

# Flood Risk Assessment

To accompany a planning application for an  
extension to

33 Lothian Avenue, Hayes,  
UB4 0EG

Prepared by

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# 1 Executive Summary

- A The extension lies within an existing developed site and this is minor development;
- B The site lies in Flood Zone 3, is at a High risk from surface water flooding and at a Low risk from reservoir failure;
- C Floor levels cannot be raised 600mm above the estimated flood level;
- D Floor levels are to be set no lower than existing floor levels;
- E Flood resilience and mitigation methods will be therefore implemented on site in line with a “water exclusion” strategy in lieu of an elevated floor to the extended area;
- F Access/egress routes are not affected and the site will be signed up to flood warning schemes;
- G There is no documented evidence of flood risk from any other sources;
- H The development does not impact on flood risk elsewhere;
- I Assuming the recommended mitigation, warning and evacuation procedures can be maintained over the lifetime of the development, the proposed minor development to an existing dwelling is considered acceptable.

## Client actions required

- I Sign up to flood warning schemes and provide confirmation to the LPA.
- II Complete an emergency flood plan and provide the LPA with an appropriately redacted copy.

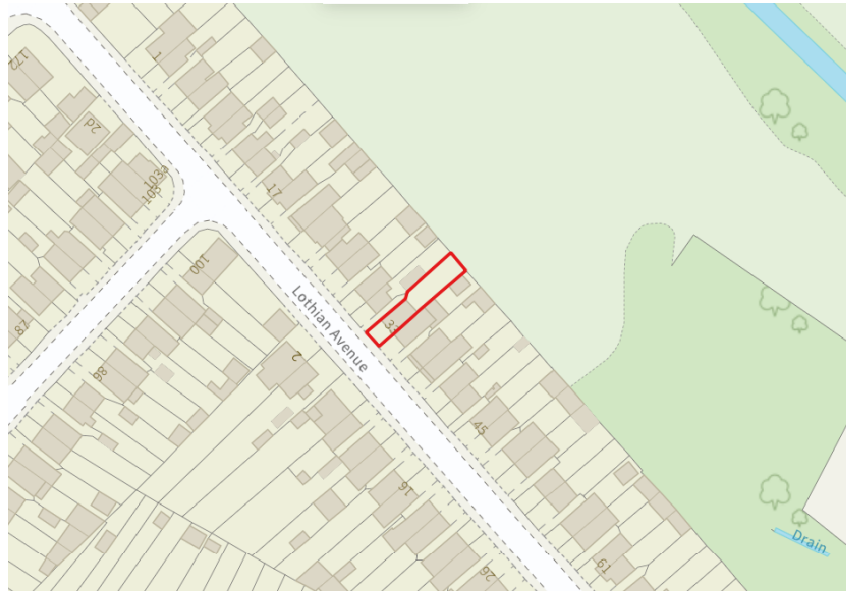
## Designer actions required

- 1 Ensure plans and specification are updated to incorporate flood resilience and resistance measures prior to submission.
- 2 Ensure plans clearly show FFL of the extension is no lower than the existing FFL.
- 3 Confirm the design intention to manage surface water at source.

## 2 Introduction

### 2.1 Site location

The project is at 33 Lothian Avenue, Hayes UB4 0EG (see Figure 1).



The Environment Agency has been consulted in order to establish the flood zone of the proposed site.

In addition, planning policies from the Local Authority were also reviewed including its Strategic Flood Risk Assessment.

Some of key policies are summarised as below.

### **3.1 Standing Advice**

Generally the following applies: Apart from habitable basements, domestic extensions within the curtilage of the dwelling (see GDPO definition of, minor development) and non-domestic extensions with a footprint of less than 250 m<sup>2</sup> will not require a detailed FRA. These applications should demonstrate that the risk of flooding from all sources has been assessed.

### **3.2 Environment Agency Guidance on Standing Advice**

The FRA should be:

- appropriate to the scale, nature and location of the development;
- proportionate to the degree of flood risk.

For all development covered by standing advice, a FRA should include:

- the site address;
- a description of the development;
- the estimated flood level for your development, taking into account the impacts of climate change over its lifetime;
- details of the finished floor levels;
- details of your flood resistance and resilience plans;
- any supporting plans and drawings any other information.

Floor levels

- floor levels are set at least 600 millimetres (mm) above the estimated flood level. You may be able to reduce this to 300mm if there is a high level of certainty about your estimated flood level. If there is a particularly high level of uncertainty it may need to be increased;
- if floor levels cannot be raised in this way, you will also need to include extra flood resistance and resilience measures. These measures should protect the property to at least 600mm above the estimated flood level.



The building design should also:

- prioritise excluding flood water where possible;
- speed recovery in case water gets in.

## 4 Flood risk analysis

### 4.1 Sources of potential flooding

Flood risk from various sources at the site is analysed in this section.

#### 4.1.1 Flood risk from sea and rivers

Flooding can occur from the sea due to a particularly high tide or surge, or combination of both.

The site is not at risk from tidal flooding.

Flooding can also take place from flows that are not contained within a river channel due to high levels of rainfall in the catchment.

With reference to the Environment Agency flood map, Figure 2, the site lies in Flood Zone 3. This means that the site has a High probability of fluvial flooding (greater than a 1 in 100yr annual probability of fluvial flooding).

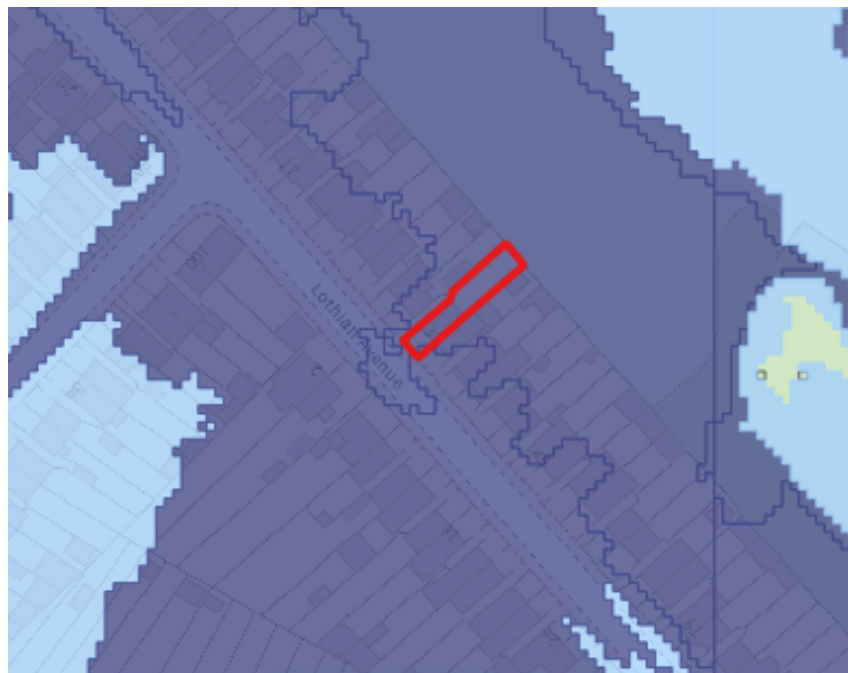


Figure 2: Flood mapping from the DEFRA online, RoFRS data including climate change. The site falls within Flood Zone 3

#### Historic flooding

The site is not shown to lie in an area of historic flooding as indicated in Figure 3.

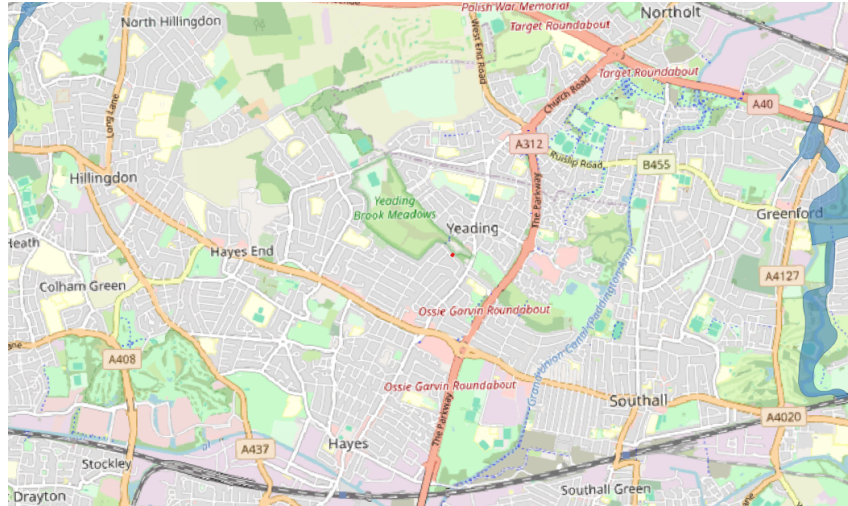


Figure 3: Historic flood mapping from the EA online data. The site falls outside an area of historic flooding

#### 4.1.2 Flood risk from groundwater

Groundwater flooding occurs when water levels in the ground rise above surface levels. It is most common in low-lying areas underlain by permeable rock (aquifers), usually due to extended periods of wet weather. The site's geology is classified as having low susceptibility to groundwater flooding (<25% ) as indicated in Figure 4.



Figure 4: Susceptibility to ground water flooding. The site falls within an area at low, <25% risk

Since the proposed development does not involve any basement elements, the impact of groundwater flooding on the proposed site will be minimal. Hence, the risk of groundwater flooding on the proposed site can be considered to be Low.

#### 4.1.3 Flood risk from sewer and highway drains

Flooding occurs when combined, foul or surface water sewers and highway drains are temporarily over-loaded due to excessive rainfall or due to blockage.

There are no indicators to Sewer flooding at the site.

Hence, the risk of sewer flooding to the proposed site can be considered to be Low.

Highway flooding manifests as surface water flooding at this location.

#### 4.1.4 Flooding risk from surface water

Flooding occurs when rainfall fall on a surface (on or off the site) which acts as run-off which has not infiltrated into the ground or entered into a drainage system.

**Present day risk** With reference to the 25.03.2025 release of the Flood Map for Planning data set, Figure 5, the site and adjacent Highway are at a High risk from surface water flooding.

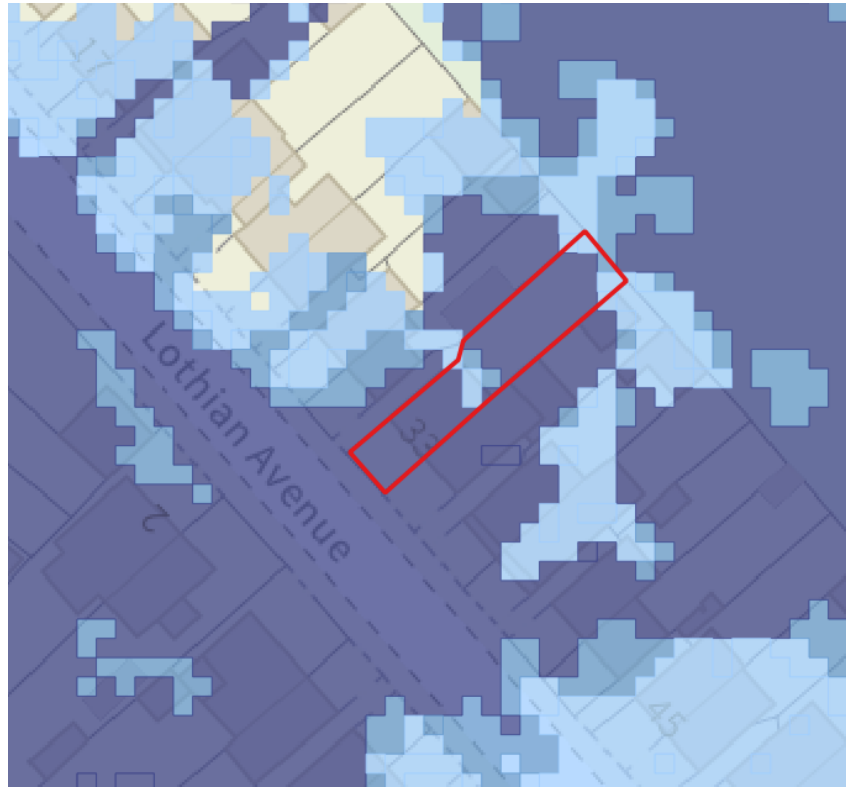


Figure 5: SW flood risk mapping of current risk. The site is shown to be at a High risk.

**Future risk** With reference to the 17.09.2025 release of the E.A online SW data set, Figure 6, the extension will remain at a High risk (greater than a 1 in 30yr) from surface water flooding.

For the design period, 1 in 100yr+ CC, there is a Very Low probability of occurrence for any depth of surface water flooding at the site greater than 300mm as shown in Table 1).

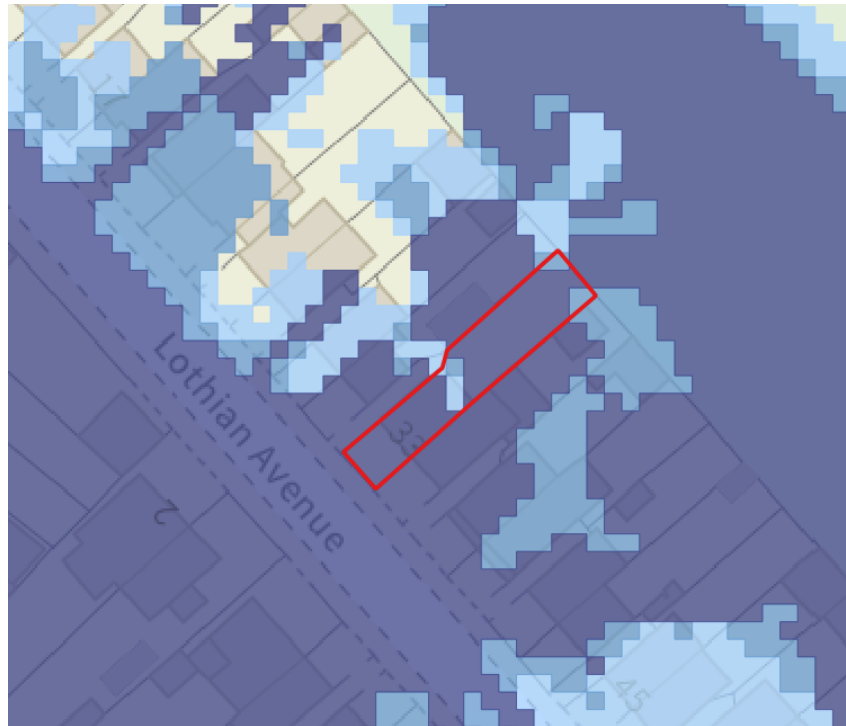


Figure 6: SW flood risk mapping including climate change. The site is in an area at High future risk

Depth	Probability of occurrence
0 - 0.2m	High
0.2 - 0.3m	Low to rear (High to front)
0.3 - 0.6m	Very Low
0.6 - 0.9m	Very Low
0.9 - 1.2m	Very Low

Table 1: Design period, 1 in 100yr + CC SW flood depth and highest related probability of occurrence at the extension

#### 4.1.5 Flood risk from infrastructure failure

Flooding occurs because of canals, reservoirs, industrial processes, burst water mains or failed pumping stations.

The site is shown to be at flood risk due to reservoir failure, as shown in Figure 7.



## 4.2 EA summary of flood risk

Figure 16 gives the EA's overall summary of flood risk to the site.

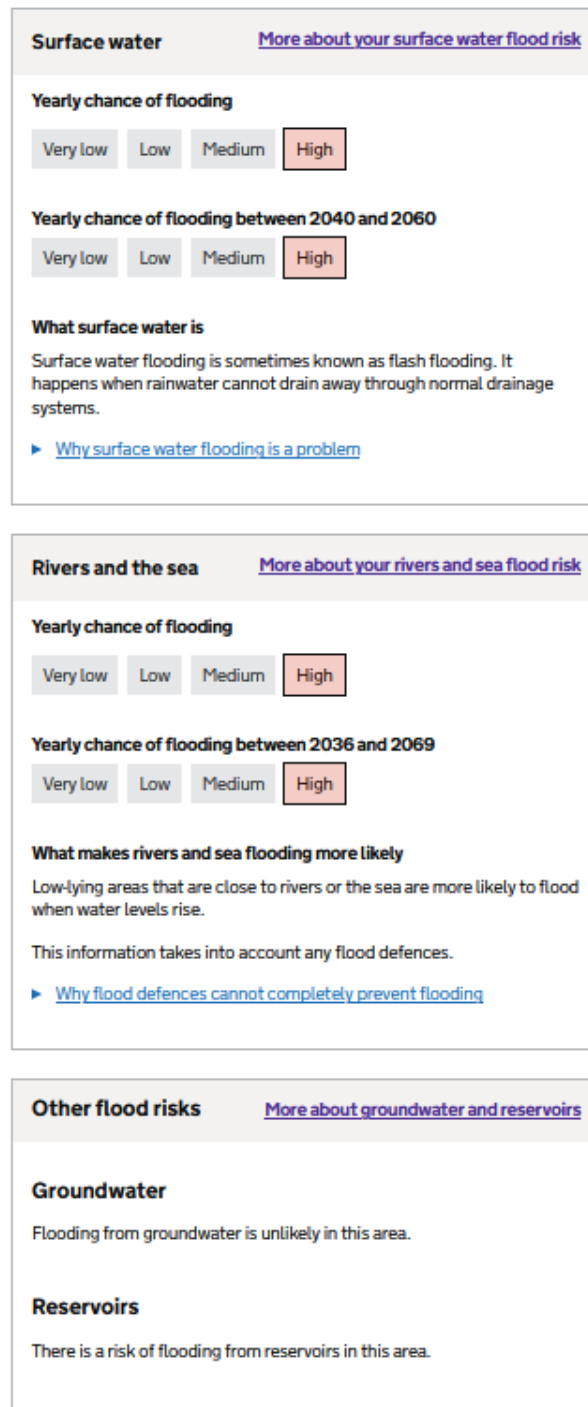


Figure 8: EA summary of flood risk to the site



## **4.3 On-site surface water analysis and management**

### **4.3.1 Generation of Run-off**

The post-development surface water run-off volume will not increase when compared to the pre-development level because there is no overall reduction in permeable areas.

### **4.3.2 SuDS Statement:**

Surface water will be managed in full alignment with the SuDS hierarchy as required under provisions made under the Town and Country Planning Act 1990.

While not required for Planning permission consent it can be confirmed that all SW on site will be also be designed, installed and tested in full accordance with Part H of the Building Regulations 2010 (as amended 2013), Requirement H3, as made under the Building Act 1984.

It is unlikely that soakaways will be viable given the expected ground conditions associated with the local geology hence the recommendation of this report would be to adopt the use of raised rain-garden planters and water butts as a viable and proportionate SuDS solution with the naturally reduced outfall from these taken to the existing drainage provision on site.

## **4.4 Impact on flood risk elsewhere**

**SW arising:** Since the proposal is intending to manage any additional surface water at source the impact on flood risk elsewhere is Low.

## 5 Levels

### 5.1 External ground level

At the front entrance the site level is 29.5m AOD.

To the rear of the dwelling the level is 29.48m AOD.

### 5.2 Existing floor level

The existing ground floor level is seen to be 150mm above external ground level at the front entrance hence at 29.65m AOD

### 5.3 Flood levels

#### 5.3.1 Fluvial

The flood level is an “estimation” based DEFRA RoFRS data for the 1 in 100yr + CC<sup>1</sup> with flood depths <sup>2</sup> as depicted in Figure 9. There is therefore a level of uncertainty in these levels (ref to Section 3.2).

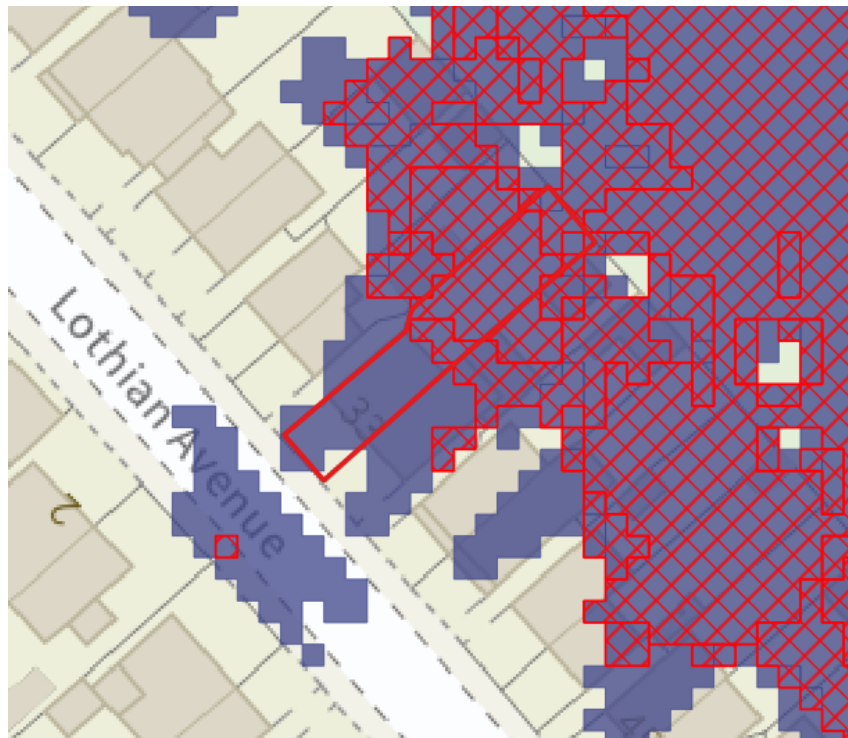


Figure 9: 1 in 100yrCC flood depths. Red hatched areas indicate estimated flood depths between 200 and 300mm, with the remaining shaded areas indicating flood depths to 200mm.

<sup>1</sup>“The climate change allowances are based on the latest UK Climate Projections (UKCP18) from the Met Office, using the Representative Concentration Pathway (RCP) 8.5.”

<sup>2</sup>Ref: Data link

For the purpose of design the estimated flood level is  $29.48 + 0.3 = 29.78\text{m AOD}$ .

### 5.3.2 Pluvial

The estimated surface water flood level is 300mm above external ground level (at the front entrance) hence **29.8m AOD**.

## 5.4 Extension's floor level

In line with EA standing advice the FFL of the extension should be set no lower than  $29.8 + 0.6 = 30.4\text{m AOD}$ .

This would in practice require the extension's floor to be elevated 0.75m above the existing FFL.

However, the designer has stated that:

“Such a change in floor levels would not be possible. An elderly family member has limited mobility hence a level ground floor is the only scenario that would be acceptable.”

Therefore floors are to be set no lower than existing FFL and, so as to align with EA standing advice, the design will now include “extra flood resistance and resilience measures”.

## 6 Management of flood risk

### 6.1 Flood risk resilience measures

Because the site is located in Flood Zone 3, and floor levels cannot be raised 600mm above estimated flood levels then so as to align with EA standing advice, flood risk resilience measures must be incorporated into the development's construction, specifically at ground floor and all construction below such that "the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment"<sup>[4]</sup>.

For the purpose of the following guidance, the estimated flood level is 29.78m AOD.

The Government's guidance states:

The design should be appropriately flood resistant and resilient by:

- 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;
- using flood resilient materials (for example lime plaster) 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;
- making it easy for water to drain away after flooding such as installing a sump and a pump;
- making sure there is access to all spaces to enable drying and cleaning;
- ensuring that soil pipes are protected from back-flow such as by using non-return valves.

In accordance with the document "Improving the Flood Performance of New Buildings - Flood Resilient Construction"<sup>[3]</sup> a series of design approaches should be planned to mitigate the flood risk based on the flow chart as at Figure 10.

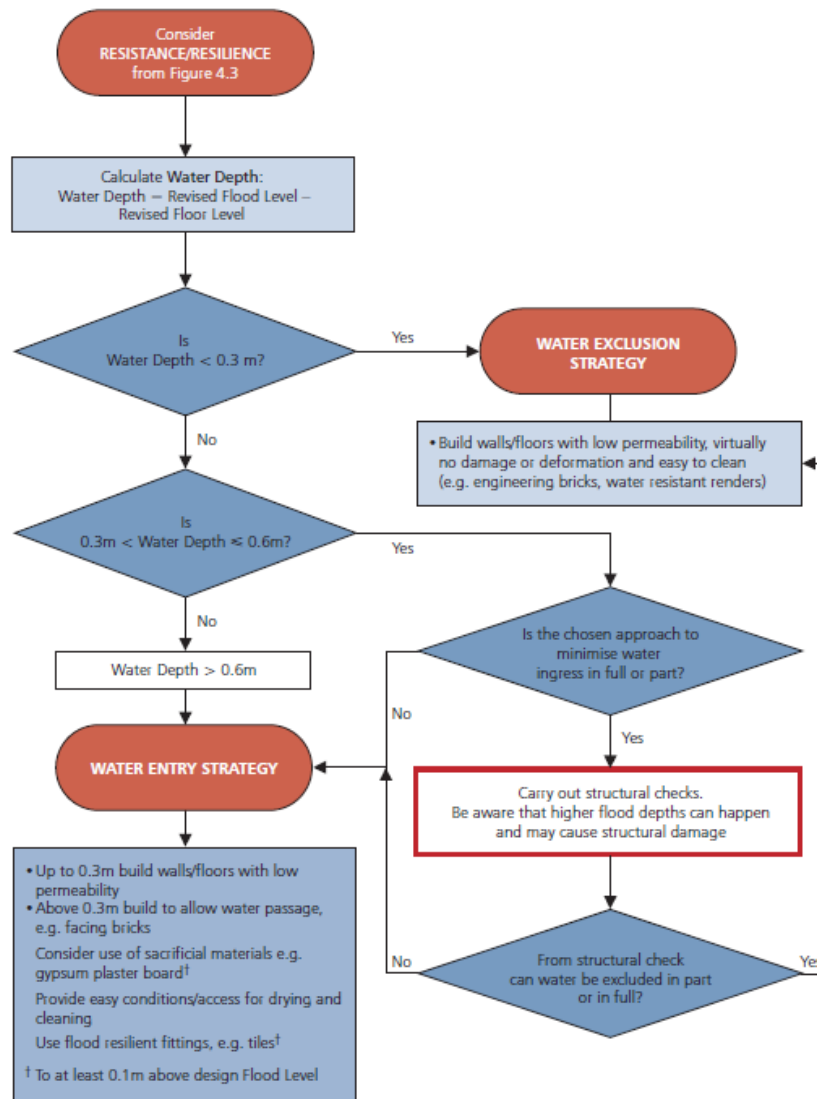


Figure 10: Design strategies for resistance and resilience<sup>[3]</sup>

Table 2 provides guidance on which materials are most suitable, suitable and unsuitable, when considering construction work involved in this project. This report recommends the use of materials from the “most suitable” column were this is at all possible on site, however they are not mandatory requirements.

Component	Most suitable	Suitable	Unsuitable
Flooring	Concrete, pre-cast or in situ	Timber floor, fully sealed, use of marine plywood.	Untreated timber, Chipboard
Floor Covering	Clay tiles, Rubber sheet floors, Vinyl sheet floors	Vinyl tiles, Ceramic tiles	
External Walls - to max flood level	Engineering brick, Reinforced concrete	Low water absorption brick	Large window openings
Doors	Solid panels with waterproof adhesives, Aluminium, plastic or steel	Epoxy sealed doors	Hollow core plywood doors
Internal Partitions	Brick with waterproof mortar, Lime based plasters	Common bricks	Chipboard, Fibreboard panels, Plasterboard, Gypsum plaster
Insulation	Foam or closed cell types	Reflective insulation	Open cell fibres
Windows	Plastic, metal	Epoxy sealed timber with waterproof glues and steel or brass fittings.	Timber with PVA glues and mild steel fittings

Table 2: Summary of Material Suitability for Building Components<sup>[1]</sup>

## 6.2 Flood mitigation measures

The designer is also recommended to consider the provision of a combination of the following flood mitigation measures, to be installed if at all practicable, for use within and around the extension for use in any flooding event:

- Flood resilient doors: Specifically designed to prevent ingress of flood water - passive system (see also Figure 11).
- Door defence: Bespoke barriers fitted externally across doors and low windows and/or the provision of filled sandbags (see also Figures 12 & 13).
- Anti flood air bricks: Where these are unavoidable, these offer replacements for standard air bricks these prevent water entering the sub floor void - passive system i.e. fully automatic (see also Figure 14).

- Air brick and flue covers (see also Figure 15).
- No service penetrations or other openings (cat flaps and letter boxes included) below 1m above FFL.



Figure 11: UPVC doors under flood conditions. These appear to offer reasonable flood resilience



Figure 12: Flood gate example.



Figure 13: Sand bag defence.





Figure 14: Anti flood air brick. Example from CSI products



Figure 15: Air brick covers. Example from Buffalo products

## 7 Management of residual risk

Any residual risk can be safely managed by not impairing access and evacuation routes, signing residents up to flood warning schemes and preparation of domestic flood plans.

### 7.1 Safe access and egress routes

The NPPF stipulates that, where required, safe access and escape routes should be available to/from new developments in flood risk areas. Access routes should be such that occupants can safely access and exit buildings in design flood conditions. The extension does not impact on existing access and egress routes. It is noted that the existing routes are within the flood risk zone (ref Figure 16).

It is therefore important that the occupiers gain early warning of likely flood events.

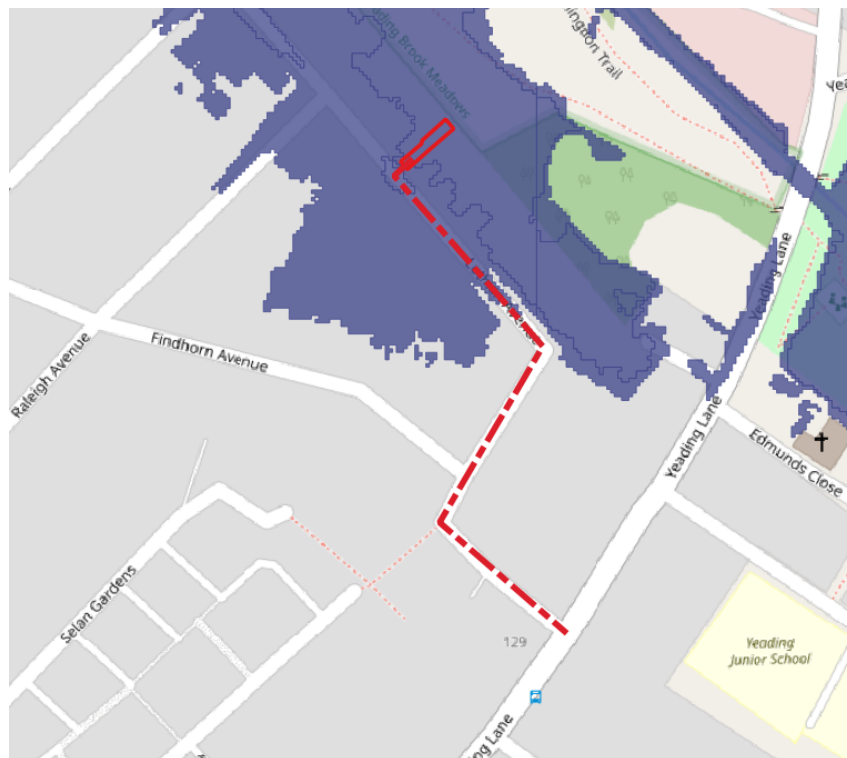


Figure 16: Access and Egress routes, although not ideal, are however existing and not impacted by the extension.

### 7.2 Flood warning schemes

Since it has been established that the site is in an area with a possibility of flooding the owners of the dwelling should (if they have not done so already) sign up to the E.A. "Flood Warnings Direct" which is a free service providing flood warnings by phone,

text or email. See <https://www.fws.environment-agency.gov.uk/app/olr/register>, or call the E.A. on 0345 988 1188 for full information.

### **7.3 Flood Plan**

This report also provides the owners of the dwelling with a proforma Flood Plan (See Appendix A for an example). The plan will, when completed bespoke to the owners and property, provide guidance on emergency response procedures in the event of flooding to the site. This will:

- Provide details of who to contact and how;
- Provide details of how to turn off gas, electricity and water mains supplies;
- Provide details of designated safe egress routes out of the building and out of the local area at risk;
- Provide details of E.A. Flood warning codes;
- Provide details of local radio stations
- Provide a check list of essential items.

## 8 Conclusions

Given that:

- The extension lies within an existing developed site and this is minor development;
- The site lies in Flood Zone 3, is at a High risk from surface water flooding and at a Low risk from reservoir failure;
- Floor levels cannot be raised 600mm above the estimated flood level;
- Floor levels are to be set no lower than existing floor levels;
- Flood resilience and mitigation methods will be therefore implemented on site in line with a “water exclusion” strategy in lieu of an elevated floor to the extended area;
- Access/egress routes are not affected and the site will be signed up to flood warning schemes;
- There is no documented evidence of flood risk from any other sources;
- The development does not impact on flood risk elsewhere;

and assuming the recommended mitigation, warning and evacuation procedures can be maintained over the lifetime of the development, the proposed minor development to an existing dwelling is considered acceptable.

Signed:



Dr Robin Saunders CEng, C. Build E, MCABE, BEng(Hons), PhD

Date: 26<sup>th</sup> October, 2025

## References

- [1] J Wingfield; M Bell; P Bowker. Improving the flood resilience of buildings through improved material, methods and details. Technical Report WP2c, CIRA, 2005.
- [2] BSI. BS 8533:2011. Technical report, 2011.
- [3] CIRIA, CLG, EA and DEFRA. Improving the flood performance of new buildings. Flood resilient construction, 2007.

- [4] Ministry of Housing, Communities and Local Government. National planning policy framework. 2021.

# A Emergency flood plan (example)

Personal flood plan

Name

Environment Agency

Are you signed up to receive flood warnings?

If not call Floodline on 0345 988 1188 to see if your area receives free flood warnings.

Let us know when you've completed your flood plan by calling Floodline on 0345 988 1188. This will help us learn more about how people are preparing for flooding.

General contact list	Company name	Contact name	Telephone
Floodline	Environment Agency		0345 988 1188
Electricity provider			
Gas provider			
Water company			
Telephone provider			
Insurance company and policy number			
Local council			
Local radio station			
Travel/weather info			

Key locations

Service cut-off	Description of location
Electricity	
Gas	
Water	

Who can help/who can you help?

Relationship	Name	Contact details	How can they/you help?
Relative			
Friend or neighbour			

Be prepared for flooding. Act now

## Personal flood plan

### What can I do NOW?

☐ Put important documents out of flood risk and protect in polythene

☐ Look at the best way of stopping floodwater entering your property

☐ Make a flood plan and prepare a flood kit

☐ Check your insurance covers you for flooding

☐ Find out where you can get sandbags

☐ Identify what you would need to take with you if you had to leave your home

☐ Understand the flood warning codes


☐ Identify who can help you/who you can help

### What can you do if a flood is expected in your area?

Actions	Location
<b>Home</b> <ul style="list-style-type: none"> <li>Move furniture and electrical items to safety</li> <li>Put flood boards, polythene and sandbags in place</li> <li>Make a list now of what you can move away from the risk</li> <li>Turn off electricity, water and gas supplies</li> <li>Roll up carpets and rugs</li> <li>Unless you have time to remove them hang curtains over rods</li> <li>Move sentimental items to safety</li> <li>Put important documents in polythene bags and move to safety</li> </ul>	
<b>Garden and outside</b> <ul style="list-style-type: none"> <li>Move your car out of the flood risk area</li> <li>Move any large or loose items or weigh them down</li> </ul>	
<b>Business</b> <ul style="list-style-type: none"> <li>Move important documents, computers and stock</li> <li>Alert staff and request their help</li> <li>Farmers move animals and livestock to safety</li> </ul>	
<b>Evacuation - Prepare a flood kit in advance</b> <ul style="list-style-type: none"> <li>Inform your family or friends that you may need to leave your home</li> <li>Get your flood kit together and include a torch, warm and waterproof clothing, water, food, medication, toys for children and pets, rubber gloves and wellingtons</li> </ul>	

There are a range of flood protection products on the market to help you protect your property from flood damage. A directory of these is available from the **National Flood Forum** at [www.bluepages.org.uk](http://www.bluepages.org.uk)

## Be prepared for flooding. Act now



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