

# Shropshire Council Strategic Flood Risk Assessment Level 2 Detailed Site Summary Tables



<b>Site details</b>	<b>Site Code</b>	<b>BRD030</b>			
	<b>Address</b>	Tasley Garden Village, Bridgnorth			
	<b>Area</b>	128 hectares			
	<b>Current land use</b>	Commercial Farmland			
	<b>Proposed land use</b>	Residential			
<b>Sources of flood risk</b>	<b>Location of site within catchment</b>	<p>The site is located in the central catchment of the Tiddle Brook and Mor Brook and within the central upper catchment of the River Severn, situated on the western edge of Bridgnorth.</p> <p>The topography slopes south-west from an area of high ground into the Tiddle Brook. The eastern section of the site is noted to have the highest elevations.</p>			
	<b>Existing drainage features</b>	<p>The Tiddle Brook intersects the western boundary and then flows along the western boundary in a southerly direction into the Mor Brook before joining the River Severn downstream. There are also two small drains that bisect the site, one in the centre and one in the south.</p>			
	<b>Fluvial</b>	<b>Proportion of site at risk</b>			
		<b>FZ3b</b>	<b>FZ3a</b>	<b>FZ2</b>	<b>FZ1</b>
		5%	5%	6%	94%
		<b>Highest zone of risk (Risk of Flooding from Rivers and Sea)</b>			
		Medium			
		<p><i>The % Flood Zones quoted show the % of the site at flood risk from that particular Flood Zone/event, including the percentage of the site at flood risk at a higher risk zone, e.g. FZ2 includes the FZ3 %. FZ1 is the remaining area outside FZ2 (FZ2 + FZ1 = 100%)</i></p>			
	<b>Available data:</b>				
	<p>The Environment Agency's Flood Zone mapping has been used in this assessment. This is based on 2D generalised modelling data, which starts at the site.</p>				
<b>Flood characteristics:</b>					
<p>Fluvial flood risk to the site is associated with the Tiddle Brook that flows through the western edge of the site and then along the western boundary. The extents of all Flood Zones extend away from the channel into the western area of the site and become more confined as the brook flows south. In the western portion of the site both the Flood Zone 2 and 3 extents occupy a very similar extent. The Tiddle Brook is culverted under the A458 in the northern most section of the site.</p> <p>The Environment Agency's Risk of Flooding from Rivers and Sea mapping shows that the western edge of the site is at Medium risk of flooding, with a probability of 1%-3.3% that flooding will occur in a given year.</p>					
<b>Surface Water</b>	<b>Proportion of site at risk (RoFfSW)</b>				
	<b>30-year</b>	<b>100-year</b>	<b>1,000-year</b>		
	1%	4%	7%		
	Max depths (m)				
	<0.3	0.3-0.9	0.3-0.9		
	Max velocity (m/s)				
<0.25	>0.25	>0.25			

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		<p><i>The % SW extents quoted show the % of the site at surface water risk from that particular event, including the percentage of the site at flood risk at a higher risk zone (e.g. 100-year includes the 30-year %)</i></p> <p><b>Description of surface water flow paths:</b>                      For the 30-year event, there is one small isolated area of ponding in the centre of the site. For the 100-year event, there are two narrow flow paths that flow from the north-east and eastern edges of the site, flowing south-west and meeting at a central point on site before flowing into the Tiddle Brook. There is also an out of bank flow path along the Tiddle Brook, down the western edge of the site. For the 1,000-year event, the surface water flow paths down the centre of the site increase in size as does the out of bank flow path along the western boundary of the site.                      A drain in the northern section of the site and a drain in the southern section of the site were also affected by all surface water events but the flow paths remained small and narrow suggesting they remained in bank for all scenarios.</p>		
	Reservoir	The site is not shown to be at risk of reservoir flooding from the available <a href="#">online</a> maps.		
	Flood history	There are no records of historic flooding at the site from the Environment Agency or Shropshire Council.		
Flood risk management infrastructure	Defences	Defence Type	Standard of Protection	Condition
		-	-	-
		This site is not protected by any formal flood defences.		
	Residual risk	The Tiddle Brook is culverted under the A458 in the northern most section of the site. If this structure became blocked, there is potential for increased surface water and fluvial flooding in the northern area of the site if water backs up due to the A458's higher ground levels, along the watercourse and through the overland route. The potential for blockage may need to be considered in a site-specific assessment.		
Emergency planning	Flood warning	The site is covered by the Environment Agency's Flood alert system, but not covered by the Flood warning System. .		
	Access and egress	Safe access and egress to the site is available via the A458 in all fluvial events; however, in the surface water events the A458 is affected by all surface water events, as a result access should be gained south of this point. Safe access and egress could also be gained via Ludlow Road from the south in all fluvial and surface water events. The depths, velocities, hazards, durations and speeds of onset of surface water and fluvial flooding along access/ egress routes should be investigated further in a site-specific assessment, to confirm whether access for emergency vehicles could still be obtained.		

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<b>Climate Change</b>	<b>Implications for the site</b>	<ul style="list-style-type: none"> <li>Increased storm intensities due to climate change may increase the extent, depth, velocity, hazard and frequency of both fluvial and surface water flooding.</li> <li>There is no detailed modelling available at the site, and therefore Flood Zone 2 has been used as a conservative indication of flood risk from climate change. This extends into a moderate portion of the site along the western boundary, but reduces as the brook flows south. As part of a site-specific Flood Risk Assessment, latest EA climate change allowances will need to be considered in a detailed hydraulic model, to confirm the impact in the site.</li> <li>Climate change also needs to be considered for surface water events; at the site-specific stage, the 100-year +40% event is considered as part of surface water drainage strategies, or surface water modelling.</li> <li>The current day 1,000-year surface water extent provides an indication of the likely increase in extent of the more frequent events. This would require a detailed FRA to assess the site layout and design.</li> <li>Developers should consider SuDS strategies to reduce the impacts of climate change from surface water in a detailed site-specific FRA.</li> </ul>	
<b>Cumulative Impact of development within the catchment</b>	<b>Level of risk</b>	<b>Catchment</b>	<b>Level of risk</b>
		Mor Brook	Low
	This site lies in the middle reaches of the Mor Brook catchment which has been identified as one that is less sensitive to the cumulative impacts from development within this catchment.		
	<b>Recommendations</b>	N/A	

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<b>Requirements for drainage control and impact mitigation</b>	<b>Broad scale assessment of possible SuDS</b>	<ul style="list-style-type: none"> <li>• Geology at the site consists of: <ul style="list-style-type: none"> <li>○ Bedrock – Predominantly Raglan Mudstone Formation in the north, Halesowen formation (Mudstone, siltstone and Sandstone) to the south and Alvey Member (Mudstone, siltstone and Sandstone) on the southern boundary.</li> <li>○ Superficial – Predominantly Till (Devensian) Deposits, however along the Tiddle Brook Alluvium Deposits are noted and across the centre of the site Head deposits are noted becoming Alluvial Fan Deposits closer to the Tiddle Brook.</li> </ul> </li> <li>• The site is not located within any Environment Agency designated Source Protection Zone.</li> <li>• Most source control techniques are likely to be suitable. Mapping suggests that permeable paving may have to use non-infiltrating systems given the possible risk from groundwater.</li> <li>• Mapping suggests that there is a high risk of groundwater flooding at this location, therefore it is likely infiltration techniques will not be suitable. This should be confirmed via site investigations to assess the potential for infiltration.</li> <li>• Detention may be feasible provided site slopes are &lt; 5% at the location of the detention feature. A liner maybe required to prevent the egress of groundwater.</li> <li>• Filtration is probably suitable provided site slopes are &lt;5% and the depth to the water table is &gt;1m. A liner maybe required to prevent the egress of groundwater.</li> <li>• All forms of conveyance are likely to be suitable. Where the slopes are &gt;5% features should follow contours or utilise check dams to slow flows. A liner maybe required to prevent the egress of groundwater.</li> <li>• The site is not designated by the Environment Agency as previously being a landfill site.</li> <li>• Developers should refer to Shropshire Council's <a href="#">‘Surface Water Management: Interim Guidance for Developers’</a> and <a href="#">‘SuDS requirements for new developments’ webpage</a> as well as the Level 1 SFRA, for information on suitable types of SuDS, the management train and opportunities and constraints in site master-planning.</li> </ul>

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<b>NPPF and planning implications</b>	<b>Exception Test requirements</b>	<p>The Local Authority have carried out the Sequential Test in line with national guidance. The Sequential Test will need to be passed before the Exception Test is applied.</p> <p>Residential development is classified as 'More Vulnerable'. It is anticipated that proposed development will be sequentially located within Flood Zone 1.</p> <p>The Exception test will need to be applied if:</p> <ul style="list-style-type: none"> <li>• More Vulnerable and Essential Infrastructure development is located in FZ3a and for Highly Vulnerable development located in FZ2.</li> <li>• Highly Vulnerable infrastructure should not be permitted within FZ3a and FZ3b.</li> <li>• More Vulnerable and Less Vulnerable Infrastructure should not be permitted within FZ3b.</li> </ul>

	<p><b>Requirements and guidance for site-specific Flood Risk Assessment</b></p>	<p><b>Flood Risk Assessment:</b></p> <ul style="list-style-type: none"> <li>• At the planning application stage, a site-specific Flood Risk Assessment will be required if any development is located within Flood Zones 2 or 3 or is greater than one hectare.</li> <li>• All sources of flooding, particularly the risk of surface water and groundwater flooding, should be considered as part of a site-specific flood risk assessment.</li> <li>• A more detailed hydraulic model will be required at Flood Risk Assessment stage, to confirm flood risk, FZ3b and climate change extents along the site's western boundary, using channel topographic survey.</li> <li>• Any FRA should be carried out in line with the National Planning Policy Framework; Flood Risk and Coastal Change Planning Practice Guidance; Shropshire Council's Local Plan policies, and the LLFA's <a href="#">'Surface Water Management: Interim Guidance for Developers'</a> and <a href="#">'SuDS requirements for new developments' webpage</a>.</li> <li>• Consultation with the Local Authority, Local Lead Flood Authority and the Environment Agency should be undertaken at an early stage.</li> <li>• The development should be designed using a sequential approach. Development should be steered away from areas of fluvial flood risk and surface water flow routes, preserving these spaces as green infrastructure. Development must be in line with Table 3: flood risk vulnerability and flood zone compatibility of the NPPG.</li> <li>• Development in FZ3b should be avoided unless appropriate use can be demonstrated in line with NPPF.</li> <li>• Development in FZ3 may require floodplain compensation and this should be confirmed with the EA at FRA stage.</li> </ul> <p><b>Guidance for site design and making development safe:</b></p> <ul style="list-style-type: none"> <li>• The developer will need to show, through an FRA, that future users of the development will not be placed in danger from flood hazards throughout its lifetime. It is for the applicant to show that the development meets the objectives of the NPPF's policy on flood risk. For example, how the operation of any mitigation measures can be safeguarded and maintained effectively through the lifetime of the development. (Para 048 Flood Risk and Coastal Change PPG).</li> <li>• Safe access and egress will need to be demonstrated in the 1 in 100-year plus climate change fluvial and rainfall events, using the depth, velocity and hazard outputs. Raising of access routes must not impact on surface water flow routes. Consideration should be given to the siting of access points with respect to areas of surface water flood risk.</li> <li>• Resilience measures will be required if buildings are situated in the flood risk area. Raising Finished Floor Levels above the design event may remove the need for resilience measures.</li> <li>• The risk from surface water flow routes should be quantified as part of a site-specific FRA, including a drainage strategy, to ensure that runoff from the development is not increased by placing development across any ephemeral surface water flow routes. A drainage strategy should help inform site layout and design to ensure there is no increase in runoff beyond the current greenfield rates.</li> <li>• On site attenuation schemes would need to be tested against the Tiddle Brook to ensure flows are not exacerbated downstream within the catchment.</li> <li>• New or re-development should adopt exemplar source control SuDS techniques to reduce the risk of frequent low impact flooding due to post-development runoff. Assessment for runoff should include allowance for climate change effects.</li> <li>• Betterment on the existing site runoff rate should be sought to ensure that there is no increase in surface water flood risk elsewhere. Ideally, surface water runoff should be fully attenuated to the greenfield rate.</li> </ul>
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		<ul style="list-style-type: none"> <li>• Developers should refer to Shropshire Local Development Framework: Adopted Core Strategy (Policy CS18) and the Level 1 SFRA for information on SuDS.</li> <li>• New development must seek opportunities to reduce overall level of flood risk at the site, for example by: <ul style="list-style-type: none"> <li>○ Reducing volume and rate of runoff</li> <li>○ Relocating development to zones with lower flood risk</li> <li>○ Creating space for flooding.</li> </ul> </li> <li>• Green infrastructure should be considered within the mitigation measures for surface water runoff from potential development and consider using Flood Zones 2 and 3 as public open space.</li> </ul>
<b>Key messages</b>	<p>The flood risk element of the Exception Test is likely to be passed if:</p> <ul style="list-style-type: none"> <li>• Development is limited to the 94% of the site located outside of the Environment Agency's Flood Zone 2 and 3. These Flood Zones cover the area of the site along the western boundary.</li> <li>• Areas in Flood Zone 2 are used for the least vulnerable parts of the development in accordance with Table 2 in the NPPF. No residential development is permitted in Flood Zone 3 and no development at all is permitted in Flood Zone 3b.</li> <li>• If flood mitigation measures are implemented then they are tested to ensure that they will not displace water elsewhere (for example, if land is raised to permit development on one area, compensatory flood storage will be required in another)</li> <li>• Space for green infrastructure should be considered in the areas of highest flood risk to the north.</li> <li>• Safe access and egress routes must not be in the areas of high surface water risk or the 100-year fluvial design flood event (taking into account climate change).</li> </ul> <p>Refer to the detailed 'guidance for developers' section for further information on the measures that are appropriate for this site.</p>	
<b>Mapping Information</b>		
<b>Flood Zones</b>	Flood Zones 2 and 3 have been taken from the Environment Agency's Flood Map for Planning; this is based on 2D generalised modelling in this area as there is no detailed hydraulic model available. It is recommended that a more detailed hydraulic model is constructed at the site-specific Flood Risk Assessment stage, to confirm flood risk.	
<b>Climate change</b>	Climate change was based on Flood Zone 2 to serve as an indication of possible extents. It is recommended that the latest EA's climate change allowances are modelled in a detailed hydraulic model as part of a site-specific Flood Risk Assessment.	

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<b>Fluvial depth, velocity and hazard mapping</b>	There is no available fluvial modelling data; therefore, the Risk of Flooding from Surface Water mapping has been used as this represents the floodplains of small watercourses. This should be explored further at site-specific stage	
<b>Surface Water</b>	The Risk of Flooding from Surface Water has been used to define areas at risk from surface water flooding.	
<b>Surface water depth, velocity and hazard mapping</b>	The surface water depth, velocity and hazard mapping for the 1 in 100-year event (considered to be medium risk) is taken Environment Agency's Risk of Flooding from Surface Water.	