



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

Site details

Site Code	GT21
Address	Land at Four Acres, Upwell
Area	0.2ha
Current land use	Authorised Gypsy and Traveller Site
Proposed land use	Gypsy and Traveller Site
Flood Risk Vulnerability	Highly Vulnerable

Sources of flood risk

Location of the site within the catchment	The site is located on the border of the Middle Level Commissioners and Needham and Laddus IDB areas, and is drained by a complex network of drainage channels, which discharge into the River Nene (Old Course), south of the site. The river level is controlled near the site and is tidal further downstream, flowing into the sea at the Wash approximately 25km north of the site.
Topography	The site and most of the surrounding area is very flat and low lying, although the site is higher than much of the surrounding area owing to the raised land along the banks of the River Nene (Old Course). The site slopes downward from south to north with a maximum elevation of 2.9m AOD and minimum elevation of 2.4m AOD.
Existing drainage features	There are small drainage channels surrounding the site to the north, east and west, which form part of the IDB drainage network. The River Nene (Old Course) flows along the south border of the site.
Fluvial and tidal	<p>The proportion of site at risk FMFP: FZ3 – 25% FZ2 – 17% 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>

Undefended 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%

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).

Flood characteristics:

The site is located within the EA's FMfP Flood Zone 2 and 3; however, the site is shown to be at low risk in all fluvial modelled events, including in all 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 River Nene (Old Course) flowing along the southern border of the site. It is recommended that a site-specific Flood Risk Assessment is undertaken for the site, which includes detailed modelling of the River Nene (Old course) 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 area of the site not within Flood Zones is likely to be developable, although its only access route, March Riverside, follows the river and is within the Flood Zones. The site-specific FRA should therefore 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.

Surface Water**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 – 0%

Max depth – N/A

Max velocity – N/A

Description of surface water flow paths:

The site is in a rural area which is generally well drained by the network of IDB drainage channels, and there is very little/no risk of surface water flooding to the site identified in the 3.3%, 1% and 0.1% AEP events.

Surface water risk is therefore unlikely to pose any barrier to development on the site.

Reservoir	There are no reservoirs which could pose a risk to the site in event of an uncontrolled release.
Groundwater	The site is within an area where there is considered to be a 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.
Residual risk	The site is not shown to benefit from any defences and is not shown to be at risk in any modelled breach events.
Emergency planning	
Flood warning	The site lies within the Environment Agency's 'Middle Level of the Fen's in Cambridgeshire and Norfolk' Flood Alert area. The site lies within the Environment Agency's 'Middle Level Commissioner area at Pondersbridge, Turves, and Upwell' Flood Warning Area.
Access and egress	<p>Access and egress to the site is unlikely to be affected in any surface water or tidal event.</p> <p>The site has a single access route, March Riverside, which runs along the Banks of the River Nene (Old Course) and is within Flood Zones 2 and 3. Fluvial flooding therefore has the potential to significantly impede access to the site. Detailed modelling will be required to determine the exact risks to the site and access routes, which should be considered as part of a site-specific Flood Risk Assessment. 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>
Dry Islands	The site is located within a dry island based on Flood Zones 2 and 3. Detailed modelling should be undertaken, and if the site is shown to be on a dry island during any modelled event, a Flood Warning and Evacuation Plan should be prepared for the site.
Climate change	
Implications for the site	<p>Management Catchment: North West Norfolk</p> <p>Fluvial Flooding (Fenlands Flood Risk Mapping)</p> <p>The site is not shown to be at risk in either the 1% AEP baseline or breach fluvial event including climate change from the Environment Agency's Fenland Flood Risk Mapping model. The site is within Flood Zones 2 and 3, believed to be based on broadscale modelling. The difference between Flood Zone 2 and 3 extents suggest the site is sensitive to increased fluvial flooding as a result of climate change and detailed modelling should be</p>

	<p>undertaken as part of a site-specific Flood Risk Assessment to confirm the impact.</p> <p>Tidal Defended 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 any undefended/breach scenarios, including an allowance for climate change, even during extreme events.</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 unlikely to be at increased risk from surface water in future as a result of climate change.</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, Middle Level Commissioners and Needham and Laddus IDBs, 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. Flood Zones in the vicinity of the site are believed to be based on broadscale modelling, therefore detailed modelling will need to be undertaken as part of the site-specific assessment if detailed modelling is not held by the IDBs.

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).
- If a site-specific FRA and drainage strategy with detailed modelling of surface water at the site showed pluvial flood risk, runoff magnitudes from the development should not be 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.
- Detailed modelling will be required to determine the exact risks to the site and access routes, which should be considered as part of a Site-Specific Flood Risk Assessment. 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.
- Consultation with RMAs early on should be implemented to ensure any flood evacuation plan put in place for the site is appropriate. This should consider the Highly Vulnerable nature of residents, widespread extents of flooding, and potential for the site to be on a dry island during an extreme event.
- 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 generally at low risk from surface water and tidal flooding. However, the site is 'Highly Vulnerable' and within Flood Zones 2 and 3. 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 demonstrates users of the site are not at risk of flooding from fluvial 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, 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.