Hinckley and Bosworth Borough Level 2 Strategic Flood Risk Assessment: Detailed Site Summary Tables

<table>
<tr><td rowspan="4">Site details</td><td>Site Code</td><td colspan="4">Site LPR94 – Land south of London Road, Markfield</td></tr>
<tr><td>Area</td><td colspan="4">25.1 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="8">Sources of flood risk</td><td>Existing drainage features</td><td colspan="4">An unnamed watercourse draining to Thornton Reservoir passes through the site from the northern boundary at London Road. It travels south-west through the middle of the site before running along the southern site boundary to the south-west corner as it is steered by the site topography.</td></tr>
<tr><td rowspan="4">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>5%</td><td>5%</td><td>6%</td><td>94%</td></tr>
<tr><td colspan="4">Fluvial flood risk to the site is associated with the watercourse as it crosses through the site and along the southern boundary with Flood Zones 3b, 3a and 2 largely confined to the channel and its immediate surroundings, with the widest extents at the source of the watercourse in the north-eastern part of the site.</td></tr>
<tr><td rowspan="4">Surface Water</td><td colspan="4">Proportion of site at risk (RoFfSW)</td></tr>
<tr><td colspan="2">30-year</td><td>100-year</td><td>1,000-year</td></tr>
<tr><td colspan="2">3%</td><td>7%</td><td>12%</td></tr>
<tr><td colspan="4">The 30-year surface water extent is mainly confined to the flow path of the watercourse channel with additional flow paths present within the site in the 100-year and 1,000-year events as surface water flows towards the unnamed watercourse including from Birchfield Avenue towards the watercourse.</td></tr>
<tr><td>Reservoir</td><td colspan="4">The site is not shown to be at risk of reservoir flooding.</td></tr>
<tr><td>Flood history</td><td colspan="4">There are no records of historic flooding at the site from Leicestershire County Council or the Environment Agency.</td></tr>
<tr><td rowspan="4">Flood risk management infrastructure</td><td rowspan="3">Defences</td><td>Defence Type</td><td>Standard of Protection</td><td colspan="2">Condition</td></tr>
<tr><td>-</td><td>-</td><td colspan="2">-</td></tr>
<tr><td colspan="4">This site is not protected by any formal flood defences.</td></tr>
<tr><td>Residual risk</td><td colspan="4">The unnamed watercourse joins with another unnamed watercourse before passing through a culvert running from north-east to south-west under the M1 180m downstream of the site. If the culvert were to become blocked flood risk at the site could potentially increase if water backs up along the watercourse.</td></tr>
<tr><td></td><td>Flood warning</td><td colspan="4">The site is not covered by the Environment Agency’s Flood Warning Service.</td></tr>
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	Area	25.1 hectares			
	Current land use	Greenfield			
	Proposed land use	Residential			
Emergency planning	**Access and egress**	Dry access and egress to/ from the north-eastern part of the site is available via London Road in 30-year and 100-year surface water flooding events. However, surface water ponding on Ratby Lane to the north and south of London Road may inhibit access in 1,000-year surface water flooding event. Surface water flood depths along Ratby Lane reach a maximum of 0.3m, in the 1,000-year event therefore access for emergency vehicles may still be possible. Access and egress from the north-west of the site may be possible via Croftway, Birchfield Avenue and the unnamed access road between Croftway and Birchfield Avenue. Dry access and egress is available along the length of London Road and Marston Drive in all fluvial flooding events. This enables access to the north-west and north-east of 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.			
Climate Change	**Climate change allowances for '2080s'**	**River Basin District**	**Central**	**Higher Central**	**Upper End**
		Humber	20%	30%	50%
	Implications for the site	Fluvial extents from climate change did not increase significantly when compared with FZ3a. As the site is affected by surface water flooding from the 100-year event, climate change may also increase the extent, depth and frequency of surface water flooding. The 1,000-year surface water extent can be used as an indication of surface water climate change extents.			

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Requirements for drainage control and impact mitigation	**Broad scale assessment of possible SuDS**	• Geology at the site consists of:
		  ○ Bedrock – Mudstone, siltstone and sandstone with a small area in the north-eastern site corner made up of igneous intrusion.
		  ○ Superficial – There are no superficial deposits present in this site
		• The site is not located within a Groundwater 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 also suggests that slopes may be unsuitable for selective source control techniques.
		• Mapping suggests that there is a medium 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 is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site-specific assessment. If this feature is feasible a liner maybe required to prevent the egress of groundwater.
		• Filtration is unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options should be assessed as part of a site-specific assessment. If this feature is feasible it should be located where the depth to the water table is >1m, additionally 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.
		• should refer to latest SuDS guidance on Leicestershire County Council's website and Environmental Best Practice notes as well as the Level 1 SFRA, for information on suitable types of SuDS, the management train and opportunities and constraints.

NPPF and planning implications	**Exception Test requirements**	The Sequential Test will need to be passed before the Exception Test is applied. 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. • Essential Infrastructure in Flood Zone 3b will require the Exception Test. Residential development is classified as 'More Vulnerable'.

	Requirements and guidance for site-specific Flood Risk Assessment	• Consultation with the Local Authority, Local Lead Flood Authority and the Environment Agency should be undertaken at an early stage.
		• 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. A Flood Risk Assessment must consider the entire lifetime of the development and consider all sources of flooding.
		• The site area includes the Flood Zone 2 extents. Most development types are appropriate for this flood risk zone but must take into account the flood risk (1% to 0.1% annual exceedance probability).
		• The site area includes the Flood Zone 3a extents. Future development must take into account the flood risk in this area (5% to 1% annual exceedance probability). More vulnerable and critical infrastructure development is possible within Flood Zone 3a but is required to pass the Exception Test. Highly vulnerable development is not permitted within Flood Zone 3a.
		• The site area includes the extents of Flood Zone 3b, also known as the functional floodplain. Only essential infrastructure passing the Exception Test is permitted within Flood Zone 3b. Should there be any development within Flood Zone 3b flood storage lost by the development must be offset.
		• An ordinary watercourse is within or immediately adjacent to the site area and therefore consultation with Lead Local Flood Authority should be completed. If alterations or discharges are proposed to the watercourse a land drainage consent will be required.
		• More detailed hydraulic modelling using channel survey may be required as part of a site-specific Flood Risk Assessment, to confirm flood risk shown in the 2D generalised modelling.
		• Resilience measures will be required if buildings are situated in the flood risk area through the centre of the site's boundary. Raising Finished Floor Levels above the design event may remove the need for resilience measures.
		• Onsite attenuation schemes would need to be tested against the unnamed watercourse running through the site 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.
		• Water quality requirements for sustainable development should comply with current SuDS guidance.
		• Assessment for runoff should include allowance for climate change effects.
		• Safe access and egress will need to be demonstrated.
		• 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.

Mapping Information	
Flood Zones	The Flood Zones have been derived from 2D generalised modelling techniques.
Climate change	The climate change allowances for the '2080s' epoch were modelled using 2D generalised modelling techniques.
Surface Water	The Environment Agency's Risk of Flooding from Surface Water has been used to define areas at risk from surface water flooding.
Fluvial depth, velocity and hazard mapping	Depth, velocity and hazard mapping for the 1 in 100-year event (Flood Zone 3a) have been taken from 2D generalised modelling techniques.
Surface water depth, velocity and hazard mapping	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.