Kassam Stadium and Ozone Leisure Park

Ref	SPS2
Primary Flood Zone	Flood Zone 1
Vulnerability Classification	Mixed (More vulnerable and Less Vulnerable)

Site Details

Site Location:	**X:**	454728	**Address:** Grenoble Rd, OX4 4XP
	Y:	202315	
Site Area:	8.48 ha		**Additional Information:** The site is already developed with the Kassam stadium, the Ozone Leisure Park and associated parking facilities taking up a large proportion of its area.
Proposed Function:	Mixed Use		
Ground Level Range (m AOD):	58.905m – 63.018m		

Fluvial Flood Risk

	1 in 100 Yr (+26%)	1 in 100 Yr (+84% CC)
Percentage Inundated (%)	1%	5%
Average Flood Depth (m)	0.15m (Max-0.59m)	0.28m (Max-0.81m)
Average Velocity (m/s)	0.09m/s (Max-0.75m/s)	0.12m/s (Max-0.65m/s)
Speed of Onset (hrs)	2 hrs	1.2 hrs

Summary: The site is at low risk of fluvial flooding, with a significant proportion of the site lying within Flood Zone 1 and only a small area in the north of the site within Flood Zone 2, Flood Zone 3a and Flood Zone 3b (see fluvial flood map overpage). When accounting for climate change, for the design 100-year (+26% climate change) event, 1% of the site is modelled to be inundated. The hazard map for this event (see defended Hazard Map) shows the hazard rating to be generally low indicating limited flood depths and velocities. Whilst hazard is greater for the extreme climate change scenario, the area inundated is limited and should not affect allocation given the development types being considered. None of the site lies within the historical flood map.

Defence Infrastructure

Description:	The site is not protected by any flood defence infrastructure.
Owner:	N/A
Standard of Protection:	N/A
Condition:	N/A

Potential Access & Egress Route: The proposed access and egress route to/from the site is in a southerly direction along Grenoble Road towards the A4074 (see access/egress map overpage).

Flood Risk: The route is predominantly flood-free although there is a small section of the route in flood zone 2 approximately 100m south west of the site associated with a small tributary of the Littlemore Brook. Flood hazard along this section is generally low. Speed of onset values at the site are fast due to its location adjacent to the Northfield Brook. However, most of the site is in Flood Zone 1 so should provide safe refuge during an extreme flood event.

Pluvial & Other Sources of Flood Risk

The risk of pluvial flooding has been assessed using the EA surface water flood maps (see pluvial flood map overpage). Parts of the site are shown to be at medium to high risk of pluvial flooding. In most of these areas the principal flood mechanism is thought to be fluvial. The flood maps use a DTM to simulate runoff, meaning that water gravitates to low points, such as streams. The flooding appears to originate from the Littlemore Brook and shows similar extents to the fluvial flood map. Where flooding is considered to be pluvial in origin, it is limited to isolated depressions on the site (i.e., the perimeter of the pitch at the Kassam Stadium).

The underlying geology at the site comprises freely draining slightly acid loamy soils underlain by sedimentary bedrock in the form of Sandstone. In this regard, the water table is likely to be mobile and groundwater flood risk is considered to be moderate.

The EA's Flood Risk from Reservoirs Map shows no risk of reservoir flooding at the site and based on the LLFA's flood incident data, there have been no recent historical flood incidents recorded close to the site.

FRA Implications, SuDS & Exception Test

Hydraulic modelling of the Littlemore Brook and Northfield Brook has indicated that the site is at low risk of fluvial flooding. A significant proportion of the site lies in Flood Zone 1 with small areas in the north of the site within Flood Zone 2. Where the site directly borders the Littlemore Brook a very small part of the site is also located in Flood Zone 3a and Flood Zone 3b. A mixed development with both housing (more vulnerable) and employment (less vulnerable) infrastructure is proposed. Both types of development are permissible within Flood Zones 2 as specified in the latest NPPF. More vulnerable development must pass an Exception Test if located in Flood Zone 3a and neither infrastructure type is permissible in Flood Zone 3b. When accounting for climate change, 1% of the site is at risk during the design 100-year (+26% Climate change) event.

The site's access route is largely flood free. There is a small area lying within Flood Zone 2 close to the site however it is considered manageable with safe access and egress possible. Given that a large proportion of the site is within Flood Zone 1, safe refuge during an extreme flood event should be possible.

The pluvial flood risk at the site is also considered to be low, the flooding shown by the EA surface water flood maps appears to be mostly fluvial in origin and where this is not the case flooding is limited to isolated depressions. The drainage strategy for the proposed development should be suitably designed to manage additional runoff arising from the development and ensure that pluvial flood risk at the site and to third party land is not increased.

In assessing and demonstrating the viability of any SuDS solution for the site, a site-specific FRA should follow the Non-statutory technical standards for SuDS. The geology at the site consists of freely draining slightly acid loamy soils in this regard the use of infiltration SuDS solutions should be explored. 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.

Overall, a mixed-use development at the site should be achievable, with a large proportion of the site lying in Flood Zone 1. A sequential approach should be implemented at the site, prioritising more vulnerable infrastructure (i.e. Dwellings) in Flood Zone 1, with less vulnerable ancillary infrastructure (i.e. Car parking, open space) located in Flood Zone 2. As Flood Zone 3a and 3b take up so little of the site area, it should be possible to locate all development outside of these zones.

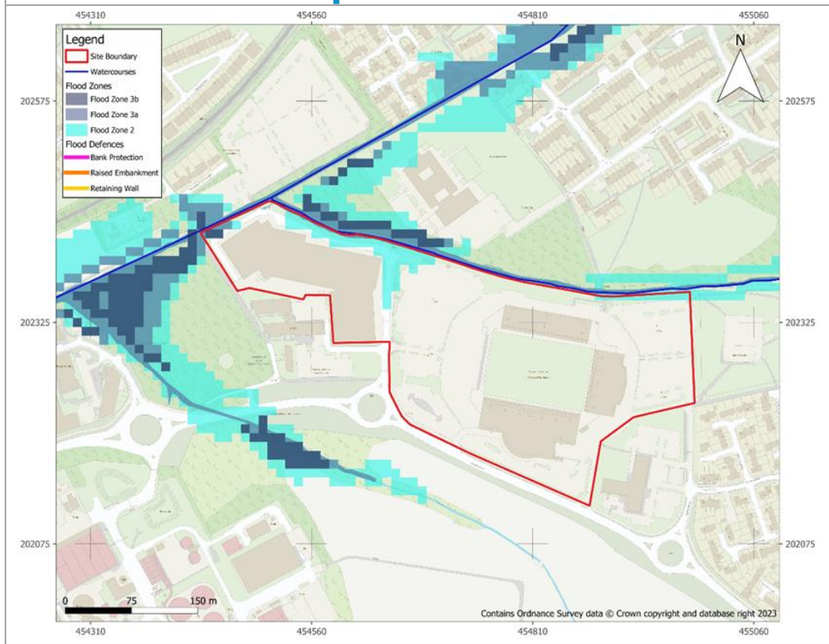
Development may need to be set at a floor level to provide an appropriate freeboard above the flood level for the 100-year (+26% climate change) design event, estimated at 59.90 m AOD and 59.00 m AOD at the upstream and downstream extent of the Littlemore Brook relative to the site. The majority of the site is higher than these levels, so ground raising should be limited and can be reduced by locating development outside of low-lying areas. A site-specific FRA should confirm any requirements with the EA including the need to provide compensatory storage and assess 3rd party impacts if ground raising is implemented.

Fluvial Hazard	**Low Risk**
Pluvial Hazard	**Low Risk**
Developable	**Proposed development type should be appropriate, a sequential approach to development is advised**

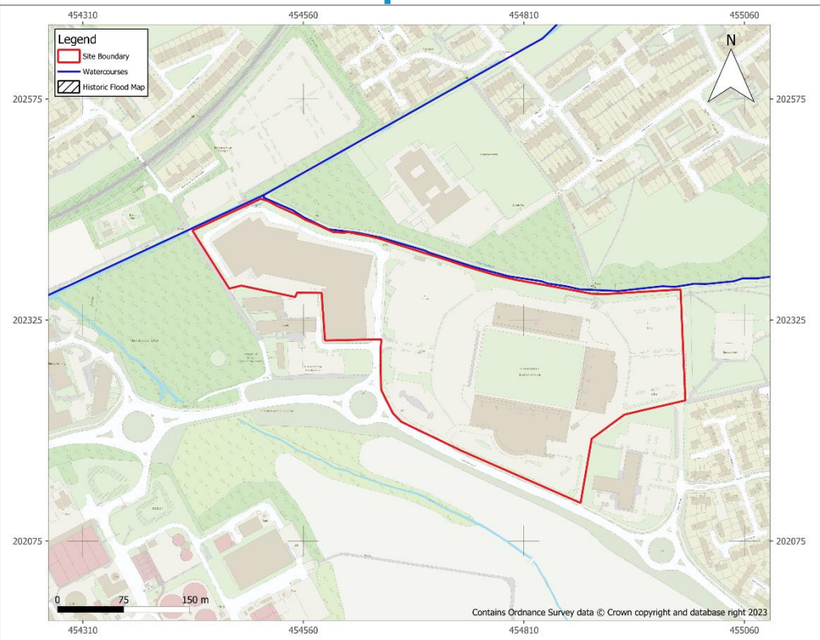
Kassam Stadium and Ozone Leisure Park

Ref	SPS2
Primary Flood Zone	Flood Zone 1
Vulnerability Classification	Mixed (More vulnerable and Less Vulnerable)

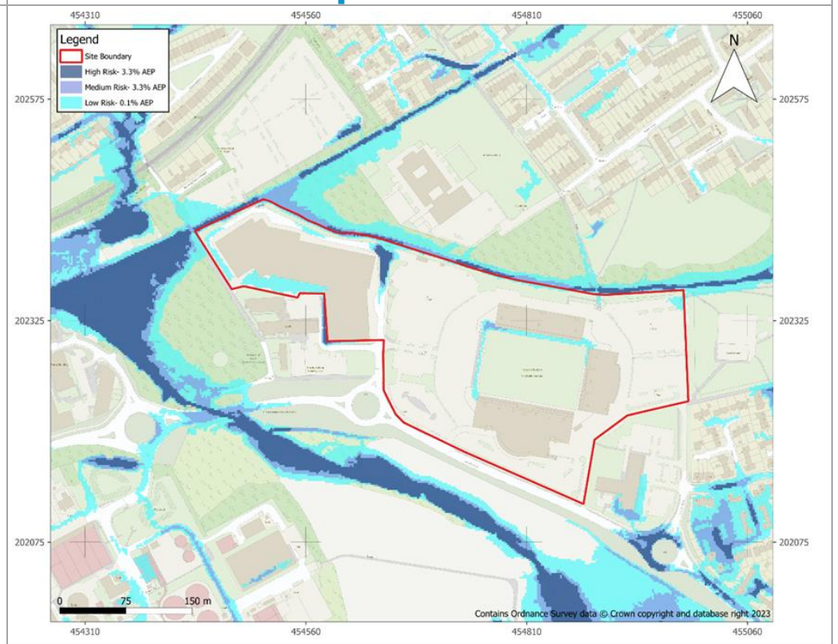
Fluvial Flood Map



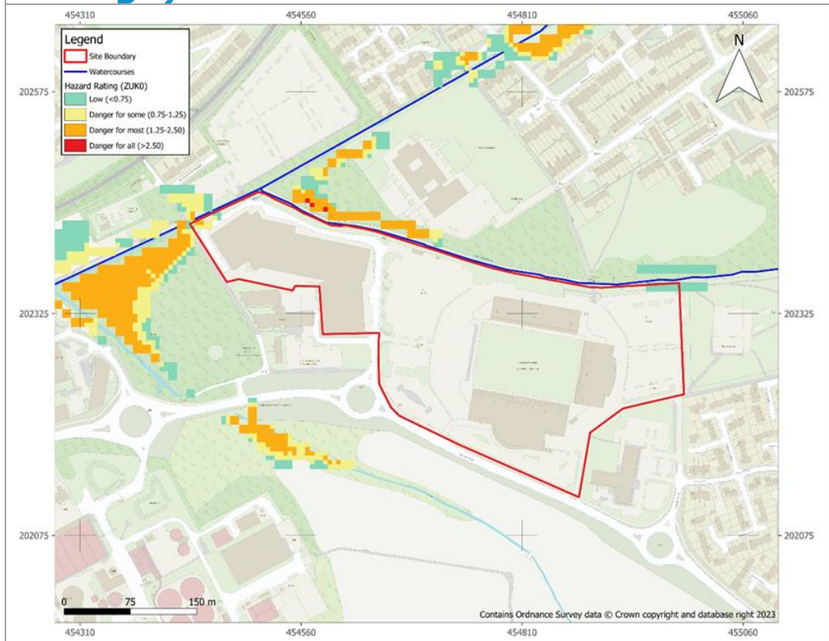
Historical Flood Map



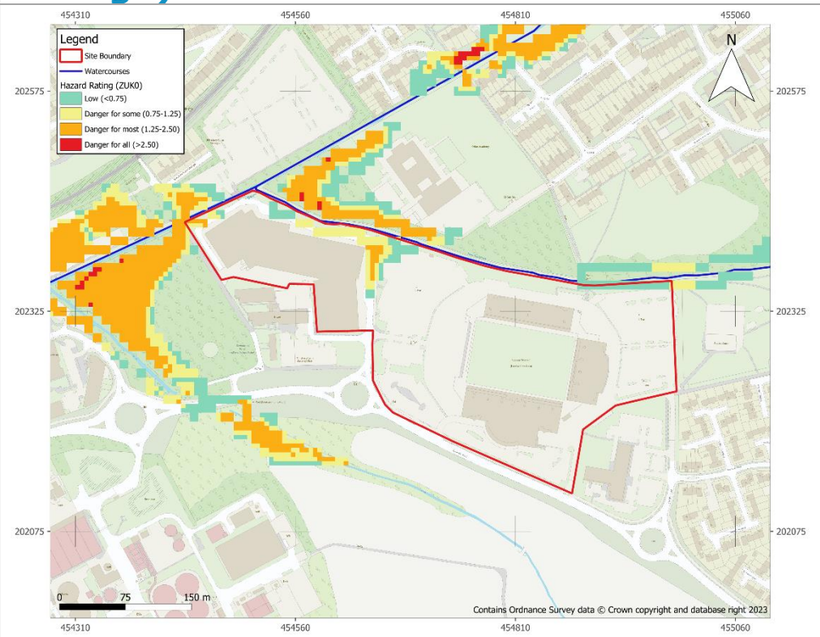
Pluvial Flood Map



Hazard Map (100 Yr + 26% Climate Change)



Hazard Map (100 Yr + 84% Climate Change)



Access/Egress Routes