

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



Site details	Site Code	SHR166			
	Address	East of Shrewsbury A49 near Preston Roads roundabout, Shrewsbury			
	Area	43.3 hectares			
	Current land use	Greenfield			
	Proposed land use	Employment			
Sources of flood risk	Location of site within catchment	The site lies on the floodplain of the River Severn on the left bank to the west of Shrewsbury. The site slopes upwards to the east away from the river.			
	Existing drainage features	The River Severn flows from north to south around a meander bend to the west of the site. The western site boundary runs approximately parallel to the river channel. An unnamed watercourse runs southwards from Uffington (to the northeast of the site) to the southeast corner of the site where it passes underneath the railway.			
	Fluvial	Proportion of site at risk			
		FZ3b	FZ3a	FZ2	FZ1
		6%	7%	15%	85%
		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 Flood Zone data is based on the 2020 Environment Agency River Severn Modelling Study Phase 1. The results have been signed off by the Environment Agency, but as the project is still ongoing, there are still aspects which could be subject to change in Phase 2.				
The results are defended; Flood Zones 2 and 3a should be undefended. However, the location of the defences in Shrewsbury are unlikely to have an impact at the site and the defended FZ2 is slightly larger than the previous modelling work, hence showing the results in this assessment.					
When the undefended runs become available in Phase 2, the Flood Zone extents should be checked, in addition to considering the impact of the argaes upstream with regards to storage and how these natural features impact the undefended model runs.					
Flood characteristics:					
Fluvial flood risk on the site is associated with the River Severn. Flood Zones 3b, 3a and 2 encroach onto the site in the northwest and southwest corners, in the areas of lowest elevation. The Flood Zones are of a similar extent in the northwest of the site whilst Flood Zone 2 extends further east in the southwest corner of the site. The north-west corner of the site is where flood depths are greatest, up to 2.4m in the site.					
The Environment Agency's Risk of Flooding from Rivers and Sea mapping partially covers this site. Zones of low, medium and high risk encroach onto the western boundary of the site, in the areas of low-lying topography. There is a more than 3.3% probability that the highest risk areas of the site will flood in any given year.					

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	Surface Water	Proportion of site at risk (RoFfSW)		
		30-year	100-year	1,000-year
		1%	1%	4%
		Max depths (m)		
		0.3-0.9	0.3-0.9	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>			
	Description of surface water flow paths:			
	Small, isolated areas of ponding can be seen across the site in local topographic depressions in the 1,000-year event. In the southeast corner of the site an area of ponding occurs in all surface water events. In the 30-year and 100-year events this surface water originates from the A49 to the south east of the site and is bounded by the embanked railway line running along the site's southern boundary. In the 1,000-year event, in addition to surface water flowing from the A49 to the south, a surface water flow route begins from the unnamed watercourse 650m to the east of the site which lies at a higher elevation. Surface water runs down the slope, crossing the A49 and entering the site in the southeast corner. It is routed along the southern boundary of the site, bounded by the railway embankment.			
Reservoir	The site is not shown to be at risk of reservoir flooding from the available online maps.			
Flood history	<p>The Shropshire Level 1 SFRA highlights Shrewsbury as an area where there have been a number of historical flooding events, including fluvial, pluvial and sewer flooding events.</p> <p>The areas of the site covered by the EA Flood Zones are also identified as areas of historic flood incidents. Data shows that flood events that partially inundated the areas in the northwest and southwest corners of the site occurred in January 1948, October 1998, Autumn 2000 and February 2004. February 2014 saw the highest levels ever recorded at the Castle Foregate gauge on the Bagley Brook. The highest level recorded at the Severn Welsh Bridge gauge was in November 2000.</p> <p>The February 2020 flood event also significantly impacted Shrewsbury though was not the highest on record. The closest incident of flooding during this event occurred within a 200m grid square approximately 740m to the west of the site, on the opposite bank of the River Severn.</p>			

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Flood risk management infrastructure	Defences	Defence Type	Standard of Protection	Condition
		-	-	-
	This site is not protected by any formal flood defences, though there are formal flood defences in Shrewsbury.			
Residual risk	<p>The unnamed watercourse to the east of the site is culverted underneath the railway embankment close to the southeast corner of the site. If this structure were to become blocked, flood risk to the site could increase as it is evident that surface water is bounded by the railway embankment and subsequently flows westwards into the site. The Severn also goes into culvert underneath the railway line; it is likely this structure is large enough so as not to easily block, but the potential for this should be considered as water backing up here could push further into the site's south-western boundary.</p> <p>The potential for blockage may need to be considered in a site-specific assessment.</p>			
Emergency planning	Flood warning	The site is partially covered by both the Environment Agency's Flood Alert and Flood Warning Services. The site lies within the River Severn in Shropshire flood alert area (031WAF103) and the River Severn at Shrewsbury flood warning area (031WFSE200).		
	Access and egress	<p>Access and egress to the site can be gained via the A49 which runs along the eastern boundary of the site and leads to the A5. At the southeast corner of the site, the A49 is subject to surface water flooding in all events. Maximum depth of water across most of this area of road is estimated to be 0.3 in the 30-year event and 0.3-0.9m in the 100-year and 1,000-year event. Access via the A49 from the north of the site is free from areas of flood risk in all surface water events.</p> <p>Safe access and egress to the site is not impeded by Flood Zones along any access route.</p> <p>The 100-year +70% climate change extent does extend over the A49 from the A roundabout to just north of 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. The detailed 2019-2020 fluvial hydraulic model of the River Severn was used to model the 2080s climate change scenarios for the 100-year (+25%), 100-year (+35%) and a 100-year (+70%) events. The results revealed a slight increase in the flood extent along western fringe of the site during the 100-year +25% climate change scenario. In the 100-year +35% scenario this extent increased further but there is also an area in the centre of the site and on the southern boundary now affected. During the 100-year +70% climate change scenario this central extent expanded greatly and there is an increase in the floodplain extent to the south. In this event the majority of the site is now affected by fluvial flooding, particularly in the western, central and southern portions of 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 events. 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
		River Severn – (Sundorne Brook to confluence of Much Wenlock-Farley Brook subcatchment)	Low
	This site lies in a large sub-catchment of the River Severn. This has been identified as a catchment with a low sensitivity to the cumulative impact from any development within the catchment.		
	Recommendations	N/A	

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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: Salop Formation – Mudstone, Sandstone and Conglomerate ○ Superficial: River Terrace Deposits 2nd – Sand and Gravel and Alluvium Deposits – Clay, Silt, Sand and Gravel (west). • 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. • 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. • Detention features may be feasible provided site slopes are < 5% at the location of the detention feature. A liner maybe required to prevent the egress of groundwater. • Filtration systems are probably suitable provided site slopes are <5% and the depth to the water table is >1m. 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.

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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. Employment development is classified as 'Less 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"> • 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. • 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, Local Lead 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 River Severn 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. • 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.
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		<ul style="list-style-type: none"> • 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 85% 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 north-western boundary. • Areas in Flood Zone 2 are used for the least vulnerable parts of the development in accordance with Table 2 in the NPPF. • 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 to the north. • 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). <p>Refer to the detailed 'guidance for developers' section for further information on the measures that are appropriate for this site.</p>	
Mapping Information		
Flood Zones	<p>The Flood Zone data is based on the 2020 Environment Agency River Severn Modelling Study Phase 1. The results have been signed off by the Environment Agency, but as the project is still ongoing, there are still aspects which could be subject to change in Phase 2.</p> <p>The results are defended; Flood Zones 2 and 3a should be undefended. However, the location of the defences in Shrewsbury are unlikely to have an impact at the site and the defended FZ2 is slightly larger than the previous modelling work, hence showing the results in this assessment.</p> <p>When the undefended runs become available in Phase 2, the Flood Zone extents should be checked, in addition to considering the impact of the argaes upstream with regards to storage and how these natural features impact the undefended model runs.</p>	

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Climate change	<p>Climate change was based on the 2020 Environment Agency River Severn Modelling Study Phase 1. The 100-year model flow was upscaled for the 2080s epoch for the Severn basin, increasing by +25%, +35% and +70%</p> <p>It should be noted that these results are considered 'draft' and have not been signed off by the Environment Agency. Developers should obtain latest results and confirm risk once Phase 2 of the Severn modelling study has been published.</p>	
Fluvial depth, velocity and hazard mapping	<p>The 100-year modelled outputs have been used to assess depth, velocity and hazard from the 2019-2020 DRAFT River Severn modelling study Phase 1 model.</p>	
Surface Water	<p>The Risk of Flooding from Surface Water has been used to define areas at risk from surface water flooding.</p>	
Surface water depth, velocity and hazard mapping	<p>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.</p>	