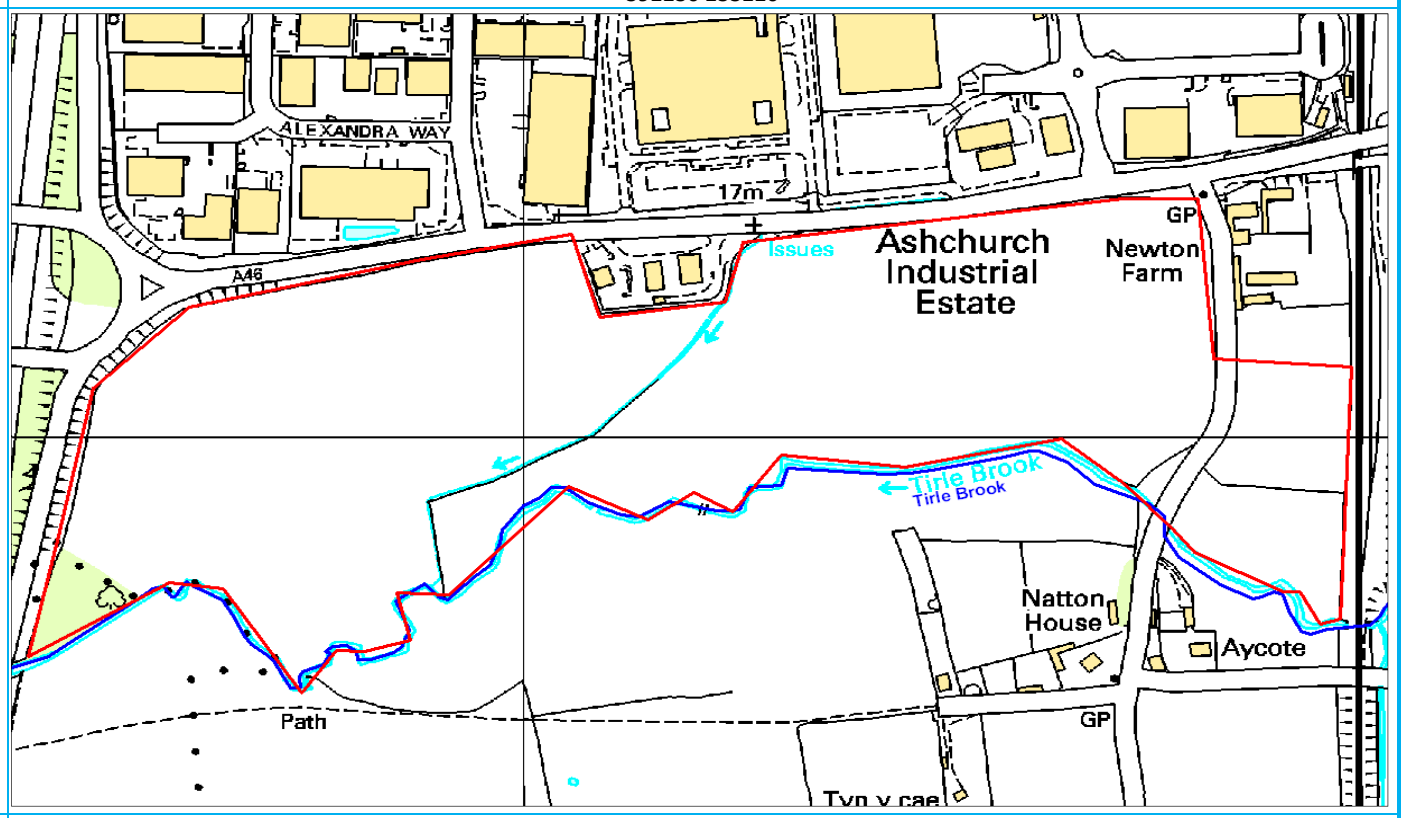
CAPITA SYMONDS

CHELTENHAM BOROUGH COUNCIL

Gloucester City Council

Tewkesbury Borough Council

Site Number	T3
Site Name	Land at south of A46 at Ashchurch
Grid Reference	392230 233220
Location Plan Site Boundary Watercourse	
Size of site (ha)	21ha
Description of Existing Flood Management Infrastructure (and condition)	NFCDD data not received. No defences identified on site visit.
Existing Land use	The existing land use is predominantly greenfield farmland with very few urban areas. The Tirle Brook flows east to west a short distance south of the site before passing under the M5 motorway--(it effectively forms the southern boundary of the site). There is an unamed Drain that bisects the centre of the site and joins the Tirle Brook.
Topography	> Ground levels in Tirle Brook floodplain are approximately 12-13m AOD > Ground Levels in the north are 17-19m AOD

Risk Assessment	
	Proportion of the site located in:- **Flood Zone 1= 14.90ha** **Flood Zone 2= 2.4ha** **Flood Zone 3a= 2.1ha (including an allowance for climate change)** **Flood Zone 3b=1.6ha**
Flood Risk Suitability Score	**(3) Site predominantly located within Flood Zone 1, however there is quite extensive fluvial flooding, culvert blockage residual risk and surface water flood risk.**

Flood Zones (2012)

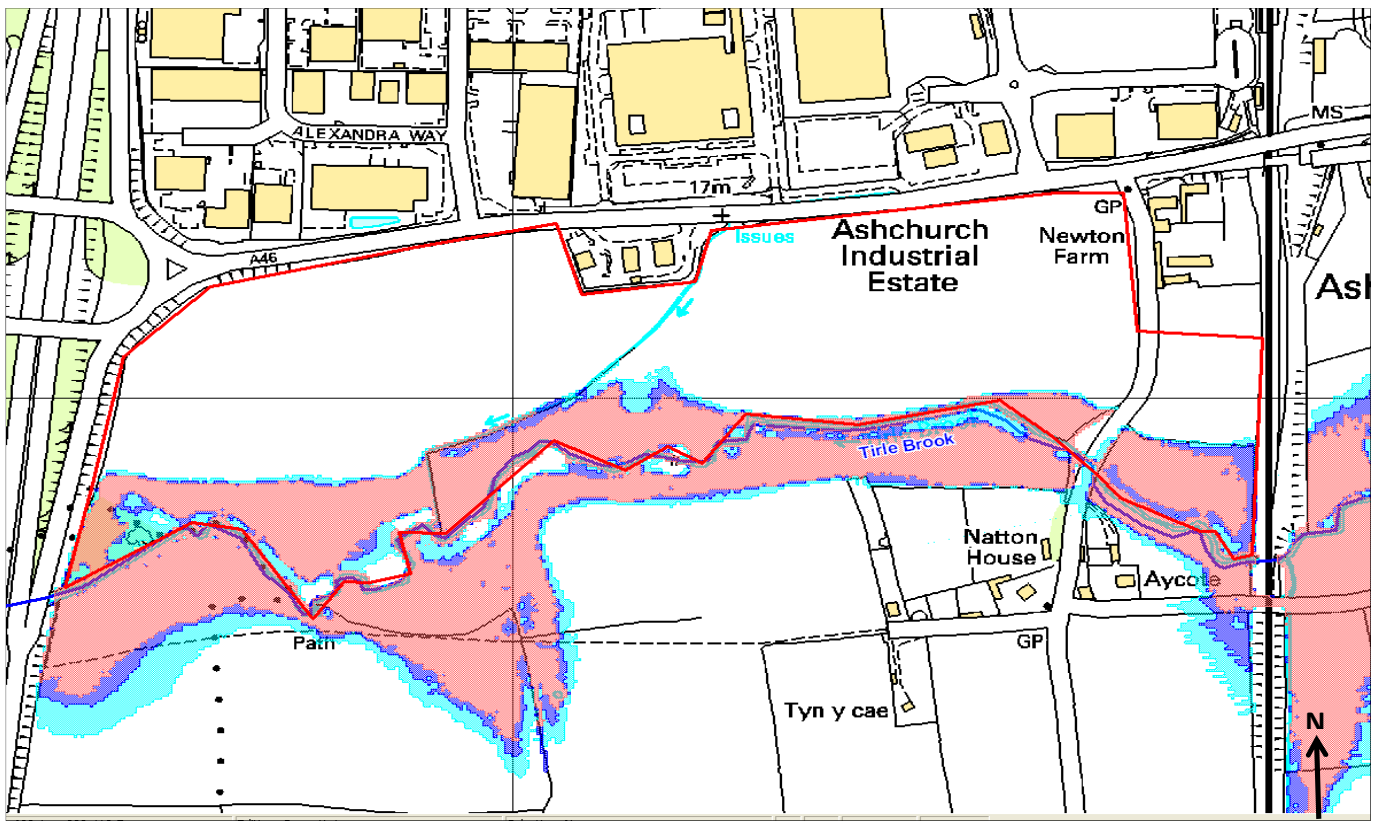
5% AEP event (3b)

1% AEP event (3a)

0.1% AEP Event (2)

Watercourse

Site Boundary

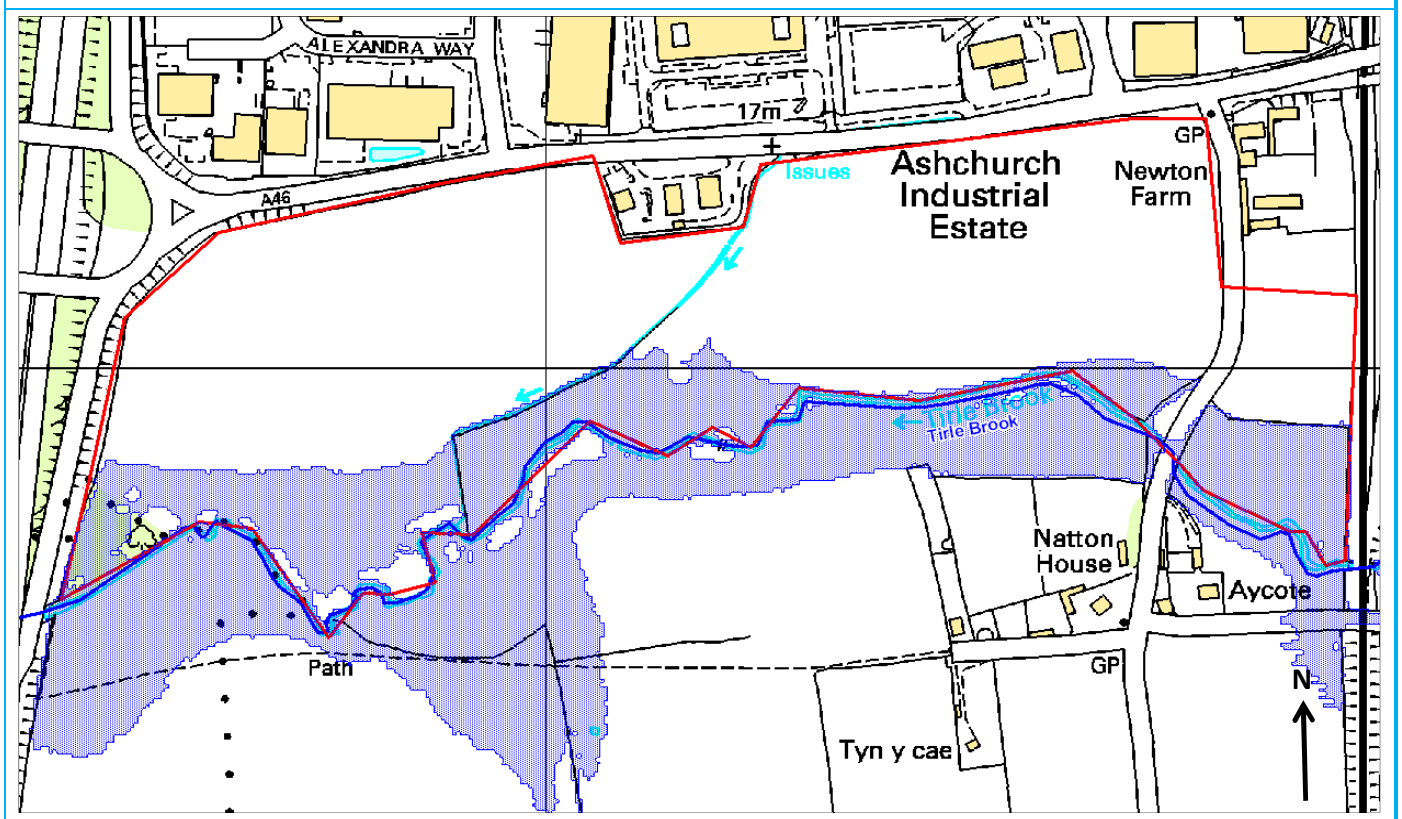


Flood Zones (2112)

1% plus climate change AEP (3a+cc)

Watercourse

Site Boundary



At this site the Actual Risk is the same as the Flood Zone i.e. both are undefended scenarios

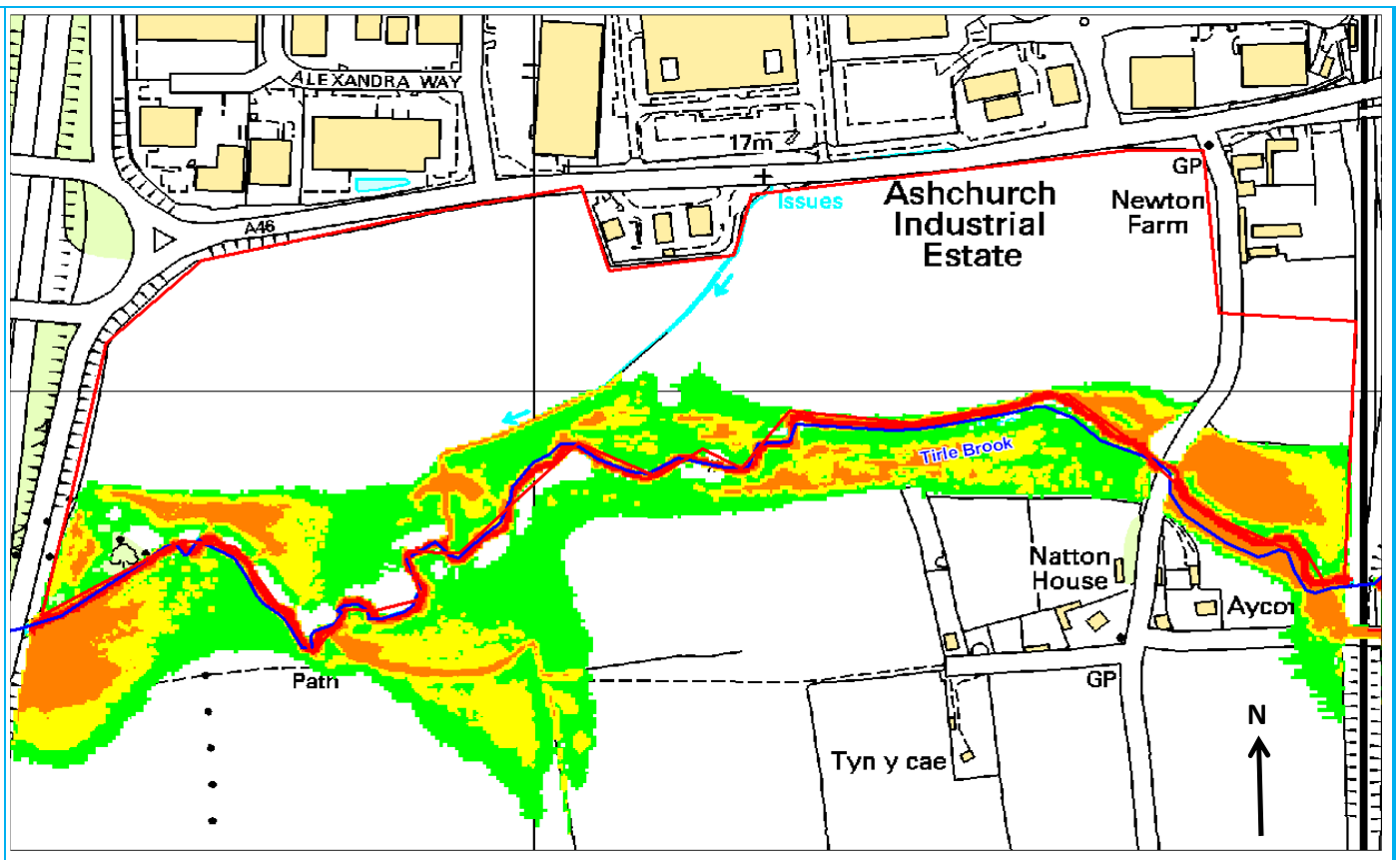
Flood Hazard 1% plus climate change (2112) AEP

Low

Moderate

Significant

Extreme

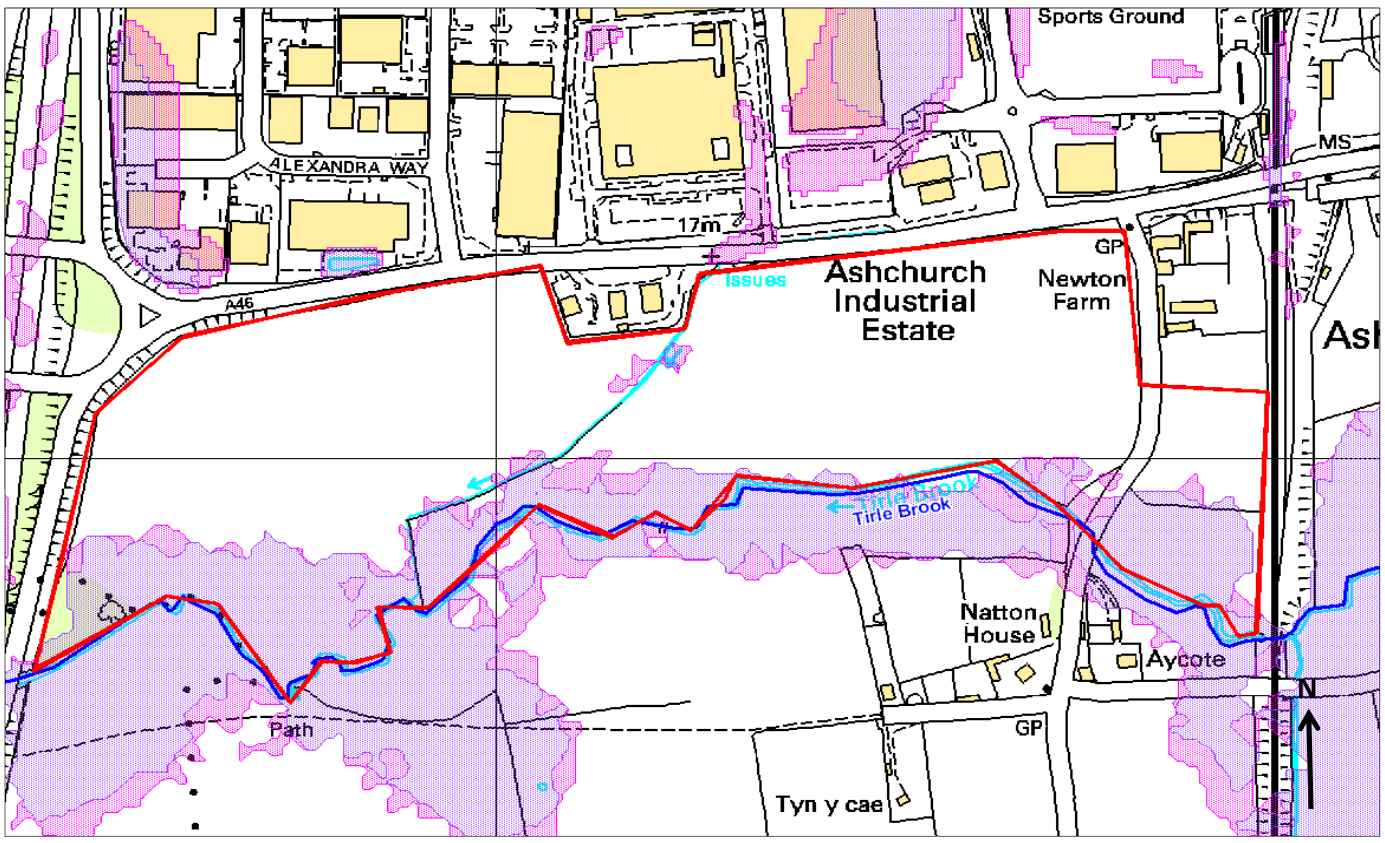


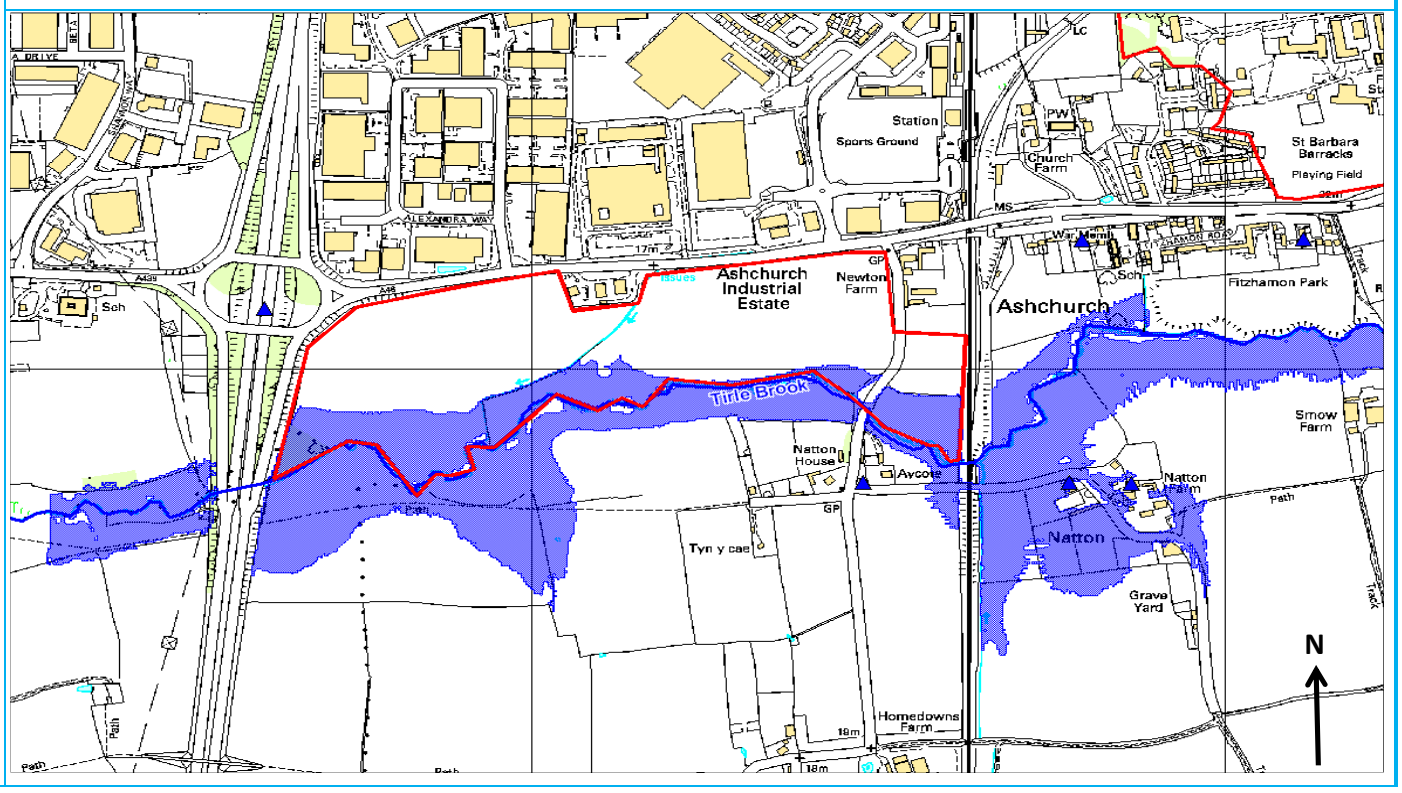
Surface Water (Pluvial)

> Much of the areas shown to be at risk from surface water flooding have predicted depths of greater than 0.3m. There is no history of flooding recorded within the site.

0.5% Surface Water Event

0.5% Surface Water Event greater than



Groundwater	The site is shown to be susceptible to groundwater flooding, this is likely to be attributed to the presence of River Terrace Deposits (sand and gravel) north of the site.
Artificial Sources	The site is not shown to be at risk from reservoir flooding
Residual Risk 1% plus climate change (2112) culvert blockage	Blockage on the Tirle Brook in the M5 Culvert (5mx4m). The scenario decreased the width of the culvert by 50% 

Summary of Risk	**> Detailed modelling of the Tirle Brook shows that part of the site is at risk during the 5% AEP fluvial event (the Functional Flood Plain) and also during the 1% and 0.1% AEP flood events. 10% of the site is located within the 1% plus climate change AEP event, 70% of the site is located in Flood Zone 1**. > The site will be required to pass the Sequential Test. Only water compatible and essential infrastructure is appropriate in the 5% AEP flood extent (8% of the site is within the functional floodplain). More vulnerable land uses within Flood Zone 3 will require the application of the Exception Test. > The site is at risk from surface water flooding, a large proportion of the southern part of the site has predicted depths greater than 0.3m. > The site is susceptible to groundwater flooding, but is not at risk from reservoir flooding. > T2 and T3 are both directly upstream of Tewkesbury town – there is an opportunity to control overall runoff volumes from these sites to benefit downstream properties. T2 and T3 could be developed in parallel and share flood risk management measures. T2 has substantially more development area available and could facilitate a high density of development in T3 if a higher proportion of T2 was used for flood mitigation measures.
Risk Management	
Flood risk management recommendations	>Finished floor levels should be 600mm above the 1% AEP event plus climate change fluvial flood level. Ground floor levels should be above surrounding ground levels to prevent ingress of surface water runoff. > If development that resulted in modification of ground levels was to take place within the 1% AEP flood extent then compensatory flood storage be provided. Compensatory flood storage and adequate flood risk management must show that there is no increase in flood risk elsewhere. > The Sequential Test will need to be applied for all types of development within the development site, however, if there is More Vulnerable development proposed within the 1% AEP flood extent the Exception Test must also be applied. Substitution of Less Vulnerable development for any More Vulnerable development within the 1% AEP flood extent is recommended wherever possible. Replacing More Vulnerable uses on the ground floor with Less Vulnerable uses on the ground floor may also be appropriate. > The Environment Agency may ask that the full width of its statutory byelaw distance (16 metres) is left undeveloped or that sufficient access is provided so that maintenance and emergency response activities can be carried out. This distance should be confirmed with the Environment Agency prior to development of a masterplan—this could potentially be a further constraint on the developable area. Furthermore, any structure that could affect flood risk within the site may be registered as a flood risk management structure, in which case consent would be required to work on the structure. > Any works that lie in, over, under or next to a main river or affect existing flood defences on main rivers will require flood defence consent from the Environment Agency under the Water Resources Act 1991 and the current level of flood protection must be maintained throughout those works. Works affecting ordinary watercourses now require the consent of the Local Authority. Additional consents under the Land Drainage Act may be required if a culvert or structure, such as a weir, is proposed to control flow on any ordinary watercourse.
SUDS Options appraisal	> The site is approximately 100% greenfield and any development is likely to result in an increase in surface water runoff, however this can be appropriately managed through the development of a SUDS treatment train for the site. > The site is underlain by Mudstone which is typically made up of clay particles that give rise to very limited permeability. Therefore infiltration based SUDS techniques are not likely to be appropriate at this site.
Reasonable prospect of compliance with the Exception Test?	> The Exception Test must be applied to all more vulnerable development proposed in Flood Zone 3a. The flood hazard shown for the 1% AEP event within the site is generally low to moderate and the flood risk area covers a reasonably small proportion of the overall site area. Safe access and egress to the site should be possible from the A46 north of the site. Therefore there is a reasonable prospect of suitable flood risk management measures being employed to enable development to pass the Exception Test. > However it should be noted that much of the area shown within the 1% AEP flood extent also lies within the functional floodplain (Flood Zone 3b). The Exception Test cannot be applied to support development other than Essential Infrastructure in the functional floodplain (water compatible development is also considered suitable). This will likely preclude most types of development being considered in this part of the site.