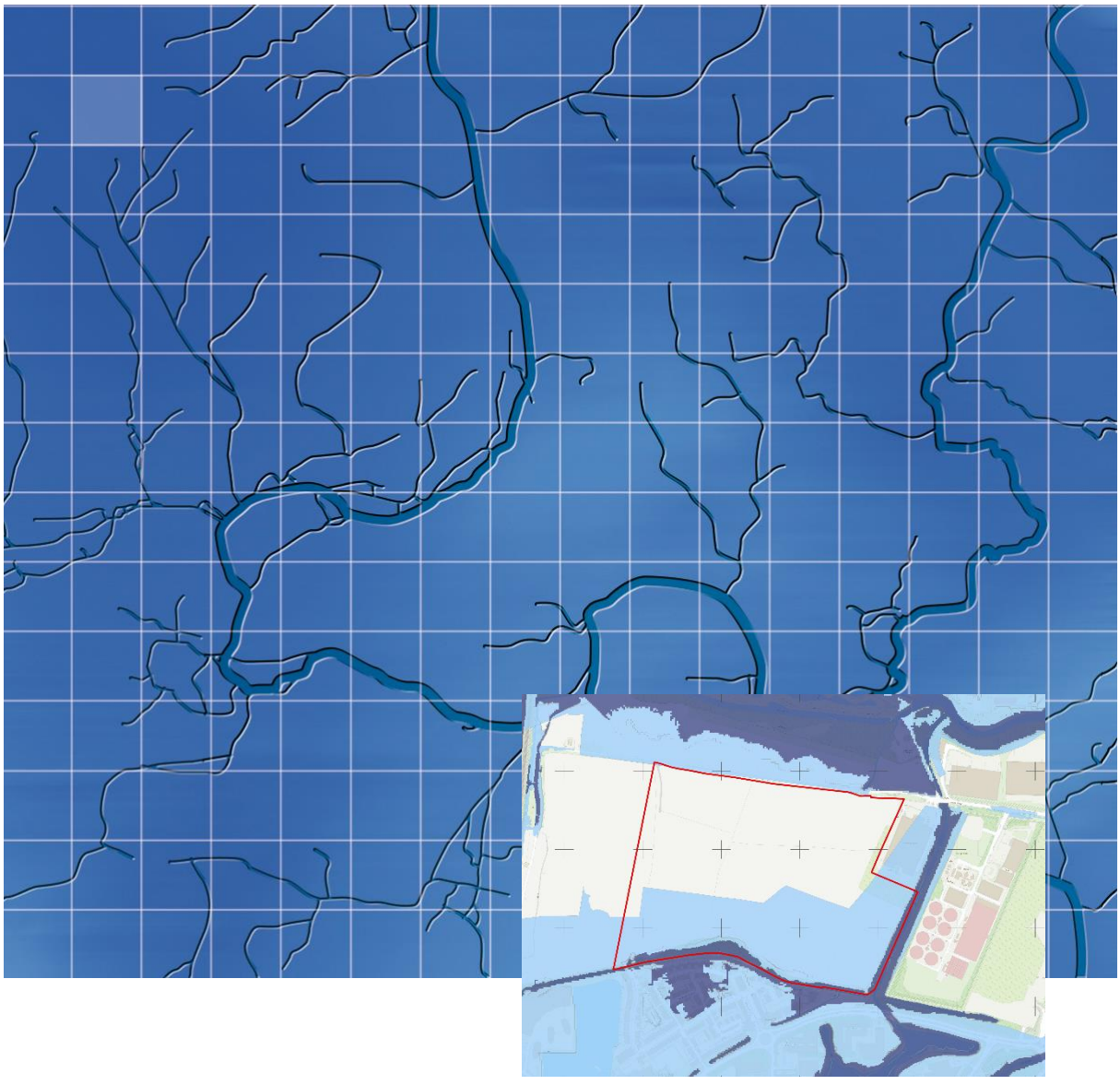
Reading Borough Council

May 2025

Land South of Island Road (SR1a)

Level 2 Strategic Flood Risk Assessment



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Document issue details

WHS10135

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1.0	02/05/2025	Draft	Daniel Hamilton (*Principal Consultant*)	Paul Blackman (*Director*)

For and on behalf of Wallingford HydroSolutions Ltd.

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.

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Land south of Island Road (SR1a) Level 2 SFRA
Flood Risk Overview

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

Flood Risk

Fluvial flood risk represents the greatest risk at the site with the River Kennet running through the centre of the site. However, flood extents are mostly limited to the river channel with the majority of the site in Flood Zone 1.

In the location of the site the latest Flood Map for Planning is based on national scale modelling. However, the River Kennet model (Tyle Mill to Thames Confluence) (2018), which informed the previous flood map, was assessed to attain further detail on fluvial flooding. Whilst it shows significant flood depths and velocities at the site, these are mostly limited to the river channel. In this respect fluvial flood risk is considered to be moderate.

The risk from other sources of flooding is considered to be low.

The overall confidence in the assessment is moderate. Whilst detailed modelling is available it does not inform the latest national scale mapping.

Conclusions and Recommendations

The development proposed is categorised as Less Vulnerable Development, which is permissible in Flood Zone 2 and Flood Zone 3a. Less vulnerable development is not permissible in Flood Zone 3b.

Considering the flood extents and the scale of development proposed it will be possible to locate the majority of infrastructure in Flood Zone 1 and all infrastructure outside Flood Zone 3a.

Contents

1 Introduction

1.1 Background

Wallingford HydroSolutions Ltd has been commissioned by Reading Borough Council (RBC) to undertake a Level 2 Strategic Flood Risk Assessment (SFRA) at Land South of Island Road (SR1a) 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, is the 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

The Land South of Island Road (SR1a) site is 32.13ha in area and is located to the south of the River Kennet. It is located in the vicinity of the Reading Green Park area, approximately 2.6 km to the southwest of the centre of Reading. The surrounding land use is a mixture of suburban land use and open space, see Figure 1.

In the Replacement Local Development Plan (RLDP) it is proposed to be used for warehouse uses with some potential for industrial and research and development (R&D) uses.

2.2 Topography

Based on 1m LiDAR data, site levels vary, with an elevated ridge running through the centre of the site, see Figure 2. It is understood that the site is a former landfill site, therefore this elevated ridge is thought to be a temporary mound of material rather than the natural ground levels at the site. The ground levels within the site boundary range from 37.0 to 51.7m AOD. The average ground level is 43.1 m AOD.

2.3 Nearby Watercourses

The River Kennet is sited approximately 180m north of the site. In this location it runs in a west to east direction. A small unnamed watercourse runs along the site's southern and eastern boundary. It joins the River Kennet approximately 250m northe of the site. Figure 1 shows the location of these watercourses.

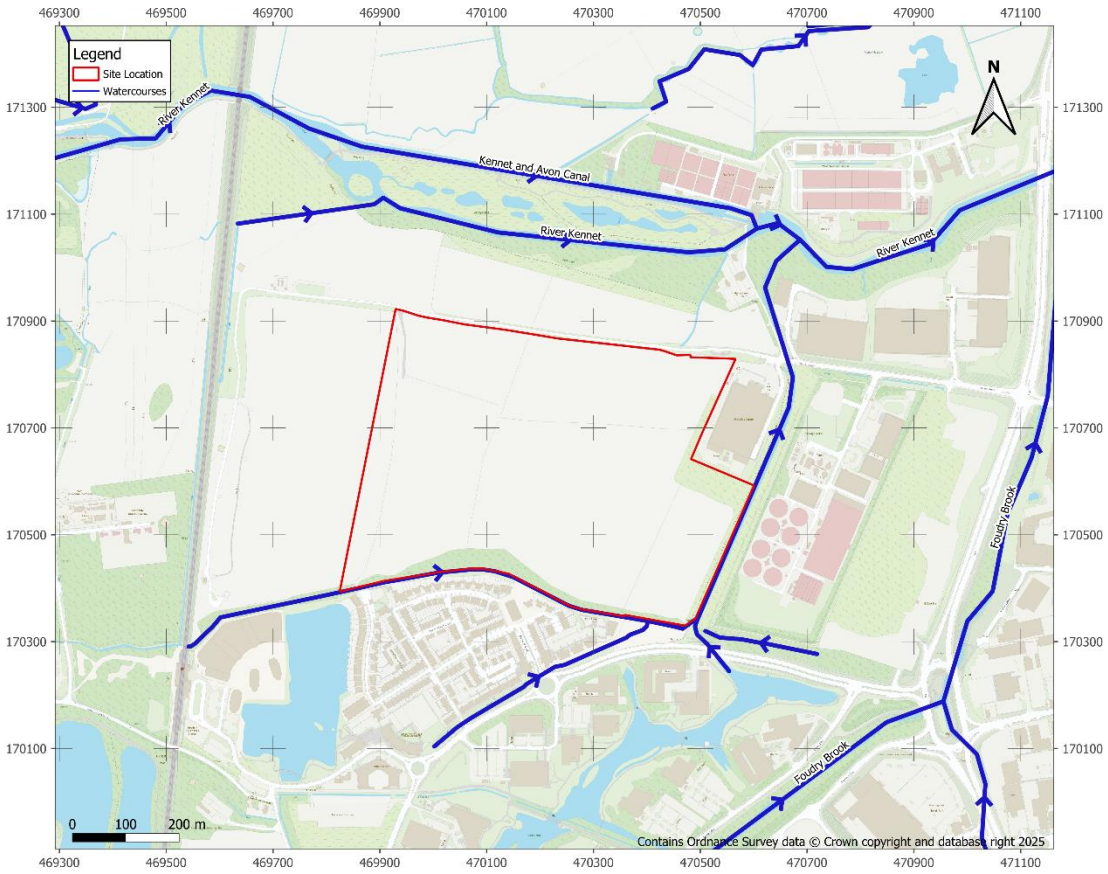

Figure 1 - Site Location

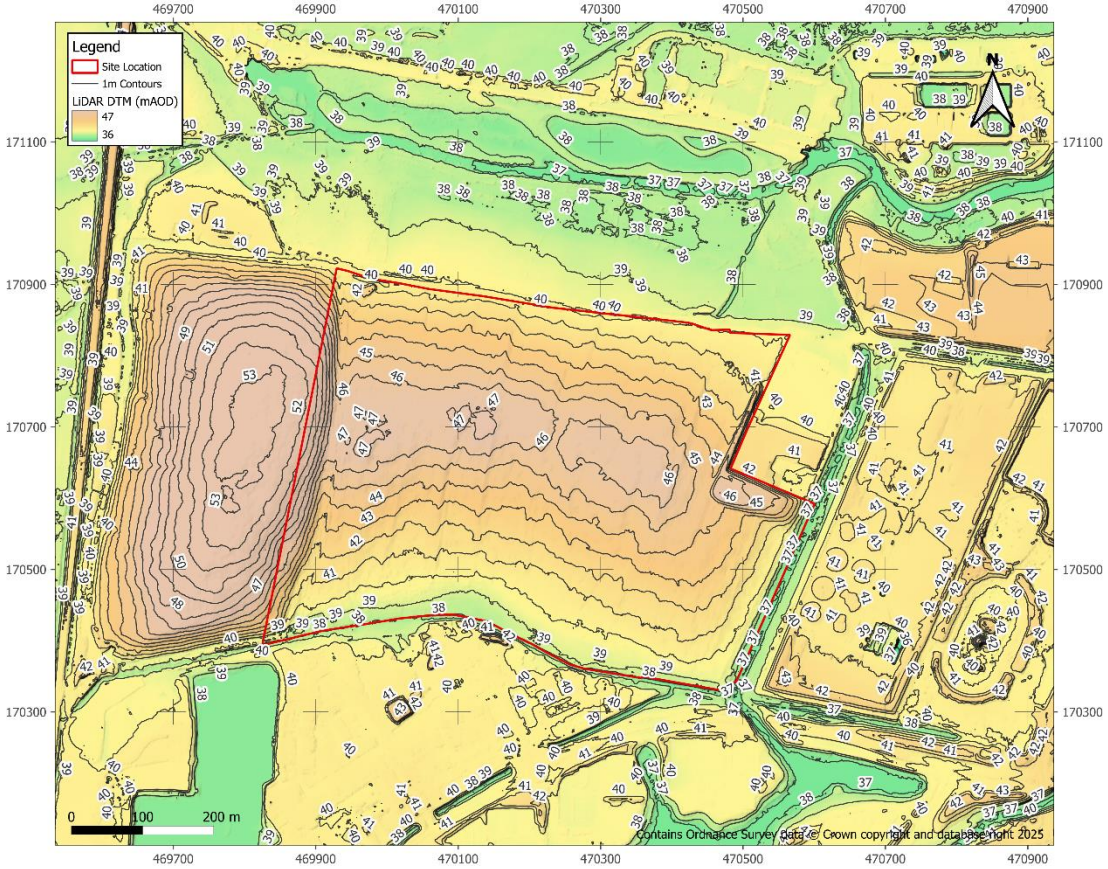

Figure 2 - Topography

3 Flood Risk

3.1 Historical Flooding

The EA has records of historic flooding at the site. In total, there is one event recorded in the EA database at this location. This event occurred in June 1971. It was attributable to flooding of the River Kennet and its associated tributaries.

3.2 Fluvial Flood Risk

In the existing Flood Map for Planning (FMfP), 43% of the site is inundated by Flood Zone 2, with 4% of the site located in Flood Zone 3a. The Flood Zone 2 extent is based on the recorded flood outline for the June 1971 flood event. This extent is far larger than all of the modelled extents, it is thought that it predates the elevated ridge referred to in section 2.2 which currently removes a large amount of the site from flood risk areas.

The Flood Zone 3a proportion is based on the latest national scale modelling, rather than the River Kennet (Tyle Mill to Thames Confluence) (2018) model, which informed the previous iteration of the FMfP and the level 1 SFRA for Reading Borough completed in November 2024.

Viewing the 2018 model results when compared to the latest national scale modelling, similar extents were generated for Flood Zone 3a. The model also has results for the 3.3% AEP event equivalent to Flood Zone 3b, these show 3% of the site to be inundated during this event located in Flood Zone 3b. Flooding at this site is mainly associated with the unnamed watercourse along the site's southern and eastern boundary, see Figure 3.

The EA climate change fluvial outputs for Flood Zone 2 and 3 have also been assessed, 7% is inundated by Flood Zone 2, a reduction relative to the recorded flood outline used for the baseline Flood Zone 2 extent, potentially due to the elevated ridge which may not have been at the site during the 1971 flood event. The proportion of the site located in Flood Zone 3a increases to 6%, see Figure 4. Similar extents were generated by the River Kennet (Tyle Mill to Thames Confluence) (2018) model.

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

3.3 Flood Defence Infrastructure

There is no formal flood defence infrastructure in the vicinity of the site. However, a significant proportion in the south of the site is located in an area associated with a reduction in risk of flooding from rivers and sea due to defences. It is not clear what defences are leading to this reduction. The EA has been contacted for comment, but at time of writing is yet to confirm. The site is not located within a flood storage area.

3.4 Surface Water Flood Risk

The EA's surface water flood maps show the majority of the site not to be at surface water flood risk. In total, less than 1% of the site is inundated in the 3.3% AEP and 1.0% AEP events, 1% is inundated in the 0.1% AEP event, for the latter this includes a small areas in the southeast and centre of the site, see Figure 5. When accounting for climate change the proportions change to marginally less than 1% is flooded in 3.3% AEP event, 1% is flooded in the 1.0% AEP event and 1% remains flooded in the 0.1% AEP, see Figure 6. Overall, the risk of surface water flooding is considered to be low.

3.5 Groundwater Flooding

The site is underlain by a bedrock consisting of Clay, Silt and Sand in the form of the Lambeth Group formation. It is expected to permit low to moderate amounts of infiltration. Superficial deposits of sand and gravel are also present at this site, these are also expected to permit

moderate amounts of infiltration. The underlying soils are loamy and clayey floodplain soils with naturally high groundwater, these are expected to have impeded drainage.

Based on the data available the water table at the site is not expected to be mobile, translating to a low risk of groundwater flooding. More data is required at the planning stage to confirm this.

3.6 Reservoir Flood Risk

The FMfP shows that the entire site is not at risk from reservoir flooding during both the wet day and dry day scenario, see Figure 7.

3.7 Flood Warning Service

The southern part of the site is located within the Foudry Brook from Stratfield Mortimer to Green Park EA Flood Warning Area.

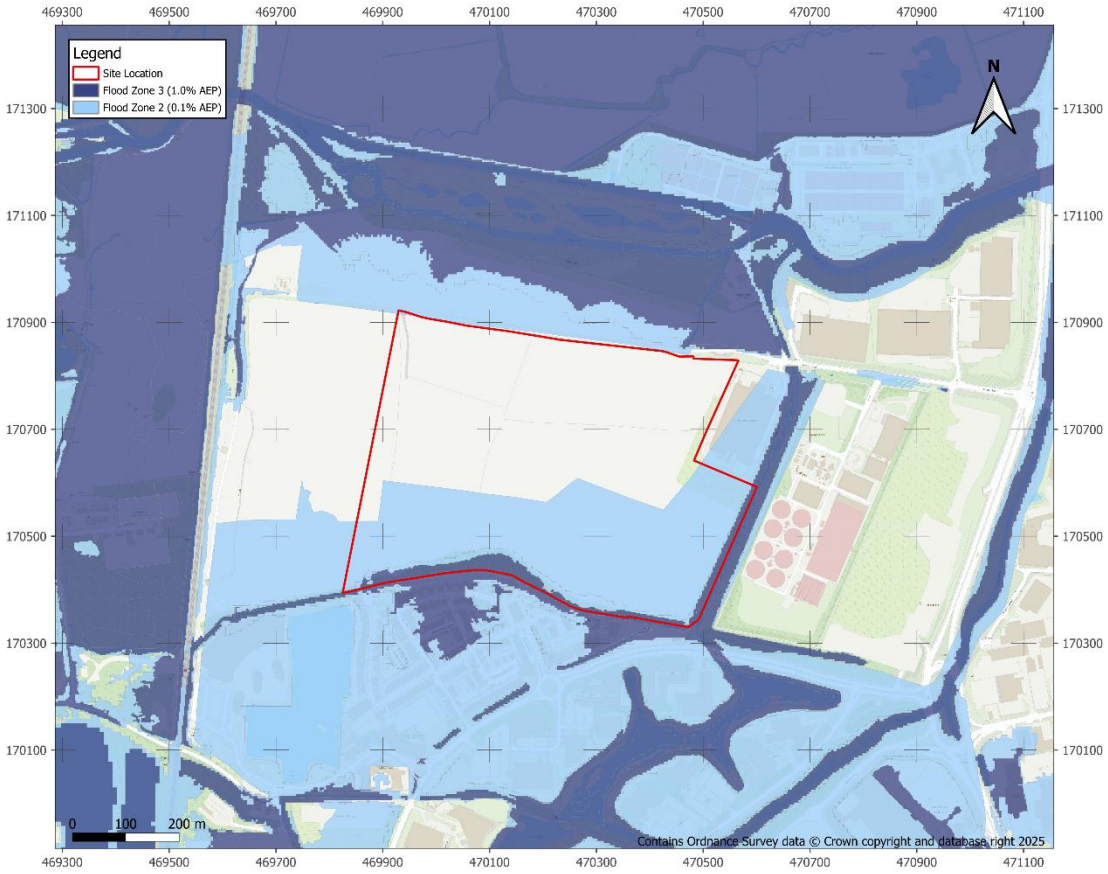

Figure 3 - Fluvial Flood Map

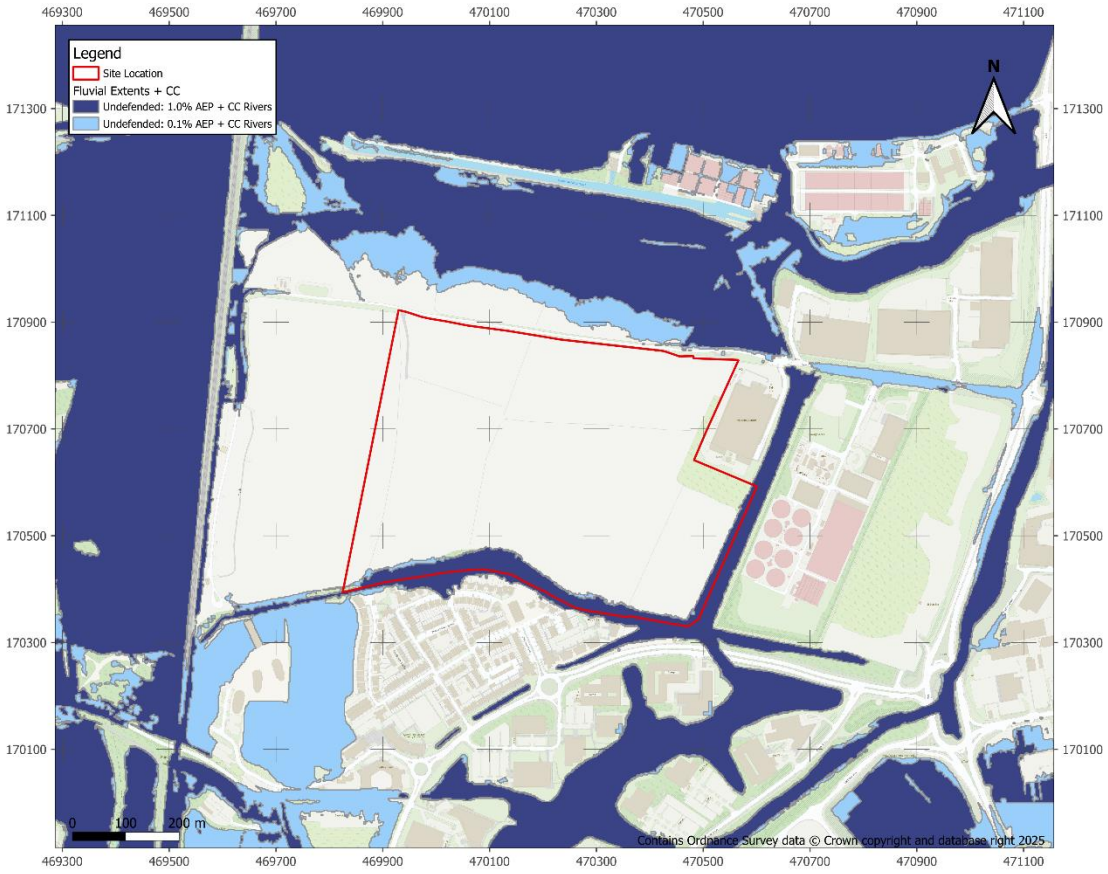

Figure 4 – Fluvial Climate Change Flood Map

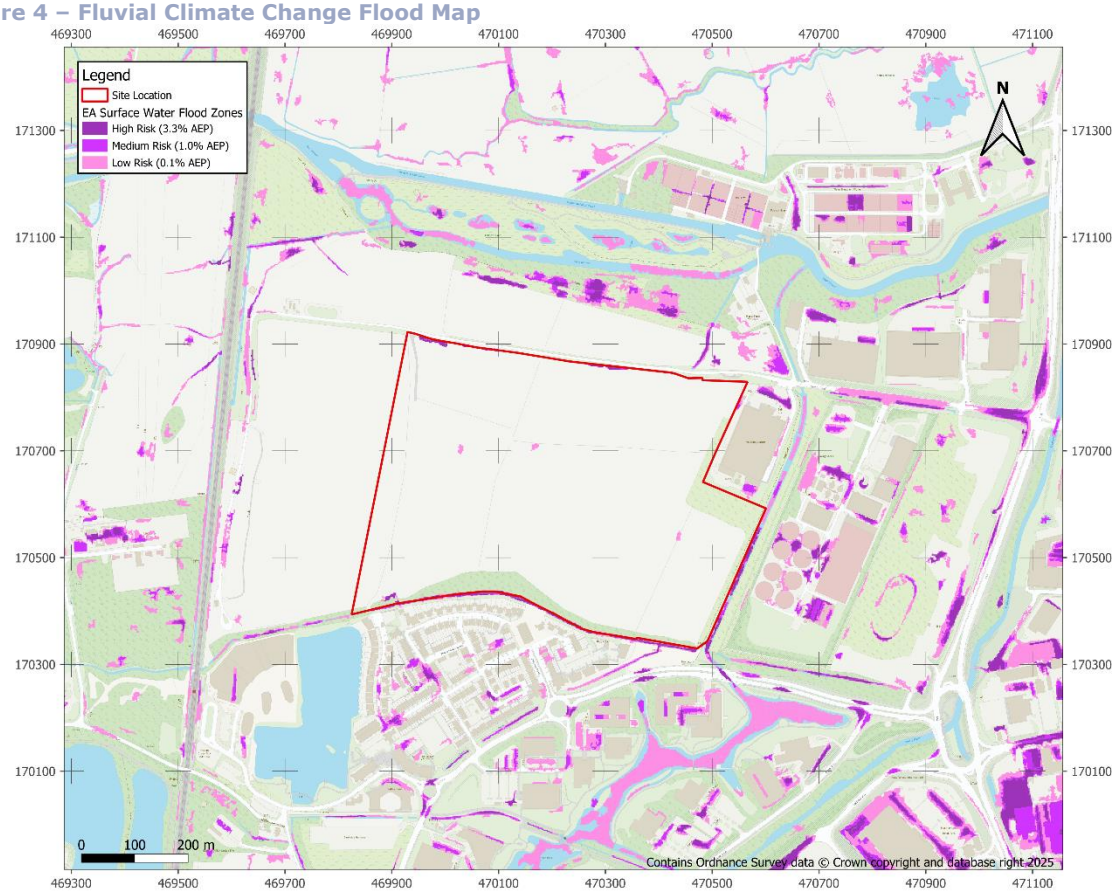

Figure 5 – Surface Water Flood Map

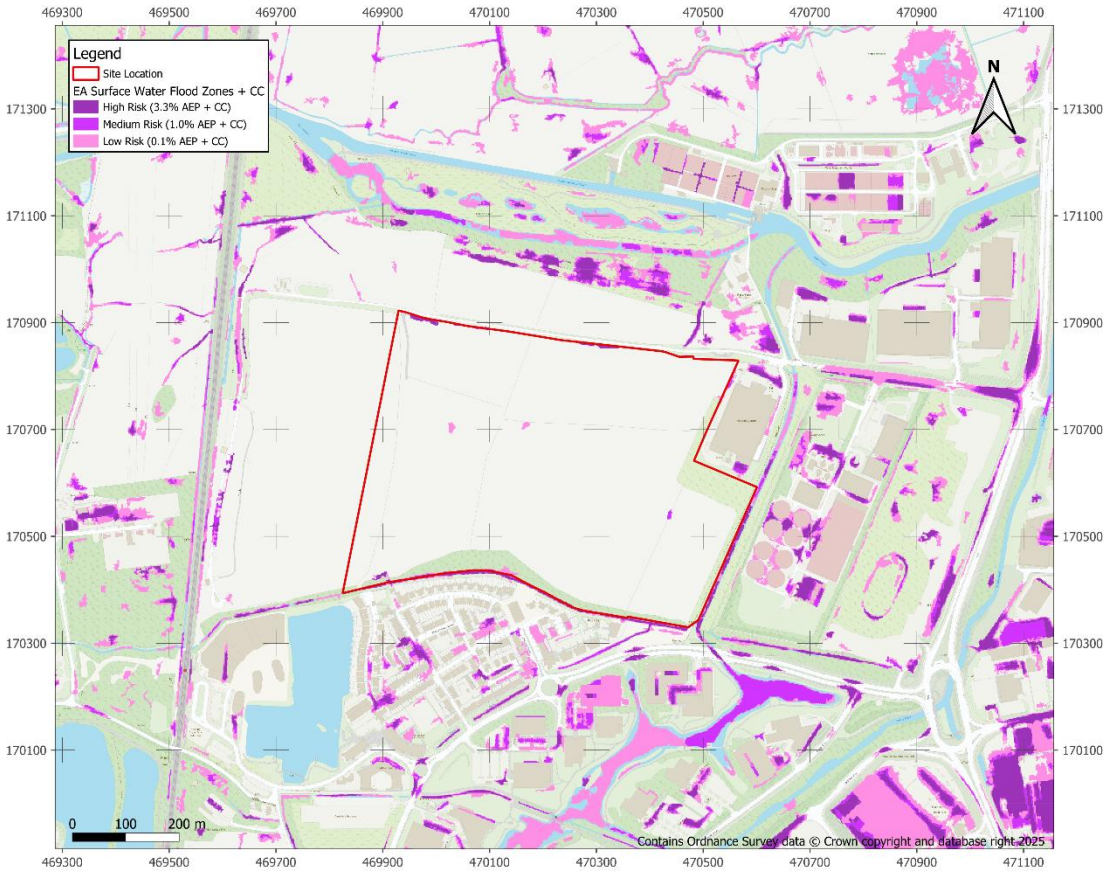

Figure 6 -Surface Water Climate Change Flood Map

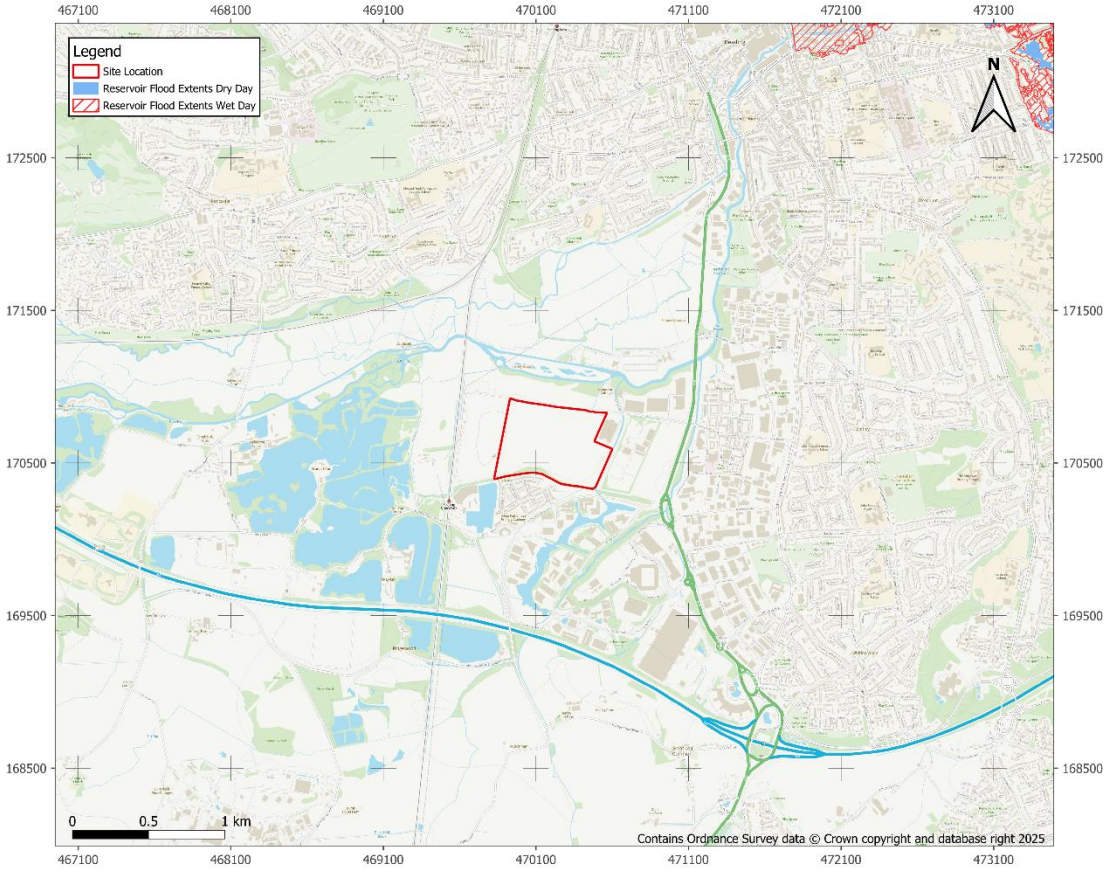

Figure 7 - Reservoir Failure Flood Map

4 Detailed Review of Primary Flood Risk

4.1 Primary Flood Risk

The primary flood risk mechanism at the site is fluvial in origin. The flood risk is quantitively assessed in more detail below.

4.2 Flood Risk Metrics

The national scale modelling does not provide details on flood depths, velocities, hazard or speed of onset. Therefore, the River Kennet model (Tyle Mill to Thames Confluence) (2018) was assessed to attain further detail on fluvial flooding.

For the 100-yr plus central climate change (21%) design event, the maximum flood level at the site is 39.06 m AOD, significantly lower than the average ground level on the site. The hazard map for this event (see Figure 8) shows that in the limited areas where flooding occurs flood hazard is a mixture of *low, danger for some* and *danger for most*, with higher hazard values located closer to the river channel running along the site's southern and eastern boundary. Given the location of the watercourse along the site's boundary speed of onset values are very fast (<1 hr), however as mentioned fluvial flood extents are limited to a small proportion of the site. Table 1 shows the flood risk metrics associated with the design event.

Table 1- Flood Risk Metrics

	Design Event 1.0% AEP (+21%)
Percentage Inundated (%)	6%
Average Flood Depth (m)	0.55m (Max- 2.34m)
Average Velocity (m/s)	0.05m/s (Max – 0.42m/s)
Speed of Onset (hrs)	<1 hr

4.3 Access and egress

Vehicular access to and from the site would be eastwards along the Island Road, with subsequent travel over the bridge crossing the unnamed watercourse onto Lindisfarne Way. From there travel would likely be in a southerly direction away from the flood extents of the Rivers Thames and Kennet, see Figure 9.

Small sections of Island Road lie in Flood Zone 2, which as mentioned is based on a recorded flood outline. The model results for the 0.1% AEP also show some isolated areas at risk, however for the most part flood hazard is low. The rest of the route beyond Island Road lies mostly in Flood Zone 1, however there are some sections of surface water flood risk. Whilst this risk is generally considered manageable, a site-specific FRA should consider in more detail the nature of the flood risk to determine how quickly it occurs and the degree of hazard.

It should be noted that flooding only effects a small proportion of the site, therefore during the majority of flood events safe refuge will be available.

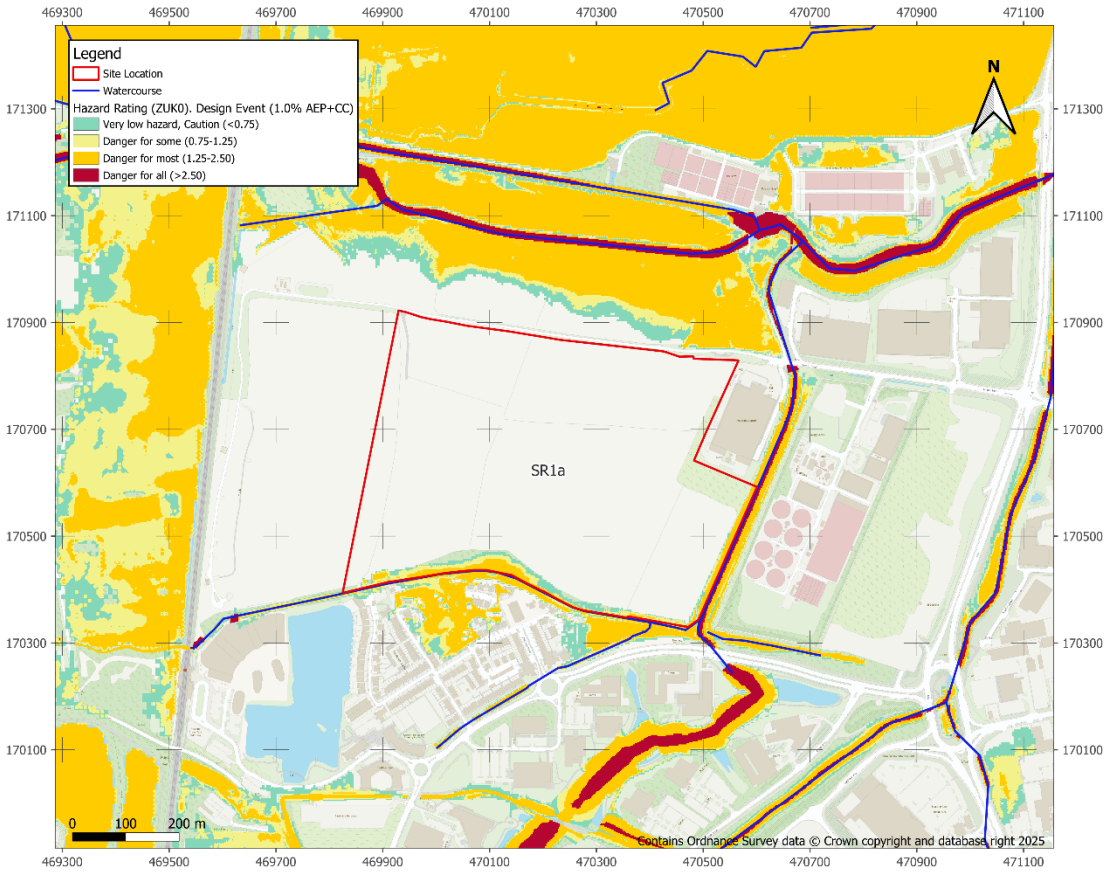

Figure 8 – Flood Hazard Map for the Design Event

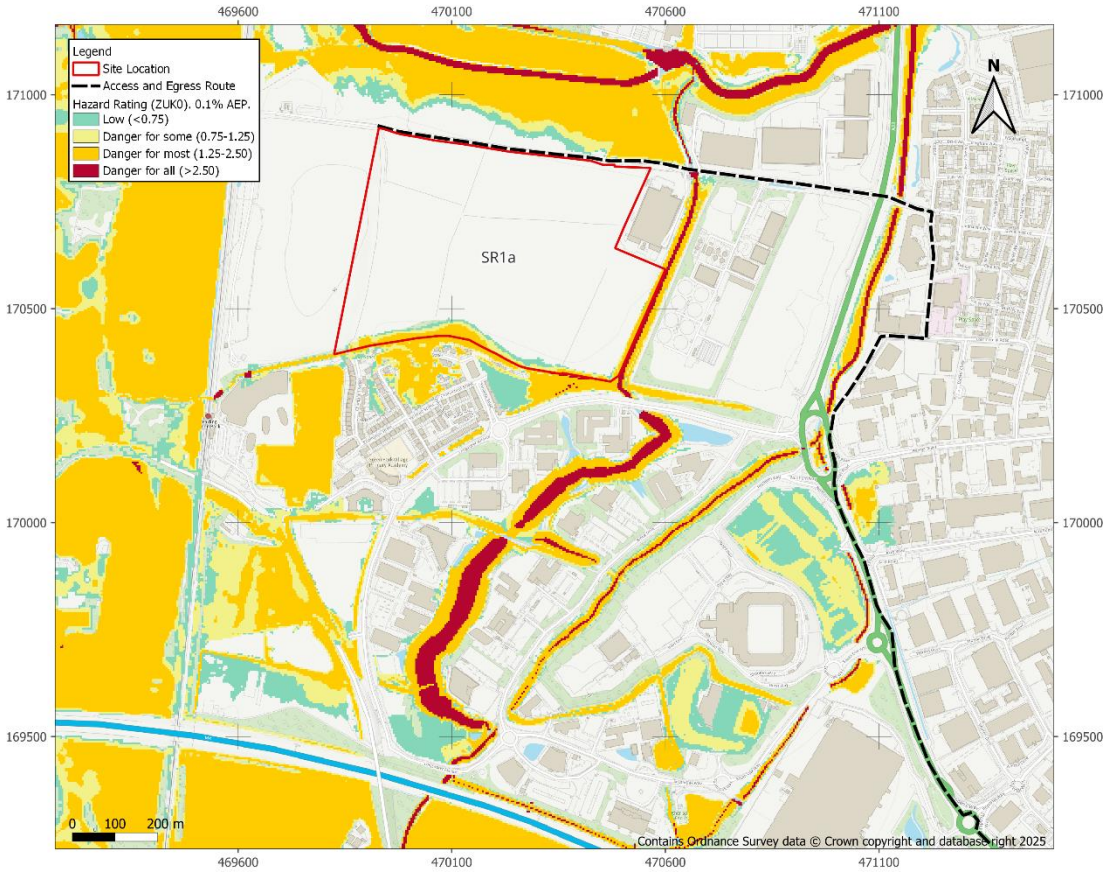

Figure 9 – Access/Egress Routes

5 Development Viability and FRA recommendations

5.1 Development Categorisation

The development proposed is categorised as *Less Vulnerable Development,* which is permissible in Flood Zone 2 and Flood Zone 3a. Less vulnerable development is not permissible in Flood Zone 3b.

Given that Flood Zone 3b inundates only a very small proportion of the site it will be possible to locate all infrastructure outside of its extent. The current Flood Zone 2 and 3a should also allow for the majority of infrastructure to be located in Flood Zone 1. Therefore, a new warehouse development at the site will be possible.

5.2 Scale of Development

The total site area is 32.6 ha. Based on the local plan the site has an indicative potential for 90,000-133,000m^2 (9.0-13.3ha) of industrial/warehouse/R&D use. Given the flood extents at the site, the scale of development will not be an issue on flood risk grounds.

5.3 Sequential Approach

Whilst Less Vulnerable Development is permissible in Flood Zone 2 and 3a, it is still 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.

5.4 Other Site-Specific Considerations

The current assessment of flood risk assumes that levels on site will remain largely the same with the elevated ridge retained, if it is to be removed this will change flood risk on site which will need to be considered as part of a site-specific FRA,

There is limited surface water flood risk within the site, therefore it should not be a barrier to development. However, parts of the access route are shown to be at surface water risk. 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. If new infrastructure is proposed, 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 non-statutory technical standards for SuDS and any relevant Local Authority Local Plan policies. The soil at the site is likely to have impeded drainage, therefore the significant use of infiltration SuDS solutions may be challenging. 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.