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

<table>
<tr><td rowspan="5">Site details</td><td>Site Code</td><td colspan="4">PON008</td></tr>
<tr><td>Address</td><td colspan="4">Minsterley Road, Pontesbury</td></tr>
<tr><td>Area</td><td colspan="4">1.98 hectares</td></tr>
<tr><td>Current land use</td><td colspan="4">Greenfield</td></tr>
<tr><td>Proposed land use</td><td colspan="4">Residential</td></tr>
<tr><td rowspan="5">Sources of flood risk</td><td>Location of site within catchment</td><td colspan="4">The site is located close to an unnamed watercourse in the upper catchment of the Rea Brook. The source of the unnamed watercourse is approximately 1.96km upstream of the site and the confluence with the Rea Brook is approximately 1.1km downstream of the site. The site slopes from higher elevation in the southeast area of the site to lower elevations in the northwest of the site. The western border of the site is bounded by an elevated track.</td></tr>
<tr><td>Existing drainage features</td><td colspan="4">An unnamed watercourse is culverted under Minsterley Road, running from southeast to northwest past the southwest corner of the site.</td></tr>
<tr><td rowspan="6">Fluvial</td><td colspan="4">Proportion of site at risk</td></tr>
<tr><td>FZ3b</td><td>FZ3a</td><td>FZ2</td><td>FZ1</td></tr>
<tr><td>0%</td><td>0%</td><td>0%</td><td>100%</td></tr>
<tr><td colspan="4">Highest zone of risk (Risk of Flooding from Rivers and Sea)</td></tr>
<tr><td colspan="4">N/A</td></tr>
<tr><td colspan="4">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%)</td></tr>
<tr><td colspan="4">Available data:
It should be noted that the unnamed watercourse near the site has not been modelled due to the its small catchment size, so any associated flood risk will not have been represented in the EA fluvial Flood Zones.
Flood characteristics:
This site does not lie within Flood Zone 2 or 3 according to the EA Flood Zone mapping. Additionally, the site is not currently covered by the Environment Agency's Risk of Flooding from Rivers and Sea mapping. There is a small unnamed watercourse close to the site which is in culvert in a north-westerly direction under Minsterley Road. It is deemed unlikely that this would impact the site, unless any overtopping occurred at the culvert inlet, where higher topography south and east of the site lowers towards the site's south-western corner. The surface water mapping will therefore provide an indication at this strategic scale.</td></tr>
<tr><td rowspan="6">Surface Water</td><td colspan="3">Proportion of site at risk (RoFfSW)</td></tr>
<tr><td>30-year</td><td>100-year</td><td>1,000-year</td></tr>
<tr><td>10%</td><td>15%</td><td>41%</td></tr>
<tr><td colspan="3">Max depths (m)</td></tr>
<tr><td>0.3-0.9</td><td>>0.9</td><td>>0.9</td></tr>
<tr><td colspan="3">Max velocity (m/s)</td></tr>
<tr><td><0.25</td><td>>0.25</td><td>>0.25</td></tr>
</table>

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		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 %)		
		Description of surface water flow paths: Surface water flooding on this site is controlled and steered by its topography. At the northern tip of the site, in the area of lowest topography there is a large area of ponding in all surface water events. Water accumulates in this area as it is bound by the elevated topography of the track running along the western boundary. In the 1,000-year event a surface water flow path is evident from the southern boundary at Minsterley Road moving northwards and bounded by the raised track along the western boundary and accumulating at the northern end of the site. Surface water flows from higher topography to the south of the site primarily along existing roadways onto Minsterley Road and subsequently onto the site which lies at lower elevation.		
	Reservoir	The site is not shown to be at risk of reservoir flooding from the available online maps.		
	Flood history	There are no records of historic flooding at the site from the Environment Agency. A number of historic flood incidents have been identified by Welsh Water and Severn Trent Water in the Minsterley/ Pontesbury area in the Level 1 SFRA, but the exact location of these incidents is not specified.		
Flood risk management infrastructure	**Defences**	**Defence Type**	**Standard of Protection**	**Condition**
		-	-	-
		This site is not protected by any formal flood defences.		
	Residual risk	If the culvert beneath Minsterley Road were to become blocked, the risk of flooding on site could increase if water backed up and flowed northwards over Minsterley Road and onto the site. Two other development sites have been proposed bordering the site to the east. If impermeable surfaces on these sites increase, surface water runoff from these sites could increase and be steered by local topography onto the study site where surface water could become trapped by the raised embankment.		
	Flood warning	The site is not covered by the Environment Agency Flood Warning Service.		

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Emergency planning	**Access and egress**	Access and egress to the site can be gained at the southern boundary via the A488. Flood Zones 2 and 3 cross this access route in Minsterley to the southwest of the site and to the east of the site where the Minsterley Brook and Pontesford Brook respectively are culverted under the road. However, in both of these locations the road is elevated over the channel with a bridge and the majority of the roads in the vicinity are not at fluvial flood risk, so it is likely that access from both directions will still be possible in fluvial flood events. The stretch of Minsterley Road adjacent to the southern boundary of the site has surface water ponding present in all events with additional ponding along access routes to the east of the site at the junction of Minsterley Road, Station Road and Hall Bank. However, maximum depths of this surface water ponding is estimated to be 0.3m in the 30-year event and 0.3-0.9m in the 100-year and 1,000-year events and therefore it is likely that emergency vehicles will still be able to access the site. 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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	Address	Minsterley Road, Pontesbury
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Climate Change	**Implications for the site**	• Increased storm intensities due to climate change may increase the extent, depth, velocity, hazard and frequency of both fluvial and surface water flooding. • As part of a site-specific Flood Risk Assessment, latest EA climate change allowances will need to be considered. A detailed fluvial hydraulic model may needed to assess fluvial risk from the unnamed watercourse which goes into culvert near the site, to confirm the impact on 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. On this site, 41% of the site is inundated with surface water during the 1,000-year flood event. • 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** Rea Brook / High This development site lies in the middle reaches of the Rea Brook catchment. The Rea Brook has been identified as one that is more sensitive to the cumulative impact of any development within the catchment, particularly in the downstream areas close to the catchment outlet into the River Severn. Communities within this catchment are at risk of surface water flooding in the 100-year event and there has been historic flooding.
	Recommendations	A strategic drainage approach needs to be considered at this site alongside proposed development sites PON017 and PON030 to ensure suitable drainage provision for all of these neighbouring developments. Due to the impoundment of any floodwaters by the local topography, long-term storage should be accommodated on this site or methods for drainage that utilise infiltration. Refer to Section 9 of the main SFRA report for information on the cumulative impact assessment and recommended policies within this catchment.

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Requirements for drainage control and impact mitigation	**Broad scale assessment of possible SuDS**	• Geology at the site consists of:
		  ○ Bedrock: Halesowen Formation.
		  ○ Superficial: No superficial deposits recorded.
		• 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.

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NPPF and planning implications	**Exception Test requirements**	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 in the site. The Exception test will need to be applied if: • 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.

	Requirements and guidance for site-specific Flood Risk Assessment	**Flood Risk Assessment:** • 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 may be required at Flood Risk Assessment stage, to confirm flood risk from the unnamed watercourse in the event of a potential blockage, using channel topographic survey. It is deemed unlikely that the watercourse's Flood Zones would impact the site given the topography, but this should be confirmed. • 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. • Subject to a hydraulic model confirming the fluvial Flood Zones at the site, development in FZ3 may require floodplain compensation and this should be confirmed with the EA at FRA stage. **Guidance for site design and making development safe:** • 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.

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		• 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.
		• New development must seek opportunities to reduce overall level of flood risk at the site, for example by:
		  ○ 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

Key messages		The flood risk element of the Exception Test is likely to be passed if: • Development is limited to the 59% of the site that lies outside the area at risk of flooding from surface water in the 1,000-year event, and this should be steered away from the northern portion of the site where surface water ponds in all events, and the western boundary. • 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 in 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 surface water risk. • The cumulative impacts of development within this catchment must be considered. Developers should ensure that surface water runoff rates are maintained at current greenfield rates through the implementation of attenuation and long-term storage on site. Refer to Section 9 of the main SFRA report for information regarding recommended policies within this catchment. Refer to the detailed 'guidance for developers' section for further information on the measures that are appropriate for this site

Mapping Information

The key dataset used to make planning recommendations regarding this site was the Risk of Flooding from Surface Water mapping. More details regarding data used for this assessment can be found below.

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Flood Zones		There is no Flood Zone data available at the site. The 2D modelling that delineates Flood Zones 2 and 3 covers watercourse catchments that exceed 3km^2. 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 the 1,000-year surface water event to serve as an indication of the potential increase in the extent of the 100-year surface water event as a result of climate change. 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.