

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



Site details	Site Code	WHT042			
	Address	The Oaklands Farm EDITED, Whitchurch			
	Area	8.15 hectares			
	Current land use	Greenfield			
	Proposed land use	Residential			
Sources of flood risk	Location of site within catchment	The site is located in an area of high elevation in the upper catchment of the Worthenbury Brook, a subcatchment of the River Dee and lies approximately 1.1km downstream of Blake Mere. The topography of the site is varied, with high ground to the east and west, and the floodplain from north to south.			
	Existing drainage features	An unnamed ordinary watercourse (the outlet of Blake Mere) runs from north to south through the site entrenched at a lower elevation than the surrounding land.			
	Fluvial	Proportion of site at risk			
		FZ3b	FZ3a	FZ2	FZ1
		6%	6%	6%	94%
		Highest zone of risk (Risk of Flooding from Rivers and Sea)			
		High			
		<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>			
		Available data: The Environment Agency's Flood Zone mapping has been used in this assessment. This is based on 2D generalised modelling data.			
	Flood characteristics: Flood Zones 2 and 3 have very similar extents due to the confined topography, and flow from north to south bisecting the site in the western half. The Environment Agency's Risk of Flooding from Rivers and the Sea dataset shows that this site is partially covered by zones of high and medium risk of flooding. In the central area of the site in low lying topography extending away from the unnamed watercourse there is an area of high risk (a probability of flooding in any given year of more than 3.3%). Extending slightly further from the channel there is an area at medium risk (annual exceedance probability of flooding of 1%-3.3%).				
Surface Water	Proportion of site at risk (RoFfSW)				
	30-year	100-year	1,000-year		
	0%	<1%	4%		
	Max depths (m)				
	n/a	<0.3	0.3-0.9		
	Max velocity (m/s)				
	n/a	<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>					

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		Description of surface water flow paths: There are a number of isolated areas of ponding across the site, concentrated in local topographic depressions present in the 100-year and 1000-year surface water events. In the 1,000-year surface water event, a flow path is present along the ordinary watercourse as it passes through the southern half of the site. Risk from surface water is very low.		
	Reservoir	The site is not shown to be at risk of reservoir flooding from the available online maps. However, the site is located downstream of Blake Mere. The topographic constraints as the watercourse weaves from one side to another of the railway line would act to hold up water and mitigate downstream risk at the site.		
	Flood history	The site is not covered by the Environment Agency's historic flood map.		
Flood risk management infrastructure	Defences	Defence Type	Standard of Protection	Condition
		-	-	-
		This site is not protected by any formal flood defences.		
	Residual risk	Approximately 50m downstream of the southern site boundary there is a sluice, visible when viewing the RoFfSW online. The operation of this sluice could impact flood risk on the site if water were to back up as a result of mismanagement. The watercourse is culverted underneath the B5398 approximately 178m downstream of the southern site boundary. Any blockage of this structure could cause flood waters to back up, potentially increasing flood risk on the site given the narrow, confined floodplain, though this distance may negate this impact. The area surrounding the channel is at a low topography, entrenched into a ditch. If large amounts of surface water runoff from high ground surrounding the site were to flow onto the site, it is likely that it will follow topography to accumulate in this area of lower elevation. The site lies approximately 1.1km downstream of Blake Mere and there is no evidence of defences on the site.		
Emergency planning	Flood warning	The site is partially covered by the Environment Agency's Flood Alert Service, in the area surrounding the ordinary watercourse. It falls within the River Dee Catchment in England and Wales from Whitchurch to Chester Flood Alert Area (013WAFDEE). The site is not covered by the Environment Agency's Flood Warning Service.		

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	Access and egress	<p>Safe access and egress to the site can be gained via Mill Park and the B5398 in all surface water events. There are some areas of surface water ponding along this route in the 100-year and 1,000-year event; however, the maximum depth is estimated to be <0.3m in the 100-year and 0.3-0.9m in the 1,000-year event and therefore it is likely that emergency vehicles will still be able to access the site.</p> <p>Flood Zones 2 and 3 do not impede access routes to the site via the B5398 from the east. Flood Zones 2 and 3 indicate that there may be some risk of fluvial flooding along the B5398 to the west of the site, where the watercourse is culverted underneath the road and railway. Access constraints need to be considered for the western portion of site, where the site is bisected and the western boundary is the railway line.</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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Climate Change	Implications for the site	<ul style="list-style-type: none"> Increased storm intensities due to climate change may increase the extent, depth, velocity, hazard and frequency of both fluvial and surface water flooding. There is no detailed fluvial modelling available at the site, and therefore Flood Zone 2 has been used as a conservative indication of fluvial flood risk from climate change. There is no increased flood risk due to climate change at the site. 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. The current day 1,000-year surface water extent provides an indication of the likely increase in extent of the more frequent surface water flooding events. At this site, this indicates that there would be a larger number of isolated areas of ponding. This would require a detailed FRA to assess the site layout and design. Developers should consider SuDS strategies to reduce the impacts of climate change from surface water in a detailed site-specific FRA. 	
Cumulative Impact of development within the catchment	Level of risk	Catchment	Level of risk
		Worthernbury Brook	High
	Recommendations	<p>This site lies in the upper Worthernbury Brook catchment. The Worthernbury Brook has been identified as a catchment that is highly sensitive to the cumulative impacts of any development within the catchment. Proposed development sites cover 0.41% of the total catchment area and are concentrated in the upper catchment in Whitchurch. There have also been a number of historic flooding incidents within this catchment. The catchment drains out of Shropshire into Cheshire.</p> <p>There is potential opportunity to develop online storage ponds or other storage and attenuation features alongside watercourses downstream within this predominantly rural catchment. It is estimated that 661m³ of long-term storage would need to be compensated for at this site in addition to storage to capture the 100-year plus climate change event to maintain current greenfield runoff rates.</p> <p>Developers should work collaboratively with the Council to consider what contribution they could make to flood alleviation plans for the town of Whitchurch.</p> <p>Refer to Section 9 of the main Level 2 SFRA for more information regarding the cumulative impact assessment and policy recommendations in this catchment.</p>	

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Requirements for drainage control and impact mitigation	Broad scale assessment of possible SuDS	<ul style="list-style-type: none"> • Geology at the site consists of: <ul style="list-style-type: none"> ○ Bedrock: Wilkesley Halite Member – halite. ○ Superficial: Glaciofluvial Deposits – Sand and Gravel. • The site is not located within any Environment Agency designated Source Protection Zone. • 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. • Infiltration may be suitable. Mapping suggests a medium risk of groundwater flooding and underlying soils may be permeable. Further site investigation should be carried out to assess potential for drainage by infiltration. If infiltration is suitable it should be avoided in areas where the depth to the water table is <1m. • Mapping suggests that the site slopes are suitable for all forms of detention. A liner maybe required due to the site potential groundwater flooding. • All filtration techniques are likely to be suitable. A liner maybe required to prevent the egress of groundwater. • All forms of conveyance are likely to be suitable. Where the slopes are >5% features should follow contours or utilise check dams to slow flows. A liner maybe required to prevent the egress of groundwater. • The site is not designated by the Environment Agency as previously being a landfill site. • Developers should refer to Shropshire Council's ‘Surface Water Management: Interim Guidance for Developers’ and ‘SuDS requirements for new developments’ 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.
NPPF and planning implications	Exception Test requirements	<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"> • More Vulnerable and Essential Infrastructure development is located in FZ3a and for Highly Vulnerable development located in FZ2. • Highly Vulnerable infrastructure should not be permitted within FZ3a and FZ3b. • More Vulnerable and Less Vulnerable Infrastructure should not be permitted within FZ3b.

	<p style="text-align: center;">Requirements and guidance for site-specific Flood Risk Assessment</p>	<p>Flood Risk Assessment:</p> <ul style="list-style-type: none"> • 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. • 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. • 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. • 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 'Surface Water Management: Interim Guidance for Developers' and 'SuDS requirements for new developments' webpage. • Consultation with the Local Authority, Lead Local Flood Authority and the Environment Agency should be undertaken at an early stage. • 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. • Development in FZ3b should be avoided unless appropriate use can be demonstrated in line with NPPF. • Development in FZ3 may require floodplain compensation and this should be confirmed with the EA at FRA stage. <p>Guidance for site design and making development safe:</p> <ul style="list-style-type: none"> • 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). • 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. • 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. • 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. • On site attenuation schemes would need to be tested against the unnamed watercourse to ensure flows are not exacerbated downstream within the catchment. • 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. • 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.
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		<ul style="list-style-type: none"> • Developers should refer to Shropshire Council's ‘Surface Water Management: Interim Guidance for Developers’ and ‘SuDS requirements for new developments’ webpage, and the Level 1 SFRA for information on SuDS. • New development must seek opportunities to reduce overall level of flood risk at the site, for example by: <ul style="list-style-type: none"> ○ Reducing volume and rate of runoff ○ Relocating development to zones with lower flood risk ○ Creating space for flooding. • 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.
Key messages		<p>The flood risk element of the Exception Test is likely to be passed if:</p> <ul style="list-style-type: none"> • Development is limited to the 94% of the site located outside of the Environment Agency's Flood Zones 2 and 3. The Flood Zones divide the site through the low-lying topography surrounding the unnamed watercourse in the west of the site, leaving a larger area available for development on the eastern part of the site. • 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 • 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). • Space for green infrastructure should be considered in the areas of highest flood risk. • Safe access and egress needs to be considered for the western portion of site, where the site is bisected and the western boundary is the railway line. • This site lies within a catchment identified as high risk of cumulative impact of development. It is important to incorporate long-term storage capacity on this site to ensure current greenfield runoff rates are maintained. Refer to Section 9 in the main SFRA for specific policy recommendations related to this site and its wider catchment. <p>Refer to the detailed ‘guidance for developers’ section for further information on the measures that are appropriate for this site</p>

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Mapping Information		
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.		
Flood Zones	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.	
Climate change	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.	
Fluvial depth, velocity and hazard mapping	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	
Surface Water	The Risk of Flooding from Surface Water has been used to define areas at risk from surface water flooding.	
Surface water depth, velocity and hazard mapping	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 Agency's Risk of Flooding from Surface Water mapping.	