



**Borough Council of King’s Lynn and West Norfolk Level 2
Strategic Flood Risk Assessment
Detailed Site Summary Tables**

Site details

Site Code	GT42/43
Address	Land at Red Barn, Hockwold cum Wilton
Area	0.7ha
Current land use	Authorised Gypsy & Traveller Site
Proposed land use	Gypsy & Traveller Site
Flood Risk Vulnerability	Highly Vulnerable

Sources of flood risk

Location of the site within the catchment	The site is located within the Southery and District IDB area, and is drained by a complex network of drainage channels, which discharge into the Little Ouse river to the south of the site. The Little Ouse joins the River Great Ouse approximately 13km downstream to the west of the site, before flowing into the sea at the Wash. Site GT43 is located within the boundary of site GT42 and is considered here as part of the larger site.
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Topography	The site and most of the surrounding area is very flat and low lying, with elevation approximately 1.5-1.8m AOD across the site.
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Existing drainage features	There are numerous small drainage channels within the vicinity of the site which form part of the IDB drainage network, including one running along the eastern border. The Little Ouse River runs 500m to the south of the site.
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Fluvial and tidal	<p>The proportion of site at risk FMFP: FZ3 – 100% FZ2 – 0% FZ1 – 0%</p> <p>Fluvial model outputs: 3.3% AEP fluvial event – 0% 1% AEP fluvial event – 0% 0.1% AEP fluvial event – 0%</p> <p>Breach Fluvial model outputs: 1% AEP fluvial event – 0%</p> <p>Defended Tidal Model Outputs 3.3% AEP tidal event – 0% 1% AEP tidal event – 0% 0.5% AEP tidal event – 0% 0.1% AEP tidal event – 0%</p> <p>Undefended Tidal Model Outputs</p>
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	<p>3.3% AEP tidal event –0% 1% AEP tidal event- 0% 0.5% AEP tidal event – 0% 0.1% AEP tidal event –0%</p> <p>Available data: Fluvial outputs are taken from the Environment Agency’s Fenlands Flood Risk Mapping Model (2015). Undefended runs have not been undertaken since the Fenlands in its current form exists only due to the long history of land drainage and continuous management by the IDB. Rather, there is composite breach mapping available which represents the risk due to failure of embankments and key management assets during the 1% AEP scenario. Tidal outputs are taken from the Environment Agency’s The Wash Model (2018).</p> <p>Flood characteristics: The site is located within the EA’s FMfP Flood Zone 3; however, the site is shown to be at low risk in all fluvial modelled events, including in the modelled breach events. The site is protected by tidal defences to a standard greater than the 0.1% AEP event, including an allowance for climate change. It is believed that the Flood Zones in this location are based on broadscale modelling and are associated with the Little Ouse River flowing to the south of the site. It is recommended that a site-specific Flood Risk Assessment is undertaken for the site, which includes detailed modelling of the Little Ouse to confirm the risk to the site. The relevant IDBs should also be consulted, as they may have modelling which was not available for use in this study which could inform the risk to the site. The site-specific FRA should consider access and egress carefully, and if safe access and egress cannot be provided during the 0.1% AEP event including an allowance for climate change a Flood Warning and Evacuation plan should be prepared for the site.</p>
<p>Surface Water</p>	<p>Proportion of site at risk (RoFfSW): 3.3% AEP – 0% Max depth – N/A Max velocity – N/A 1% AEP – 0% Max depth – N/A Max velocity – N/A 0.1% AEP – <1% Max depth – 0.3-0.6m Max velocity – <0.25m/s</p> <p>Description of surface water flow paths: The site is in a rural area which is well drained by the network of IDB drainage channels, and there is very little risk of surface water flooding to the site identified even in the most extreme rainfall events. In the 0.1% AEP event, there is some minor ponding shown to form in the field to the east of the site, which encroaches slightly along the site border.</p>
<p>Reservoir</p>	<p>There are no reservoirs which could pose a risk to the site in event of an uncontrolled release.</p>

Groundwater	The site is within an area where there is considered to be a very low risk of groundwater emergence.
Sewers	Anglian Water's Sewer Flooding register was not available for this assessment.
Flood history	The site is not within the Environment Agency's recorded flood outlines dataset. Historic Flood Records from the LLFA were not available to support this assessment.
Flood risk management infrastructure	
Defences	The site is not shown to be protected by any formal defences and is outside the undefended modelled extents of tidal flooding.
Residual risk	As the site is not shown to benefit from defences, there is minimal residual risk to the site from breach or failure of defences.
Emergency planning	
Flood warning	The site lies within the Environment Agency's 'Ely Ouse in Cambridgeshire, Suffolk and Norfolk' Flood Alert Area. The site does not lie within an Environment Agency Flood Warning Area.
Access and egress	<p>Access and egress to the site is from Cowle's Drive. Access and egress to the site is unlikely to be affected in any tidal or surface water event.</p> <p>The site is entirely within Flood Zone 3, which has a wide extent across the surrounding area, therefore fluvial flooding has the potential to significantly impede access/egress. Depth, hazard and velocity outputs were not available for this assessment, therefore a site-specific Flood Risk Assessment should use detailed model outputs to quantify the risk to the site and implications for access/egress. If the site is shown to be at significant risk and/or access and egress is not possible in the 0.1% AEP event, a Flood Warning and Evacuation Plan should be prepared for the site. This should consider the Highly Vulnerable nature of the site and the potential for the rapid onset of flooding if defences were to breach.</p>
Dry Islands	The site is not located within a dry island during any modelled flood event; however, Flood Zones in the area are believed to be based on broadscale modelling and this should be confirmed using detailed model outputs.
Climate change	
Implications for the site	<p>Management Catchment: Cam and Ely Ouse</p> <p>Fluvial Flooding (Fenlands Flood Risk Mapping): The site is not shown to be at risk in either the 1% AEP baseline or breach fluvial events including climate change from the Environment Agency's Fenland Flood Risk Mapping model. The site is shown to be within Flood Zone 3; however, detailed model outputs for the Little Ouse River were not available for this assessment. Detailed modelling should be used to assess the risk to site in the future as part of a site-specific Flood Risk Assessment.</p> <p>Tidal Defended:</p>

	<p>The site is not shown to be at risk in the 0.1% AEP +CC (2115 epoch) tidal defended event.</p> <p>Tidal Undefended/Breaches: The site is not shown to be at risk in the 0.1% AEP +CC (2115 epoch) tidal undefended event.</p> <p>Surface Water: Climate change allowances have not been applied to the Environment Agency’s Risk of Flooding from Surface Water Dataset for this assessment. However a comparison of the extent of the 1% AEP surface water event to the 0.1% AEP surface water event suggests that the site is not sensitive to increases in surface water risk as a result of climate change and is likely to remain low risk in future.</p>
<p>NPPF and planning implications</p>	
<p>Exception Test requirements</p>	<p>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.</p> <p>The NPPF classifies Gypsy and Traveller Sites as “Highly Vulnerable”. Normally, Highly Vulnerable uses would not be permitted within Flood Zone 3. However, given the widespread extent of Flood Zone 3 within the Borough area, a pragmatic approach is required.</p> <p>The Borough Council of King’s Lynn and West Norfolk has engaged with the Environment Agency in their approach and demonstrated through a documented sequential screening process (see Main Report) that there are not sufficient sites outside Flood Zones to meet the required need. Therefore, this site has been taken forward for consultation.</p> <p>As the site is within Flood Zone 3 and Flood Zone 2, and classified as ‘Highly Vulnerable’, the Exception Test is required for this site.</p>
<p>Requirements and guidance for site-specific Flood Risk Assessment</p>	<p>Flood Risk Assessment:</p> <p>Appendix C of the Level 2 SFRA and Sections 8 and 9 of the Level 1 SFRA have more guidance on this section and any relevant policies and information applicable to development within King’s Lynn and West Norfolk borough. The Level 2 SFRA Addendum contains a summary of changes in legislation since the Level 1 and Level 2 SFRAs were completed.</p> <ul style="list-style-type: none"> • Consultation with the Borough Council of King’s Lynn and West Norfolk, Anglian Water, Southery and District IDB, and the Environment Agency should be undertaken at an early stage. • Developers should consult with Anglian Water to ensure that the development aims to help achieve the targets of the Drainage and Wastewater Management Plan. • Any FRA should be carried out in line with the National Planning Policy Framework; Flood Risk and Coastal Change Planning Practice Guidance; Borough Council of King’s Lynn and West Norfolk’s Local Plan Policies and Sustainable Drainage Design and Evaluation Guide for developers. • Flood Risk Assessments should be informed by detailed modelling including depth velocity and hazard outputs, including an allowance for climate change. <p>Guidance for site design and making development safe:</p>

- 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).
- This development is proposed within Flood Zone 3 where detailed model results were not available. Southey and District IDB should be consulted, as they may hold modelling that was not available for this study. If detailed modelling does not exist, detailed modelling should be undertaken for a Flood Risk Assessment. Careful consideration will need to be given to flood resistance and resilience measures and an appropriate Flood Warning and Evacuation Plan will be essential if modelling confirms there is significant risk to the site.
- The risk from surface water flow routes should be quantified as part of a site-specific FRA, 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 are as close as possible to greenfield rates.
- Planning permission is required to surface more than 5 square metres of unpaved ground using a material that cannot absorb water.
- Arrangements for safe access and egress will need to be demonstrated for the 0.1% AEP fluvial and surface water events with an appropriate allowance for climate change, using the depth, velocity, and hazard outputs. As access and egress will not be possible during tidal breach events, a Flood Warning and Evacuation Plan will be required.
- Consultation with RMAs early on should be implemented to ensure an appropriate flood evacuation plan is put in place for the site. This should consider the Highly Vulnerable nature of residents, widespread extents of flooding, and potential for rapid inundation of the site in event of breach.
- Flood resilience and resistance measures should be implemented where appropriate during the construction phase, e.g. raising of floor levels. These measures should be assessed to make sure that flooding is not increased elsewhere. If floor levels cannot be raised to meet the minimum requirements, developers will need to:
 - raise them as much as possible
 - include extra flood resistance and resilience measures.
- Other examples of flood resistance and resilience measures include:
 - using flood resistant materials that have low permeability to at least 600mm above the estimated flood level
 - making sure any doors, windows or other openings are flood resistant to at least 600mm above the estimated flood level
 - by raising all sensitive electrical equipment, wiring and sockets to at least 600mm above the estimated flood level.

The site is at low risk from tidal and surface water sources. However, the site is Highly Vulnerable, within Flood Zone 3, and therefore is likely to be at significant risk from fluvial flooding associated with the Little Ouse River. Normally, 'Highly Vulnerable' uses are not permitted within Flood Zone 3. However, considering the wide extent of Flood Zone 3 within the Borough, and the Borough's evidence demonstrating a clear need and lack of lower risk suitable sites, it may be appropriate to develop the site provided:

- A site-specific Flood Risk Assessment, supported by detailed modelling of the Little Ouse River demonstrates users of the site are not at risk of flooding from fluvial and surface water sources during the 0.1% AEP event including an allowance for Climate Change.
- an appropriate Flood Warning and Evacuation Plan is prepared for the site, which considers the Highly Vulnerable nature of the site and its users, the potential for rapid onset of flooding, and the potential widespread nature of flooding affecting access routes. The plan will need to demonstrate that users of the site can be warned and evacuated safely during the 0.1% AEP fluvial event, including an allowance for climate change.

Mapping Information

Flood Zones	Flood Zones 2 and 3 have been taken from the Environment Agency's Flood Map for Planning mapping.
Climate change	Climate change runs from the Environment Agency's Fenlands Flood Risk Mapping and The Wash Models have been used in this assessment.
Fluvial and tidal extents, depth, velocity and hazard mapping	Fluvial outputs are taken from the Environment Agency's Fenlands Flood Risk Mapping Model (2015). undefended runs have not been undertaken since the Fenlands in its current form exists only due to the long history of land drainage and continuous management by the IDB. Rather, there is composite breach mapping available which represents the risk due to failure of embankments and key management assets during the 1% AEP scenario. Tidal outputs are taken from the Environment Agency's The Wash Model (2018).
Surface Water	The Environment Agency's Risk of Flooding from Surface Water dataset has been used for this assessment.
Surface water depth, velocity and hazard mapping	The Environment Agency's Risk of Flooding from Surface Water dataset has been used for this assessment.