Harborough District Council

Level 2 Strategic Flood Risk Assessment

Detailed Site Summary Table

Site details

Site Code	**10595: Proposed Allocation MP1**
Address	**Land south of Coventry Road, Lutterworth**
Area	16.4 hectares
Current land use	Mixed – construction area and greenfield
Proposed land use	Employment
Flood Risk Vulnerability	Less Vulnerable

Sources of flood risk

Location of the site	The site is bounded by Coventry Road (A4103) to the north, by the A5 to the west, and by Beaufort Boulevard to the south. At present, a construction road bisects the site. An unnamed ordinary watercourse flows north-eastwards along the southern boundary and enters a culvert at the southern boundary and then a second at the south-eastern corner of the site. The site falls in the catchment for the unnamed watercourse, which rises approximately 480m south-west of the site and drains 0.98km2 at the site. The watercourse flows to an unnamed tributary of the River Swift approximately 1.4km east of the site and is located within the Avon Warwickshire Management Catchment.
Topography	The Environment Agency's (EA) 1m resolution 2022 Composite LiDAR shows that the site is on a south-eastern slope, with a maximum elevation of 132.1m AOD in the central northwestern boundary of the site, and minimum elevation of 116.1m AOD in the lower eastern corner of the site.

Existing drainage features	The site is likely to drain into the unnamed ordinary watercourse at the southern boundary of the site, which ultimately drains into the River Swift approximately 1.6km directly south of the site.
Fluvial	**Available data and mapping:** EA Flood Map for Planning for Rivers and Sea. **Flood Map for Planning** **Data analysis:** Details of the sites location within each Flood Zone are provided within the SFRA Site Screening Appendix. **Flood characteristics:** • Flood Zone 1 represents areas which have less than 1 in 1000 (0.1%) chance of river flooding in a given year. The site in its entirety (100%) is in Flood Zone 1. While the site is in Flood Zone 1, the unnamed ordinary watercourse has a small catchment that is not included within the broadscale modelling. Fluvial extents are likely to be captured within the surface water extents. Developers should seek or conduct modelling of the unnamed ordinary watercourse as part of a site-specific flood risk assessment.
Fluvial plus climate change	In the absence of detailed modelling, the Risk of Flooding from Surface Water dataset with a climate change allowance has been used to assess the depth, hazard and velocity of fluvial flood risk to the site, Consideration from developers should still be given to the any detailed modelling may be required within a site-specific assessment.
Surface water	**Available data and mapping:** The EA's Risk of Flooding from Surface Water dataset for the 3.3%, 1% and 0.1% AEP events. **Data analysis:** **3.3% AEP (1 in 30 year) event:** Proportion is 1% Max Depth is 0.82m

	Max Velocity is 1.39m/s Max Hazard is 1.48, Danger for Most Mean Depth is 0.14m Mean Velocity is 0.66m/s Mean Hazard is 0.69, Caution **1% AEP (1 in 100 year event):** Proportion is 2% Max Depth is 0.93m Max Velocity is 1.56m/s Max Hazard is 1.34, Danger for Most Mean Depth is 0.13m Mean Velocity is 0.74m/s Mean Hazard is 0.62, Caution **0.1% AEP (1 in 1000 year) event:** Proportion is 14% Max Depth is 1.16m Max Velocity is 2.27m/s Max Hazard is 2.39, Danger for All Mean Depth is 0.11m Mean Velocity is 0.92m/s Mean Hazard is 0.68, Caution **Flood characteristics:** The site is most significantly affected by the 0.1% AEP event, with surface water mapping likely representing fluvial flood extents from the unnamed ordinary watercourse.

	In the 3.3% AEP event, a flow path enters the eastern side of the site and is attached to the flow path along the unnamed ordinary watercourse which flows along the southern site boundary. Within the flow path at the eastern side of the site, maximum flood depth is 0.21m, maximum velocity is 1.26m/s and a maximum hazard rating of 'Danger for Some' Within the channel of the ordinary watercourse, flood depths, velocities and hazard ratings are greater. The rest of the site remains unaffected. In the 1% AEP event, the flow path within the eastern side of the site increases in extent. An additional three instances of ponding form, one north of the flow path, and two in the centre of the site. Outside of the channel of the ordinary watercourse, the maximum depth is 0.27m, maximum velocity is 1.56m/s, with a maximum hazard rating is 'Danger for Most' within the flow path. Across the site, average depths are 0.13m, average velocities are 0.74m/s, and average hazard rating is 'Caution'. In the 0.1% AEP event, the extent of surface water flooding increases significantly, with multiple flow paths forming through the central and eastern areas of the site and new areas of ponding in the north of the site. In the eastern area a significant flow path flows from north to south into the unnamed ordinary watercourse, as do the flow paths in the central area. The maximum depth is 1.16m, a maximum velocity of 2.27m/s, with a maximum hazard rating of 'Danger to All' at the south-eastern corner of the site. Across the site, average depths are 0.11m, average velocities are 0.92m/s, and an average hazard rating of 'Caution'.
Surface water plus climate change	**Available data and mapping:** The EA's Risk of Flooding from Surface Water dataset for the 3.3% and 1% AEP events with both upper and central climate change scenarios. **Management Catchment:** The site is located within the Avon Warwickshire Management Catchment. The EA guidance recommends that the Upper End allowance is considered for both the 3.3% and 1% AEPs for the 2070's epoch, unless the allowance

	for the 2050's epoch is higher, in which case this should be used. This is appropriate for development with a lifetime beyond 2100. The recommended uplift on peak rainfall intensity for the 3.3% AEP central and upper estimates are 25% and 35%, and 25% and 40% for the 1% AEP event. **Data analysis:** **3.3% AEP (1 in 30 year) central climate change event:** Proportion is 5% Max Depth is 1.03m Max Velocity is 1.86m/s Max Hazard is 2.05, Danger for All Mean Depth is 0.12m Mean Velocity is 0.82m/s Mean Hazard is 0.68, Caution **3.3% AEP (1 in 30 year) upper climate change event:** Proportion is 7% Max Depth is 1.06m Max Velocity is 2.0m/s Max Hazard is 2.13, Danger for All Mean Depth is 0.12m Mean Velocity is 0.84m/s Mean Hazard is 0.68, Caution **1% AEP (1 in 100 year) central climate change event:** Proportion is 13% Max Depth is 1.14m Max Velocity is 2.25m/s Max Hazard is 2.34, Danger for All

	Mean Depth is 0.11m Mean Velocity is 0.9m/s Mean Hazard is 0.67, Caution **1% AEP (1 in 100 year) upper climate change event:** Proportion is 17% Max Depth is 1.18m Max Velocity is 2.61m/s Max Hazard is 2.47, Danger for All Mean Depth is 0.11m Mean Velocity is 0.93m/s Mean Hazard is 0.67, Caution **Flood characteristics:** The site is shown to be at risk of flooding from all modelled scenarios. The 3.3% plus climate change allowances show significantly greater risk to the site in comparison to the present day 3.3% AEP and 1% AEP events. Flow paths extend further across the site though maximum flood depths remain largely similar to the present day 3.3% and 1% AEP events. The 1% AEP plus climate change events are similar in extent to the present day 0.1% AEP event with multiple flow paths crossing the site. The design event for the site is the 1% AEP plus 25% climate change allowance. The maximum depth is 1.14m, the maximum velocity is 2.25m/s and a maximum hazard rating of 'Danger for All' along the northern boundary. Across the site, average depths are 0.11m, average velocities are 0.9m/s, and an average hazard rating of 'Caution'.
Reservoir	The site is not located in a Wet or Dry day reservoir flooding extent, according to the EA's reservoir flood mapping.
Groundwater	**Available data and mapping:** The JBA Groundwater Flood Data Map (GW5) is provided as a 5m resolution grid.

	Flood characteristics: The JBA Groundwater Flood Data Map shows that the site is at no risk from groundwater emergence. As such the site is not considered to be susceptible to groundwater flooding, due to the nature of the local geological conditions. This should be confirmed through additional site investigation work.
Sewers	Sewer flood records from Severn Trent Water were unavailable and therefore cannot be assessed as part of this assessment. Severn Trent Water's DWMP identifies the area as od medium priority concern for internal sewer flood risk. The risk of sewer flooding should be considered within a site-specific assessment prior to development.
Flood history	From the EA's Recorded Flood Outlines mapping, there are no recorded historic extents within or in the vicinity of the site.

Flood risk management infrastructure

Existing defences	The EA's AIMS dataset shows that there are no formal defences at the site or in its vicinity.
Potential defences	The EA's AIMS dataset shows that there are no potential defences in or near the site.
Residual risk	There is residual risk to the site from the culvert along the southern boundary and the second at the lower eastern corner of the site. The culvert could pose a residual risk to the site in the event of a blockage, which could cause water to back up and encroach on the site. Developers should seek modelling of blockage scenarios for the culverts at the site.

Emergency planning

Flood warning	The site is not located within an EA Flood Alert or Flood Warning Area.
Access and egress	At present, access and egress to the site is via access points from a private access road connecting to the A4303 in the centre of the site. The second along the southern boundary onto Beaufort Boulevard. In the fluvial events, access and egress to the site remains achievable via all routes.

	During all modelled present day surface water events access and egress to the site remains achievable via the A4303. Access and escape via Beaufort Boulevard would unlikely be achievable due to the flooding to this road. During the surface water design event (1% AEP plus 25% climate change allowance) flooding is similar to the present day 0.1% AEP surface water event. Access and egress should remain achievable via the A4303. Developers will need to demonstrate safe access and egress to all parts of the site in the design surface water and fluvial events. Raising of access routes should not impede surface water flow paths.

Requirements for drainage control and impact mitigation

Broad-scale assessment of possible SuDS	**Geology and Soils** The geology consists of: • Bedrock of interbedded mudstone and limestone forming the Blue Lias Formation. • Superficial deposits of diamicton (Oadby Member), and clay, silt, sand and gravel alluvium. The soils on site consist of slowly permeable, seasonally wet, slightly acidic but base-rich loamy and clayey soils, which is likely to have impeded drainage. The composition of geology and soils at the site suggests that infiltration is unlikely to be a viable means of surface water disposal. **SuDS** • JBA Groundwater mapping suggests the site is at 'low risk' of groundwater flooding during a 1% AEP flood event, the site is not considered to be susceptible to groundwater flooding, due to the nature of the local geological conditions. However, infiltration SuDS may not always be appropriate, and the infiltration potential of the site should be confirmed through infiltration testing, in line with BRE 365.

	• The site is located within a Nitrate Vulnerable Zone. Therefore, early engagement with the LLFA and the EA is recommended to determine requirements for the site to manage the impact to surrounding watercourses. Consideration of water quality is likely to be of high importance and demonstrated through the use of the Simple Index Approach. • The site has not been identified to be located within a historic landfill site or Source Protection Zone. • SuDS measures should follow the discharge hierarchy, and if it is proposed to discharge runoff to a watercourse or sewer system, the condition and capacity of the receiving watercourse or asset should be confirmed through surveys and the discharge rate agreed with the asset owner. • Due to the topography, any surface water not intercepted via infiltration will drain via gravity at the south of the site. It is therefore recommended that the LLFA and the EA are consulted about viable discharge locations for surface water from the site and their attenuation potential.
Opportunities for wider sustainability benefits and integrated flood risk management	• Implementation of SuDS at the site could provide opportunities to deliver multiple benefits including volume control, water quality, amenity and biodiversity, helping meet requirements for the Nitrate Vulnerable Zone. This could provide wider sustainability benefits to the site and surrounding area. Proposals to use SuDS techniques should be discussed with relevant stakeholders (LPA, LLFA and EA) at an early stage to understand possible constraints. • The design of the surface water management proposals should take into account the impacts of future climate change over the projected lifetime of the development. • Opportunities to incorporate source control techniques such as green roofs, permeable surfaces and rainwater harvesting must be considered in the design of the site. • SuDS are to be designed so that they are easy to maintain, and it should be set out who will maintain the system, how the

	maintenance will be funded and should be supported by an appropriately detailed maintenance and operation manual. • SuDS should be designed with a holistic approach, combining ecology, landscape and drainage requirements specific to the site, and incorporating Biodiversity Net Gain requirements. • Opportunities to incorporate filtration techniques such as filter strips, filter drains and bioretention areas must be considered. Consideration should be made to the existing condition of receiving waterbodies and their Water Framework Directive objectives for water quality. The use of multistage SuDS treatment will improve water quality of surface water runoff discharged from the site and reduce the impact on receiving water bodies. • The potential to utilise conveyance features such as swales to intercept and convey surface water runoff should be considered. Conveyance features should be located on common land or public open space to facilitate ease of access. • SuDS should be designed in line with Leicestershire County Council's SuDS Guidance.

NPPF and planning implications

Exception Test requirements **(Local Authority Considerations)**	The Local Authority will need to confirm that the Sequential Test has been carried out in line with national guidelines. The Sequential Test will need to be passed before the Exception Test is applied. The NPPF classifies employment sites as 'Less Vulnerable' and the site is in Flood Zone 1 in its entirety, therefore the Exception Test is not required.
Requirements and guidance for site-specific Flood Risk Assessment **(Developer considerations)**	**Flood Risk Assessment:** The Level 1 SFRA has more guidance on this section and any relevant policies and information applicable to development within Harborough District Council. • The developers will need to demonstrate in a site-specific flood risk assessment that site users will be safe in the 1% AEP fluvial and surface water events including an allowance for climate change throughout the lifetime of the development. Developers should seek

	or conduct modelling of surface water at the site, and modelling of the unnamed ordinary watercourse with blockage scenarios for the two culverts. As part of the flood risk assessment, developers will need to show that the site is not at increased flood risk in the future, and that development does not increase the flood risk off site. • There is significant risk from surface water at the site, and as such flow routes should be quantified as part of the site-specific flood risk assessment, including a drainage strategy, so runoff rates are not increased by development across any ephemeral surface water flow routes. A drainage strategy should help inform site layout and design to ensure runoff rates do not exceed greenfield rates. Infiltration rates should be assessed as part of the drainage strategy. • Consultation with Harborough District Council, Leicestershire County Council, and the EA should be undertaken at an early stage. • Developers should consult with Severn Trent Water to ensure that the development aims to help achieve the targets of the Drainage and Wastewater Management Plan. • Development plans should use the Level 1 SFRA for Harborough District Council, as well as the Local Flood Risk Management Strategies to identify cumulative flood risk issues. It should also promote an integrated approach to water management. **Guidance for site design and making development safe:** • The developer will need to show, through a site-specific flood risk assessment, 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). • Raise commercial finished floor levels 600mm above the 1 in 100-year plus climate change flood level.

	• Protect and promote areas for future flood alleviation schemes. • 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). • The risk from surface water flow routes should be quantified as part of a site-specific flood risk assessment, including a drainage strategy, so runoff magnitudes from the development are not increased by development across any ephemeral surface water flow routes. A drainage strategy should help inform site layout and design to ensure runoff rates do not exceed greenfield rates. • Arrangements for safe access and egress are likely to be possible, however these will need to be considered further within a site-specific flood risk assessment for the surface water events with an appropriate allowance for climate change, using the depth, velocity, and hazard outputs.

Key messages

The site is most significantly impacted by the 0.1% AEP surface water flood event and surface water design event (1% AEP plus 25% climate change allowance), with residual risk of blockages in the two culverts along the southern boundary. Development is likely to be able to progress if:

- New development is located in areas of lowest risk, in line with the sequential approach, by steering sites away from areas with a high risk of surface water flooding.
- A site-specific flood risk assessment demonstrates that site users will be safe in the 1% AEP fluvial and surface water events, including an allowance for climate change. This will need to use detailed fluvial/surface water modelling to determine any interaction with the unnamed ordinary watercourse. Developers will need to show that the site is not at an increased risk of flooding in the future and that development of the site does not increase the risk off site. Developers should seek or conduct fluvial modelling of the unnamed ordinary watercourse, including blockage scenarios for the two culverts, at the site as part of the flood risk assessment.
- A carefully considered and integrated flood resilient and sustainable drainage design is put forward, including a site-specific Surface Water Drainage Strategy, and SuDS maintenance and management plan and supported by detailed modelling (as above), with development to

be steered away from the areas identified to be at highest risk of surface water flooding within the site. This is to be in line with the sequential approach to site layout.

- There is early engagement with the LLFA and the EA on the proposed SuDS measures and infiltration rate to discuss requirements on the site meeting relevant conditions due to the sites location within a Nitrate Vulnerable Zone.

Mapping information

The key datasets used to make planning recommendations for this site were the EA's Flood Map for Planning and the EA's Risk of Flooding from Surface Water map. More details regarding data used for this assessment can be found below.

Flood Zones	Flood Zones 2 and 3 have been taken from the EA's Flood Map for Planning mapping.
Climate change	The latest climate change allowances (updated May 2022) have been applied to the EA's RoFSW dataset.
Fluvial depth, velocity and hazard mapping	N/A
Surface water	The EA's Risk of Flooding from Surface Water (RoFSW) map has been used to define areas at risk from surface water flooding.
Surface water depth, velocity and hazard mapping	The EA's Risk of Flooding from Surface Water (RoFSW) has been used to define areas at risk from surface water flooding.