

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



<b>Site details</b>	<b>Site Code</b>	<b>KCK009</b>			
	<b>Address</b>	Church Lane, Knockin			
	<b>Area</b>	0.91 hectares			
	<b>Current land use</b>	Greenfield			
	<b>Proposed land use</b>	Residential			
<b>Sources of flood risk</b>	<b>Location of site within catchment</b>	The site lies in a valley in the upper reaches of the Weir Brook catchment, a sub-catchment of the River Severn.			
	<b>Existing drainage features</b>	The Weir Brook runs from north to south along the eastern boundary of the site. The watercourse bifurcates north of the site, re-joining shortly downstream of The Avenue.			
	<b>Fluvial</b>	<b>Proportion of site at risk</b>			
		<b>FZ3b</b>	<b>FZ3a</b>	<b>FZ2</b>	<b>FZ1</b>
		0%	3%	4%	96%
		<b>Highest zone of risk (Risk of Flooding from Rivers and Sea)</b>			
		Medium			
		<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>			
	<b>Available data:</b> The Environment Agency's Flood Zone mapping has been used in this assessment. This is based on 2D generalised modelling data.				
	<b>Flood characteristics:</b> Flood Zones 2 and 3 are confined to the area surrounding the Weir Brook, encroaching slightly over the eastern boundary into the site. The majority of the site does not lie within Flood Zones 2 or 3. The eastern site boundary is at a medium risk of flooding from the Weir Brook, with a 1%-3.3% probability of flooding in any given year according to the Environment Agency's Risk of Flooding from Rivers and Sea mapping.				
	<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>	
0%		<1%	1%		
Max depths (m)					
<0.3		<0.3	0.3-0.9		
Max velocity (m/s)					
<0.25		>0.25	>0.25		
<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>					
<b>Description of surface water flow paths:</b> There is minimal risk of surface water flooding on this site. A small amount of surface water flooding is associated with the Weir Brook along the eastern edge of the site in the 100-year and 1,000-year events.					

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	<b>Reservoir</b>	The site is not shown to be at risk of reservoir flooding from the available <a href="#">online</a> maps.		
	<b>Flood history</b>	The site is not covered by the Environment Agency historic flooding map. Evidence from Severn Trent Water identifies 3 historic incidents of sewer flooding approximately 200m to the south of the site.		
<b>Flood risk management infrastructure</b>	<b>Defences</b>	<b>Defence Type</b>	<b>Standard of Protection</b>	<b>Condition</b>
		-	-	-
		This site is not protected by any formal flood defences.		
	<b>Residual risk</b>	The Weir Brook is culverted underneath the B4396 208m downstream of the site. If this structure were to become blocked during a flood event, it is possible that water could back up and increase flood risk on the site.		
<b>Emergency planning</b>	<b>Flood warning</b>	The site is partially covered by the Severn Vyrnwy Confluence Flood Alert Area (031WAF114).		
	<b>Access and egress</b>	<p>Access and egress to the site can be gained from Church Lane. Flood Zones 2 and 3 encroach across the B4396 to the east of the site where watercourses are culverted underneath the road; it is recommended that access to Church Lane is gained via the B4396 from the west. This may be due to 2D generalised modelling which does not account for structures and allows water to flow over topographic low points.</p> <p>Access and egress to the site via the B4396 from all directions is possible in all surface water events. There are surface water flow routes crossing the B4396 close to the culverted watercourses in all events; however, maximum depths are estimated to be 0.3m in the 30-year event and 0.3-0.9m in the 100-year and 1,000-year event so it is likely that emergency vehicles will still be able to access the site.</p> <p>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.</p>		

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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 fluvial flood risk from climate change. As a result, there is no additional risk of flooding evident on the site. Fluvial flood risk remains in the area close to the Weir Brook along the eastern boundary. 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 flooding extent provides an indication of the likely increase in extent of the more frequent surface water 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>
		Weir Brook	Low
	This site lies in the middle reaches of the Weir Brook catchment which has been identified as one with a low sensitivity to the cumulative impacts of 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: Helsby Sandstone Formation - Sandstone.</li> <li>○ Superficial: Glaciofluvial Deposits – Sand and Gravel.</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 both to and 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. If possible, proposed SuDS should be discussed with relevant stakeholders (LPA, LLFA and EA) at an early stage to understand possible constraints given that the site is located with a Source Protection Zone.</li> <li>• Detention features may be feasible provided site slopes are &lt; 5% at the location of the detention feature. If the site has contamination or groundwater issues; a liner will be required.</li> <li>• Filtration systems are probably suitable provided site slopes are &lt;5% and the depth to the water table is &gt;1m. If the site has contamination or groundwater issues; a liner will be required.</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. If the site has contamination or groundwater issues; a liner will be required.</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</a>' webpage 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. Residential development is classified as 'More Vulnerable'. It is recommended that proposed development will be sequentially located within Flood Zone 1 areas of the site.</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 style="text-align: center;"><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, 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 Weir 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 Council's <a href="#">‘Surface Water Management: Interim Guidance for Developers’</a> and <a href="#">‘SuDS requirements for new developments’ webpage</a>, 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 97% of the site located outside of the Environment Agency’s Flood Zone 3, steering away from the eastern 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.</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>		
The key dataset used to make planning recommendations regarding this site was the Environment Agency’s Flood Map for Planning. More details regarding data used for this assessment can be found below.		
<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.	

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<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.
<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 30-year (high risk), 1 in 100-year (medium risk) and 1 in 1,000-year (low risk) events is taken from the Environment Agency's Risk of Flooding from Surface Water mapping.