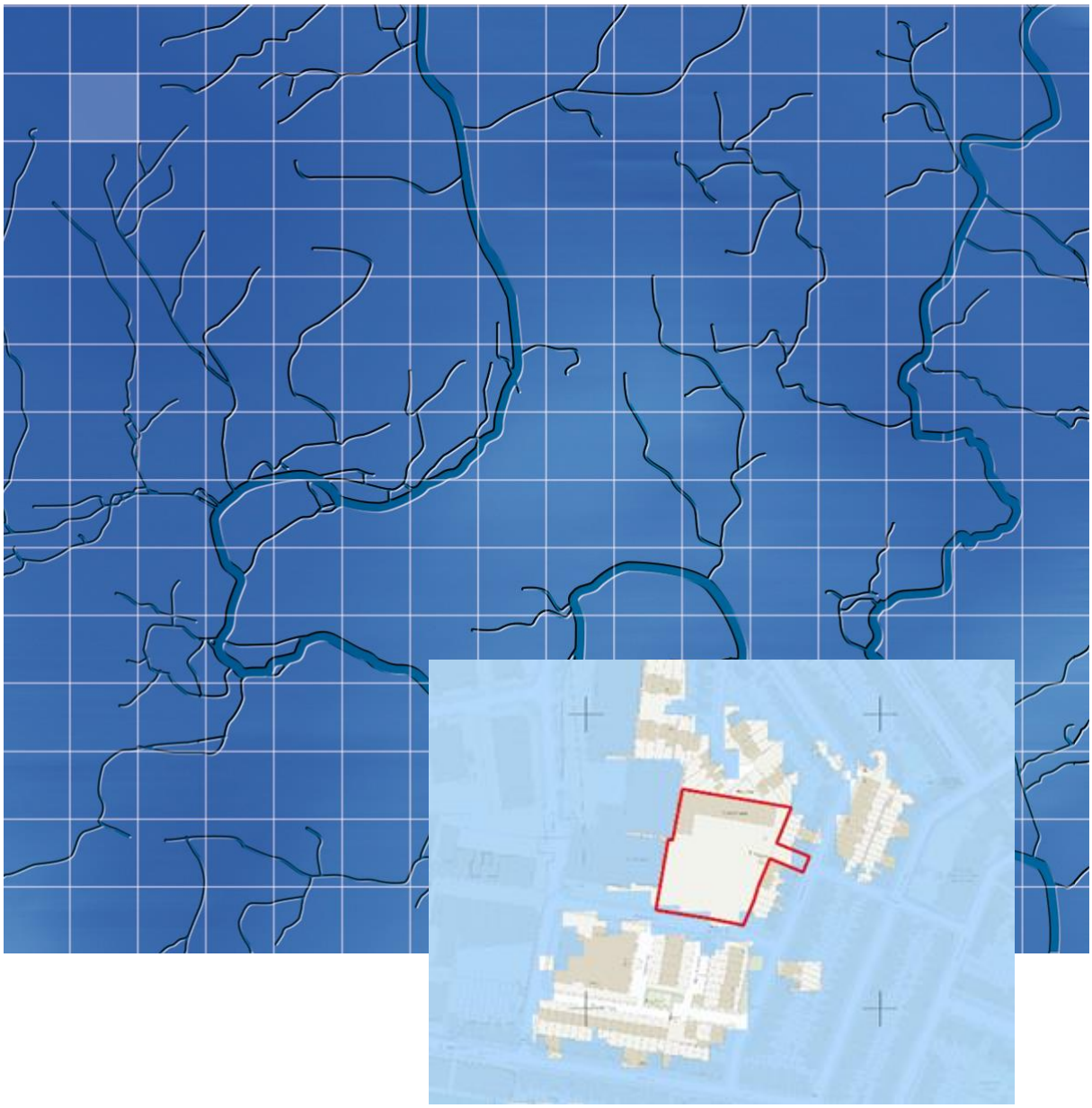
Reading Borough Council

May 2025

2 Ross Road & Part of Meadow Road (WR3b)

Level 2 Strategic Flood Risk Assessment



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1.0	02/05/25	Draft	Jasmine Lucas (*Graduate Consultant*)	Daniel Hamilton (*Principal Consultant*)

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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2 Ross Road & Part of Meadow Road (WR3b) Level 2 SFRA Flood Risk Overview

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

Flood Risk

Fluvial flood risk represents the greatest risk to the site based on the EA's fluvial flood map. However, only a small proportion of the site is located in Flood Zone 2 and none of the site falls within Flood Zones 3a or 3b.

In this location the fluvial flood map is based on detailed modelling in the form of the River Thames model (Pangbourne to Sonning) (2021). The outputs of this model were further assessed and show flood depths and velocities to be moderate. In this respect fluvial flood risk is considered moderate.

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

The overall confidence in the assessment is high. This is based on the availability of recent detailed modelling in the vicinity of the site.

Conclusions and Recommendations

The development proposed is categorised as *More Vulnerable Development,* which is permissible in Flood Zone 2, but needs to pass the Exception Test to justify development in Flood Zone 3a. More vulnerable development is not permissible in Flood Zone 3b.

As none of the site is located in Flood Zone 3a or 3b with the majority of its area falling in Flood Zone 1 a residential development should be possible. Access routes to and from the site are located within Flood Zone 2 and the design flood extent however development is already established in the area and given the slow response time of the Thames it should not be a barrier to development.

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 2 Ross Road & Part of Meadow Road (WR3b) 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

2 Ross Road & Part of Meadow Road (WR3b) is a 0.60 ha site located in central Reading, approximately 500 m northwest of Reading train station. The surrounding land use is urban, see Figure 1.

In the Replacement Local Development Plan (RLDP) it is proposed for residential development consisting of 41 - 61 dwellings.

2.2 Topography

Based on 1m LiDAR data, the site is relatively flat with a minor topographic depression close to the centre of the site and a slight slope towards Meadow Road to the south, see Figure 2. The ground levels within the site boundary range from 38.6 to 39.4 m AOD. The average ground level is approximately 39.0 m AOD.

2.3 Nearby Watercourses

The site is located approximately 325 m southwest of the River Thames and 230 m south of a smaller unnamed watercourse of the Thames. The River Thames in this location flows from west to east. The unnamed watercourse runs east to west and joins the Thames approximately 1.4 km northwest of the site. Figure 1 shows the location of these watercourses.

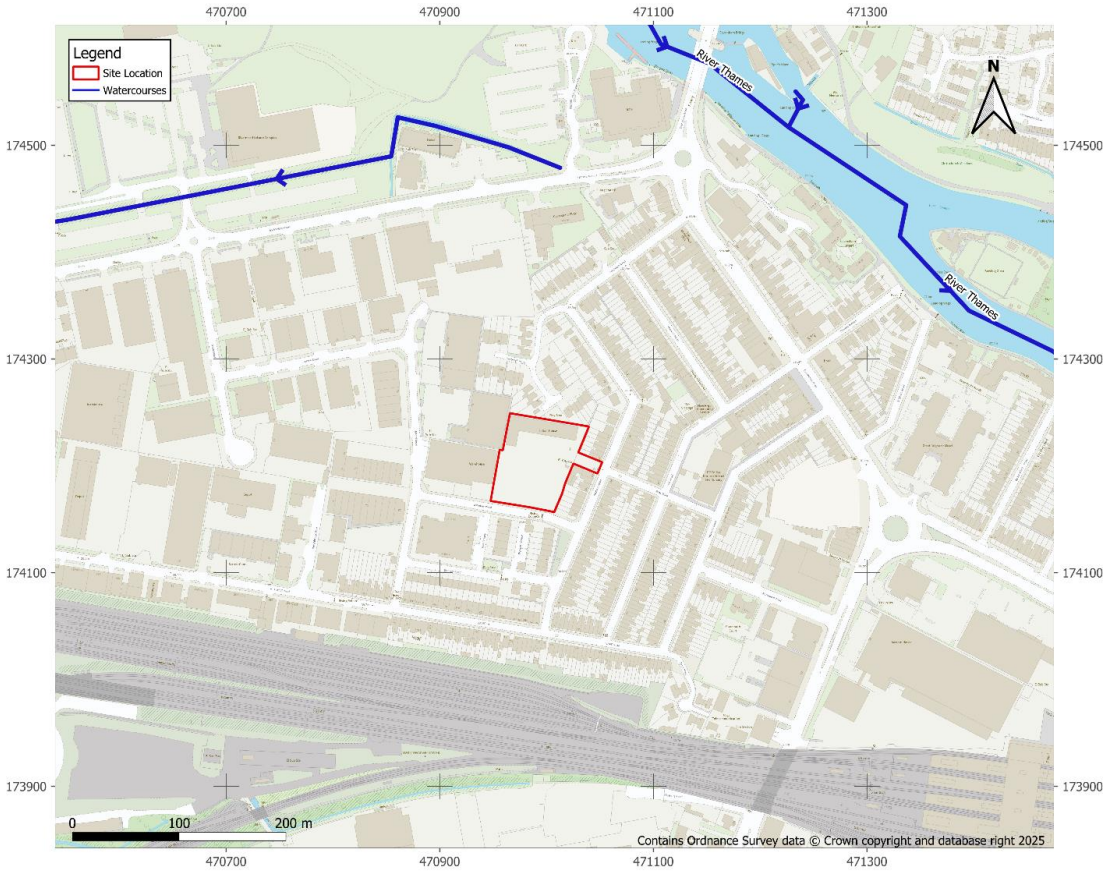

Figure 1 - Site Location

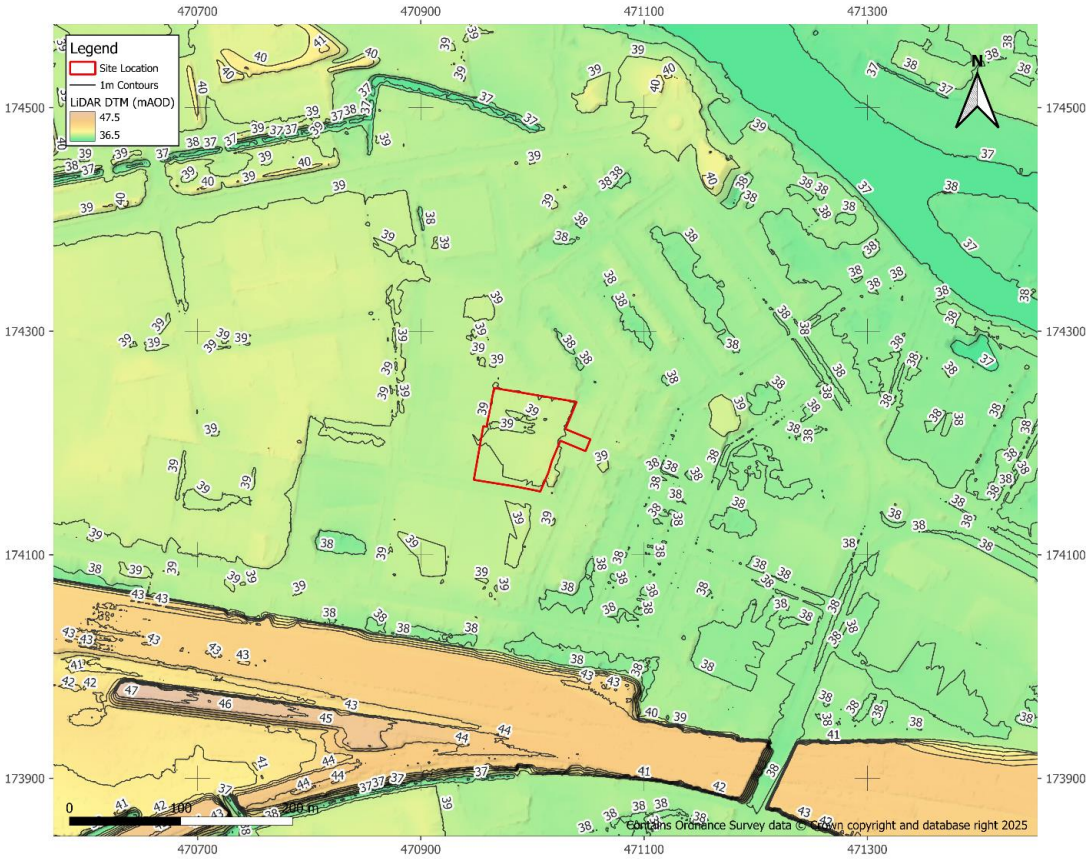

Figure 2 – Topography

3 Flood Risk

3.1 Historical Flooding

The EA does not hold any records of flooding at this site. The closest record of flooding occurred 50 m west of the site in spring 1947 as a result of the River Thames exceeding channel capacity.

3.2 Fluvial Flood Risk

In the existing Flood Map for Planning (FMfP), approximately 5% of the site is inundated by Flood Zone 2. No part of the site is located within Flood Zone 3a or 3b. All fluvial flooding at this site is associated with the River Thames, see Figure 3.

The EA climate change fluvial outputs for Flood Zone 2 and 3 have also been assessed. During these events, the entire site is located within Flood Zone 2 and 4% is located within Flood Zone 3a, see Figure 4.

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. The site is not located within an area associated with a reduction in risk of flooding from rivers and sea due to defences nor is it located within a flood storage area.

3.4 Surface Water Flood Risk

The EA's surface water flood map shows approximately 3% of the site is inundated during the 3.3% AEP event, 3% is inundated during the 1.0% AEP event and 5% is inundated during the 0.1% AEP event, see Figure 5. The area inundated is located within the localised topographic depression identified in section 2.2. When accounting for climate change the risk increases marginally to 3%, 4%, and 8% respectively, see Figure 6.

Overall, the risk of surface water flooding is considered to be moderate.

3.5 Groundwater Flooding

The site is underlain by a bedrock of chalk in the form of the Seaford Chalk formation. It is expected to permit high amounts of infiltration. Superficial deposits of silt are also present at this site, these are also expected to be freely draining. The underlying soils are acid loamy soils which are also expected to be freely draining.

Based on the data available the water table at the site could be mobile, translating to a moderate risk of groundwater flooding. More data is required at the planning stage to confirm this. However, given the site's location within a river, groundwater flooding is likely to be heavily correlated with fluvial flooding.

3.6 Reservoir Flood Risk

The FMfP shows that the entire site is at risk from reservoir flooding during the wet day scenario, however the site is not at risk during the dry day scenario, see Figure 7. Whilst the site is shown to be at risk, it should be noted that reservoir failure is a rare event with a very low probability of occurrence. Current reservoir regulations aims to make sure that all reservoirs are properly maintained and monitored to detect and repair any problem.

3.7 Flood Warning Service

The site is located partially within the River Thames at Reading and Caversham EA Flood Warning Area.

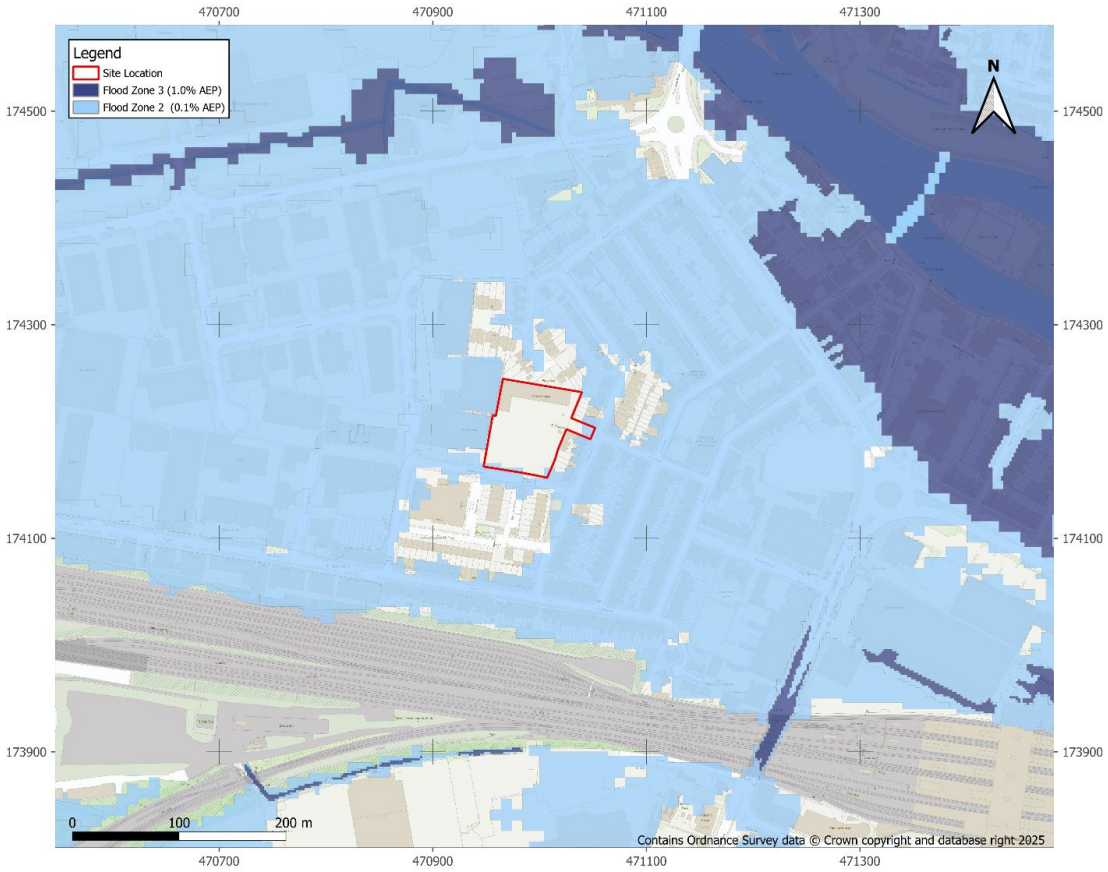

Figure 3 - Fluvial Flood Map

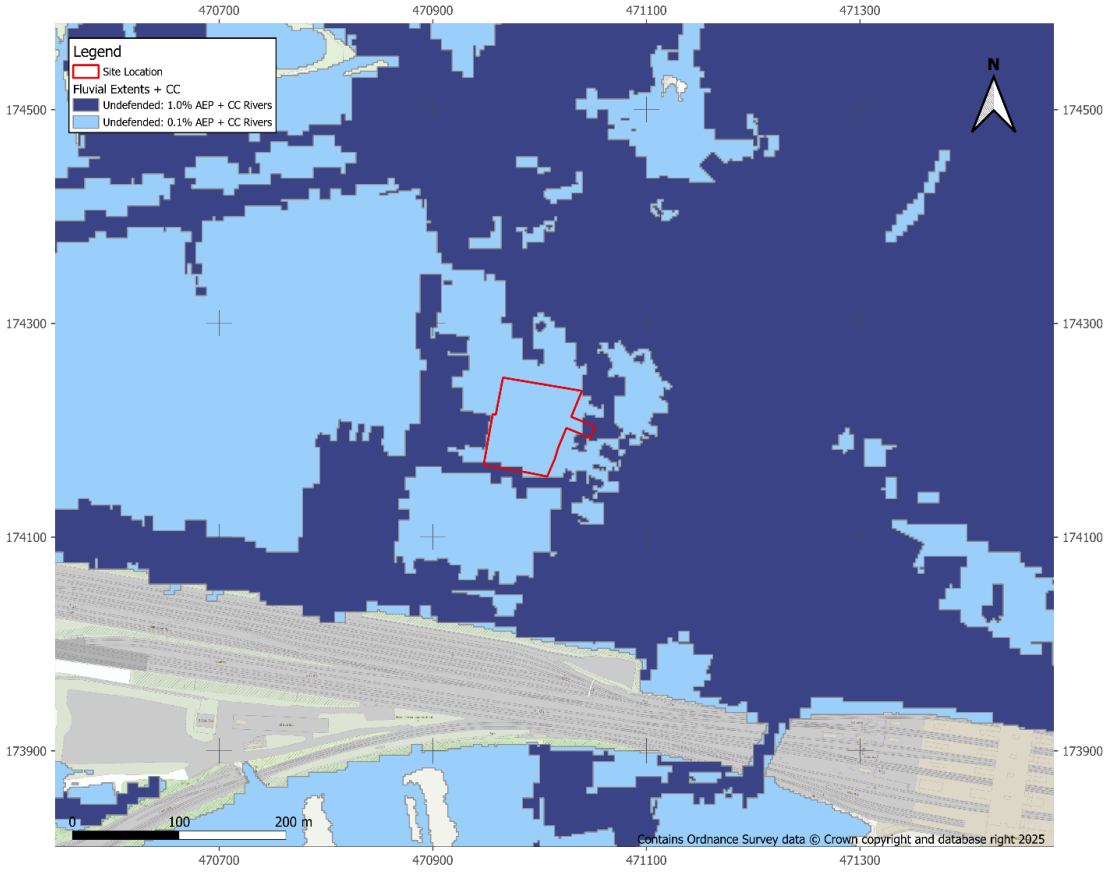

Figure 4 – Fluvial Climate Change Flood Map

Figure 5 – Surface Water Flood Map

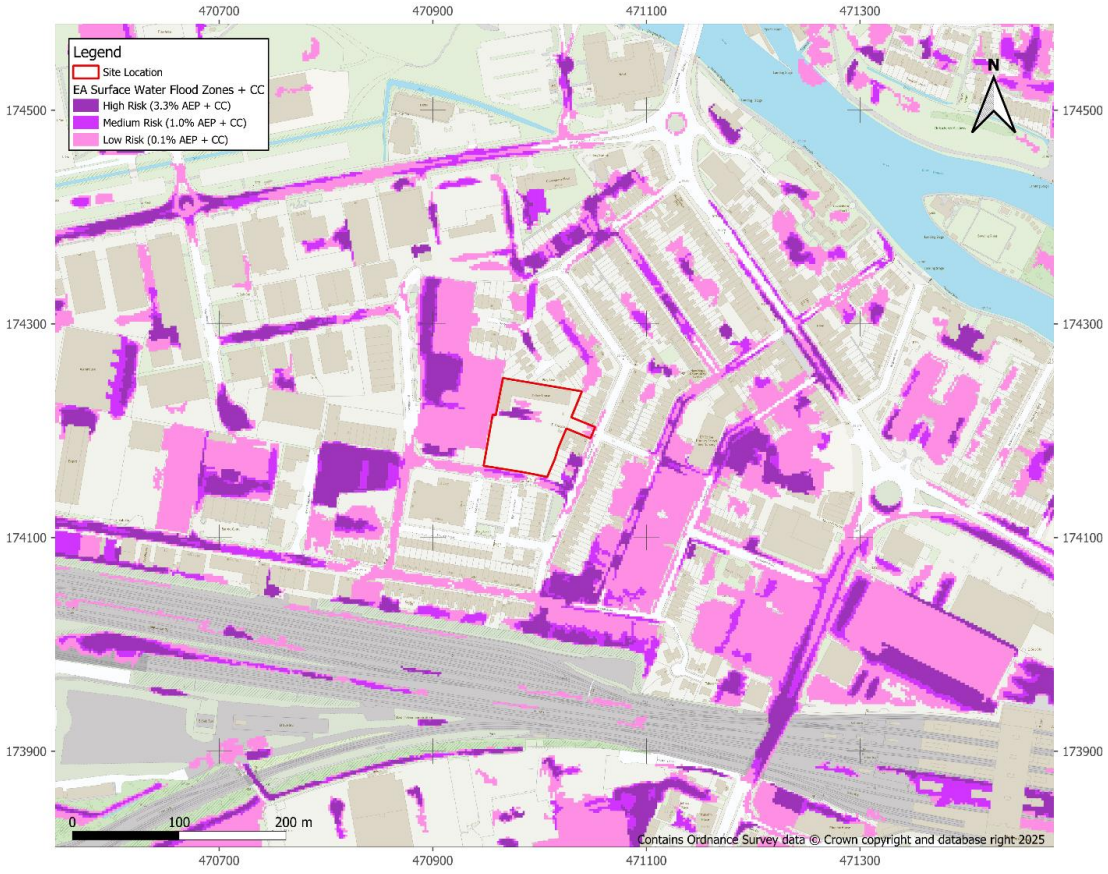

Figure 6 -Surface Water Climate Change Flood Map

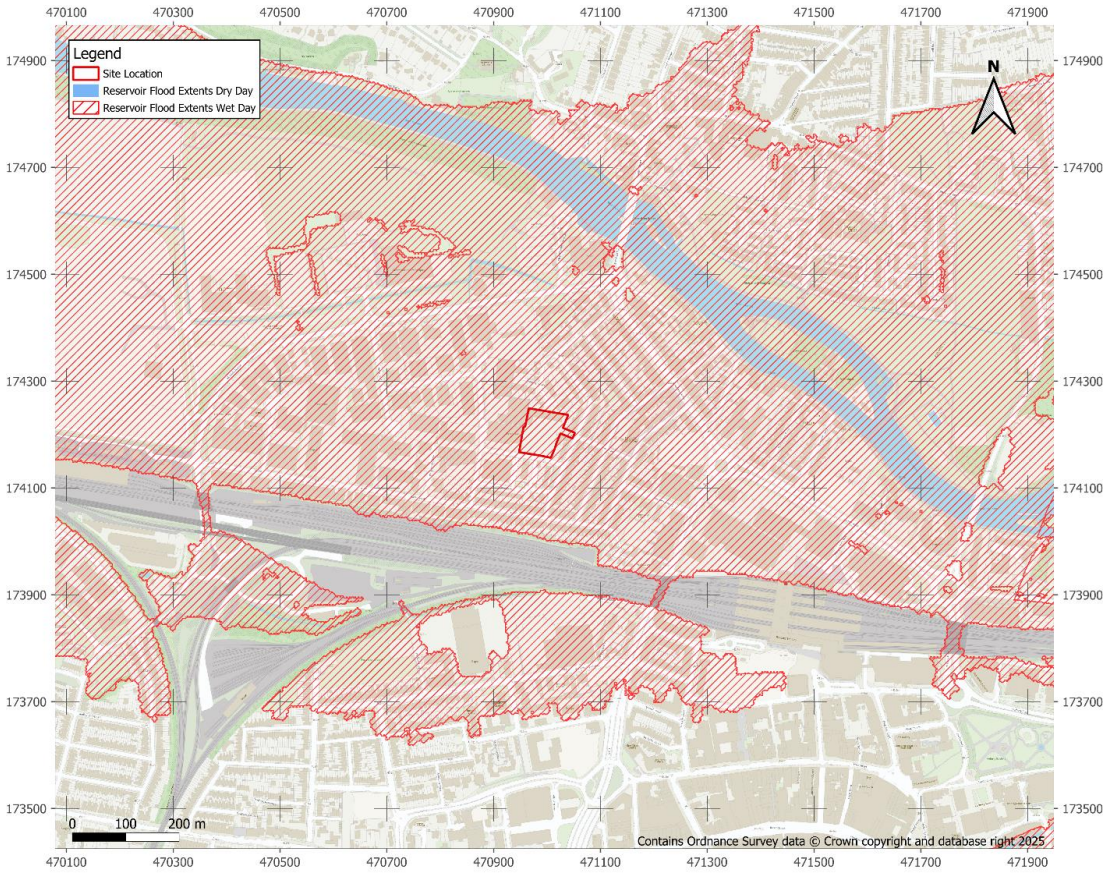

Figure 7 - Reservoir Failure Flood Map

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 River Thames model (Pangbourne to Sonning) (2021) which informs the latest FMfP was assessed to attain further detail on fluvial flooding.

For the 100-yr plus central climate change (31%) design event, the maximum flood level at the site is 38.7 m AOD, lower than the average ground level on site. The hazard map for this event (see Figure 8) shows that the flood risk along Meadow Road has a *low* hazard rating. This is likely due to the low average flood depth (0.05 m) and average velocity (0.05 m/s). Table 1 shows the flood risk metrics associated with the design event. Speed of onset values are also

Table 1- Flood Risk Metrics

	Design Event 1.0% AEP (+31%)
Percentage Inundated (%)	2%
Average Flood Depth (m)	0.05 m (Max- 0.07 m)
Average Velocity (m/s)	0.05 m/s (Max – 0.06 m/s)
Speed of Onset (hrs)	228 hrs

4.3 Access and egress

Current vehicle and pedestrian access to the site is via Ross Road though another smaller entrance located along Meadow Road. During an extreme flood event, the majority of the site is flood free whereas the surrounding roads are not.

The best route of egress during a flood event, following the lowest hazard route, would be north along Addison Road towards Randolph Road, see Figure 9. From here site users should continue north onto Caversham Road and cross the River Thames towards flood free areas on the northern bank.

The majority of this route is inundated by Flood Zone 2 (0.1% AEP) and during the design event. However, it is important to note that the hazard rating tends to be *low* indicating limited flood depths and velocities. Despite this, providing adequate flood warning to site users will be essential. In general, the River Thames in this location is slow responding and the site is located a significant distance from where flood water first leaves its banks. The site is also in a flood warning area. Providing adequate flood warning to allow for safe access and egress during a fluvial flood event is therefore possible.

It is also important to note that parts of the route are at surface water flood risk, this risk is covered in more detail in the other site-specific considerations section. 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.

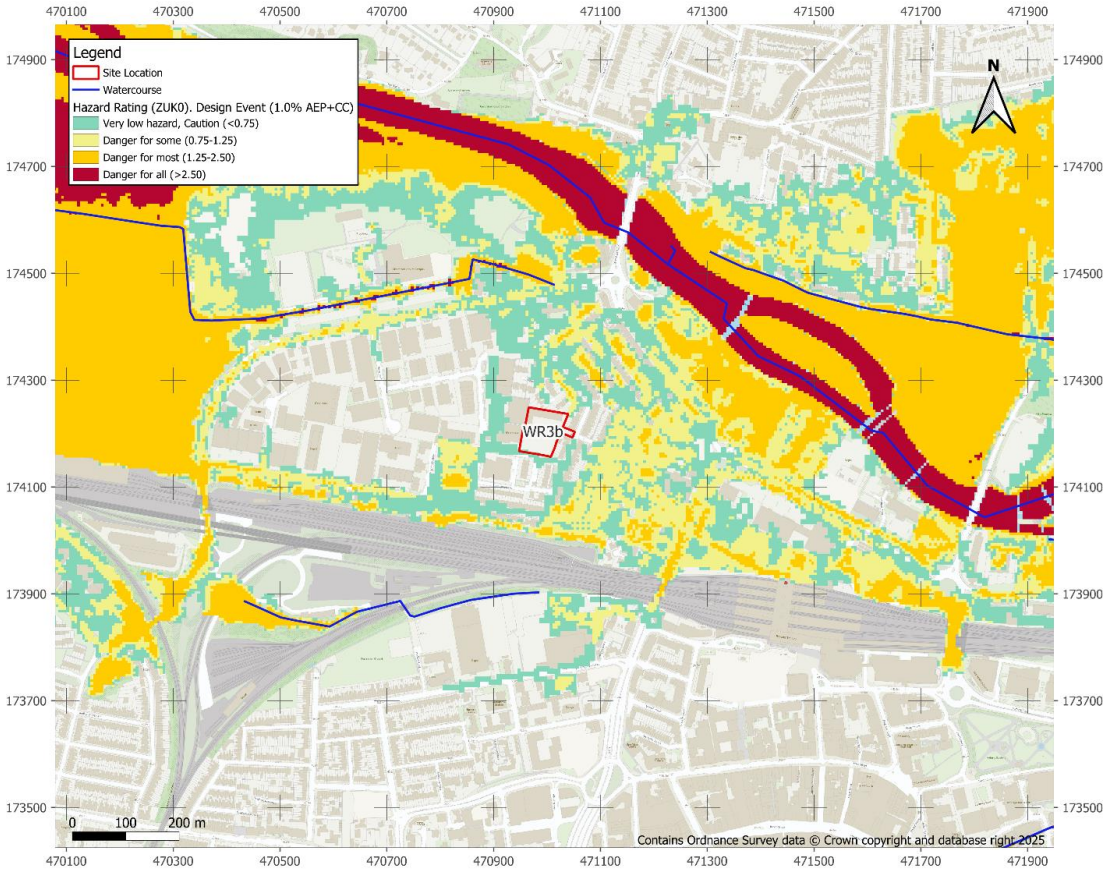

Figure 8 – Flood Hazard Map for the Design Event

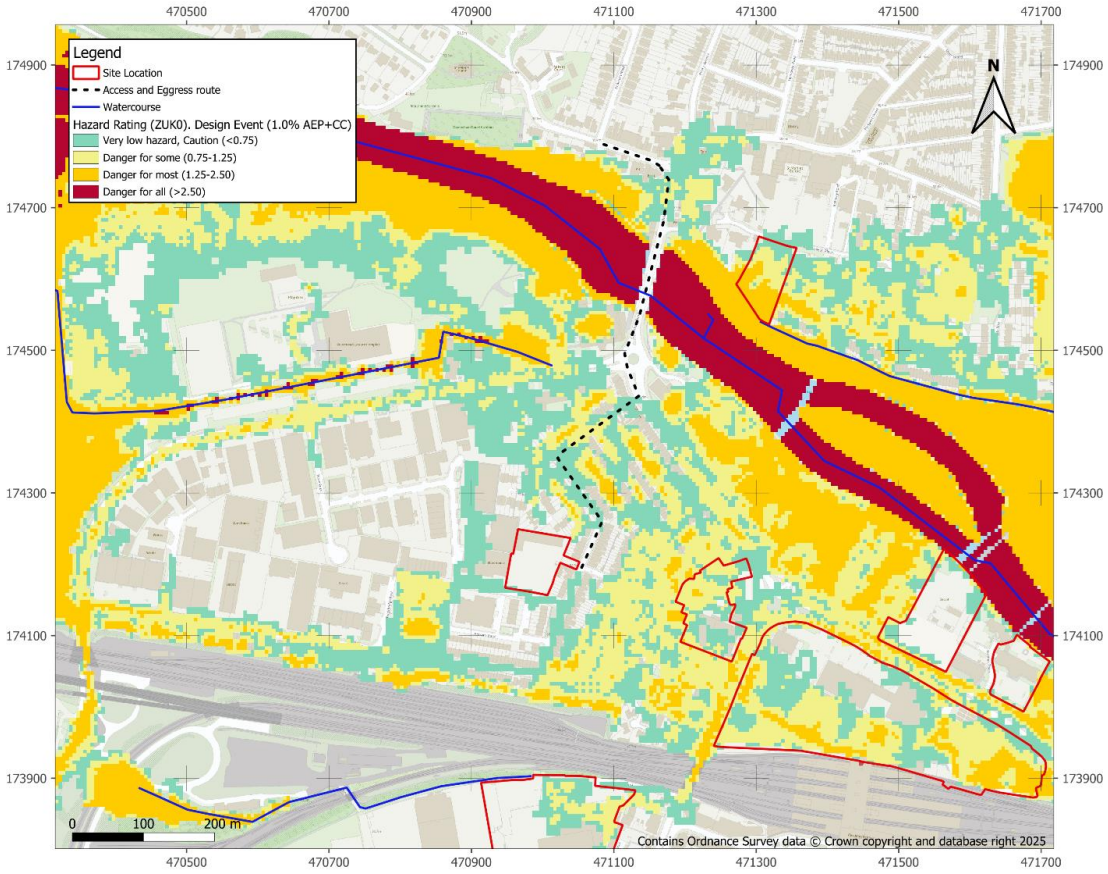

Figure 9 – Access/Egress Routes

5 Development Viability and FRA recommendations

5.1 Development Categorisation

The development proposed is categorised as *More Vulnerable Development,* which is permissible in Flood Zone 2, but needs to pass the Exception Test to justify development in Flood Zone 3a. More vulnerable development is not permissible in Flood Zone 3b.

As none of the site is located in Flood Zone 3a or 3b with the majority of its area falling in Flood Zone 1 a residential development should be possible. Access routes to and from the site are located within Flood Zone 2 and the design flood extent however development is already established in the area and given the slow response time of the Thames it should not be a barrier to development.

5.2 Scale of Development

The total site area is currently 0.60 ha; allocated for the development of 41-61 residential dwellings. Given the scale of the development, it is likely to cover the majority of the site area, however to reduce the impact on floodplain storage, building footprints and infrastructure should be sited outside of the small area lying within the modelled design flood extent.

5.3 Sequential Approach

Whilst it should be possible to locate the majority of infrastructure in Flood Zone 1 it is important that a sequential approach is implemented at the site, prioritising more vulnerable residential development in lower flood risk areas with ancillary infrastructure such as car parks and green spaces located in higher flood risk areas if required. This is under the assumption that it does not increase flood risk elsewhere and is designed to be appropriately resistant and resilient to flooding. For this site it is recommended that the climate change extents are used, which more clearly show the graduation in flood risk across the site.

5.4 Other Site-Specific Considerations

A small area of surface water flood risk is present within the site, located in and around the small topographic depression. Therefore, development should be sited outside of this at-risk area where possible. Furthermore, parts of the egress route are at risk from surface water flooding. Therefore, 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. Given both the fluvial and surface water flood risk to the site access route, provision of a Flood Evacuation Plan (FEP) should be considered.

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 geology at the site is freely draining. However, the proximity to the River Thames and the permeability of the bedrock may mean the water table is high or mobile. 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.