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# Huntingdonshire Level 2 Strategic Flood Risk Assessment Site Summary

## Site CfS:242

## Final Draft Report

**Prepared for**

Huntingdonshire District Council

**Date**

November 2025

# Document Status

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# Contract

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| JBA Project Code | 2022s1322 |

This report describes work commissioned by Huntingdonshire District Council by an instruction via email dated 21 July 2025. The Client's representative for the contract was Frances Schulz of Huntingdonshire District Council. Amy Ewens of JBA Consulting carried out this work.

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The methodology adopted and the sources of information used by JBA in providing its services are outlined in this Report. The work described in this Report was undertaken between 21 July 2025 and 6 November 2025 and is based on the conditions encountered and the information available during the said period. The scope of this Report and the services are accordingly factually limited by these circumstances.

The conclusions and recommendations contained in this Report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate.


## Acknowledgements

We would like to thank the Environment Agency, Cambridgeshire County Council for their assistance with this work.

## Copyright

# Contents

## List of Figures

## List of Tables

# 1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for Local Plan Site CfS:242. The content of this report assumes the reader has already consulted the 'HDC Level 1 SFRA' (2024) and read the 'HDC Level 2 SFRA Main Report' (2025) and is therefore familiar with the terminology used in this report.

## 1.1 Site CfS:242

- Location: Land off Huntingdon Road, Brampton
- Existing site use: Agricultural
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Hinchingbrooke Country Park and a car park
- Proposed site use vulnerability: Less vulnerable
- Site area (ha): 5.78
- Watercourse: Unnamed ordinary watercourse, tributary to the Alconbury Brook (EA main river)
- Environment Agency (EA) model: Lower Ouse - Alconbury Brook 2015
- Summary of requirements from Level 2 SFRA scoping stage:
    - Subject to the Exception Test as more vulnerable development proposed in Flood Zone 3a
    - Assessment of fluvial flood depths, velocities and hazards
    - Assessment of surface water flood extent, depths and hazards
    - Assessment of all other sources of flood risk

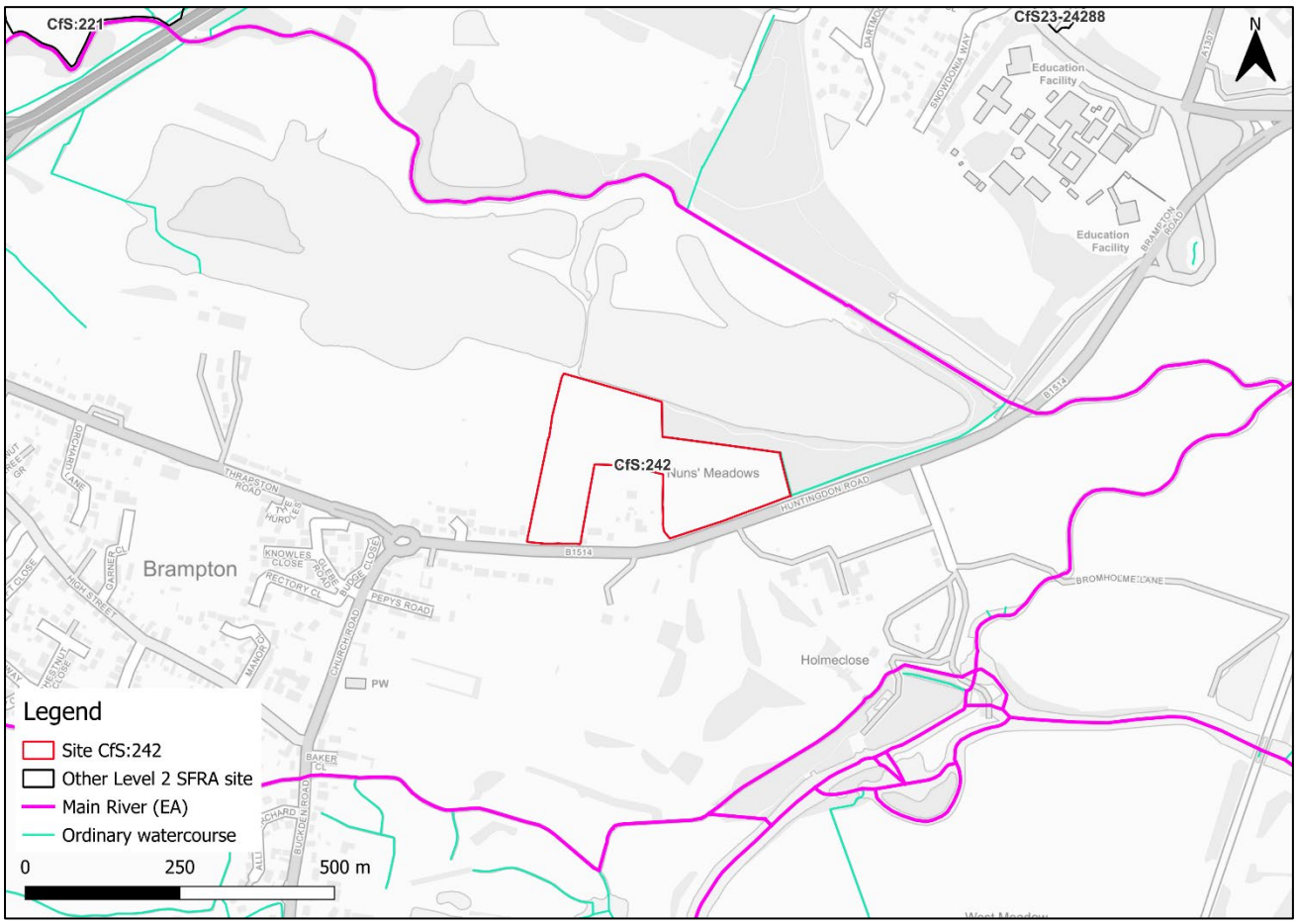


Figure 1-1: Existing site location boundary

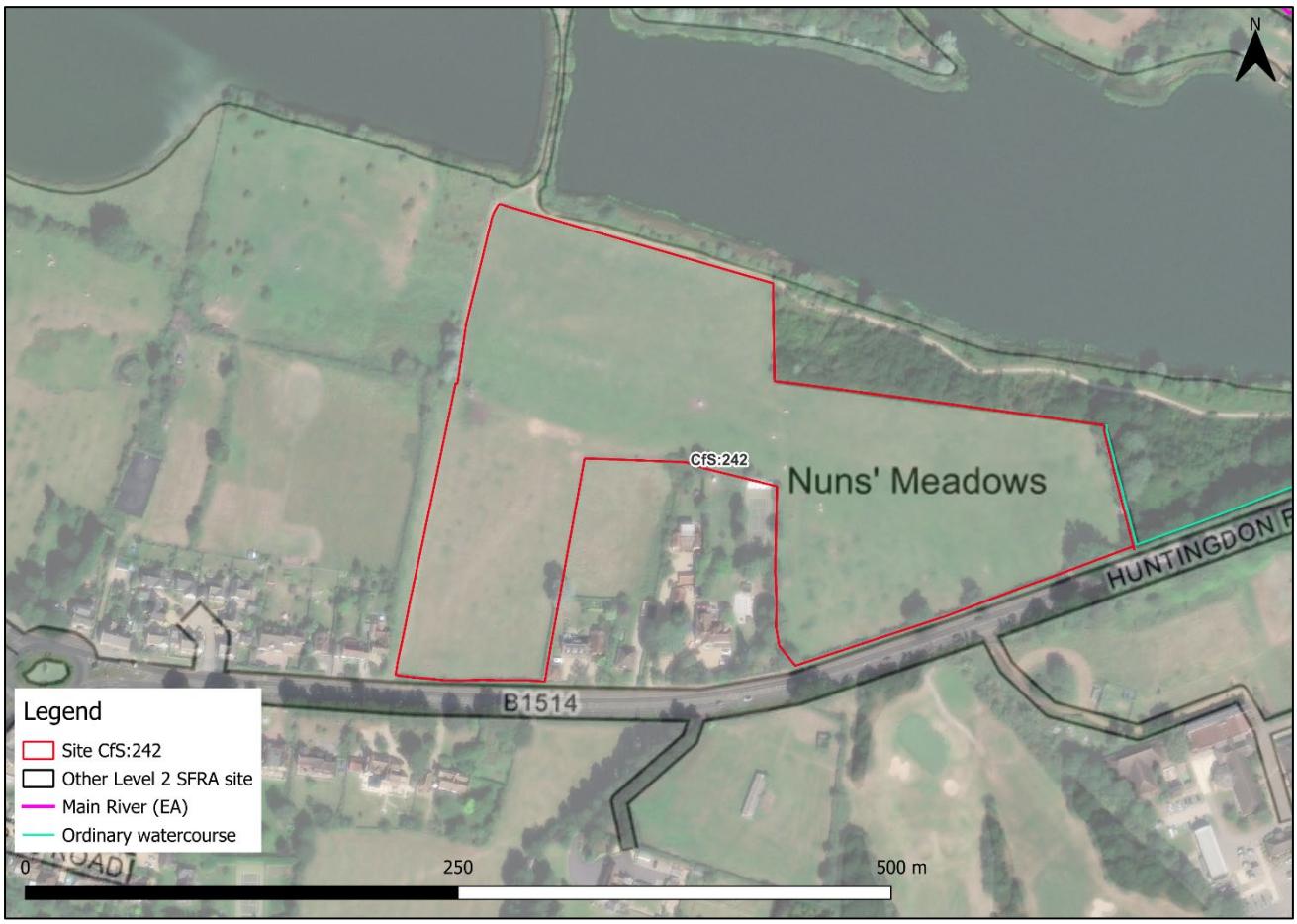


Figure 1-2: Aerial photography

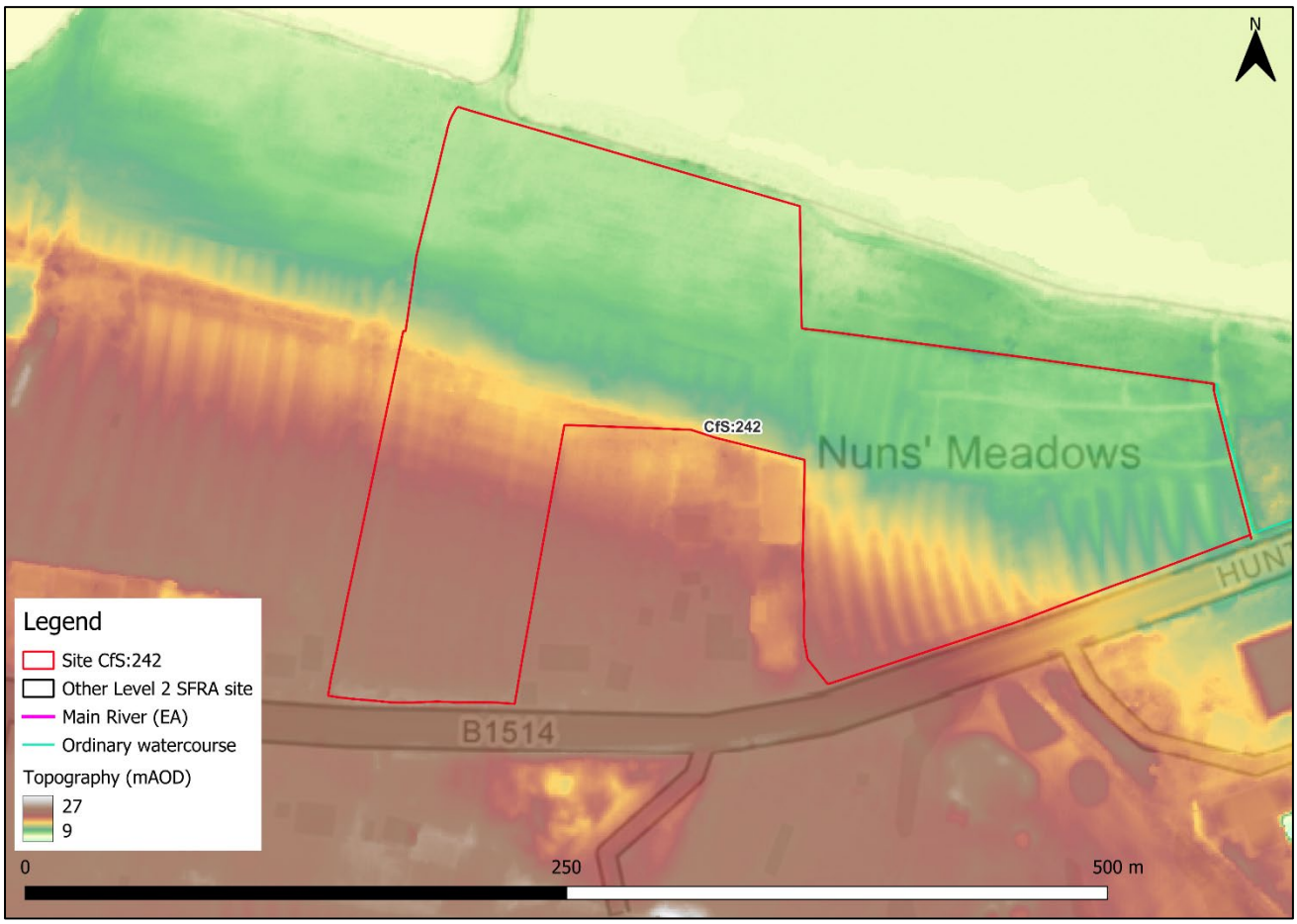


Figure 1-3: Topography

# 2 Flood risk from rivers and sea

## 2.1 Existing risk

### 2.1.1 Flood Map for Planning and functional floodplain

Based on the EA's Flood Map for Planning (accessed July 2025) and Flood Zone 3b (functional floodplain), as updated in this Level 2 SFRA, the percentage areas of the site within each flood zone are stated in Table 2-1 and can be viewed on Figure 2-1. This version of the Flood Map for Planning does not consider flood defence infrastructure (Section 2.2) or the impacts of climate change (Section 2.3).

The majority of the site is located within Flood Zone 3b, which is based on the outputs from the fluvial Lower Ouse 2015 (Alconbury Brook) model. More vulnerable development is not permitted in Flood Zone 3b. The southern extent of the site is located within Flood Zone 1 and therefore at low risk from rivers and the sea.

Flood Zone 2 is different to the equivalent model outputs for reasons unknown at this stage. Flood Zones 3a and 3b appear to be based on the outputs from the fluvial Lower Ouse 2015 (Alconbury Brook) model.

Table 2-1: Existing flood risk based on percentage area of site at risk

| Flood Zone 1 (% area) | Flood Zone 2 (% area) | Flood Zone 3a (% area) | Flood Zone 3b (% area) |
|---|---|---|---|
| 25 | 11 | 1 | 63 |

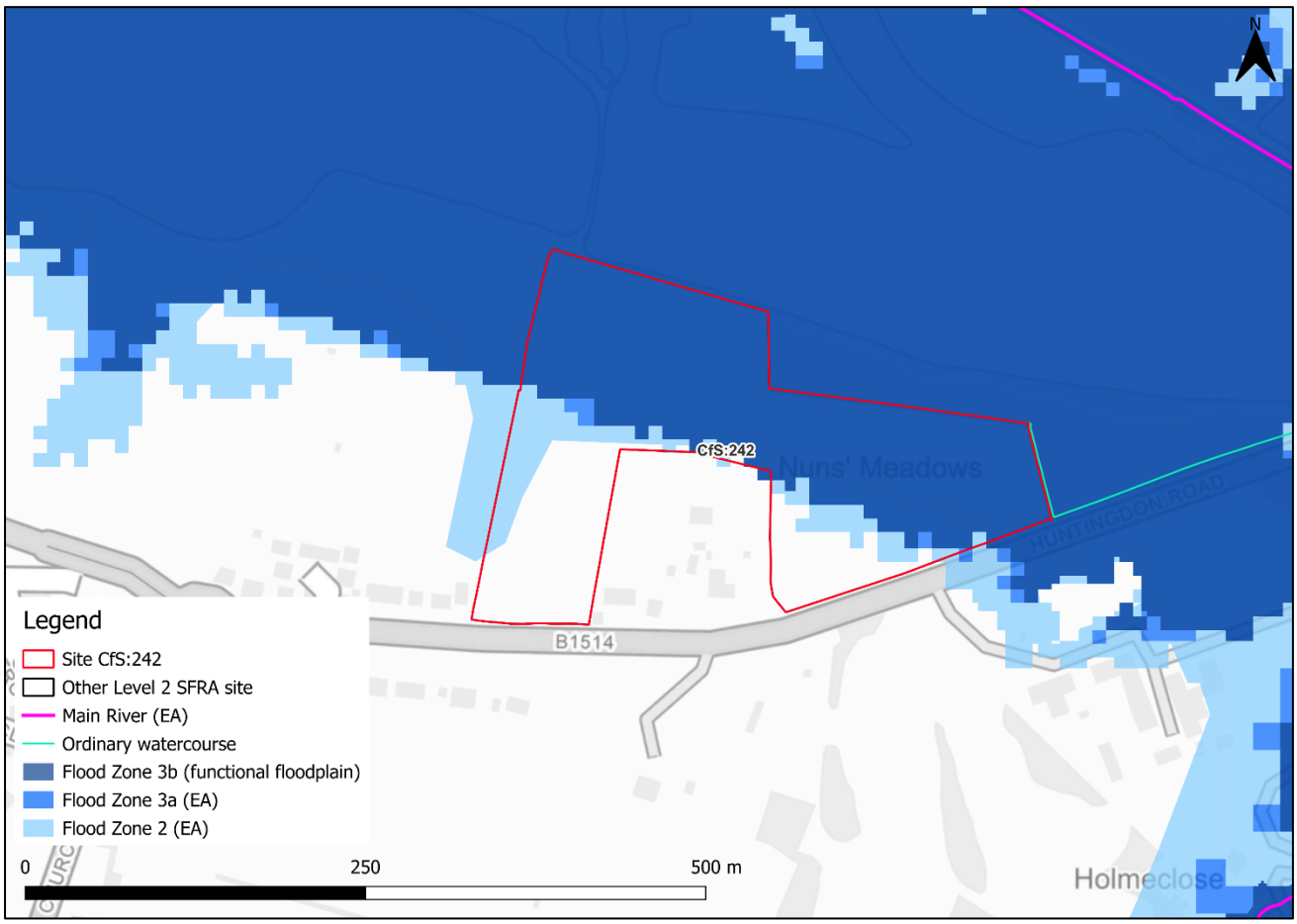


Figure 2-1: Existing risk

### 2.1.2 Fluvial undefended model outputs (Alconbury Brook, 2015)

The Lower Ouse - Alconbury Brook (2015) detailed model shows that during the 1% AEP event, the north and east of the site is at risk of flooding from the Alconbury Brook. A large range of flood depths are modelled to occur, with flood flooding in the centre of the site modelled to remain below 0.15m and flooding in the north of the site, a topographic low spot, modelled to exceed 1.2m (Figure 2-2). Flood velocities are modelled to predominantly remain below 0.25m/s (Figure 2-3). Flooding is modelled to be a danger for some (Figure 2-4).

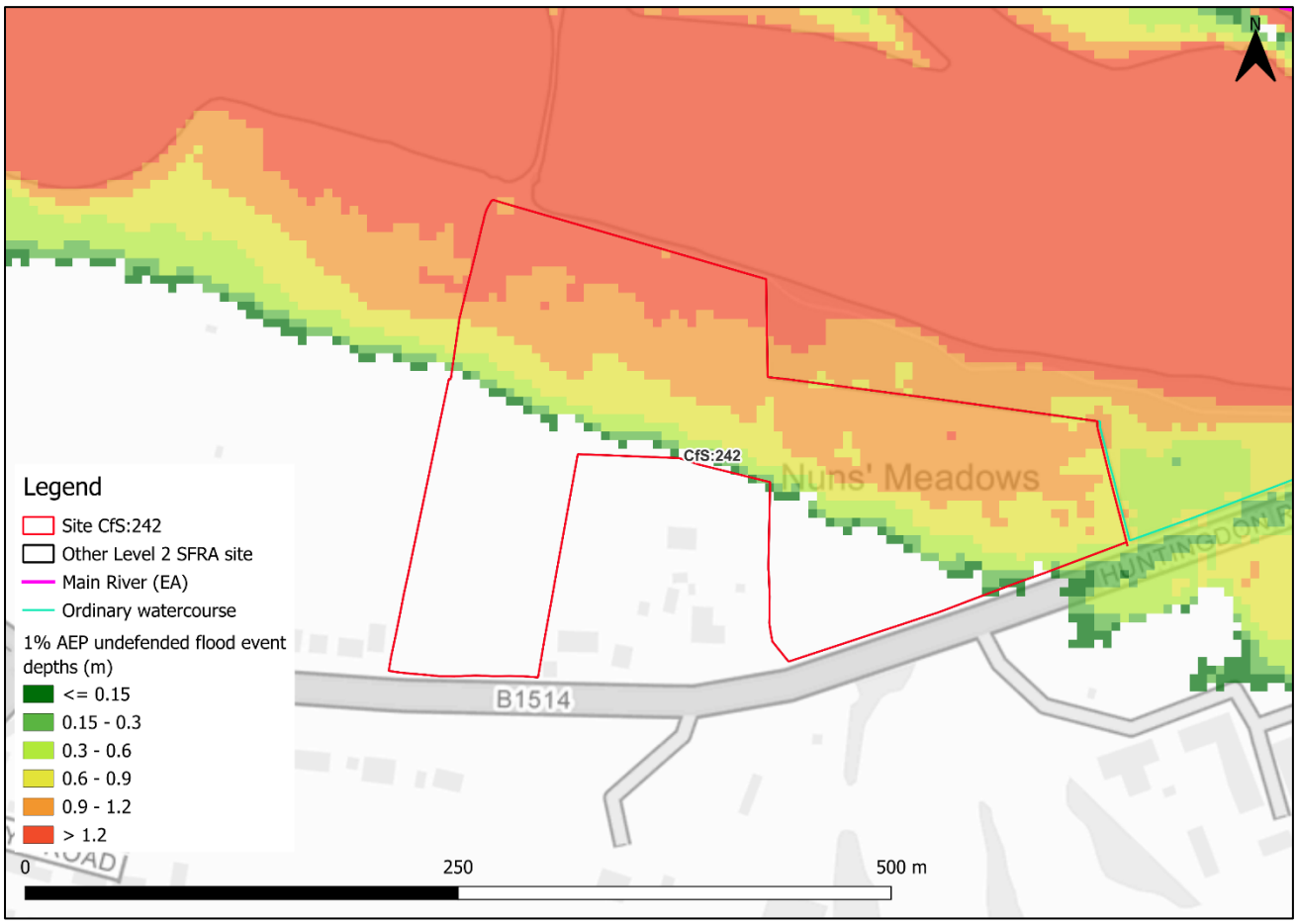


Figure 2-2: Flood depths for 1% AEP undefended flood event

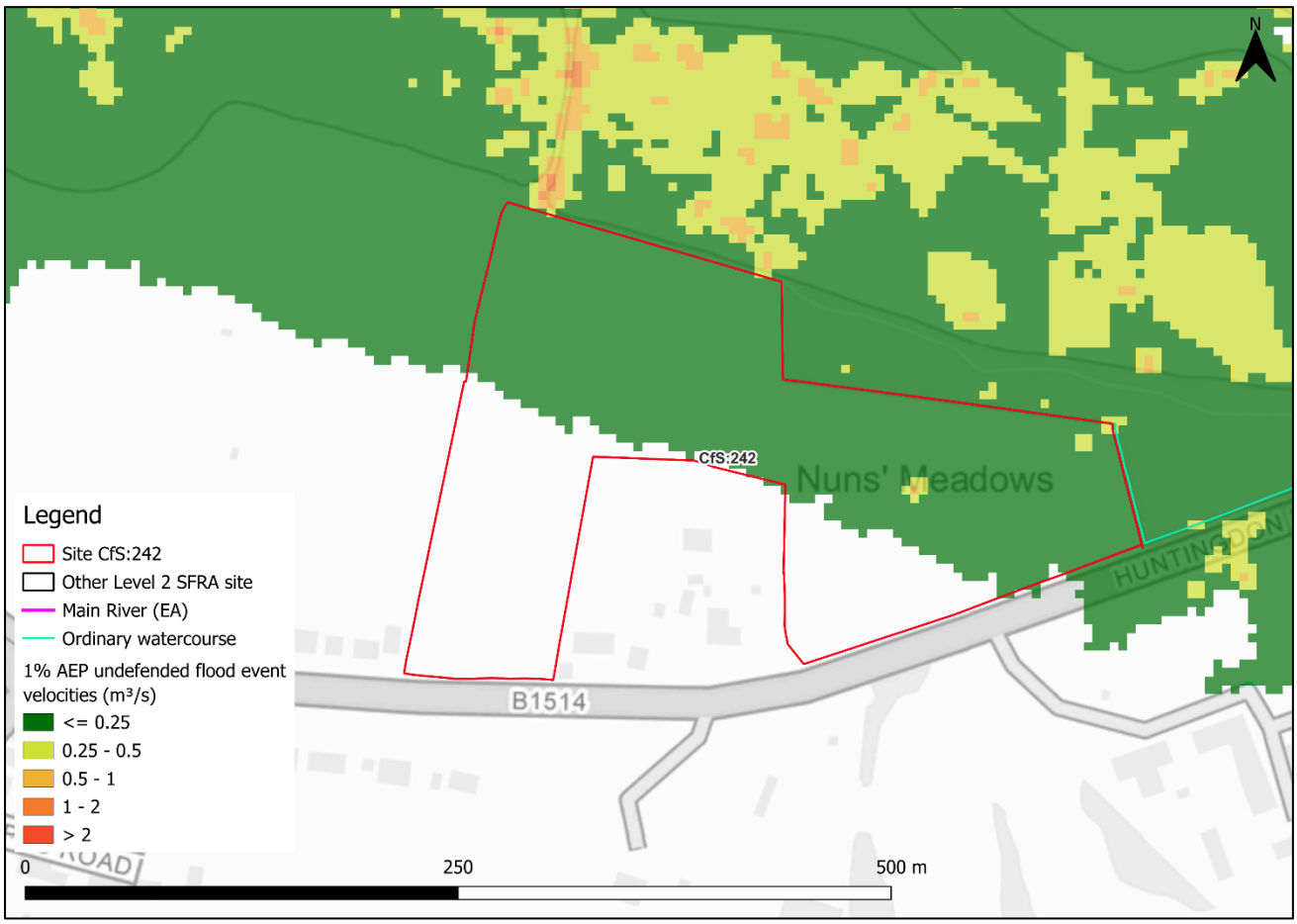


Figure 2-3: Flood velocities for 1% AEP undefended flood event

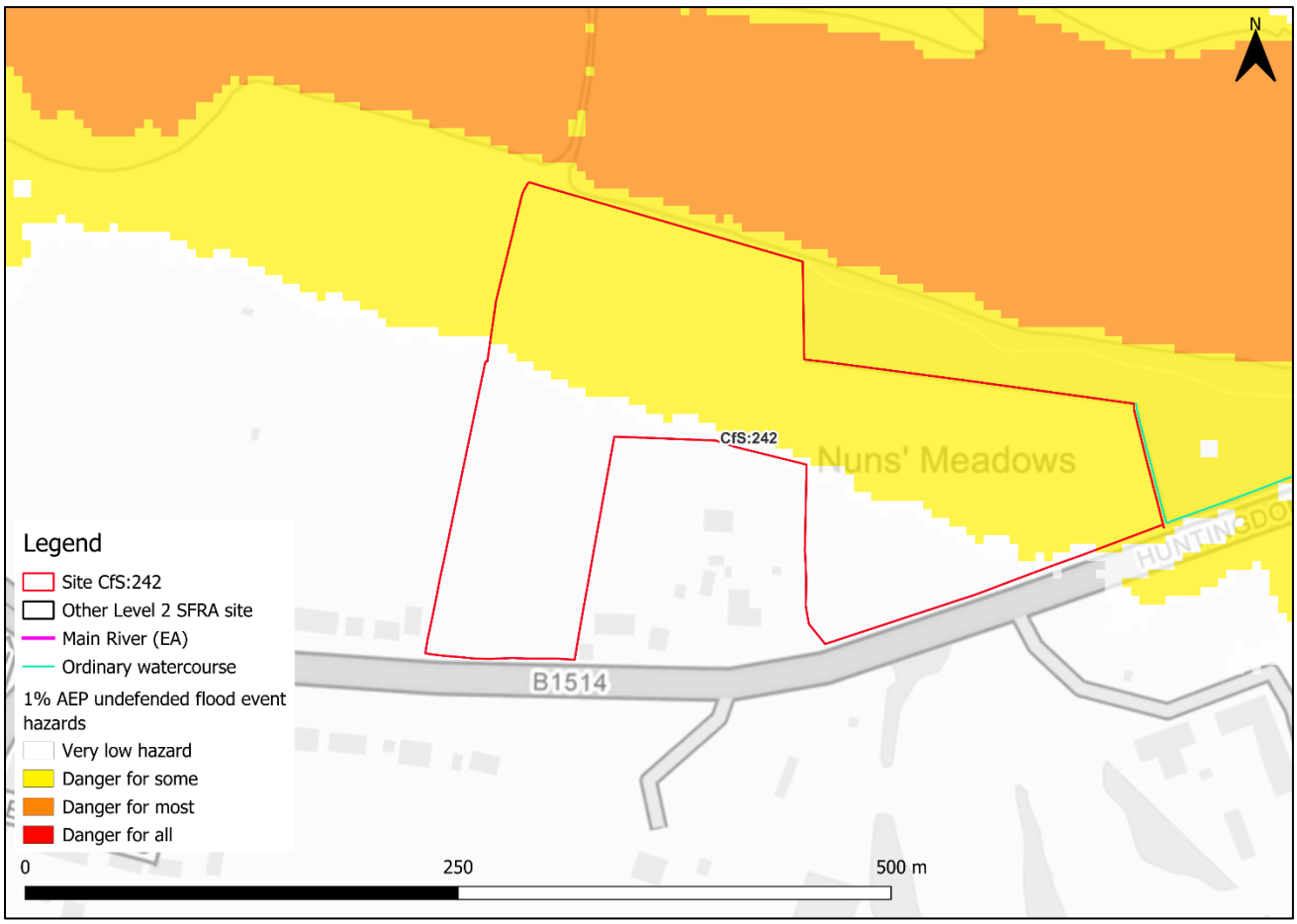


Figure 2-4: Flood hazard[1] for 1% AEP undefended flood event

## 2.2 Flood risk management

### 2.2.1 Flood defences

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

### 2.2.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. These areas are shown in Figure 2-5. Note, the WwNP mapping is broadscale and indicative, therefore further investigation will be required for any land shown to have potential for WwNP. There is significant potential within and upstream of the site for tree planting to reduce flood risk.

1 Fluvial hazard ratings based on Table 4 of the SUPPLEMENTARY NOTE ON FLOOD HAZARD RATINGS AND THRESHOLDS FOR DEVELOPMENT PLANNING AND CONTROL PURPOSE – Clarification of the Table 13.1 of FD2320/TR2 and Figure 3.2 of FD2321/TR1. May 2008.

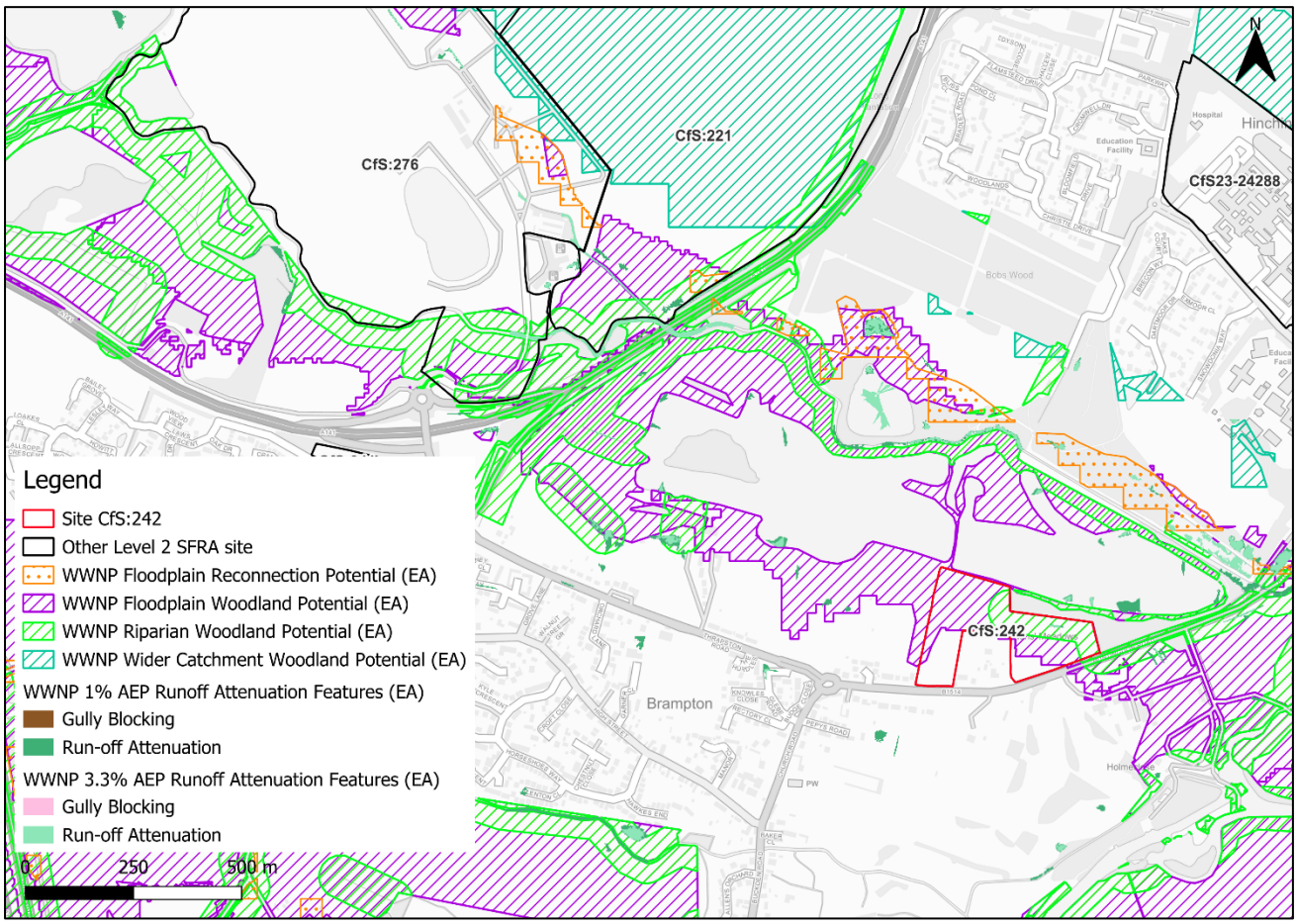


Figure 2-5: Natural Flood Management (NFM) potential mapping

## 2.3 Impacts from climate change

### 2.3.1 Fluvial

The EA's SFRA guidance states that SFRAs should assess the central allowance for less, more, highly vulnerable, and water compatible development. The higher central allowance should be assessed for essential infrastructure.

The impacts of climate change on flood risk from the Alconbury Brook have been modelled with and without flood defence infrastructure in place, where applicable.

With consideration of the EA's SFRA guidance, the latest central and higher central climate change allowances have been modelled as shown in Table 2-2.

Table 2-2: Modelled climate change allowances for peak river flows for the Upper and Bedford Ouse management catchment

| Return period (AEP event) | Central allowance 2080s (% increase) | Higher central allowance 2080s (% increase) |
|---|---|---|
| 2% as a proxy for 3.3% which is not available | 19 | 30 |

| Return period (AEP event) | Central allowance 2080s (% increase) | Higher central allowance 2080s (% increase) |
|---|---|---|
| 1% | 19 | 30 |
| 0.1% | Model would not run for this scenario | |

The Lower Ouse - Alconbury Brook (2015) detailed model shows that during the 1% AEP plus climate change event, the area modelled to be at risk of flooding from the Alconbury Brook does not increase in extent. However, a larger area of flooding is modelled to exceed 1.2m in depth (Figure 2-6). Flooding is still modelled to remain predominantly remain below velocities of 0.25m/s (Figure 2-7) and be a danger for some (Figure 2-8).

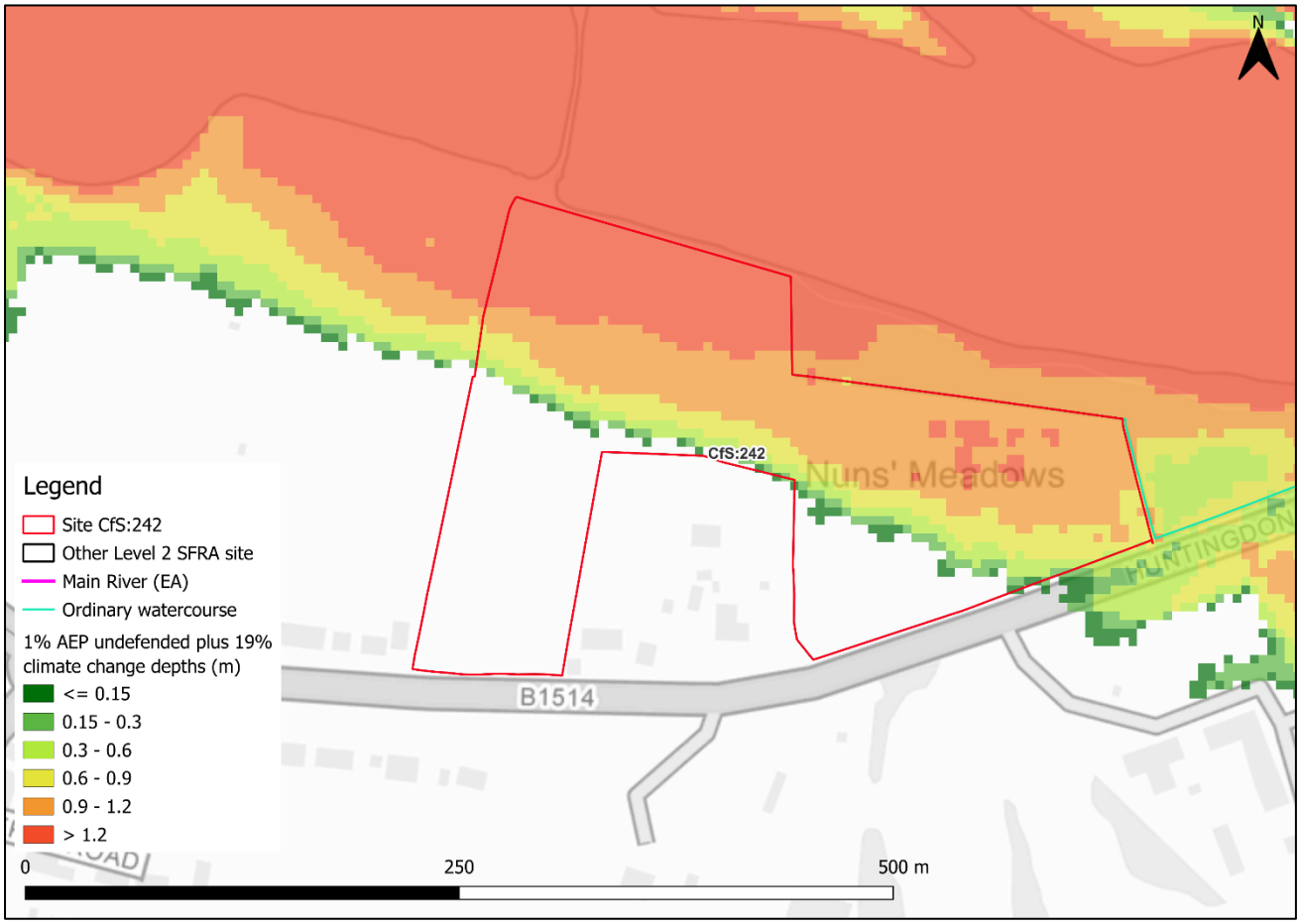


Figure 2-6: Flood depths for 1% AEP undefended flood event +19% (central climate change allowance)

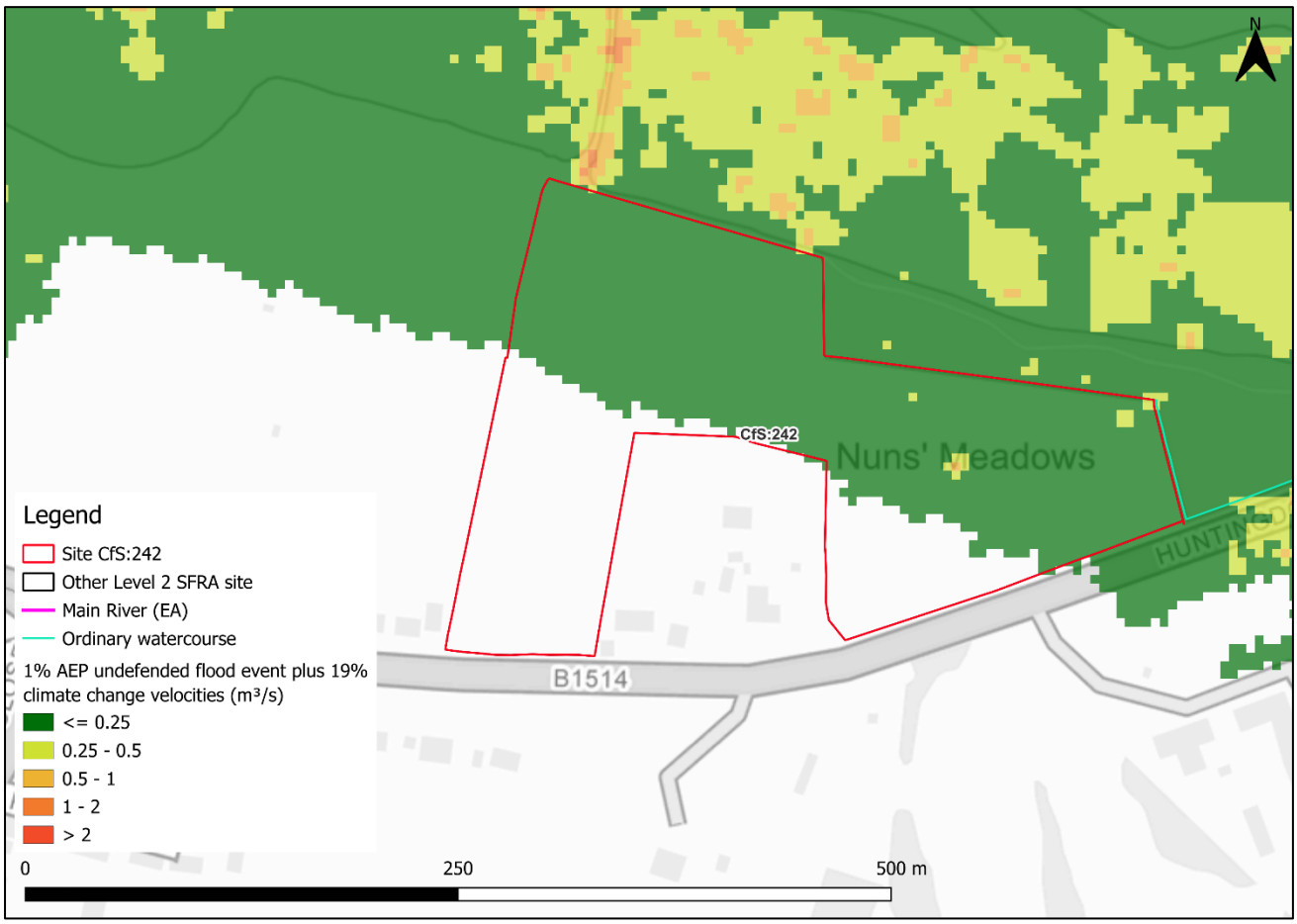


Figure 2-7: Flood velocities for 1% AEP undefended flood event +19% (central climate change allowance)

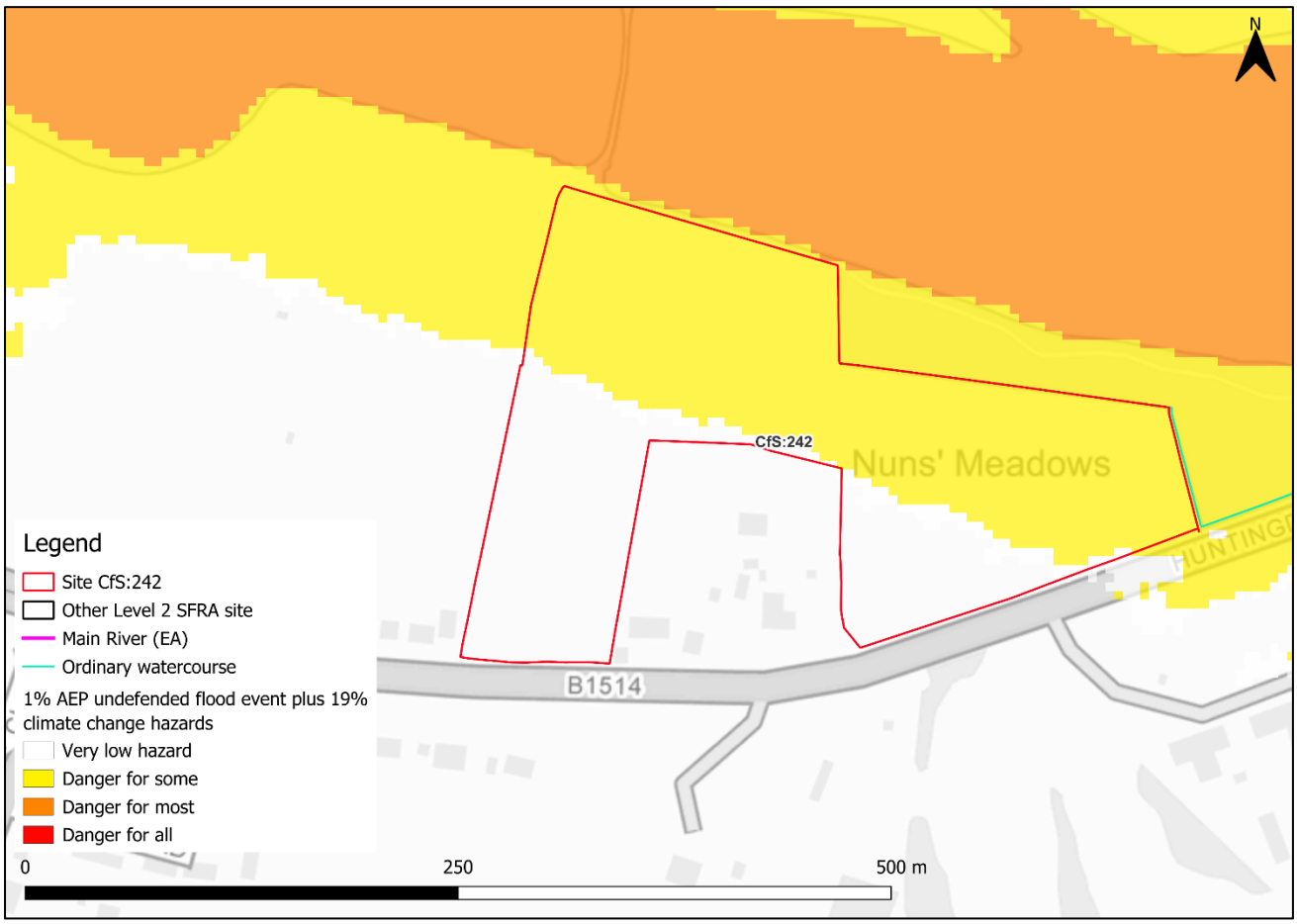


Figure 2-8: Flood hazard[1] for 1% AEP undefended flood event +19% (central climate change allowance)

### 2.3.2 Tidal

The EA's Flood Map for Planning shows the site is not at risk from tidal climate change.

## 2.4 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered and mapped in Figure 2-9 which shows two flood events, March 1947, and April 1998, impacting the north and east of the site. The flood source for both events is unknown.

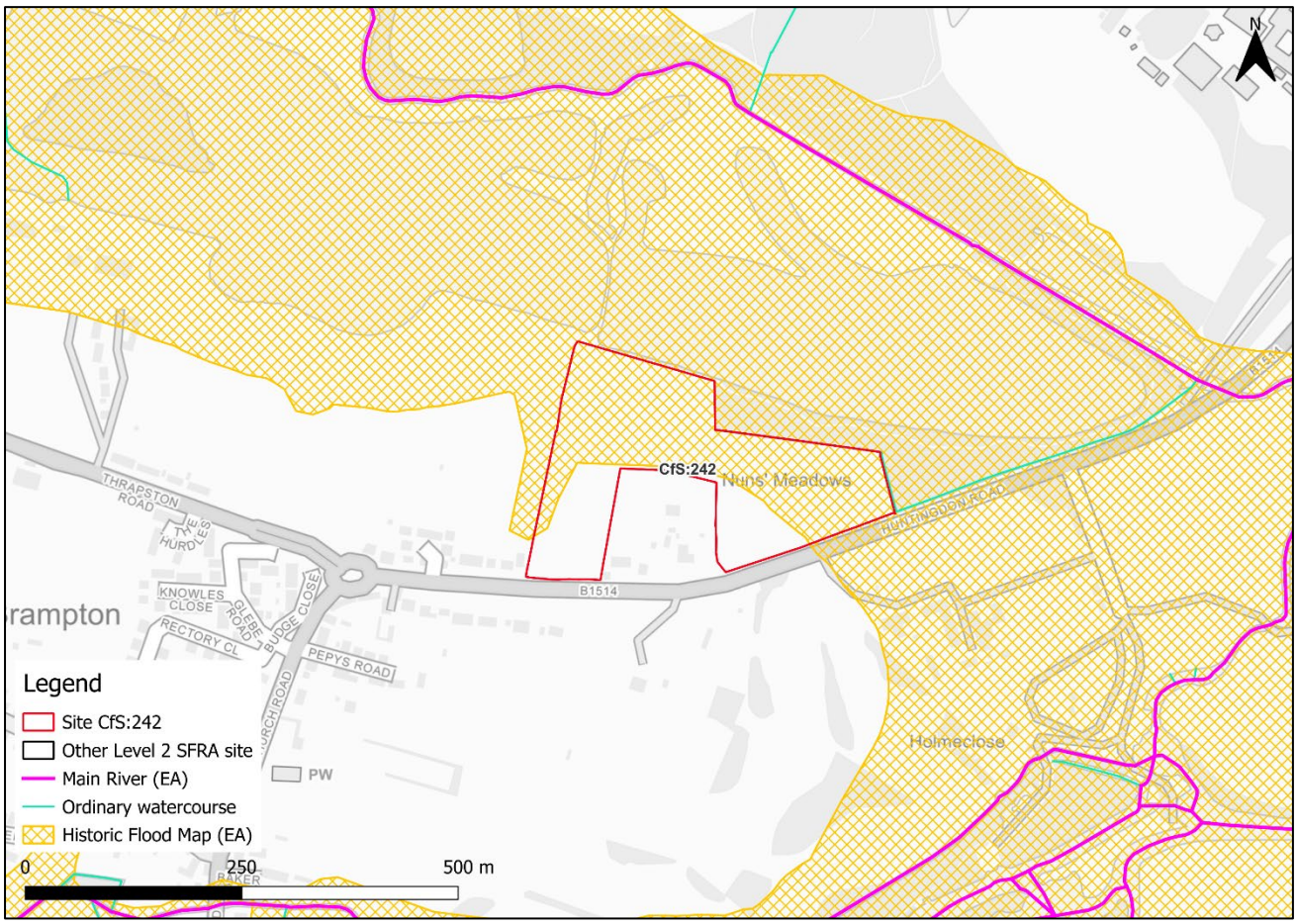


Figure 2-9: Recorded historic flood events onsite and around the site

## 2.5 Emergency planning

### 2.5.1 Flood warning

The EA operates a Flood Warning Service for properties located within a Flood Warning Area (FWA) for when a flood event is expected to occur. As shown in Figure 2-10, this site is located within a FWA, namely Alconbury Brook at Hamerton, Alconbury Weston, Alconbury, Little Stukeley and Brampton.

Flood alerts may be issued before a flood warning for properties located within a Flood Alert Area (FAA) to provide advance notice of the possibility of flooding. A flood alert may be issued when there is less confidence that flooding will occur in a FWA. As shown in Figure 2-10, this site is located within a FAA, namely Alconbury Brook in Cambridgeshire.

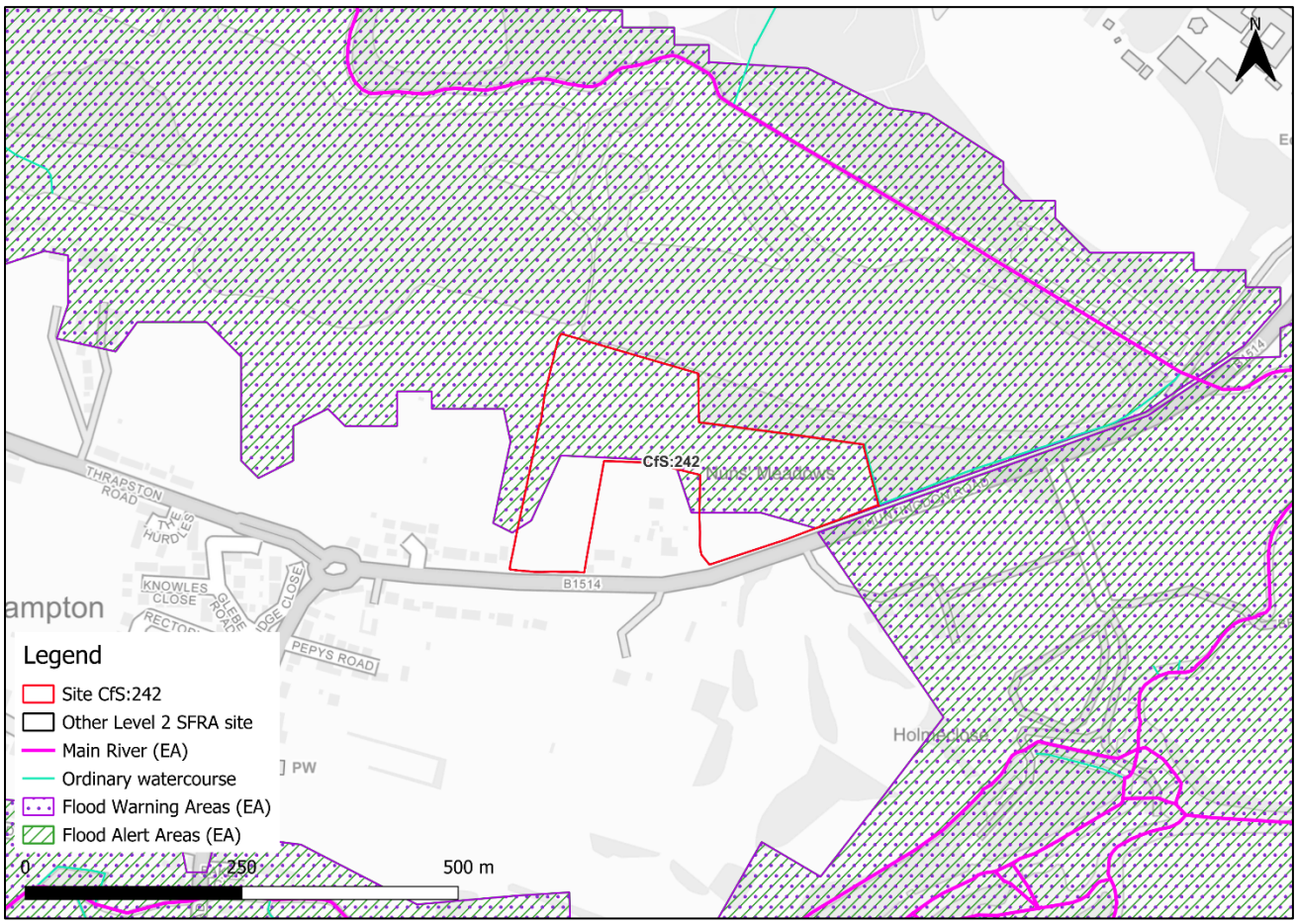


Figure 2-10: EA Flood Warning Areas and Flood Alert Areas

### 2.5.2 Access and escape routes

Based on available information, safe access and escape routes could likely be achieved during a flood event via Huntingdon Road to the south (Figure 2-11).

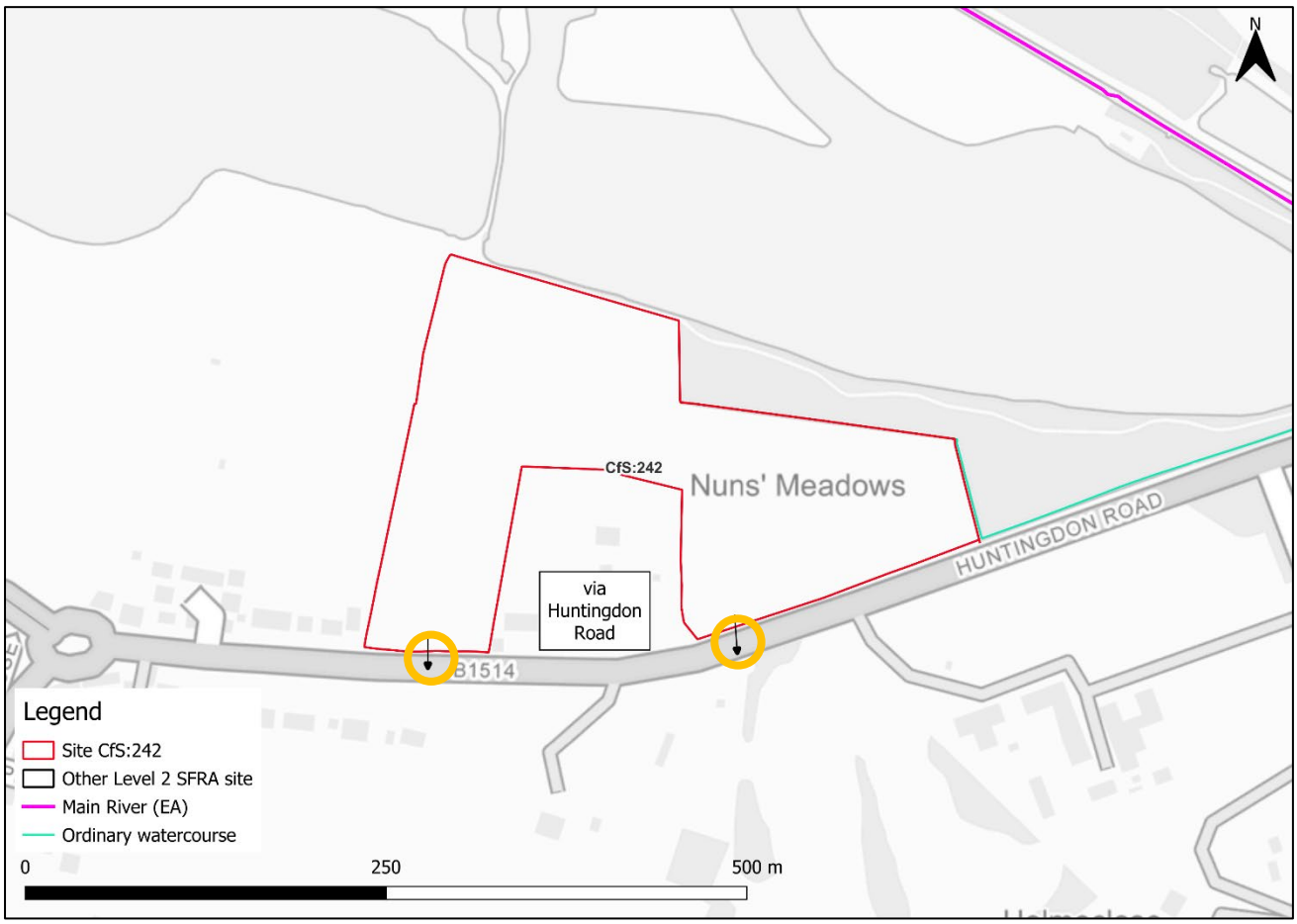


Figure 2-11: Potential access and escape routes

## 2.6 Observations, mitigation options, site suitability, sequential approach to development management - fluvial and tidal

- Observations:
  - A large area of the site is within Flood Zone 3b and therefore should be left as open greenspace.
  - Local detailed modelling of the Alconbury shows significant flood depths within the 1% AEP event extent. This risk increases with climate change. It is therefore recommended that the siting of the car park avoids the 1% AEP plus central climate change event flood extent.
  - The extent of fluvial risk from the unmodelled watercourse is currently unknown. Using the 0.1% AEP surface water event as a proxy, risk is modelled to remain largely confined to the east of the site.
- Defences:
  - The site does not benefit from any formal engineered defences.
- Mitigation:
  - The risk area should remain as open greenspace for inclusion in the country park, offering multifunctional benefits.

- The proposed car park should be sited directly next to the access road (Huntingdon Road), outside of the risk area.
- The site-specific FRA may look to develop a model of the unnamed watercourse to fully understand the onsite fluvial risk and look to include the channel and risk areas within a blue green corridor.
- If works are proposed on or near a river, a separate permission may be required. The type of permission needed and whether it must be sought from the Environment Agency, Lead Local Flood Authority or Internal Drainage Board will depend on the activity and location proposed.

- Access and escape:
  - Safe access and escape routes must be available at times of flood and appear to be available from the south of the site, via Huntingdon Road. A FWA is in place however which should provide advanced warning for site users to evacuate ahead of a flood event in the short term.
  - EA flood warnings and alerts should continue to be in place to ensure early evacuation of site users before an extreme flood event occurs.

# 3 Flood risk from surface water

## 3.1 Existing risk

The NaFRA2 Risk of Flooding from Surface Water (RoFSW) mapping received a significant update and was published January 2025, including for surface water flood extents and depths. However, at the time of writing, the EA has confirmed that the depth information available is not structured in a way that is suitable for planning purposes. Therefore, this Level 2 SFRA considers the third generation RoFSW depth and hazard mapping in addition to the NaFRA2 extents, as agreed with the EA. Surface water depth and hazard should be modelled at the site-specific FRA stage.

### 3.1.1 Risk of Flooding from Surface Water - NaFRA2 extents

Based on the EA's national scale RoFSW map, as updated in January 2025, surface water risk to the site is predominantly very low. Approximately 1% of the site is at high surface water risk. A further 1% is at medium surface water risk and 3% at low surface water risk.

Surface water risk is nominal in the east of the site.

Table 3-1: Existing surface water flood risk based on percentage area at risk using the NaFRA2 RoFSW map

| Very low risk (% area) | Low risk (% area) | Medium risk (% area) | High risk (% area) |
|---|---|---|---|
| 95 | 3 | 1 | 1 |

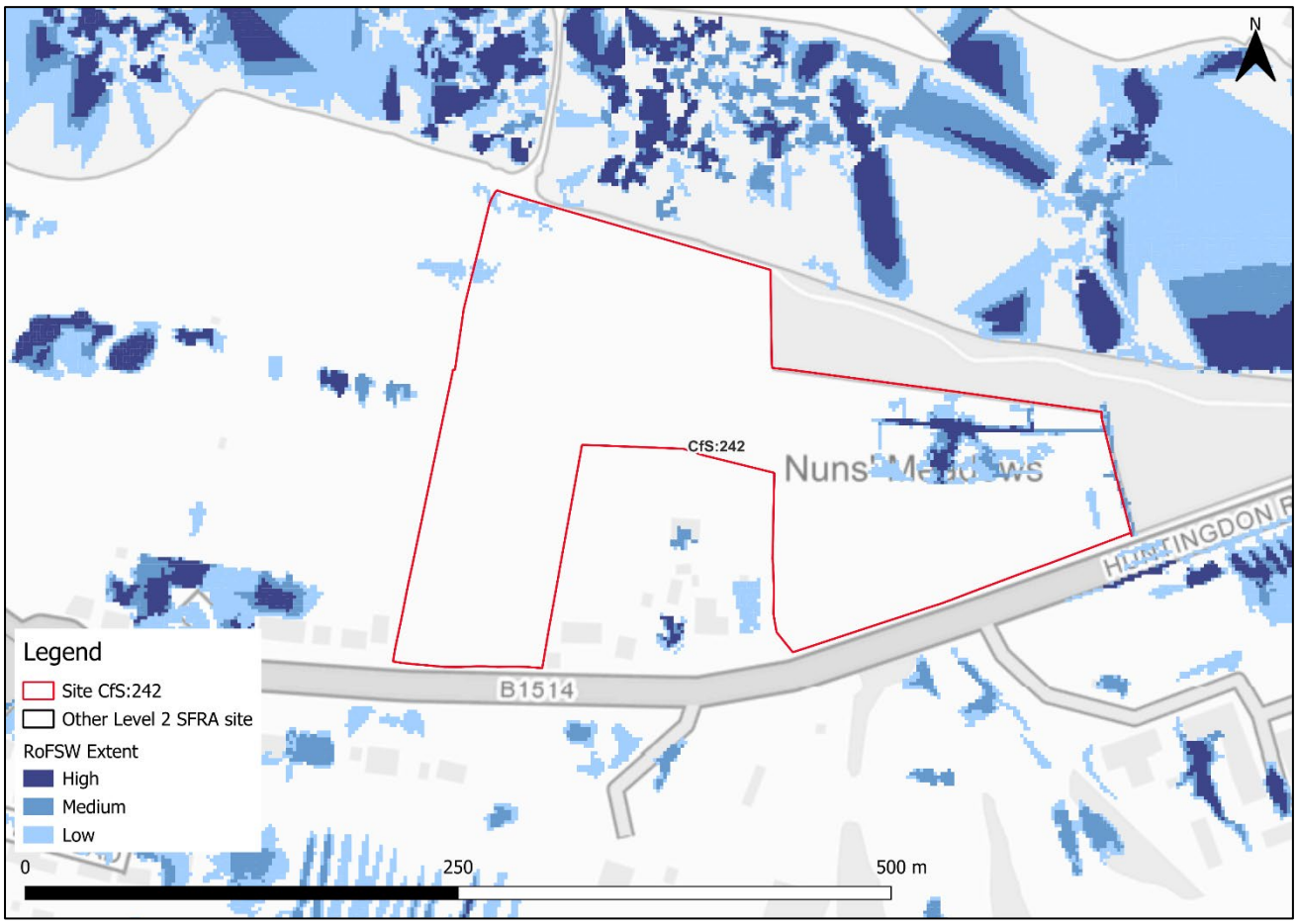


Figure 3-1: Surface water flood extents (NaFRA2 - Risk of Flooding from Surface Water map)

### 3.1.2 Risk of Flooding from Surface Water - third generation depths and hazard

Based on the EA's national scale third generation RoFSW map, flooding is predicted to remain below 0.3m in depth (Figure 3-2) and be a low hazard (Figure 3-3).

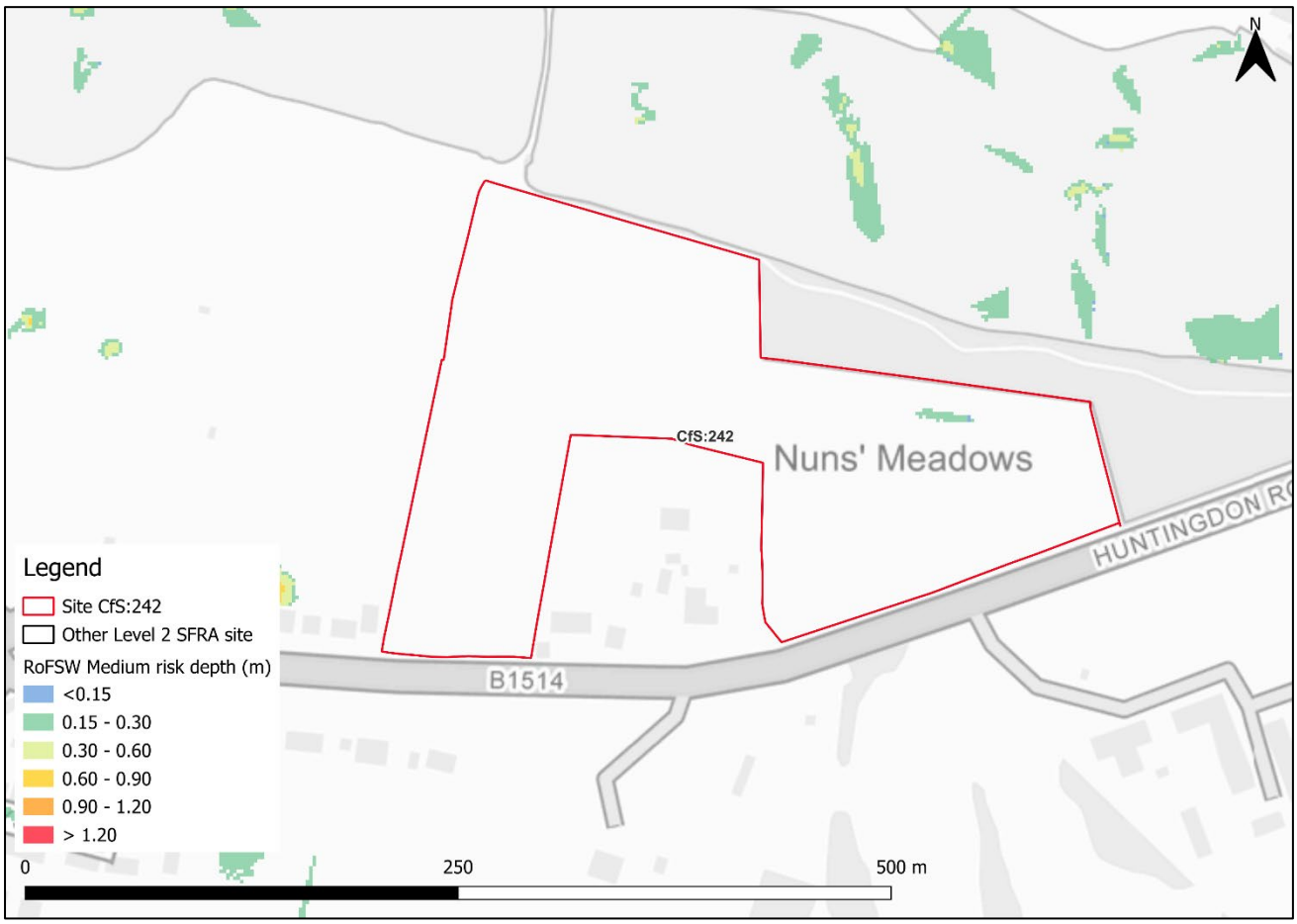


Figure 3-2: Medium risk event surface water flood depths (Third generation - Risk of Flooding from Surface Water map)

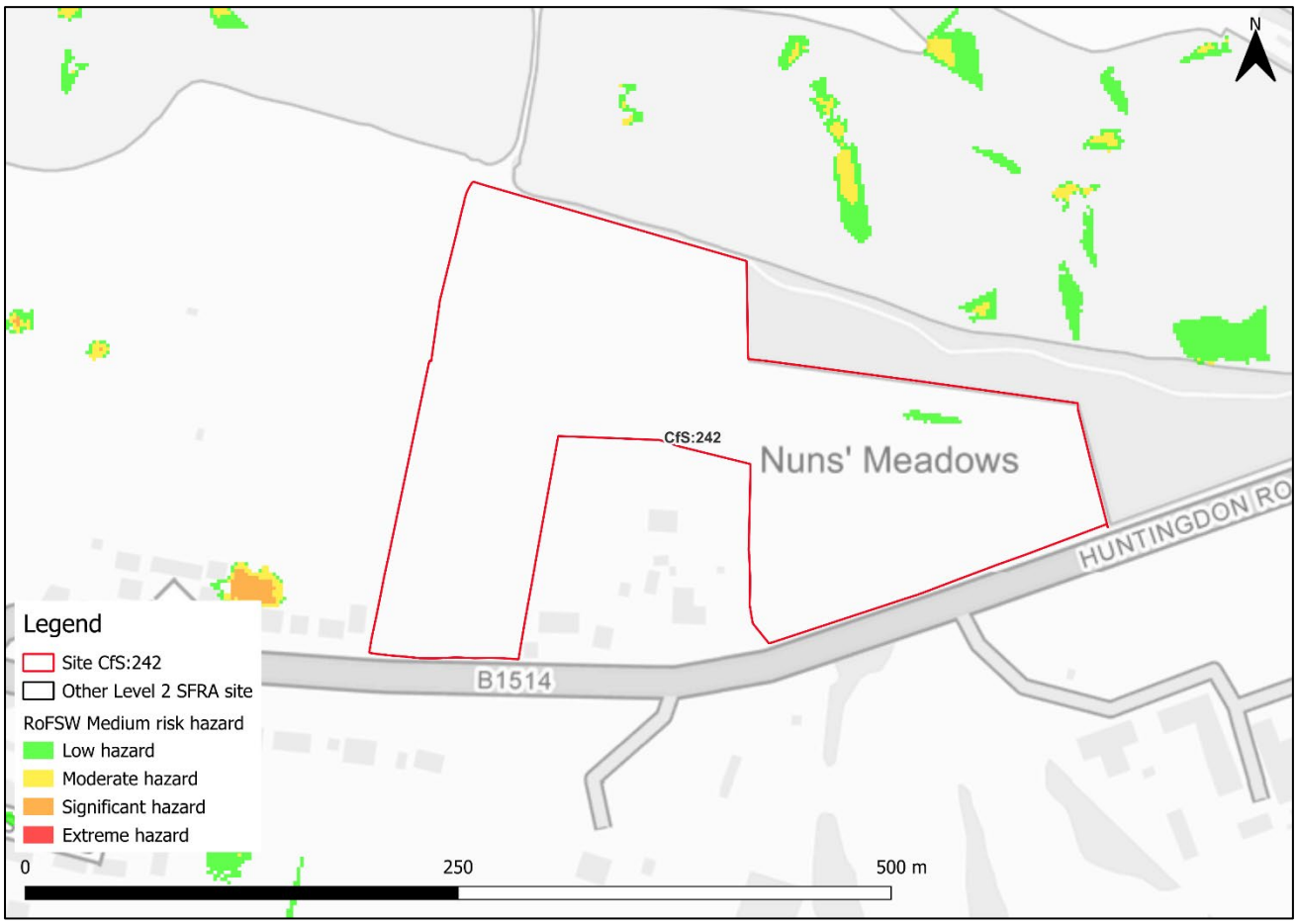


Figure 3-3: Medium risk event surface water flood hazard[2] (Third generation - Risk of Flooding from Surface Water map)

## 3.2 Impacts from climate change

The NaFRA2 RoFSW mapping now includes one modelled climate change scenario, the 2050s central allowance for the high, medium and low risk events. However, the upper end allowance on peak rainfall for the 2070s should be assessed in SFRAs.

Therefore, at the time of writing, the available national surface water climate change mapping is unsuitable for consideration in development planning. This Level 2 SFRA considers the low risk surface water event as a conservative proxy for the medium risk event plus climate change, as agreed with the EA. The impact of climate change on surface water flood risk should be fully accounted for at the site-specific FRA stage.

Based on current information, a bigger area in the east of the site is predicted to be at surface water flood risk, and some nominal areas in the northwest of the site are also predicted to be at risk (Figure 3-4). Flooding in the east of the site is still predicted to remain below 0.3m in depth (Figure 3-5) and predominantly be a low hazard (Figure 3-6). However,

2 Based on Section 7.5 Hazard rating. What is the Risk of Flooding from Surface Water map? Report version 2.0. April 2019. Environment Agency

the EA's national scale third generation RoFSW map does not show the at risk areas in the northwest of the site.

There are therefore clear differences between the NaFRA2 RoFSW map and the third-generation depths and hazard mapping. This reinforces the requirement for detailed assessment of surface water at the FRA stage to establish surface water flood risk conditions.

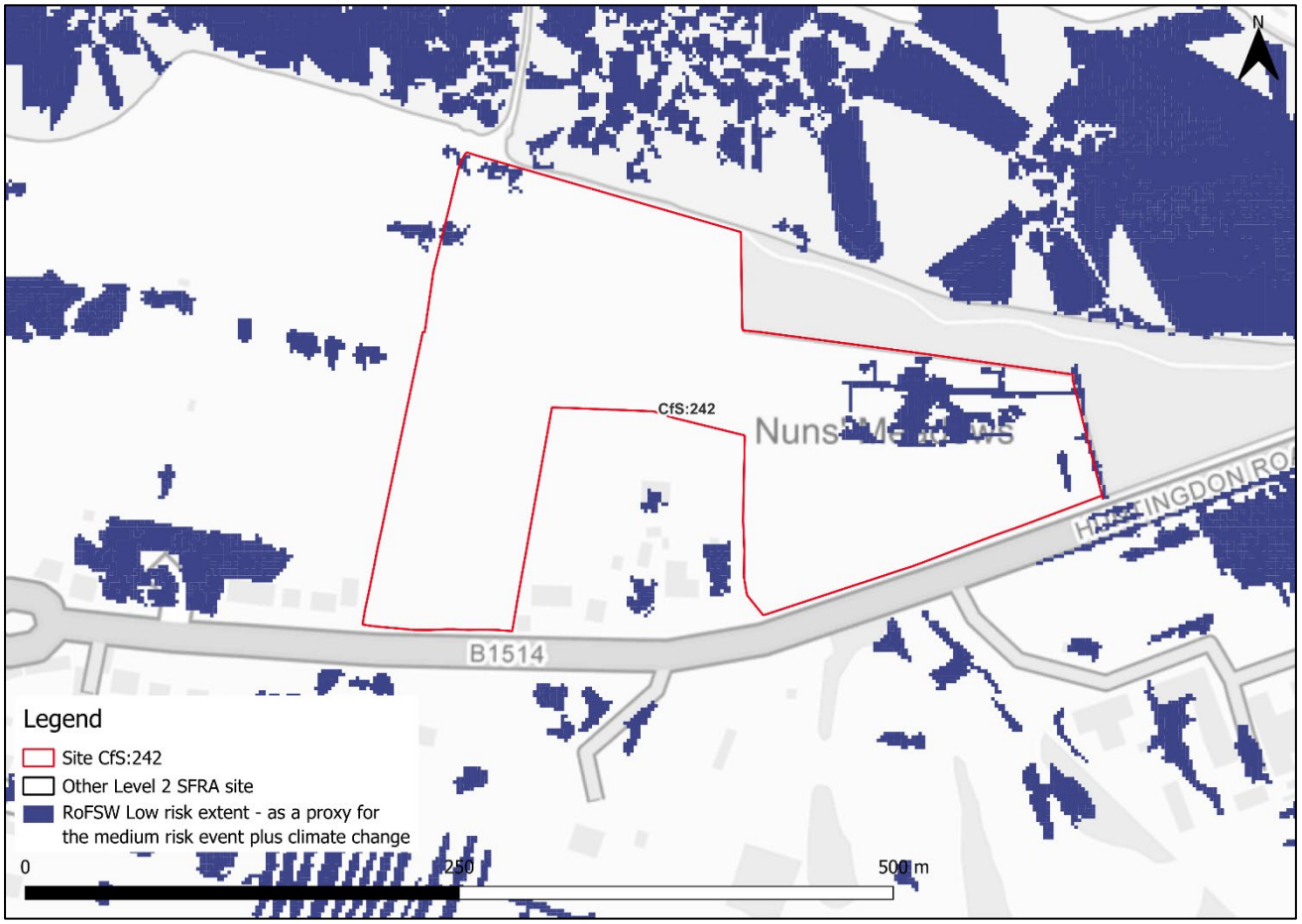


Figure 3-4: Low risk event surface water flood extent, as a proxy for the medium risk event plus climate change (NaFRA2 - Risk of Flooding from Surface Water map)

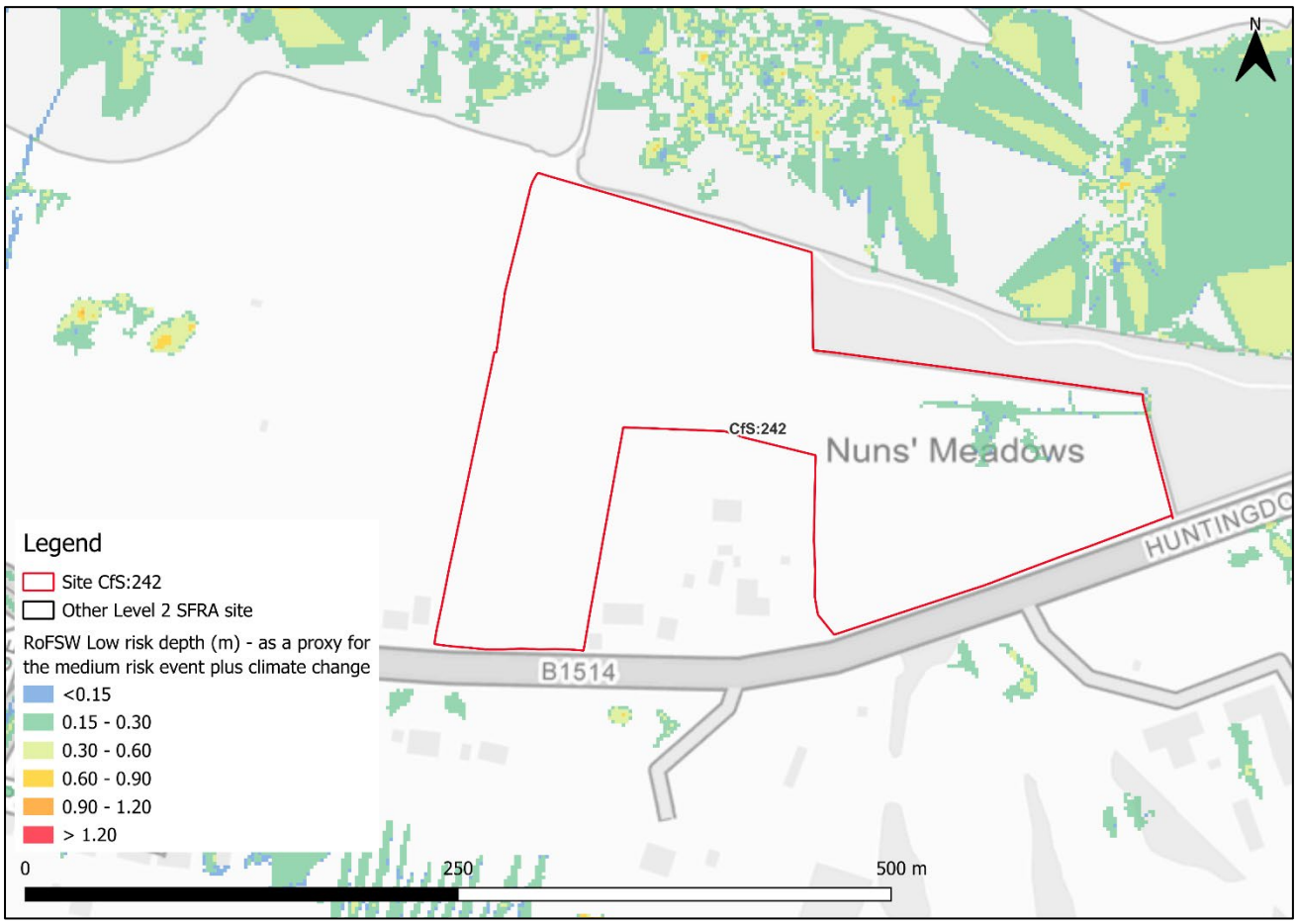


Figure 3-5: Low risk event surface water flood depths, as a proxy for the medium risk event plus climate change (Third generation - Risk of Flooding from Surface Water map)

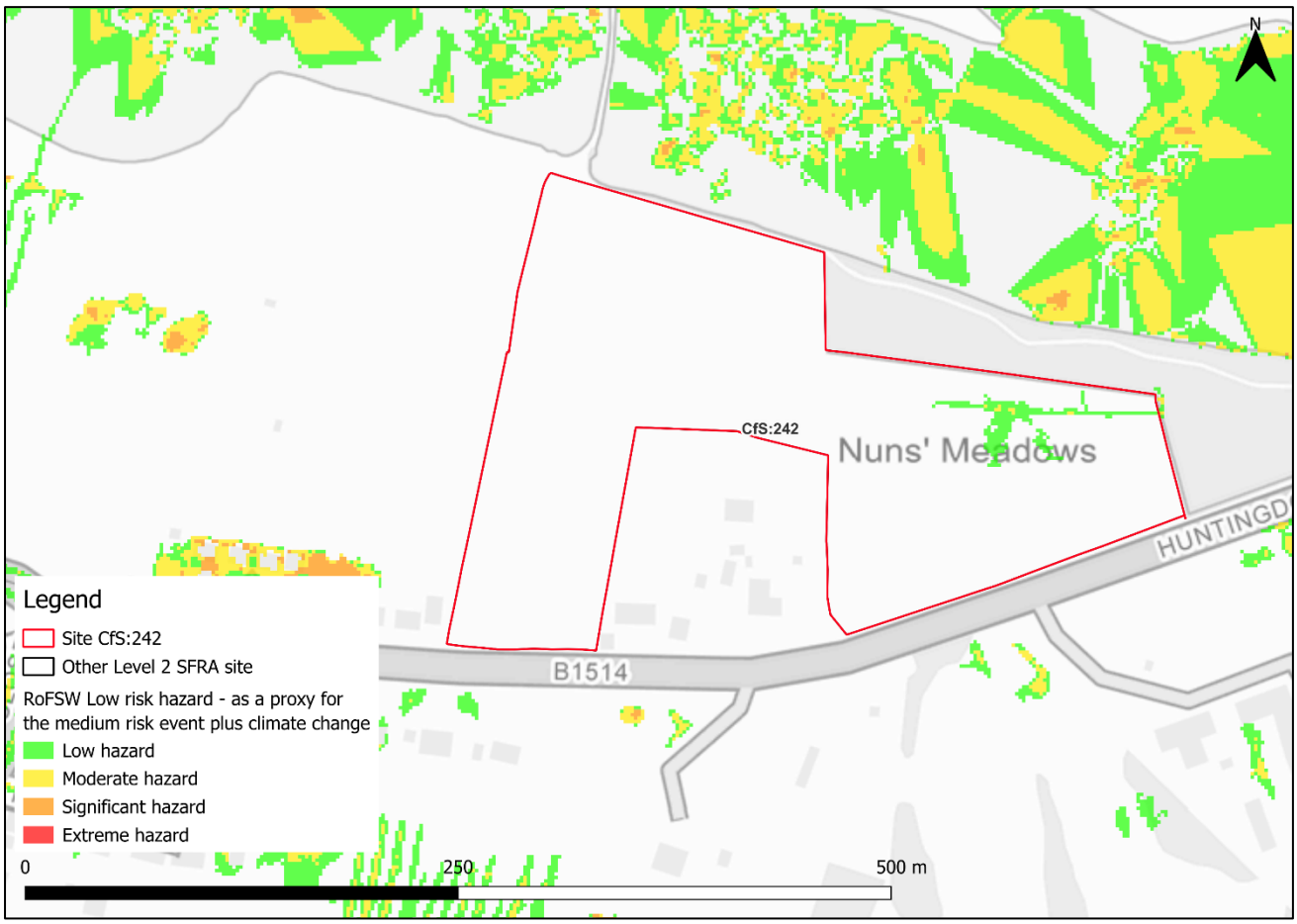


Figure 3-6: Low risk event surface water flood hazard, as a proxy for the medium risk event plus climate change (Third generation - Risk of Flooding from Surface Water map)

## 3.3 Observations, mitigation options, site suitability, sequential approach to development management - surface water

- Current risk to the site is predominantly very low, with 95% of the site being at very low surface water flood risk. Surface water risk in the high and medium risk events is confined to areas of ponding within topographic low spots in the east of the site.
- The effects of climate change on surface water have not been modelled for this SFRA, however the low risk surface water event has been used as a proxy for the medium risk event plus climate change. Risk is largely similar to the medium risk event, with a greater extent of ponding within the topographic low spots and some additional nominal areas of ponding in the northwest.
- Surface water flood depths, hazards, including for the impact of climate change should be considered further through the site-specific FRA and drainage strategy. Any surface water modelling at the FRA stage should consider flood depths and hazards.
- There are clear differences between the NaFRA2 RoFSW map and the third-generation depths and hazard mapping. This reinforces the requirement for

detailed assessment of surface water at the FRA stage to establish surface water flood risk conditions.

- The drainage strategy must ensure there is no increase in surface water flood risk elsewhere as a result of new development. Greenfield rates will apply, and the developer should follow the National SuDS guidance and any local guidance available from the LLFA.
- Topographic low spots and flow paths should be incorporated into site design and layout.
- The RoFSW map is not suitable for identifying whether an individual property will flood and is therefore indicative. The RoFSW map is not appropriate to act as the sole evidence for any specific planning or regulatory decision or assessment of risk in relation to flooding at any scale without further supporting studies, modelling, or evidence.

# 4 Cumulative impacts assessment and high risk catchments

## 4.1 Level 1 cumulative impacts assessment

A cumulative impact assessment was completed through the Huntingdonshire Level 1 SFRA (2024), which aimed to identify catchments sensitive to the cumulative impact of new development. This site is located within one catchment, namely, the Alconbury and Brampton Brooks catchment. This catchment is ranked as a high sensitivity catchment. Planning considerations for sites at high sensitivity to the cumulative impacts of development can be found in Appendix G of the Level 1 SFRA. Cumulative impacts of development should also be considered as part of a site-specific FRA.

# 5 Groundwater, geology, soils, SuDS suitability

Risk of groundwater emergence is assessed in this SFRA using JBA's 5m Groundwater Emergence Map. This dataset is recommended for use by the EA in the SFRA Good Practice Guide[3]. Figure 5-1 shows the map covering this site and the surrounding areas. Table 5-1 explains the risk classifications.

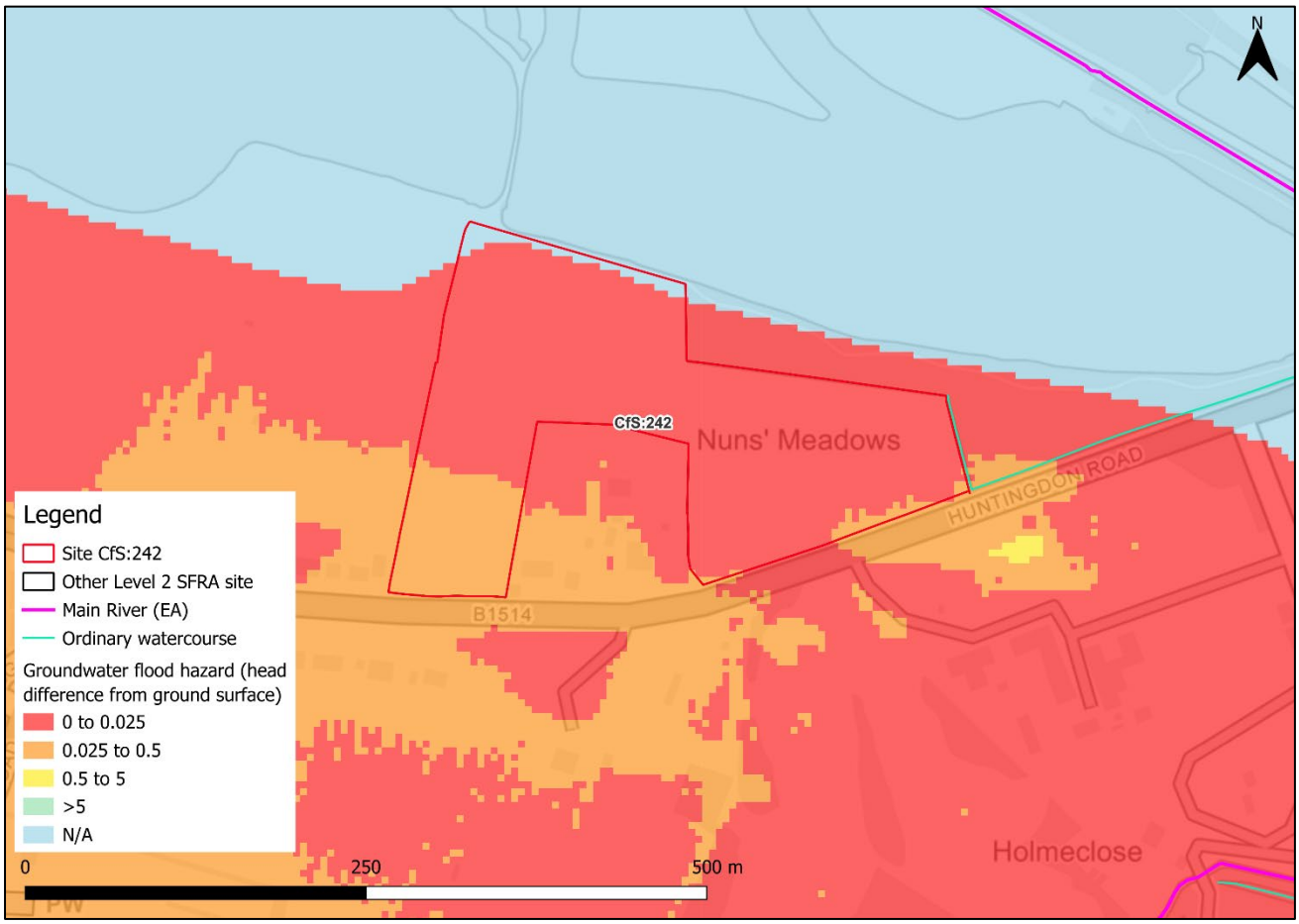


Figure 5-1: JBA 5m Groundwater Emergence Map

The majority of the site is shown to have groundwater levels at or very near (within 0.025m of) the ground surface in the 100-year return period flood event. Infiltration SuDS are therefore unlikely to be appropriate at this site. The site-specific FRA should further investigate groundwater levels through percolation testing in both wet and dry weather conditions across the site.

3 Strategic flood risk assessment good practice guide. ADEPT. December 2021.

Table 5-1: Groundwater Hazard Classification

| Groundwater head difference (m)* | Class label |
|---|---|
| 0 to 0.025 | Groundwater levels are either at very near (within 0.025m of) the ground surface in the 100-year return period flood event.<br>Within this zone there is a risk of groundwater flooding to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots. |
| 0.025 to 0.5 | Groundwater levels are between 0.025m and 0.5m below the ground surface in the 100-year return period flood event.<br>Within this zone there is a risk of groundwater flooding to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally. |
| 0.5 to 5 | Groundwater levels are between 0.5m and 5m below the ground surface in the 100-year return period flood event<br>There is a risk of flooding to subsurface assets, but surface manifestation of groundwater is unlikely. |
| >5 | Groundwater levels are at least 5m below the ground surface in the 100-year return period flood event.<br>Flooding from groundwater is not likely. |
| N/A | No risk.<br>This zone is deemed as having a negligible risk from groundwater flooding due to the nature of the local geological deposits. |
| *Difference is defined as ground surface in mAOD minus modelled groundwater table in mAOD. | |

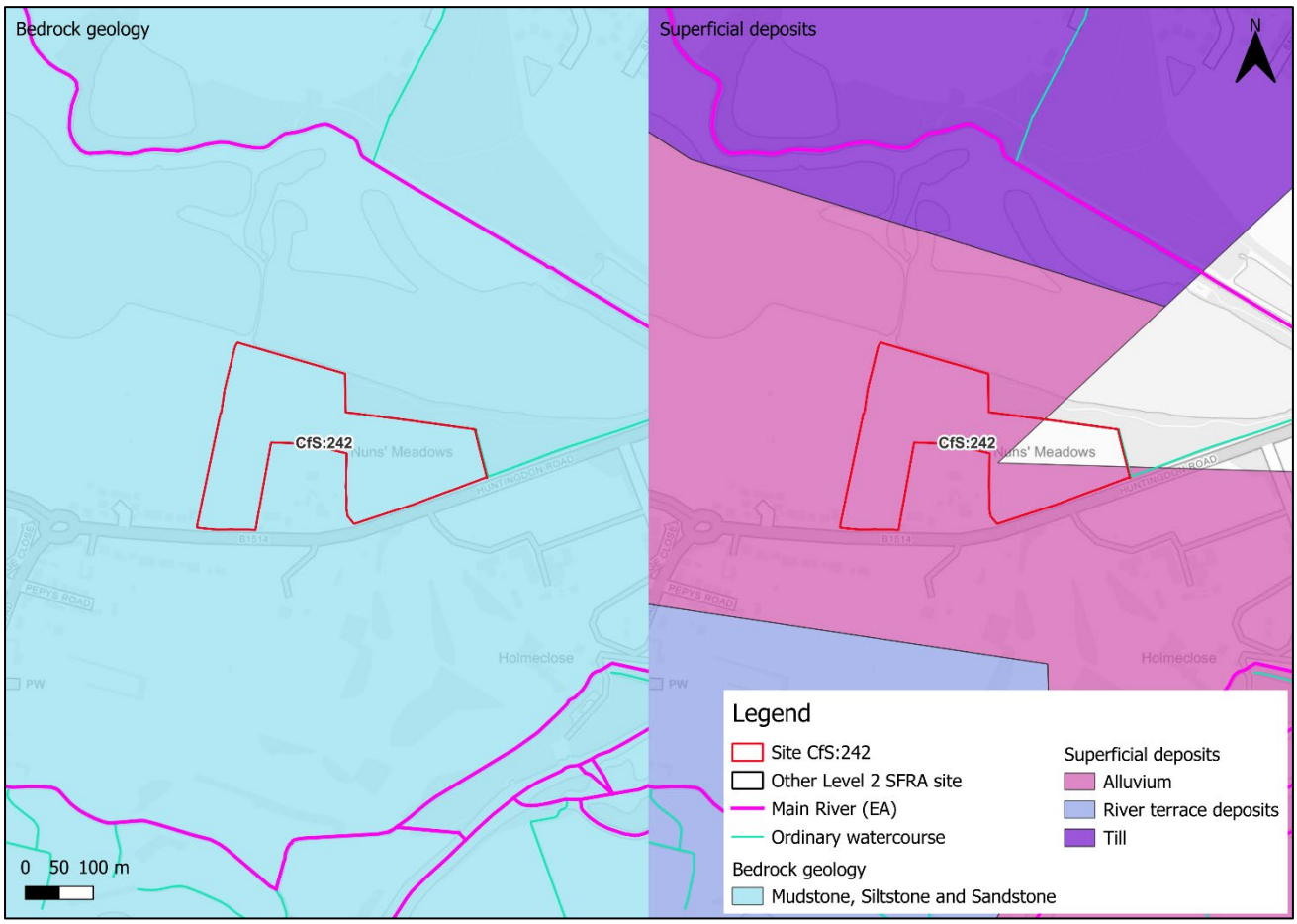


Figure 5-2: Soils and geology

# 6 Residual risk

Although a site may be afforded some protection from defences and / or drainage infrastructure, there is always a residual risk of flooding from asset failure i.e. breaching / overtopping of flood defences, blockages of culverts or drainage assets.

Based on current information, there is a residual risk of reservoir flooding from at the site.

## 6.1 Flood risk from reservoirs

The EA's Reservoir Flood Maps (RFM) (2021) show where water may go in the unlikely event of a reservoir or dam failure. Figure 6-2 shows the RFM in a 'dry day' and 'wet day' scenario. A 'dry day' scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. A 'wet day' scenario assumes a worst-case scenario where a reservoir releases water held on a 'wet day' when local rivers have already overflowed their banks.

The site is potentially at risk from flooding from Grafham Water reservoir during the 'dry day' and 'wet day' scenarios which is situated within the Cambridgeshire LLFA. Anglian Water Services Ltd is the undertaker for this reservoir.

The site is also potentially at risk of flooding from Caldecotte Lake reservoir during the 'wet day' scenario which is situated within the Milton Keynes LLFA. Anglian Water Services Ltd is the undertaker for this reservoir.

The EA's SFRA guidance states that where a proposed development site is shown to be at potential risk from reservoir failure, then an assessment into whether the reservoir design or maintenance schedule needs improving should be carried out. Expert advice may be required from an all-reservoirs panel engineer. The Council should consult Anglian Water Services Ltd is the undertaker for these reservoirs. to ascertain whether the proposed development could affect the reservoir's risk designation, it's design category or how it is operated. The Council, as category 1 responders, can access more detailed information about reservoir risk and reservoir owners using the Resilience Direct system.

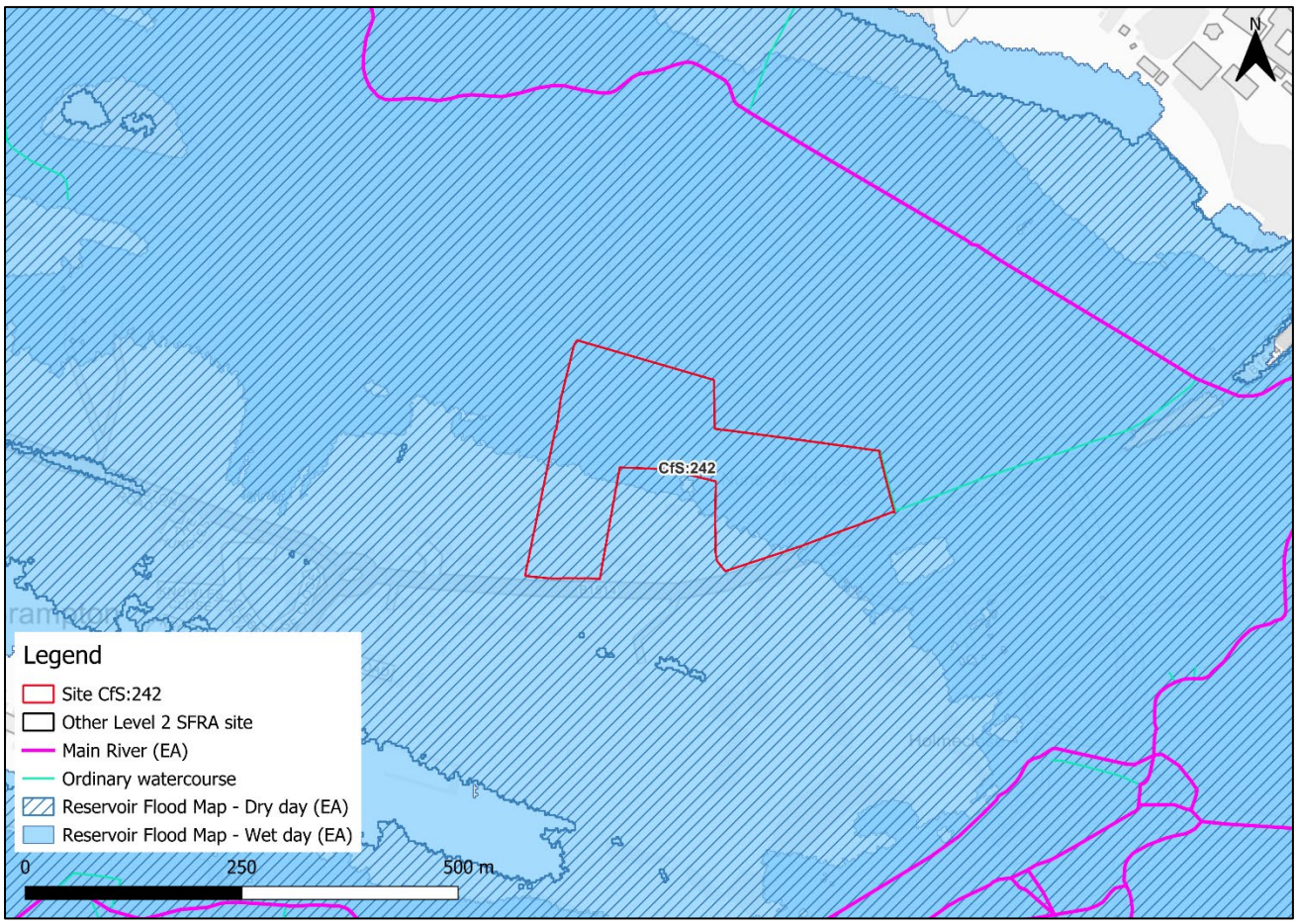


Figure 6-1: EA Reservoir Flood Map

# 7 Overall site assessment

## 7.1 Can part b) of the exception test be passed?

This site is not required to pass part b) of the exception test as it is proposed for less vulnerable development. However, it must still be shown that the site can remain safe for its lifetime.

## 7.2 Recommendations summary

Based on the evidence presented in the Level 1 SFRA (2024) and this Level 2 SFRA:

- The risk area should be converted to open greenspace for the country park.
- The car park should be sited in Flood Zone 1 next to the access road. Ground conditions should be investigated due to high groundwater emergence risk. Appropriate drainage for the car park will be required, ensuring any surface water is mitigated onsite.
- Opportunities for NFM features to reduce flood risk to the site and surrounding areas should be explored.
- Safe access and escape routes should be considered further to ensure safe evacuation of site users during the low risk surface water flood event.

## 7.3 Site-specific FRA requirements and further work

At the planning application stage, the following should be considered:

- The FRA should be carried out in line with the latest versions of the NPPF; FRCC-PPG; EA online guidance; the HDC Local Plan, and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with, where applicable, the local planning authority; the lead local flood authority; emergency planning officers; the Environment Agency; Anglian Water; the highways authorities; and the emergency services.

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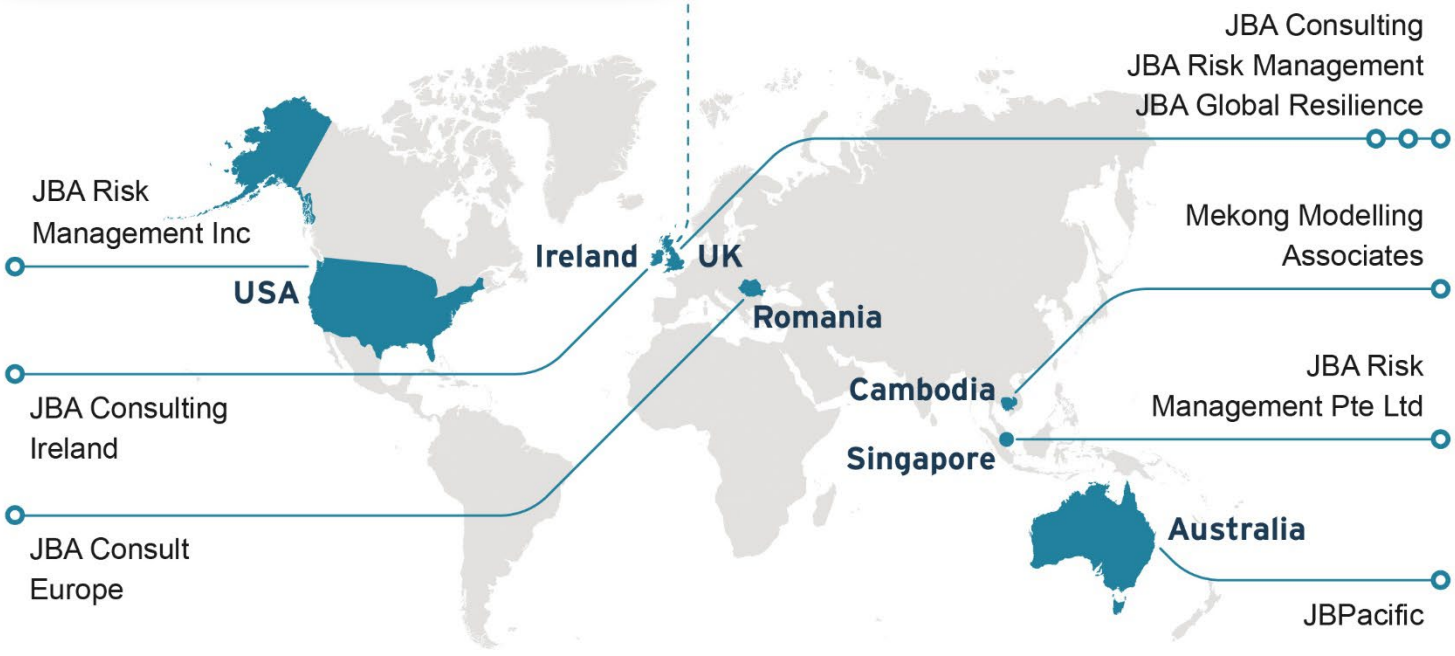


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