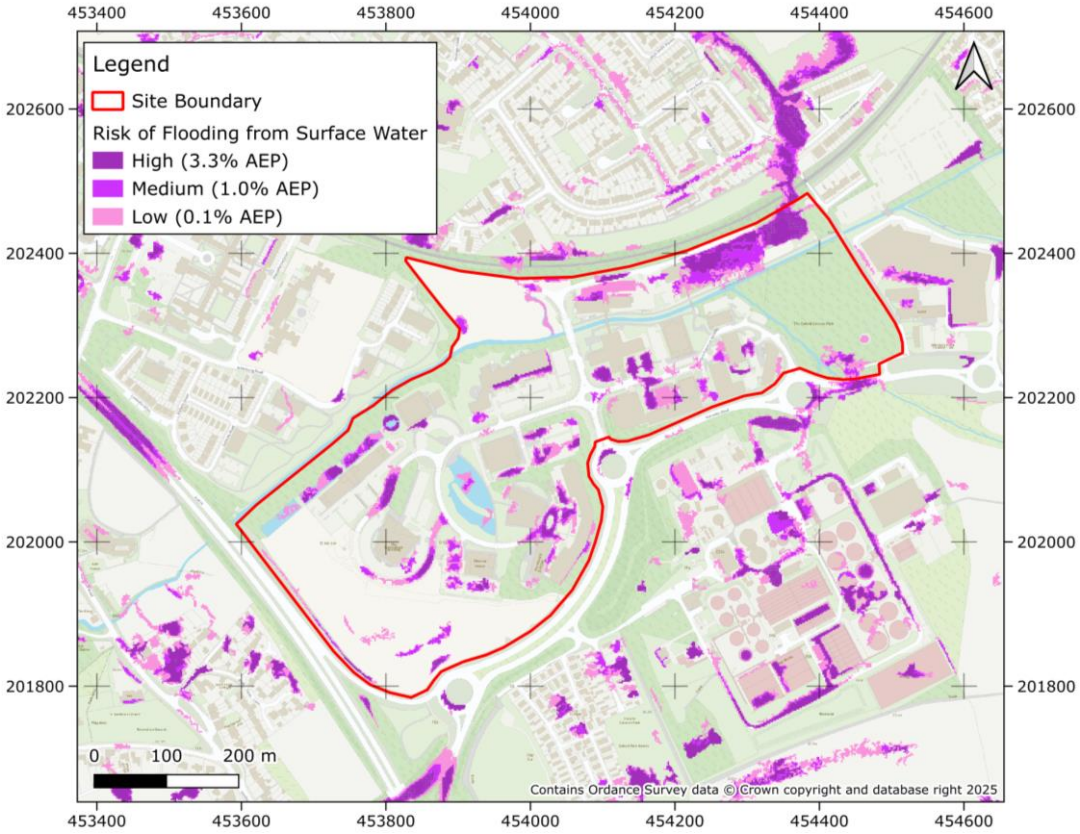


Figure 6 – Surface Water Flood Map

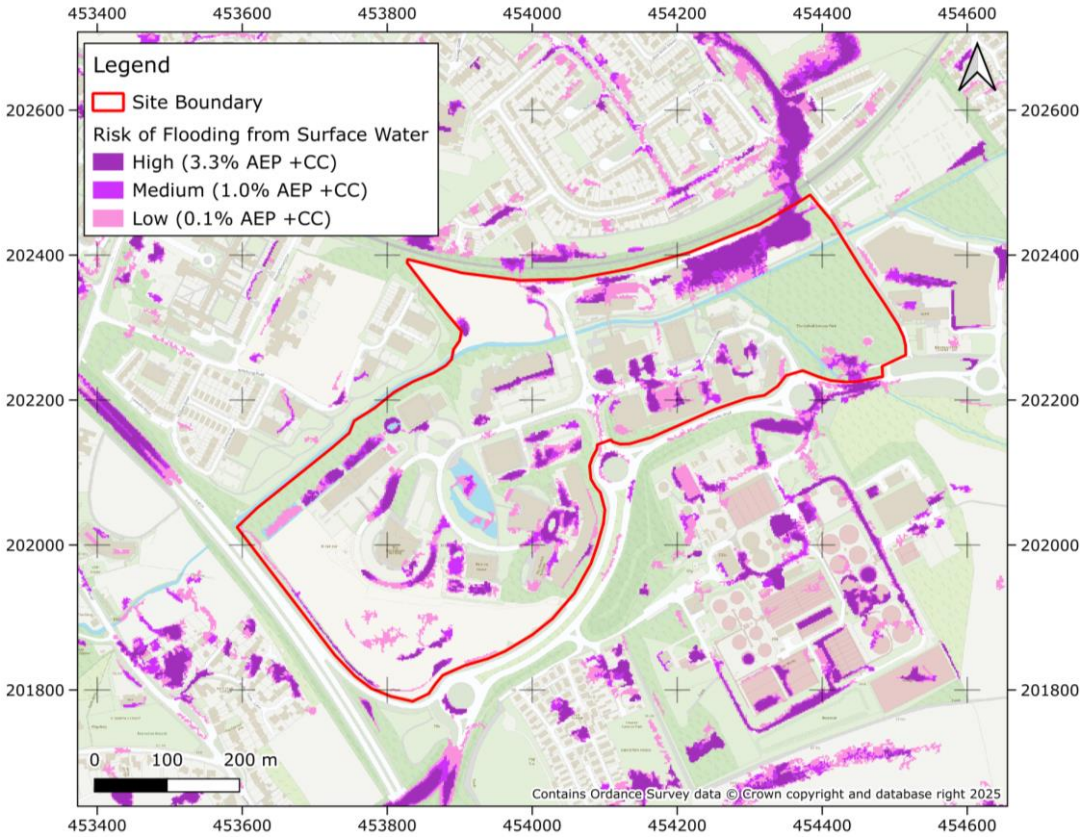


Figure 7 -Surface Water Climate Change Flood Map

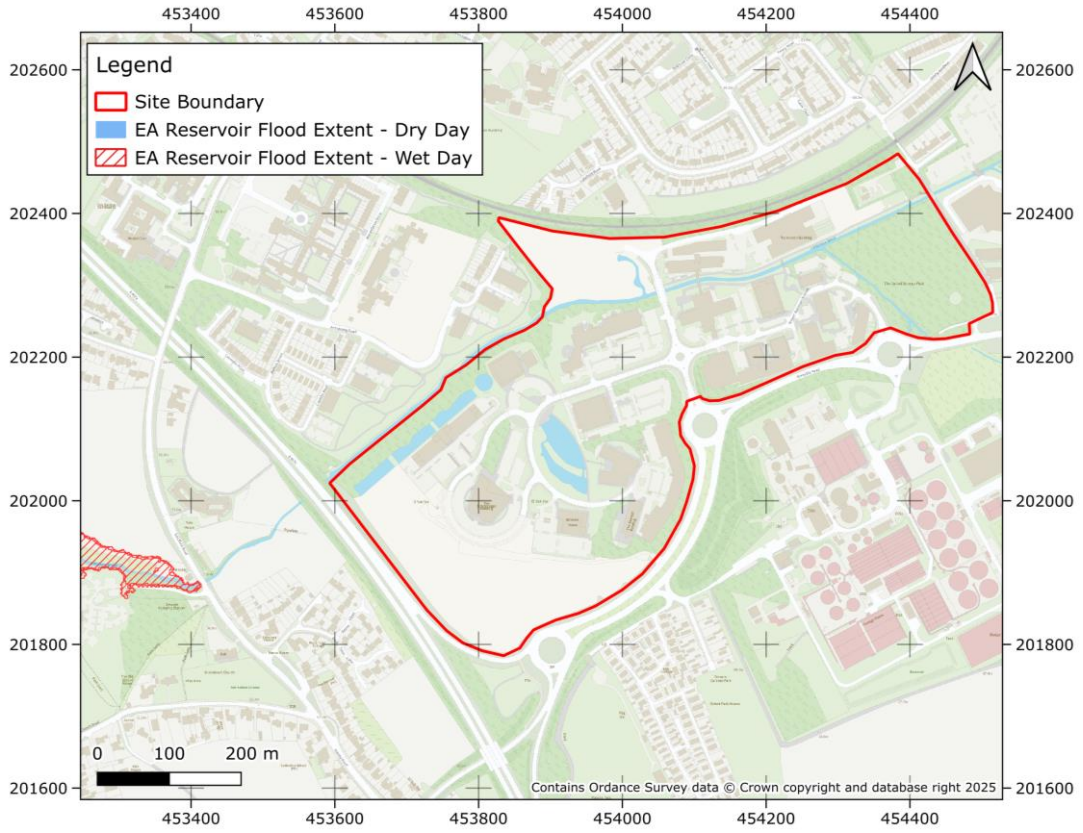


Figure 8 - Reservoir Failure Flood Map

4 Detailed Review of Primary Flood Risk

4.1 Primary Flood Risk

Fluvial flooding is the primary flood risk mechanism at the site and is assessed in more detail below.

4.2 Flood Risk Metrics

The Northfield Brook and Littlemore Brook Model (2011) was re-run as part of the previous SFRA for Oxford City in 2023. This was to obtain results applying the latest climate change allowances. These extents have been reviewed and are significantly reduced relative to the climate change extents shown in the latest national mapping (see Figure 5). Therefore, to ensure a precautionary approach the national mapping outputs have been assessed in more detail.

Depth data is not available for the climate change extents reviewed in section 3.2; these extents consider the 2080s epoch (2070-2125). However, depth data is available from the national mapping from the Risk of Flooding from Rivers and Sea (RoFRS) dataset. The climate change allowances used in RoFRS are based on the 2050's epoch (2041-2069) and reflect the median estimate of flow increases. The RoFRS extents are very similar to the extents applying the 2080s allowances, therefore are considered suitable for the purposes of this SFRA.

The depth mapping across the site (see Figure 9) follows the Littlemore Brook in the north of the site and the tributary in the east, with around 24.3% of the total site area inundated. Inundations depths vary, they are highest close to the watercourses (>1.2m) and fall moving away (between 0.2-0.9 m).

It should be noted that given the expected lifetime of the development, a site-specific FRA will need to consider the climate change impacts for the 2080's epoch (2075-2125).

4.3 Access and egress

Current access to the site is assumed to be via Grenoble Road to the south of the site there are two roundabouts on Grenoble Road that allow site access.

The best identified route leaves the site via Grenoble Road and then heads west, the route eastwards runs through the flood extents of the Littlemore Brook Tributary, see Figure 10.

Flood warning will therefore be important. It should be noted that the site is not currently located within an EA Flood Warning Area. However, other areas of Oxford are located within flood warning areas and so Flood Warnings from these should be considered when assessing the need for evacuation from the site.

Once the development layout is known, a site-specific FRA should consider onsite routes across the site and any infrastructure or instructions to site users required to reach the proposed access route. The proposed route should also be reassessed in a site-specific FRA when all access points to the site are known, to ensure the route with the lowest hazard remains the same. It should also consider pluvial flood risk along any routes identified.

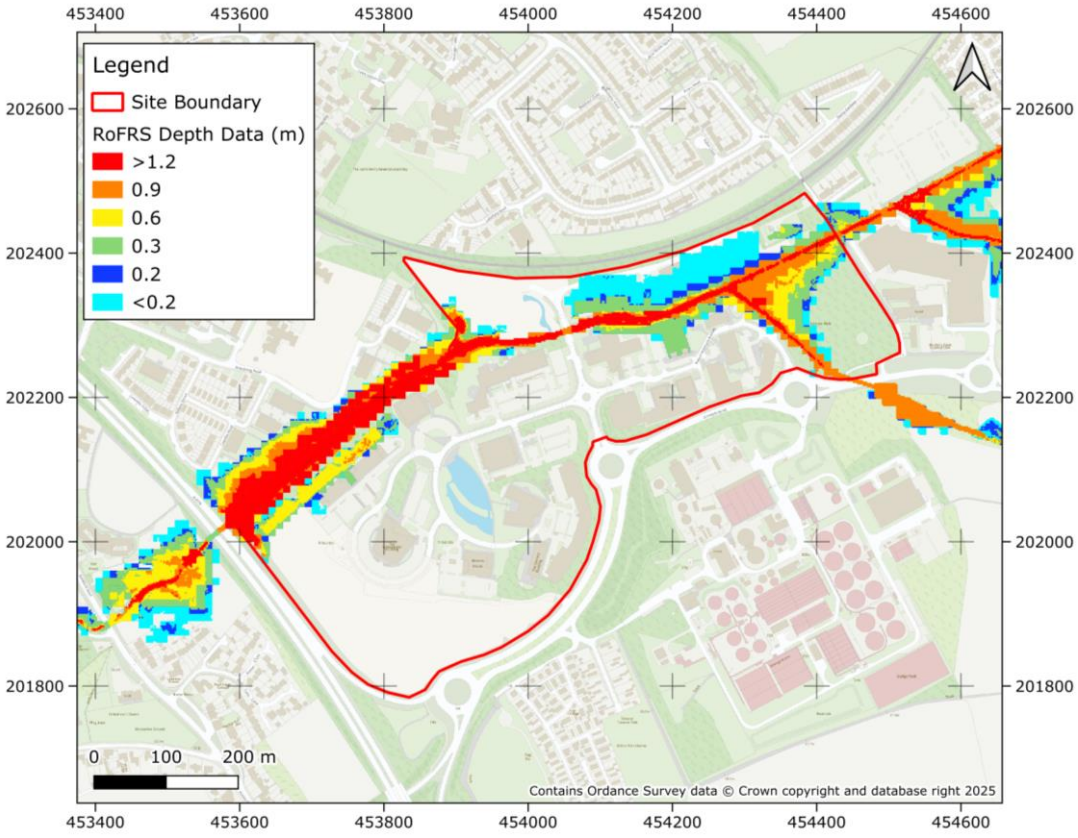


Figure 9 – RoFRS Depth Data for 1.0% AEP + Climate Change Event

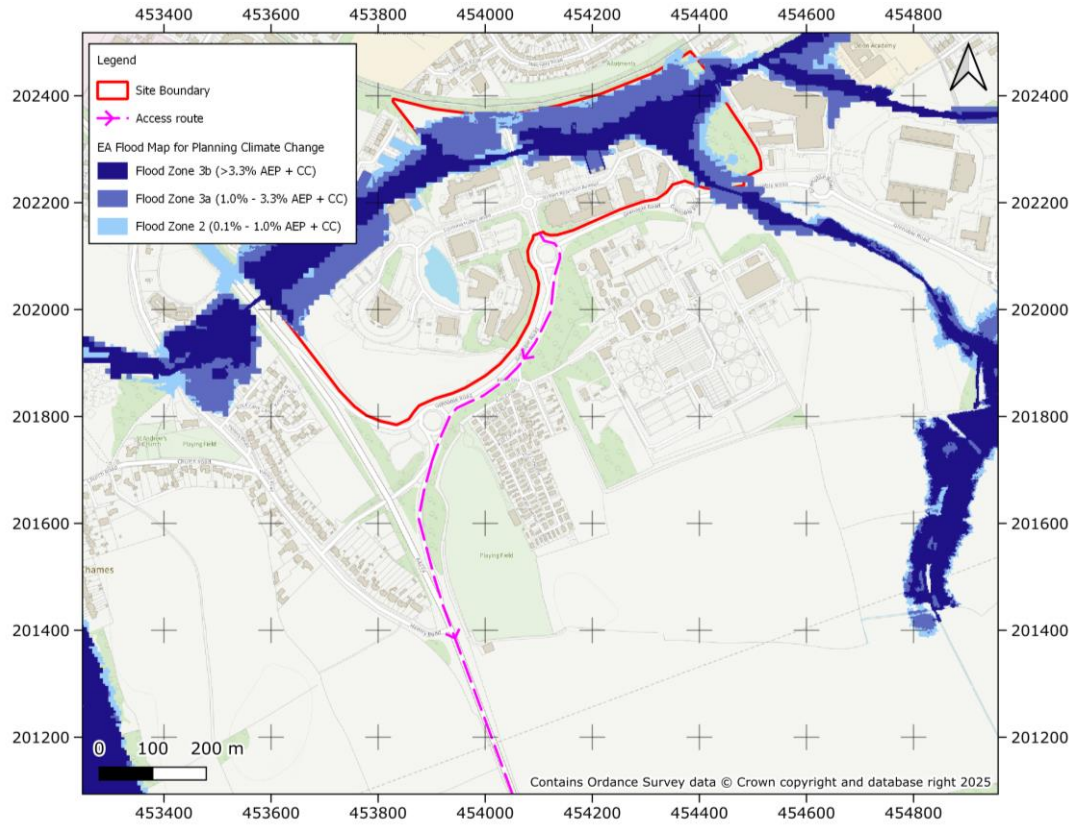


Figure 10 – Access/Egress Routes

5 Development Viability and FRA recommendations

5.1 Development Categorisation

The development proposed is employment and is categorised as *Less Vulnerable Development.* Less vulnerable development is permissible in Flood Zones 2 and 3a. However, a sequential approach to the siting of the development should be used, with development prioritised first within Flood Zone 1 prior to consideration of any siting within Flood Zone 2 or 3a. The design must ensure that areas of the site that may be located within Flood Zone 3b in the future are avoided altogether.

5.2 Scale of Development

The total site area is currently 27.3 ha; allocated for 100,000 m^2 (10 ha) of employment development.

In total approximately 33% or 9 ha of land lies within the fluvial flood zones when accounting for climate change. The at-risk areas are mainly concentrated in the north of the site. It should therefore be possible to locate the majority of infrastructure in Flood Zone 1, namely in the open areas along the eastern and northern site boundaries. This is provided there are no constraints (non-flood related) which require development to be located in at-risk areas, for example existing development onsite.

If development does need to be located in flood risk areas, as stated above employment development is permissible in Flood Zone 2 and Flood Zone 3a without the requirement for an exception test. However, if it is located within the design 1.0% AEP plus climate change extent, ground raising may be required along with associated compensatory storage. The latter could compromise the available development space.

5.3 Sequential Approach

It is important that a sequential approach is implemented at the site, prioritising development in Flood Zone 1 wherever possible, followed by Flood Zone 2 and then Flood Zone 3a. As already stated, no development should be located in Flood Zone 3b.

Note, surface water flood risk is also present in smaller areas across the site. Therefore, it should be used to inform the development layout with development located outside of high-risk areas if possible.

5.4 Other Site-Specific Considerations

Areas of surface water flood risk are present within the site and along the access routes. A site-specific FRA should consider in more detail the nature of the surface water flood risk to determine how quickly it occurs and the degree of hazard on site. The drainage strategy for the proposed development should be suitably designed to manage additional runoff arising from the development and ensure that surface water flood risk at the site and to third party land is not increased.

In assessing and demonstrating the viability of any drainage solution for the site, a site-specific FRA should follow the national standards for SuDS and any relevant Local Authority Local Plan policies. The geology at the site has moderate permeability, therefore the use of infiltration SuDS solutions may be possible. It is recommended that a geotechnical investigation is undertaken at this site to obtain further information relating to infiltration rates, this will confirm whether infiltration could be viable in some areas. Attenuated discharge to a watercourse or a sewer will also need to be considered as part of a site-specific FRA.