



Site off Broad Lane, Cottenham

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# FLOOD RISK: TECHNICAL NOTE





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## **FLOOD RISK: TECHNICAL NOTE**

**TECHNICAL NOTE (RV3) CONFIDENTIAL**

**PROJECT NO. 70050606**

**OUR REF. NO. TN01**

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Site off Broad Lane, Cottenham

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## **FLOOD RISK: TECHNICAL NOTE**

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## EXECUTIVE SUMMARY

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This High Level Technical Note has been prepared, on behalf of Landhold Capital, to support the planning representation for a proposed residential development at the 'Site off Broad Lane, Cottenham (Post Code: CB24 8SW),' with regards to fluvial flood risk only.

Reference to the Environment Agency (EA) Flood Map for Planning currently identifies the Site to predominantly lie within Defended Flood Zone 3, with Formal Flood Defences forming the banks of the Cottenham Lode.

A site-specific hydraulic modelling study has been undertaken which demonstrates the entirety of the Site to be at no risk of fluvial flooding in the 1 in 100 year 'defended' or 'undefended' scenarios, assumed equivalent to the Flood Zone 3.

Based on the site-specific modelling undertaken, it is considered that the EA Flood Map for Planning is not wholly representative of the potential fluvial flood risk to the Site. The Site not identified to be within the extents of Flood Zone 3 and is considered appropriate for the proposed residential development, in accordance with the NPPF and PPG.

In accordance with best practice, active consultation has been undertaken with the EA to inform the site-specific hydraulic modelling, with liaison ongoing with respect to the findings.

## 1. SITE SETTING

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1.1.1. WSP UK Ltd. has been appointed by Landhold Capital to undertake a site-specific fluvial hydraulic modelling study to support the planning representation for the proposed development at the 'Site off Broad Lane, Cottenham (Post Code: CB24 8SW),' hereafter referred to as the Site.


### 1.2. LOCATION

1.2.1. The Site, comprising approximately 7.1ha, is located off Broad Lane, to the north of Cottenham, South Cambridgeshire, CB24 8SW. The Site is bound by existing residential development to the south, a farm to the north, agricultural land to the west and Broad Lane to the east..

1.2.2. A Site location plan is shown in Figure 1-1.



#### KEY:

 Site Boundary

**Figure 1-1 - Site Boundary**

## 2. FLOOD ZONES

2.1.1. The following sections summarises the currently identified Flood Zones, in accordance with the Environment Agency (EA) Flood Map for Planning and the Site-Specific Hydraulic Modelling Study.

2.1.2. With respect to Flood Zones, these are defined, by the EA, in the following manner:

- Flood Zone 1 is land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%)
- Flood Zone 2 is land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year
- Flood Zone 3 is land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year

### 2.2. FLOOD MAP FOR PLANNING

2.2.1. Reference to the EA Flood Map for Planning identifies that the Site lies predominantly within 'Defended' Flood Zone 3, with a small localised area identified to be in Flood Zone 2 and the remainder identified to be Flood Zone 1. There are Formal Flood Defences forming the banks of the Cottenham Lode.

2.2.2. The EA Flood Map for Planning at the Site is reproduced as Figure 2-1.



#### KEY:

- Cottenham Lode
- Site Boundary
- EA Flood Zone 3
- EA Flood Zone 2
- Flood Defences
- Areas Benefitting from Defences

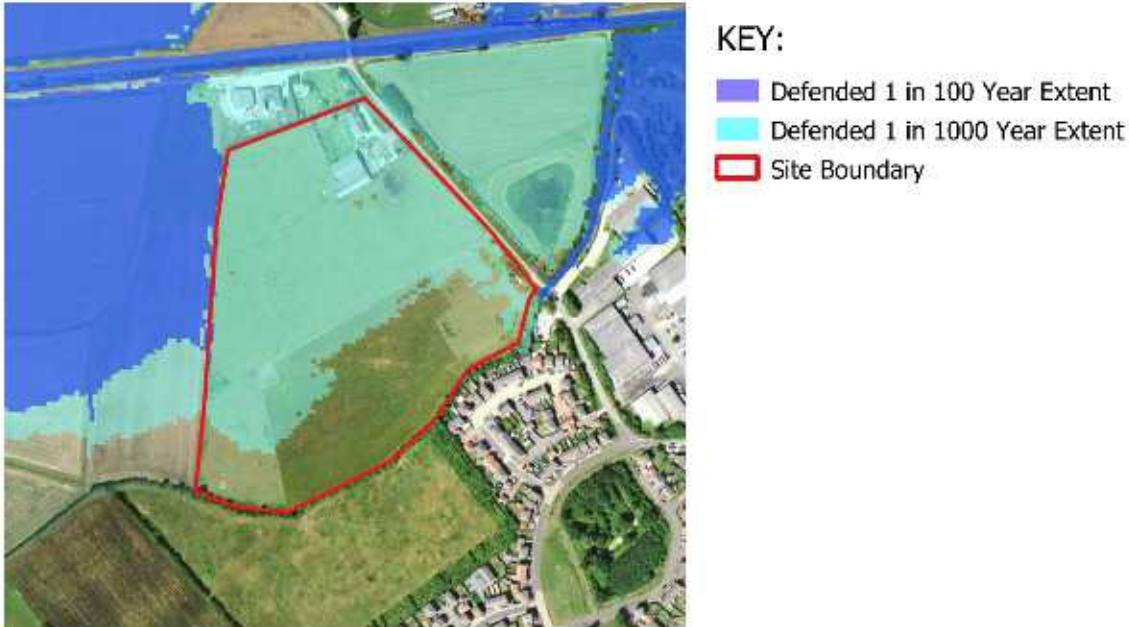
Figure 2-1 - Environment Agency Flood Map for Planning

### 2.3. SITE-SPECIFIC MODELLING

2.3.1. In accordance with best practice, active consultation has been undertaken with the EA with regard to the potential fluvial flood risk to the Site. Through acceptance of a Model Scoping Note (ref. 70050606 SN001 Rv1), it was agreed with the EA to undertake a site-specific modelling study to enhance understanding of the potential fluvial flood risk. This study included

assessment of 'defended,' 'undefended' and 'breach' scenarios, which will be submitted, for review to the EA.

- 2.3.2. Based on the site-specific hydraulic modelling, the respective EA Flood Zones, assuming these to be equivalent to the 1 in 100 Year and 1 in 1000 Year 'defended' modelled extents, may be considered to be as shown in Figure 2-2.



**Figure 2-2 - Modelled Flood Zones Equivalent Result**

- 2.3.3. While removal of formal flood defences is considered to be highly unlikely and breaches in formal flood defences is considered to be 'rare,' 'undefended' and 'breach' scenarios have been assessed. The Site is shown to be at residual risk of fluvial flooding in the 1 in 100 year and 1 in 1,000 year 'breach' scenarios, with potential risk of fluvial flooding in the 1 in 1,000 year 'undefended' scenario.

## 2.4. COMPARISON OF FLOOD MAP FOR PLANNING AND SITE-SPECIFIC MODELLING

- 2.4.1. The Flood Map for Planning compared against the site-specific model outputs for the Flood Zone 3, assumed to be equivalent to 1 in 100 Year 'defended' event, and Flood Zone 2, assumed to be equivalent to 1 in 1000 Year 'defended' event, at the Site are shown in Figure 2-3 and Figure 2-4 respectively.



KEY:

- Defended 1 in 100 Year Extent
- EA Flood Zone 3
- Site Boundary

**Figure 2-3 – Comparison of 'Flood Zone 3' Extents**



KEY:

- Defended 1 in 1000 Year Extent
- EA Flood Zone 2
- Site Boundary

**Figure 2-4 - Comparison of 'Flood Zone 2' Extents**

### 3. PLANNING CONTEXT

#### 3.1. NATIONAL PLANNING POLICY FRAMEWORK 2019

- 3.1.1. The Updated National Planning Policy Framework (NPPF), first published in 2012 and most recently in February 2019, sets out the Government's national policies for flood risk management in a land use planning context within England.
- 3.1.2. Paragraph 155 of the NPPF states "Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere."
- 3.1.3. The guidance further states that local planning authorities should '*ensure that flood risk is not increased elsewhere.*' Allocation and planning of development should therefore be considered against a risk based search sequence as provided by the supporting Planning Practice Guidance (PPG).

#### 3.2. PLANNING PRACTICE GUIDANCE

- 3.2.1. The publicly available Planning Practice Guidance (PPG) advises how to take account of and address the risks associated with flooding and coastal change in the planning process, in accordance with the NPPF.
- 3.2.2. As previously noted, site-specific modelling has been undertaken which demonstrates none of the Site to be located within Flood Zone 3, with the remainder identified to be within Flood Zones 1 and 2. As it is currently proposed to develop the Site for residential purposes, the proposed use would be classified as 'More Vulnerable,' in accordance with PPG Table 2. Further to this, PPG Table 3 identifies which Flood Zones may be considered appropriate for the proposed development. As shown in Table 1, which comprises PPG Table 3, the Site may be considered appropriate, in its entirety, for residential purposes in accordance with PPG and the NPPF.

**Table 1 - Flood Vulnerability and Flood Zone Compatibility (PPG Table 3)**

		Flood Risk Vulnerability Classification				
		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Fluvial Flood Zone	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test Required	✓	✓
	Zone 3a	Exception Test Required	✓	✗	Exception Test Required	✓
	Zone 3b	Exception Test Required	✓	✗	✗	✗

- 3.2.3. While the entirety of the site may be considered appropriate for residential development, PPG requires assessment of climate change to demonstrate how a development will be managed for its lifetime. Within the site-specific modelling,

3.2.4. It is considered 'best-practice' to locate all development outside of the maximum extents of the 1 in 100 Year plus 35% Climate Change allowance. The site-specific hydraulic modelling in the 1 in 100 Year plus 35% Climate Change allowance for the 'defended' scenario is shown in Figure 3-1. The site-specific hydraulic modelling demonstrates that approximately 4ha of the Site is outside of the modelled flood extent.



**Figure 3-1 - 1 in 100 Year plus Climate Change Maximum Flood Extent in 'Defended' Scenario and Identified Potential Developable Land Area.**

## 4. CONCLUSIONS & RECOMMENDATIONS

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### 4.1. CONCLUSIONS

- 4.1.1. The EA Flood Map for Planning currently identifies that the Site lies predominantly within Defended Flood Zone 3, benefitting from Formal Flood Defences.
- 4.1.2. The site-specific hydraulic modelling demonstrates the entirety of the Site to be at no risk of fluvial flooding in the 1 in 100 year 'defended' or 'undefended' scenarios, assumed equivalent to the Flood Zone 3.
- 4.1.3. Based on the site-specific modelling undertaken to date, it may be considered that the EA Flood Map for Planning is not wholly representative of the potential fluvial flood risk to the Site. Based on the site-specific modelling, the Site is not identified to be within the extents of Flood Zone 3 and therefore is considered appropriate for the proposed residential development, in accordance with the NPPF and PPG.
- 4.1.4. With respect to areas appropriate for development, it is considered 'best-practice' to locate all development outside of the extents of the 1 in 100 year plus 35% climate change extent. Based on the works undertaken to date, this identifies a minimum developable area of approximately 4ha.

### 4.2. RECOMMENDATIONS

- 4.2.1. Given that the site-specific modelling has demonstrated that the EA Flood Map for Planning is not wholly representative of the potential fluvial flood risk to the Site, it is recommended that liaison with the EA is continued, with the potential to undertake a Formal Flood Map Challenge, should it be required.
- 4.2.2. Further to this, measures may be integrated within the proposed development to enhance the resilience and mitigate the potential residual fluvial flood risk from a potential breach, pending acceptance by the EA. Given this, it is recommended to undertake active liaison with the EA to determine the most appropriate measures, if any, to be implemented. These may include, but are not exclusive to, protection and integration of primary flow routes, potential ground re-profiling or elevated finished floor levels, implementation of flood resilient design and active maintenance and inspection of the Formal Flood Defence.

## LIMITATIONS OF THIS TECHNICAL NOTE

WSP has prepared this Note in accordance with the instructions of Landhold Capital for their specific use. Any person who uses any information contained herein do so at their own risk.

The conclusions and recommendations contained herein are limited by the availability of background information and the planned use for the Site.

Third party information has been used in the preparation of this report, which WSP assumes is correct at the time of writing. Whilst all reasonable checks have been made on data sources and the accuracy of the data, WSP does not accept no liability for third-party data.

The general limitations of this Technical Note are that:

- A number of sources have been used to compile this report, which WSP has relied upon; WSP is unable to guarantee the accuracy of the information that has been provided by others.
- Fluvial flooding is a natural process. Natural processes are inherently random, therefore the outputs produced by the baseline model, or any forthcoming models, cannot be considered to be a definitive representation of a single flood event. Fluid flow within rivers and on floodplains is governed by a set of complex physical processes. Hydraulic modelling requires the necessary simplification of these processes into mathematical models, thereby it may only be considered to be a simplified representation of a single flood event.
- At this stage, the hydraulic modelling undertaken to date does not include any representation of the proposed development.



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