

# Botley Road Retail Park

Ref	SPCW8
Primary Flood Zone	Flood Zone 2
Vulnerability Classification	Less vulnerable

## Site Details

Site Location:	X:	449347	Address: Botley Retail Park, OX2 0HY
	Y:	206180	
Site Area:	8.85 ha		Additional Information: The site is an existing development- Botley Road Retail Park. Land use is predominantly impermeable with warehouses interspersed with car parking facilities.
Proposed Function:	Employment		
Ground Level Range (m AOD):	55.134m-58.965m		

## Fluvial Flood Risk

	1 in 100 Yr (+26%)	1 in 100 Yr (+84% CC)
Percentage Inundated (%)	69%	87%
Average Flood Depth (m)	0.28m (Max-2.63m)	0.39m (Max-2.79m)
Average Velocity (m/s)	0.14m/s (Max-1.32m/s)	0.24m/s (Max-1.71m/s)
Speed of Onset (hrs)	42 hrs	18 hrs

**Summary:** The site is at high risk of fluvial flooding. The majority of the site is in Flood Zone 2 and large portions of the site also fall within 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, 69% of the site is modelled to be inundated. The hazard map for this event (see hazard maps) shows the hazard rating to be mostly low in the west of the site, however moving eastwards towards the Bulstake Stream the hazard rating increases showing *Danger for most* in many areas. This indicates significant flood depths and velocities onsite. The extent and hazard are even greater for the extreme climate change scenario, however given the proposed development type this scenario should not be relevant. The majority of the site lies within the historical flood map, this was from flood events in Spring 1947 and Summer 2007 respectively.

## Defence Infrastructure

Description:	Retaining Wall along left bank of Bulstake Stream along with some minor bank protection. Proposed development is on right hand bank, therefore defence infrastructure not expected to have significant impact on flooding at the site.
Owner:	Private
Standard of Protection:	5-years
Condition:	2 (Good)

**Potential Access & Egress Route:** Access/Egress from the site is to the west of the site via Botley Rd. Subsequent travel would likely be along the A420 or B4044 (see access/egress map overpage).

**Flood Risk:** The start of the route is at significant flood risk lying predominantly in Flood Zone 3. Flood hazard along this section is mixed but, in some locations, indicates *Danger for most*. Approximately 300m west of the site the Botley Rd becomes flood free and onward travel is at minimal flood risk.

For these reasons early warning will be essential at the site to ensuring that the access route can be utilised before floodwater inundates the site and wider Botley area. It should be noted, that the River Thames catchment which the site falls within is dominated by chalk, it has relatively slow river response times to storm events, being groundwater, rather than surface water dominated. This increases the time taken for inundation and for adequate warnings and preparation in 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). There are isolated areas showing medium to high risk at low points in the site and most significantly at one of the site entrances. However, the majority of the site is not at risk of pluvial flooding.

Away from the site, the flooding observed in the west of the site is thought to be fluvial in origin. 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 Wytham Stream.

The underlying geology at the site comprises loamy and clayey floodplain soils with naturally high groundwater underlain by sedimentary bedrock in the form of Mudstone. In this regard, groundwater flood risk is considered to be moderate.

The EA's Flood Risk from Reservoirs Map shows the entire site to be at risk in the wet-day scenario and partially at risk in the dry-day scenario. Reservoir failure is a rare event with a very low probability of occurrence, so this risk is not considered a significant barrier to development at the site. Based on the LLFA's flood incident data, eight incidents have been recorded to the west of the site, four of these were associated with flooding of the Seacourt Stream in 2007. The remaining four incidents were associated with separate sewer flooding incidents between 2000 and 2006.

## FRA Implications, SuDS & Exception Test

Hydraulic modelling of the River Thames and its associated tributaries has indicated that the site is at high risk of fluvial flooding. Most of the site lies within Flood Zone 2, with a significant proportion of the site also within Flood Zones 3a and 3b. Employment (less vulnerable) infrastructure is proposed at the site. This is permissible within Flood Zones 2 and 3a. It is not permissible in Flood Zone 3b under any circumstances. When accounting for climate change, 69% of the site is at risk during the design 100-year (+26% Climate change) event.

The start of the proposed access route to/from the site is at significant flood risk lying predominantly in Flood Zone 3. Approximately 300m west of the site the route becomes flood free and onward travel is at minimal flood risk. For these reasons early warning will be essential at the site will be vital to ensuring that the route can be utilised before floodwater inundates the site and wider Botley area. A site-specific FRA should look into this in more detail and consider provision of a flood evacuation plan.

The pluvial flood risk at the site is considered to be low, no flooding is predicted at the site for all events up to and including the 1000-year event and flood risk to the surrounding road network is limited. 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 loamy and clayey floodplain soils with naturally high groundwater in this regard the use of infiltration SuDS solutions is likely to be limited. 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 new employment development at the site does face significant barriers, although it is important to note that development is already established at the site and across the wider Botley area. It is essential that a sequential approach is implemented with regards to the site layout. Employment development can be located in Flood Zone 3a without the need for an exception test, however where possible development should be located in Flood Zone 1 and Flood Zone 2, with ancillary infrastructure (i.e., car parks) located in Flood Zone 3a. No development (unless water compatible development) is permissible in Flood Zone 3b.

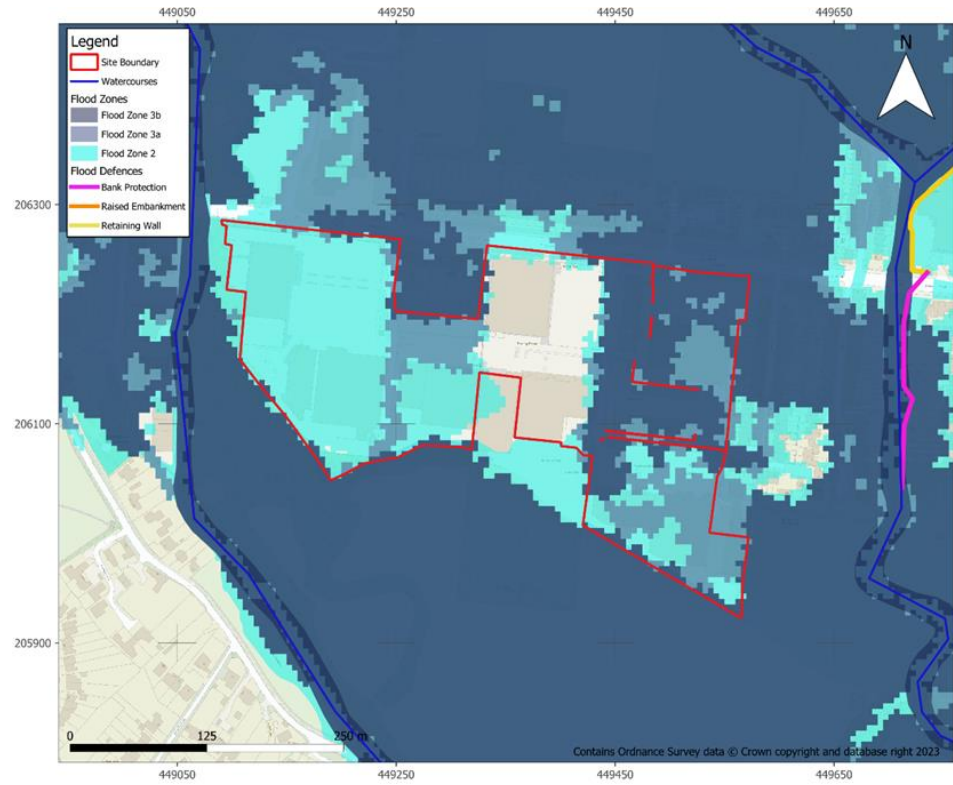
Development may need to be set at a floor level to provide an appropriate freeboard above the flood level for the 100-year (+26% climate change) design event, estimated at 57.68 m AOD. A large amount of the site is sited below this level, so ground raising may be significant. A site-specific FRA should confirm any requirements with the EA including the need to provide compensatory storage and assess 3<sup>rd</sup> party impacts if ground raising is implemented.

Fluvial Hazard	High Risk
Pluvial Hazard	Low Risk
Developable	Proposed development is possible in some of the site, however there are barriers regarding flood risk, access and ground raising

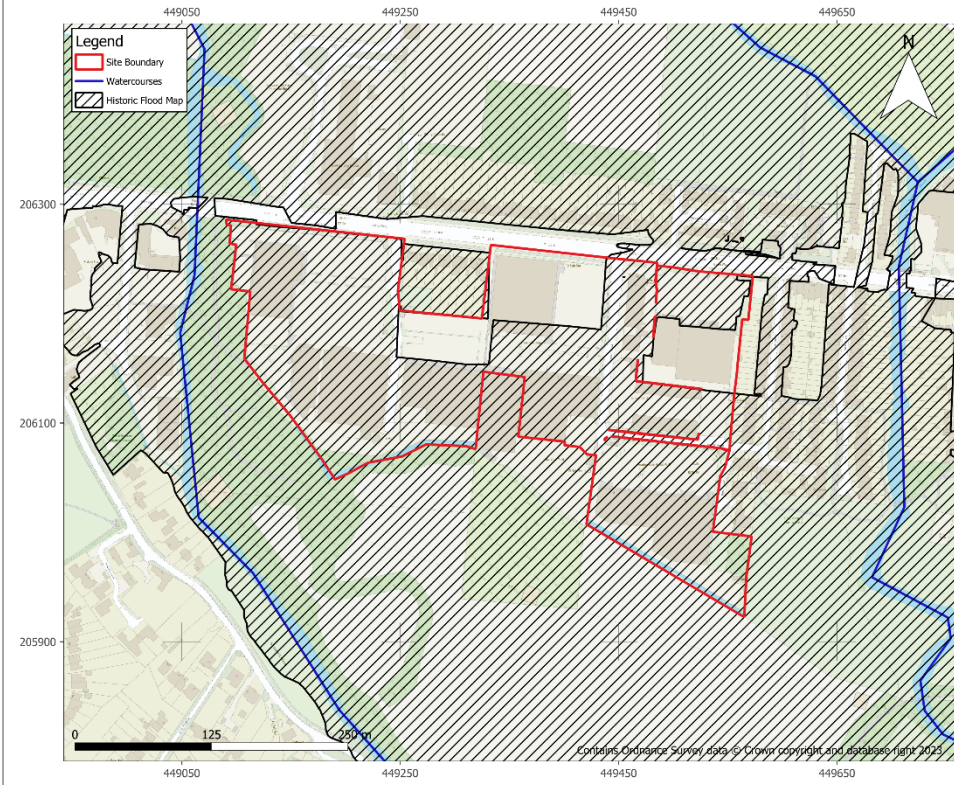
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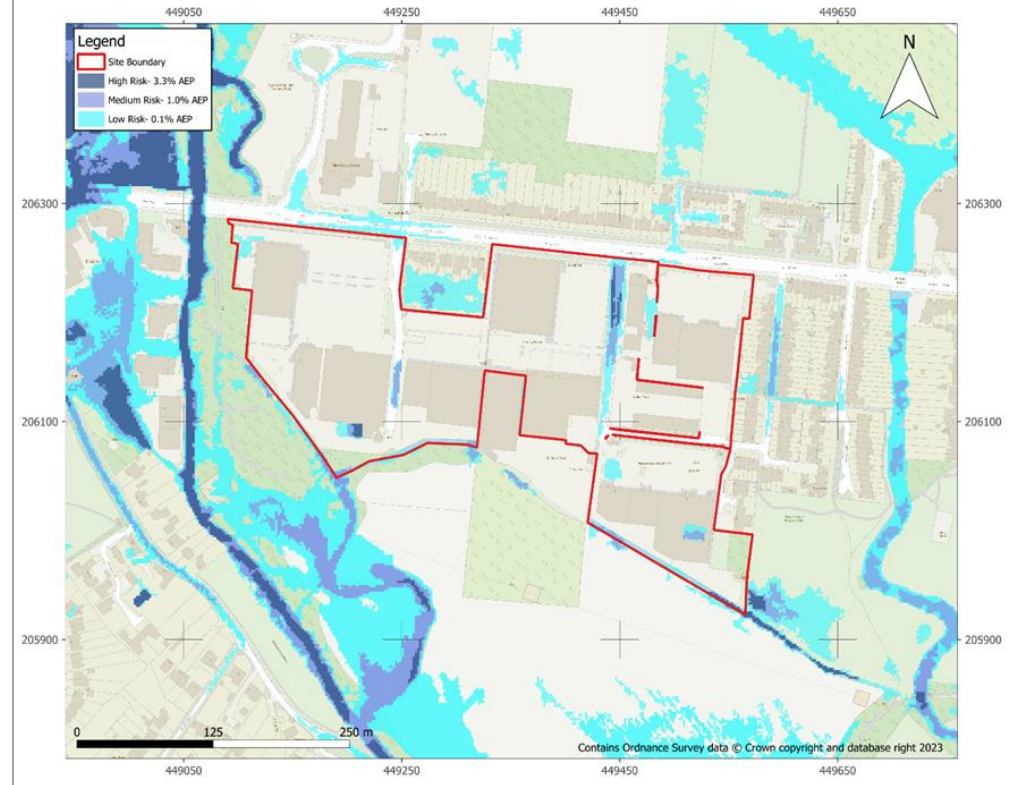
## Fluvial Flood Map



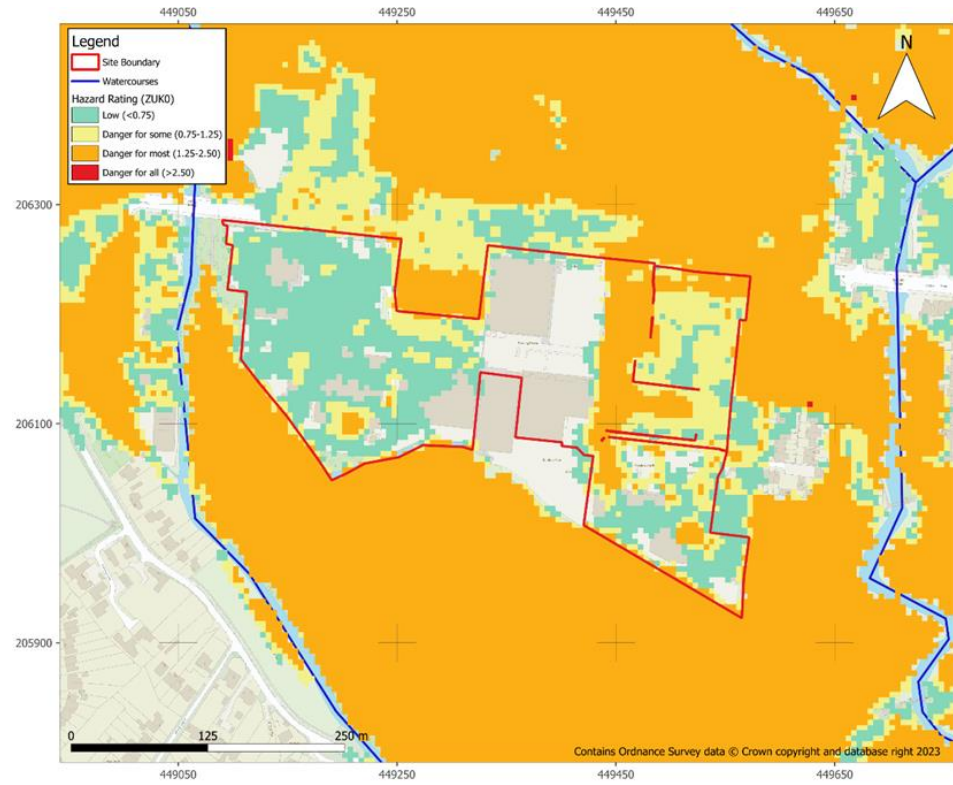
## Historical Flood Map



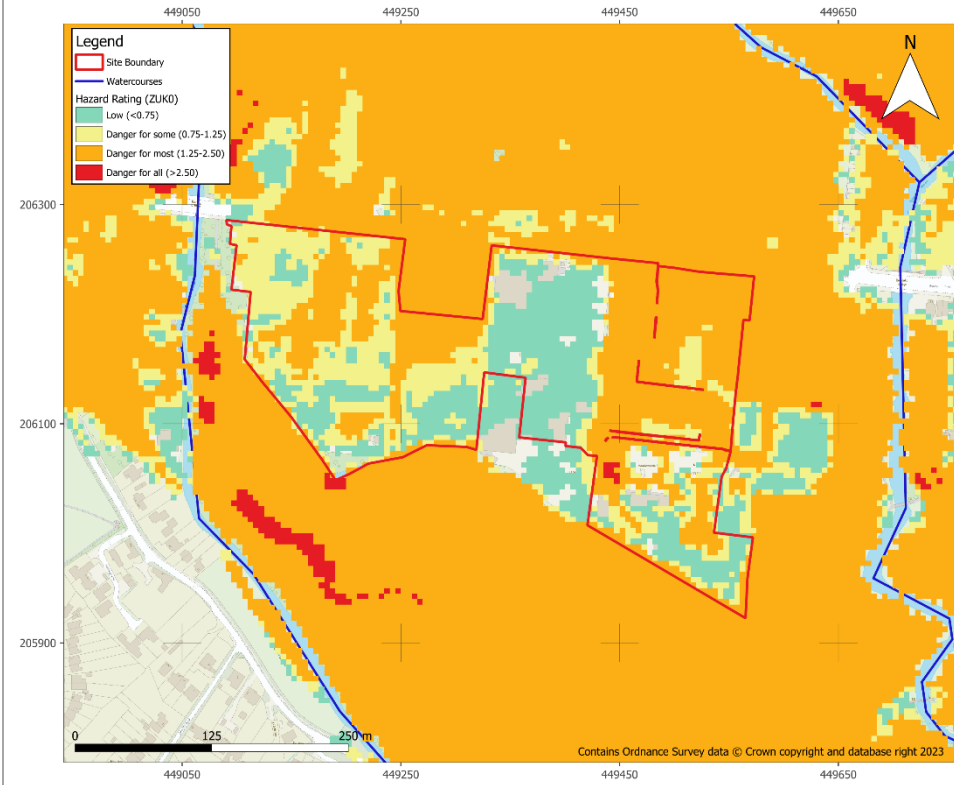
## Pluvial Flood Map



## Hazard Map (100 Yr + 26% Climate Change)



## Hazard Map (100 Yr + 84% Climate Change)



## Access/Egress Routes

