



Flood Risk Management Limited

Detailed Flood Risk Assessment

Proposed Residential Development
Land to the North of Meredyke Road
Luddington
North Lincolnshire
DN14 4RF

Client : For Client

Flood Risk Management Limited

The Riverside Building,
Livingstone Road,
Hessle,
East Riding of Yorkshire,
HU13 0DZ

www.frm-ltd.co.uk

admin@frm-ltd.co.uk

01482 762 191

Version Control

Revision	Remarks	Date
A	Preliminary	08/02/2025
B	Advice from LLFA and EA incorporated	18/04/2025

CONTENTS

1.	Introduction.....	5
2.	Approach	5
2.1	<i>National and Local Planning Policy (Flood Risk).....</i>	5
2.2	<i>Scope of Report</i>	5
2.3	<i>Sources of Data</i>	6
2.4	<i>Licence Information and Attribution</i>	6
3.	Context	6
3.1	<i>Location.....</i>	6
3.2	<i>Study Area.....</i>	7
3.3	<i>Description of Proposed Development.....</i>	7
3.4	<i>Topography</i>	7
4.	Flood Risk Information.....	8
4.1	<i>Flood Risk Maps</i>	8
5.	Flood Risk Map Commentary	10
6.	Sequential and Exception Test.....	10
7.	Detailed Analysis of Flood Risk	12
7.1	<i>Historic Flooding</i>	12
7.2	<i>Climate Change.....</i>	12
7.3	<i>Flooding from Rivers and Large Watercourses due to Overtopping of Defences.....</i>	12
7.4	<i>Flooding Due to Residual Risk</i>	12
7.5	<i>Flooding from Groundwater</i>	12
7.6	<i>Flooding from other Local Sources.....</i>	13
7.7	<i>Flooding from the Development Site Itself.....</i>	13
8.	Conclusion	13
8.1	<i>Finished Floor Level (FFL)</i>	13
8.2	<i>Flood Resilient Construction (if required).....</i>	14
8.3	<i>Place of Safety.....</i>	14

Flood Risk Management Limited

The Riverside Building, Livingstone Road, Hessle, East Riding of Yorkshire, HU13 0DZ
Registered in England and Wales – Company Number 10268343

9. **Flood Warnings** 14

1. Introduction

Flood Risk Management Limited has been commissioned to prepare a detailed flood risk assessment (FRA) for a proposed residential development at outline stage.

A FRA is required because the development is identified as being in flood risk zone 3a.

This is a supplementary document to a planning application; the conditions of a planning consent are likely to refer to this document, which means the applicant must comply with specific requirements set out in this report and consider its recommendations.

The Local Planning Authority (LPA) may condition a planning consent using information set out in this report.

2. Approach

2.1 National and Local Planning Policy (Flood Risk)

This report complies with the requirements set out in the Technical Guide to the National Planning Policy Framework on flood risk and the LPA Strategic Flood Risk Assessment (SFRA). It clearly considers:

- The effect of a range of flooding events including extreme events on people and property.
- How people will be kept safe from flood hazards identified.

2.2 Scope of Report

This report will:

- Assess the risk of flooding to the development.
- Assess the risk of flooding that this development might present elsewhere.

This report will not:

- Set out any detailed design.
- Set out any detailed hydraulic calculations.
- Is not intended to replace the advice of a town planning expert in respect of a Sequential Test, Exception Test, or identification of sustainability benefits.

2.3 Sources of Data

The following publications and data sources were used in the production of this report:

- National Flood Risk Map for Planning – Rivers and Sea
- National Map for Risk of Flooding from Surface Water
- North & Northeast Lincolnshire SFRA
- LPA Development and Flood Risk Guidance Note
- National Planning Policy Framework (NPPF)
- Technical Guidance to NPPF
- Planning Practice Guidance (Planning and Flood Risk)
- Flood Risk Assessments Guide for New Development (FD2320)
- Flood Risk Assessments: Climate Change Allowances
- EA Product 4 Data Request EMD 390063

2.4 Licence Information and Attribution

Contains Environment Agency information © Environment Agency and database right.

Contains OS data © Crown copyright and database right 2025.

Contains extracts from North Lincolnshire Council policy documents.

3. Context

3.1 Location

The development is situated in the village of Luddington, 1,965m from the tidal river Trent at its closest point.

The National Grid Reference of the proposed development is SE 4830 1672.



Figure 1 : Location Plan

3.2 Study Area

The study area will be the left bank flood plain of the tidal river Trent.

3.3 Description of Proposed Development

The proposal is for a single 2 storey residential property

3.4 Topography

The topographical survey of the development has been produced from the EA 2022 LiDAR DTM data set, levels have been interpolated using a GDAL algorithm. The client has provided a site survey level, also shown on Figure 2 which calibrates well to this data. The average site level is around 3.1mAOD.

All levels should be checked on site.

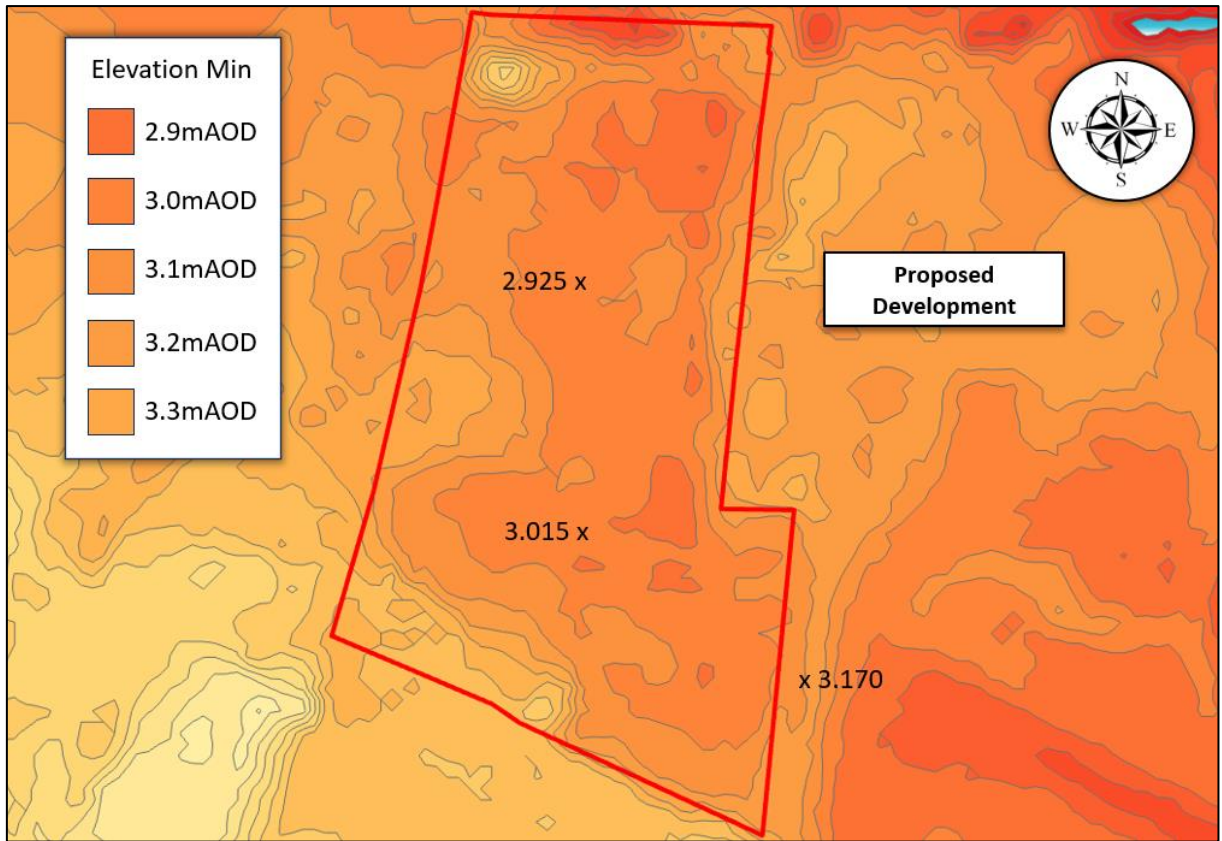


Figure 2 : Topography - LiDAR + Site Survey

4. Flood Risk Information

4.1 Flood Risk Maps

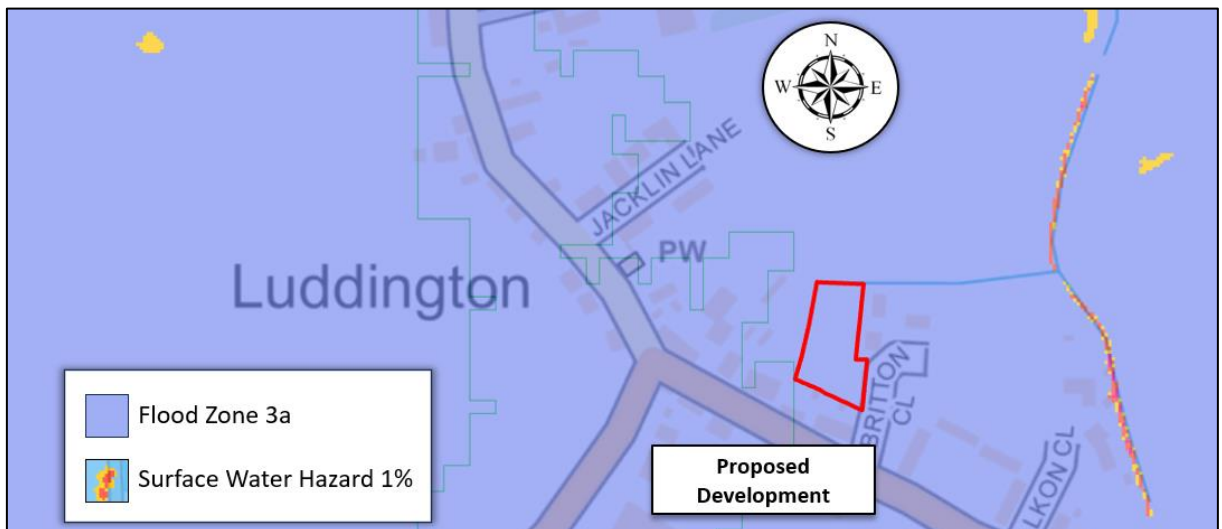


Figure 3 : Flood Zone 2 & 3a with Surface Water Hazard 1%

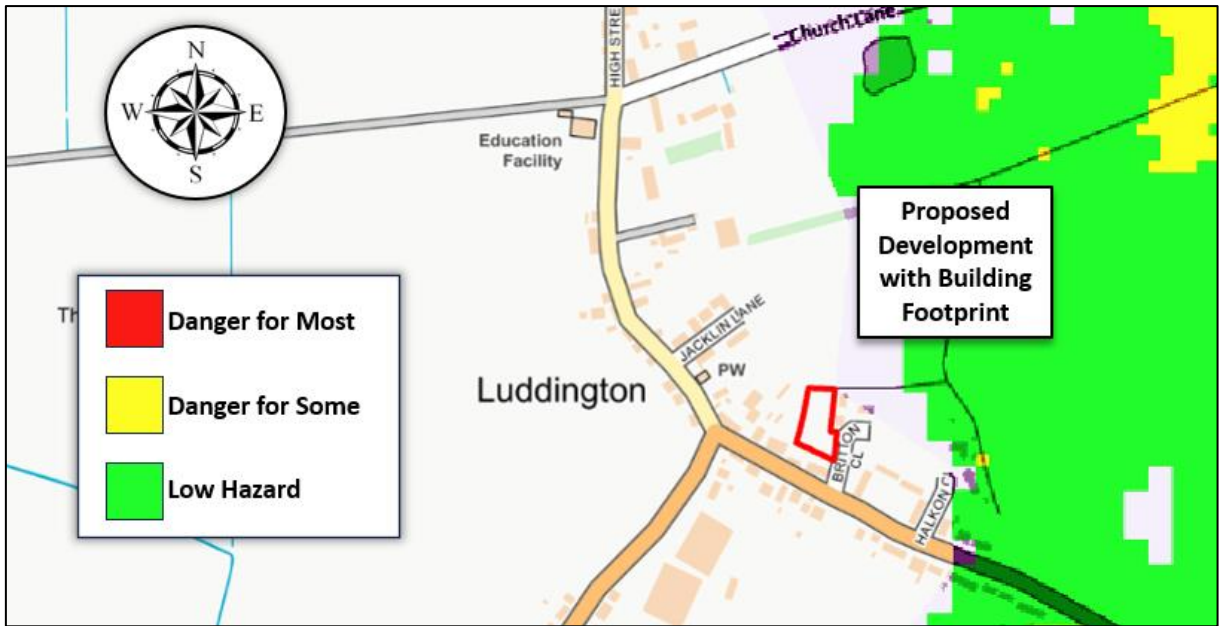


Figure 4 : Breach FD2320 Danger L2 SFRA

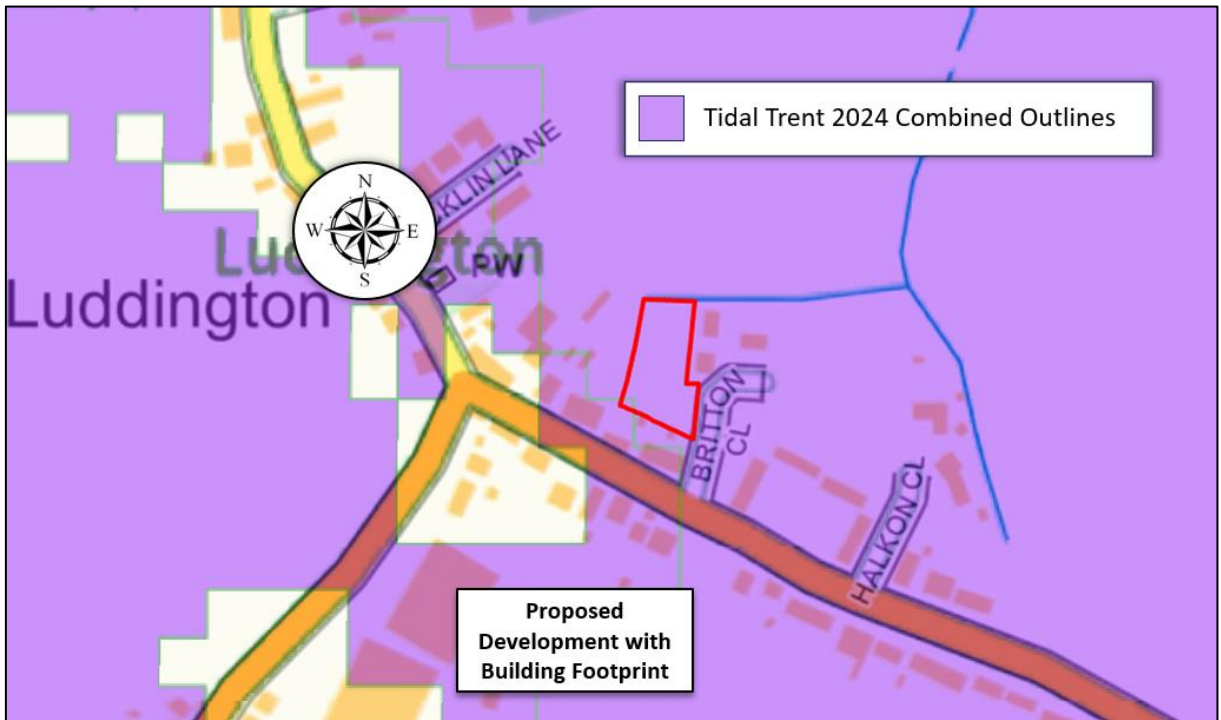


Figure 5 : Breach 2024 Tidal Trent Combined Flood Extend Outlines - Jacobs Model

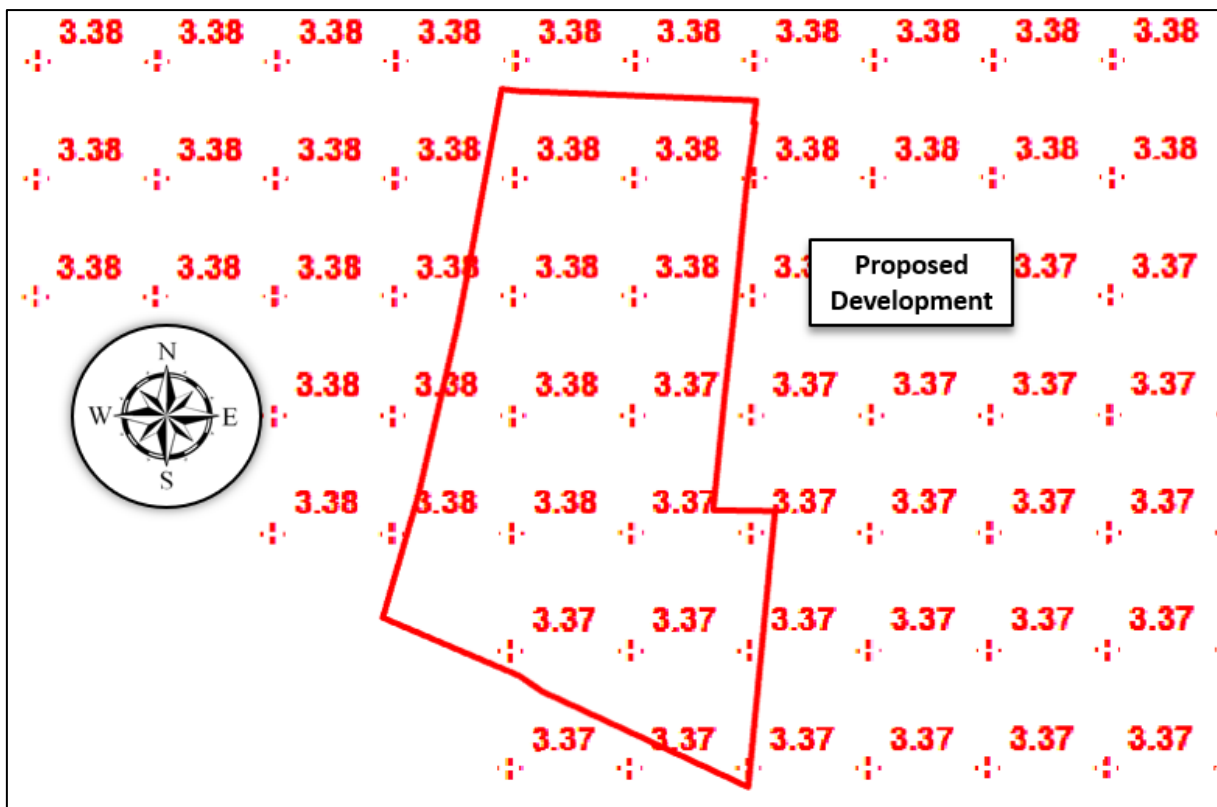


Figure 6 : Floodplain Breach Heights - Jacobs Tidal Trent Model

5. Flood Risk Map Commentary

The National flood risk map for planning - rivers and sea shows the whole site is in flood risk zone 3a

The national surface water mapping product shows there is no modelled surface water flood risk.

6. Sequential and Exception Test

The LPAs Development and Flood Risk Guidance note advises that a sequential test is required for this development.

The note guides that sites with lower flood risk should be considered in the "area of search" and this will be in the individual settlement development limits. Because this is a more vulnerable development the note also advises an exception test must be passed.

NPPF Table 3: Flood risk vulnerability and flood zone' compatibility'

Flood risk vulnerability classifications (see table 2)		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood Zone (See Table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	×	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	×	×	×

The note advises that the applicant should provide evidence of the development's sustainability so the Local Planning Authority (LPA) can determine whether the proposal meets the first part of the exceptions test.

To pass the second part of the exceptions test, the LPA must be satisfied that the development is safe in the event of a flood. The LPA will review the contents of this report and assess whether, over its lifetime, the development and its users can be kept safe during a flood.

A search within the development limits indicates that there are no other readily available sites for this type of development, and sequentially, there are no opportunities for development at a lower flood risk.

This development can meet the LPA's sustainability objectives by incorporating sustainable design principles, such as using flood-resistant materials, elevating the structure, and integrating sustainable drainage systems (SuDS) where appropriate.

A property here can contribute to the area's housing needs; North Lincolnshire's Core Strategy emphasises the importance of providing a mix of housing types to meet local needs, and a single dwelling can contribute to this goal.

The development can provide economic benefits by creating construction jobs and supporting local businesses. Additionally, it can enhance the social fabric of the community by providing a new home for a family, thereby contributing to the area's vitality.

The recommendations in this Flood Risk Assessment (FRA) will help ensure the development and its users remain safe in the event of a flood.

7. Detailed Analysis of Flood Risk

7.1 *Historic Flooding*

Historically the river Don passed directly through the village before that river was diverted to the Aire, then subsequently to the Ouse in c1628. This whole area would have been subject to seasonal flooding prior to these improvement works.

It has not been possible to locate any public records showing more recent flooding. The EAs historic flooding information does not show flooding in this area.

7.2 *Climate Change*

The development is in the Lower Trent and Erewash Management Catchment, the peak river flow allowances are 29% (Central) over the lifetime of the development.

Peak rainfall volume in the 1%AEP event is predicted to increase by up to 40% in this catchment over the development's lifetime.

7.3 *Flooding from Rivers and Large Watercourses due to Overtopping of Defences*

The proposed development benefits from raised defences on the left bank of the river Trent, Environment Agency data shows that without these defences the development would flood.

7.4 *Flooding Due to Residual Risk*

The Level 2 SFRA breach mapping scenarios including allowances for climate change differ from the latest EA breach mapping scenarios. The SFRA product shown in figure 4 shows the development is not at risk and there is no danger to the development whereas the latest EA model output data from the Tidal Trent model shows the development may flood.

The 2024 floodplain breach heights map, shown in figure 6, shows a flood height at the development of 3.38mAOD, this means that during a breach in the design event at the end of the lifetime of the development there may be a maximum flood depth of around 280mm.

7.5 *Flooding from Groundwater*

The areas superficial geology is locally made up of warp, clays and silts, atop of mudstone bedrock which suggests groundwater flooding is less likely in this area.

7.6 *Flooding from other Local Sources*

There are no other significant risks from other local sources identified.

7.7 *Flooding from the Development Site Itself*

The development will lead to increased runoff resulting from the introduction of additional impermeable surfaces. In so far as is reasonably practicable, the design should include measures to ensure that the flow rate of water from new impermeable areas to the runoff destination does not exceed the existing greenfield runoff rate, which is typically 1.4l/s/ha or the calculated Q_{bar} (IH124) for a 1-year rainfall event. The design should be tested to ensure the flood volume generated in the 100-year rainfall event + 40% climate change is managed without causing a flood risk.

Whilst the designer should take into account the Sustainable Drainage Systems (SuDS) hierarchy encompassing Source, Site, and Regional control, Regional control is not a practical option for this project due to the minimal flow rates (<1l/s/ha) required for the site's small footprint. Therefore, the designer should prioritize the use of soakaways, provided infiltration testing confirms a rate greater than 1×10^{-6} m/s. Alternatively, site control methods such as infiltration trenches, filter strips, or rain gardens should be explored.

8. **Conclusion**

This whole area benefits from raised defences on the left bank of the river Trent, modelling data provided by the EA including climate change suggests this development will not flood due to overtopping within its lifetime, but in the event of failure of the raised defences the development site may flood up to an elevation of 3.38mAOD. The average site level is around 3.1mAOD so in these circumstances this would result in an average flood depth of 280mm, however due to the nature of the area the LPA/LLFA and EA are advising the use of a critical flood level of 4.1mAOD.

8.1 *Finished Floor Level (FFL)*

In the design scenario the maximum flood level will be 3.38mAOD caused by failure of the raised defences on the left bank of the river Trent.

The SFRA references the development as being in area 3T4, the Lead Local Flood Authority and EA have specifically advised the use of a critical flood level for this development of 4.1mAOD. The component parts of the critical flood level is a minimum

FFL at 3.8mAOD with an additional 300mm of flood resilience measures, discussed below.

The LLFA have specifically advised *“a minimum Finished Floor Level of **3.8mAOD** with an additional **300mm** of freeboard (flood resilience) incorporated into the design.”*

The EA have specifically advised *“Finished floor levels for the proposed new dwelling should therefore be set at a minimum of **4.1mAOD**”*

It is therefore recommended that a **FFL of 4.1m** is incorporated into the design.

8.2 Flood Resilient Construction

Flood resilience measures appropriate to this development are:

- using flood resistant materials that have low permeability.
- Consider using any doors, windows or other openings that are passively flood resistant. Flood defence products should not protect the building above 600mm above finished floor level without the advice of a structural engineer.
- using flood resilient materials (for example lime plaster).
- raising all sensitive electrical equipment, wiring and sockets to at least 300mm above the finished floor level.
- making sure there is access to all spaces to enable drying and cleaning.

Standards for the installation and retrofit of resistance measures are in British Standard 851188-1:2019+A1:2021.

8.3 Place of Safety

Although flood extent data shown on NELC and EA modelling suggests that access and egress to higher ground in the design event is likely to be achievable, because the development and the higher ground is situated in a large flood plain, it is recommended that in a flood event the users of the development remain in place until flood water has subsided or until advised otherwise by the authorities, because this is a two storey property there is a safe refuge on the upper floor.

9. Flood Warnings

The applicant should register with the Government's flood information service which can be found here:

<https://flood-warning-information.service.gov.uk/warnings>

Report Ends