

Flood Risk Assessment

To accompany a planning application for an
extension to
**69 Thornhill Road, Ickenham,
London, UB10 8SH**

Prepared by
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Innervision Design Ltd

February 2025



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1 Executive Summary

- A The extension is to an existing dwelling already at flood risk 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 residual risk from highway flooding;
- C The site is also at a Low risk from both reservoir flooding and ground water flooding;
- D Floor levels in the extension cannot be raised 600mm above predicted flood levels because it would not be practicable to do so;
- E Flood resilience and mitigation methods will therefore be implemented on site, in accordance with EA standing advice and in line with the Government's best practice guidance;
- F Safe 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 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 viable.

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 in line with the drainage hierarchy and best practice.

2 Introduction

2.1 Site location

The project is at 69 Thornhill Road, Ickenham, London UB10 8SH (see Figure 1).

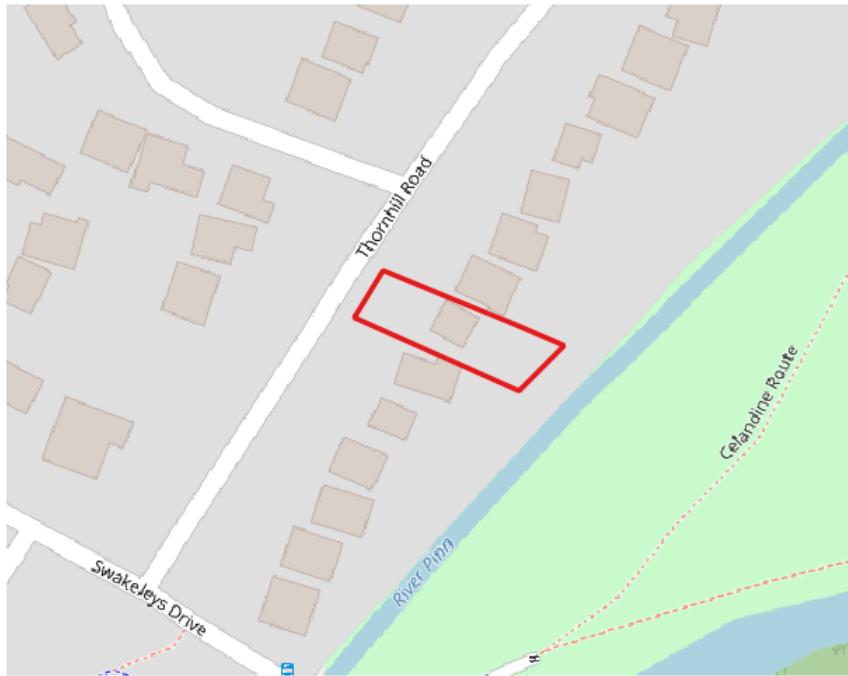


Figure 1: Site location plan, as indicated with North topmost. (source: EA flood mapping)

2.2 Development description

The proposal is for a domestic extension not exceeding 250m² in footprint. The site is an existing developed site and the proposed work is classed as minor development.

The existing and proposed layouts and proposed sections are to be submitted under separate cover.

2.3 Site geology

Geological mapping data from within the vicinity indicate Lambeth Group - Clay, silt and sand however this would require confirmation on site. If available on site, the superficial deposits will offer only medium to poor permeability.

Infiltration SuDS may not be viable (subject to site testing).

3 Policies

In preparation for this Flood Risk Assessment (FRA), National Planning Policy Framework^[5] and British Standards on Assessing and Managing Flood Risk^[2] were reviewed, and their related policies are, where applicable, referred to in this report.

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 m² will not require a detailed FRA. These applications should demonstrate that the risk of flooding from all sources has been assessed. The main sources of flooding are likely to be tidal, surface water and sewer flooding.

3.2 Environment Agency Guidance on Standing Advice

For all relevant vulnerable developments (i.e. more vulnerable, less vulnerable and water compatible), you should follow the advice for:

- surface water management
- access and evacuation
- floor levels
- extra flood resistance and resilience measures

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 Zones 3 and 2 (in risk order). This means that the site has a High probability of fluvial flooding (greater than a 1 in 100yr annual probability of fluvial flooding).

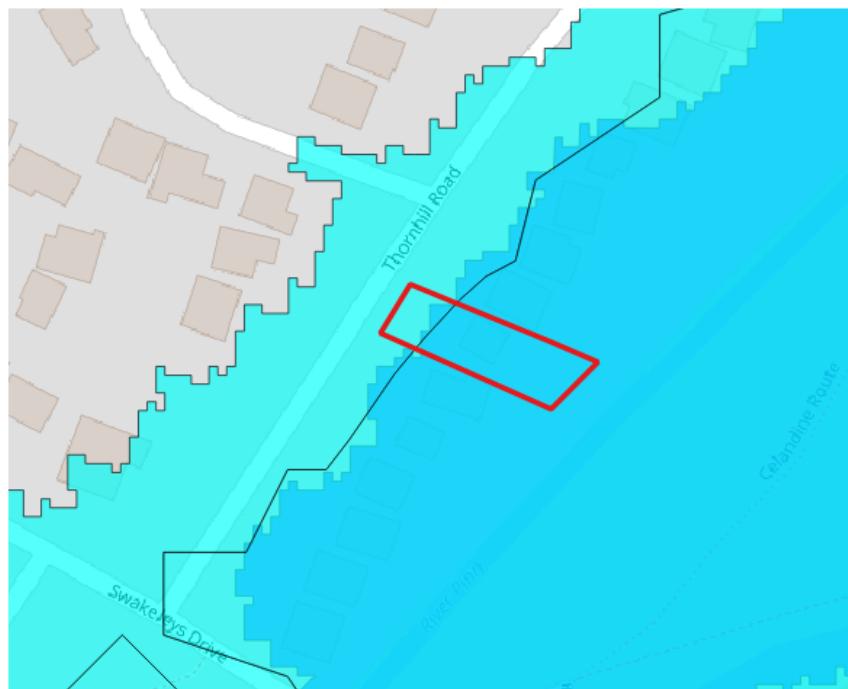


Figure 2: Flood mapping from the EA online data. The site falls within Flood Zones 3 and 2

Historic flooding

The site is shown to lie in an area of historic flooding as indicated in Figure 3.

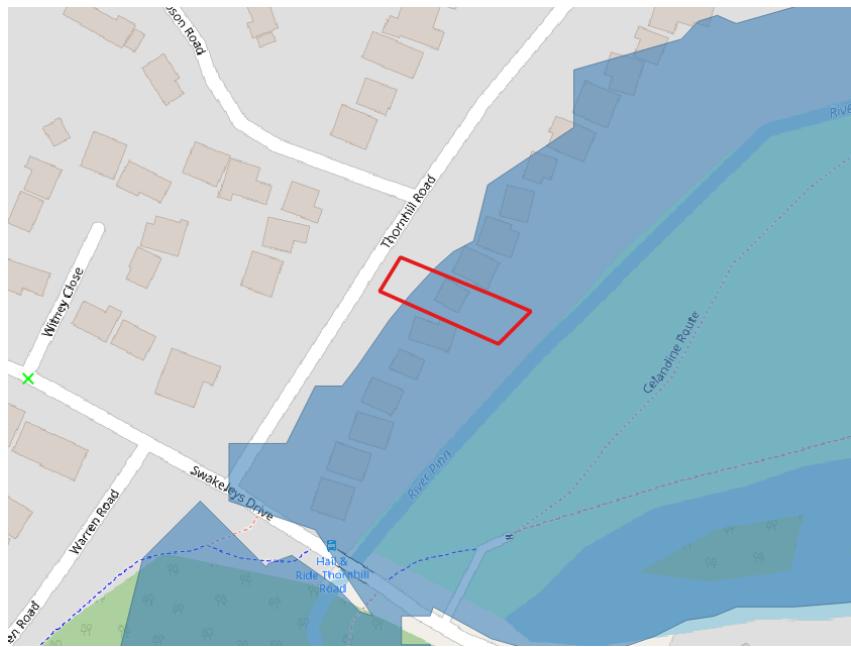


Figure 3: Historic flood mapping from the EA online data. The site falls within an area of historic flooding

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.

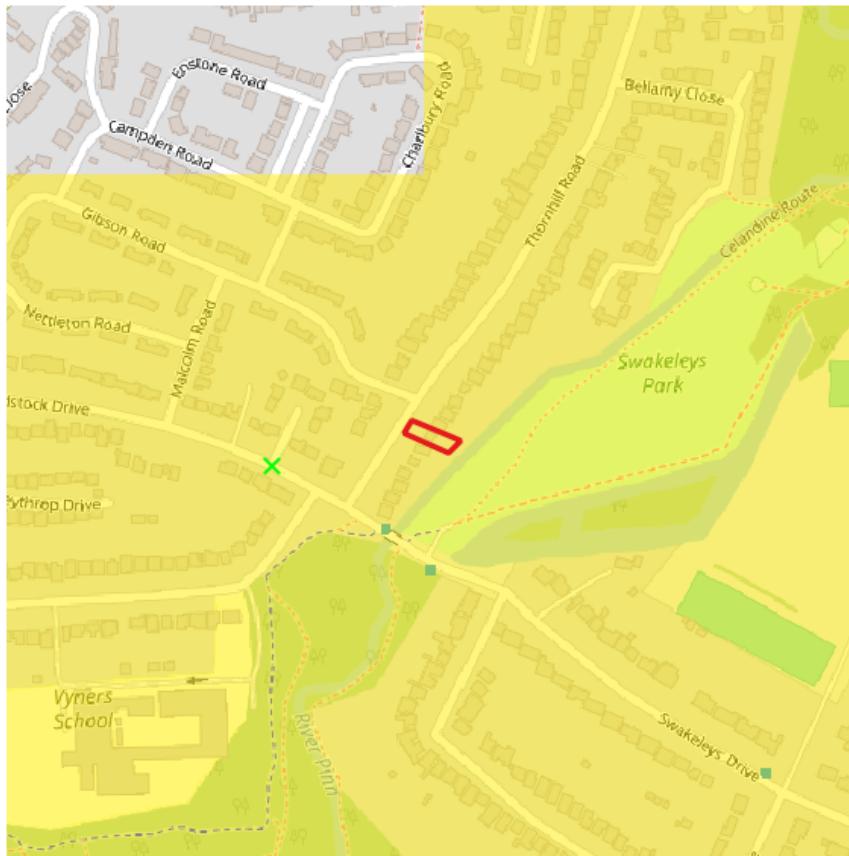


Figure 4: Susceptibility to ground water flooding. The site falls within an area at low, <25% risk

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 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.

With reference to the E.A RoFSW data, Figure 5, the site, in part, is at a very High risk from surface water flooding (>1in30yr) for the design period and wholly at risk from the more extreme 1 in 100yr to 1 in 1000yr event

For design, flood depths at the location of the extension are up to 600mm above external ground level at the footprint as shown in Figure 6.

The adjacent highway is shown to be at a very High risk. Generally surface water flooding is a short term event hence the relative risk of flooding from the highway is to be considered as a residual risk given the site slopes down from the highway.

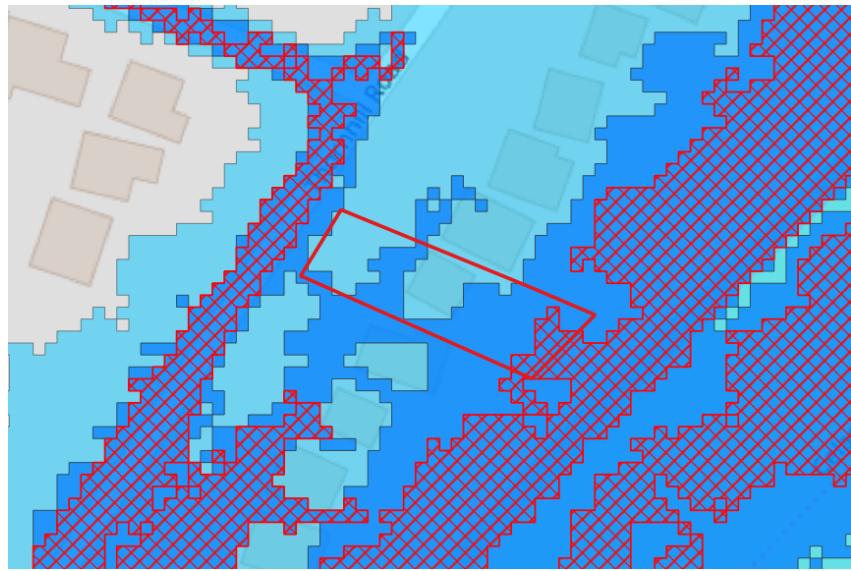


Figure 5: 1in 30yr, 1 in 100yr and 1 in 1000yr SW flood extent mapping. The site is, in part, at a very High risk, <1in30yr, from SW flooding (areas of red hatching).

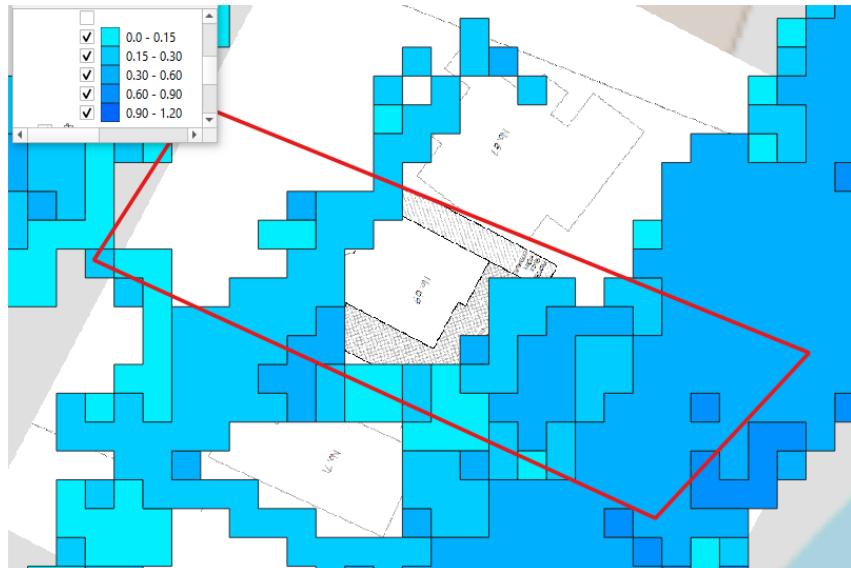


Figure 6: 1 in 100yr SW flood depth mapping. At the footprint of the extension predicted flood levels are up to 600mm above external ground level.

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.

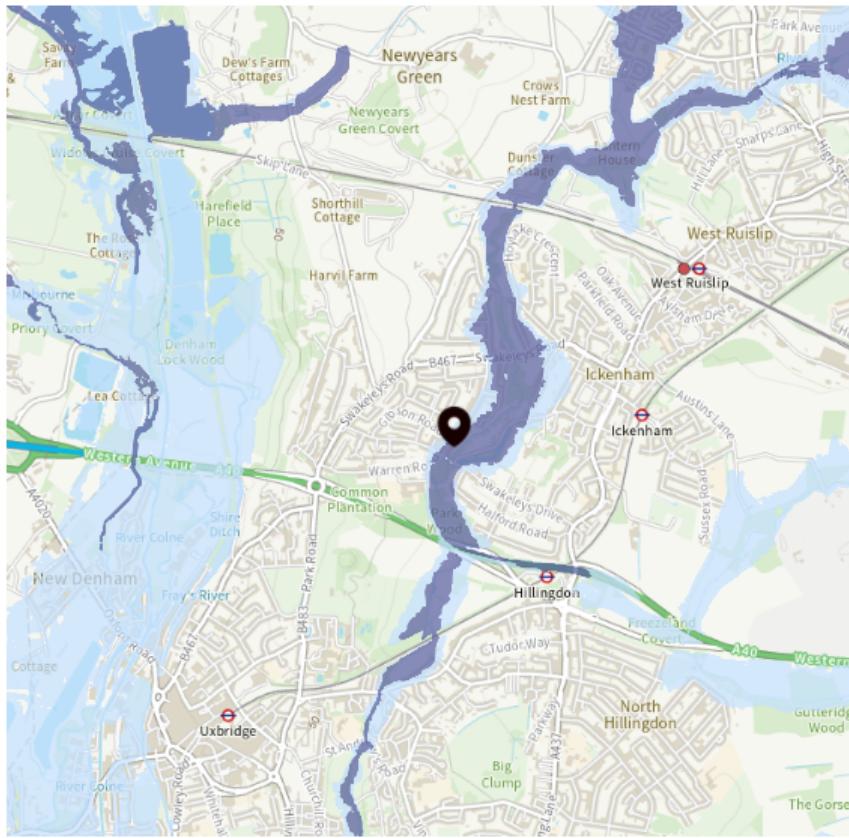


Figure 7: Flood risk from reservoir flooding. (Source: EA flood mapping)

However the EA have previously stated that:

“Reservoir flooding is extremely unlikely to happen. There has been no loss of life in the UK from reservoir flooding since 1925. All large reservoirs must be inspected and supervised by reservoir panel engineers. As the enforcement authority for the Reservoirs Act 1975 in England, we ensure that reservoirs are inspected regularly and essential safety work is carried out.”

Hence the flood risk to the site from reservoir failure is considered to be Low.

4.1.6 Urban flash flooding

With reference to the UFF dataset there are no referenced flash flood incidents at this location.

4.2 On-site surface water analysis and management

4.2.1 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 an overall reduction in permeable areas.

4.2.2 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, water butts and an attenuated and a hydraulically controlled outfall as a viable and proportionate SuDS solution with the reduced outfall from these taken to the existing drainage provision on site.

4.3 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 minimal.

5 Levels

5.1 Flood level data

5.1.1 Fluvial

Design period flood level is estimated at 36.52m AOD (based on Lidar data and flood extents).

5.1.2 Surface water

Depths to 600mm above ground level (36.19m AOD) at the extension giving a predicted flood level of 36.79m AOD.

5.2 Floor level data

Existing FFL 36.4m AOD

To align with EA standing advice floor levels of the extension should ideally be raised to 600mm (given uncertainty in the data) above estimated fluvial flood levels to 37.12mAOD and to 300mm above predicted SW flood levels to 37.09m AOD.

Hence in the worst case the EA standing advice would have the FFL of the extension raised to 37.12m AOD or 0.72m above the existing FFL.

However the designer has commented:

“Raising floor levels would put all floor levels, window alignment and ceilings, roof all out of line. Likewise you would never get Planning Permission to raise the height of the building”.

The proposed floor level is therefore designed to be no lower than any existing ground floor levels.

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 predicted flood levels it is a recommendation of this report that, in line with current best practice^[4], flood risk resilience measures should 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"^[5].

For the purpose of the following guidance the estimated flood level is 36.79m AOD (from surface water flooding).

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"^[3] a series of design approaches should be planned to mitigate the flood risk based on the flow chart as at Figure 8.

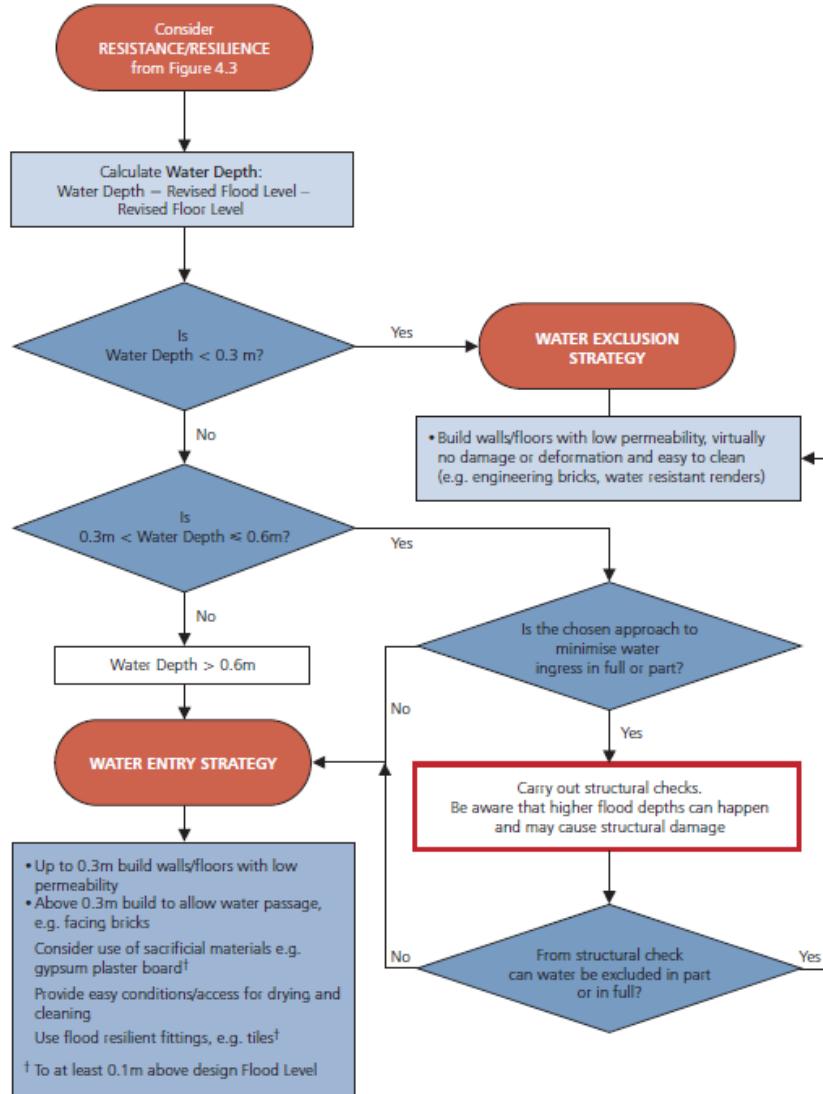


Figure 8: Design strategies for resistance and resilience^[3]

Table 1 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 1: Summary of Material Suitability for Building Components^[1]

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 9).
- Door defence: Bespoke barriers fitted externally across doors and low windows and/or the provision of filled sandbags (see also Figures 10 & 11).

- 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 12).
- Air brick and flue covers (see also Figure 13).
- No service penetrations or other openings (cat flaps and letter boxes included) below 1m above FFL.



Figure 9: UPVC doors under flood conditions. These appear to offer reasonable flood resilience



Figure 10: Flood gate example.



Figure 11: Sand bag defence.



Figure 12: Anti flood air brick. Example from CSI products



Figure 13: 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 (ref Figure 14).

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

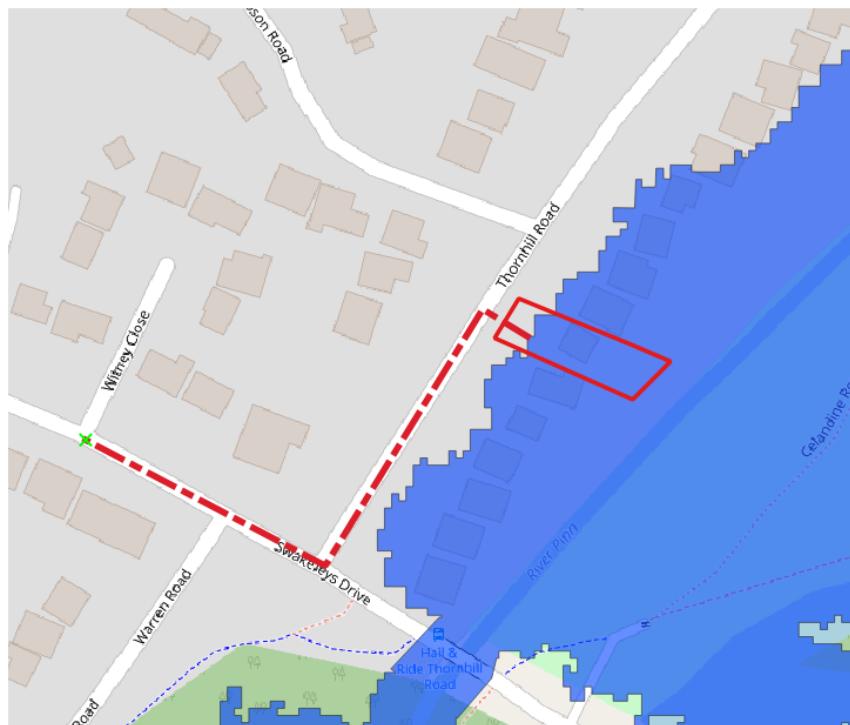


Figure 14: Access and Egress routes are existing and not impacted by the extension.

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 is to an existing dwelling already at flood risk and this is minor development;
- The site lies in Flood Zone 3, is at a High risk from surface water flooding and at a residual risk from highway flooding;
- The site is also at a Low risk from both reservoir flooding and ground water flooding;
- Floor levels in the extension cannot be raised 600mm above predicted flood levels because it would not be practicable to do so;
- Flood resilience and mitigation methods will therefore be implemented on site, in accordance with EA standing advice and in line with the Government's best practice guidance;
- Safe 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;

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 viable.

Signed:



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

Date: 4th February, 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] D Kelly, M Barker, J Lamond, S McKeown, E Blundell, and E Suttie. Code of practice for property flood resilience. Technical report, CIRIA, 2020.
- [5] Ministry of Housing, Communities and Local Government. National planning policy framework. 2021.

A Emergency flood plan (example)

Personal flood plan																																									
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Friend or neighbour																																									
Be prepared for flooding. Act now																																									

Personal flood plan		What can I do NOW?		
		Environment Agency		
Put important documents out of flood risk and protect in polythene Check your insurance covers you for flooding		<input type="checkbox"/> Look at the best way of stopping floodwater entering your property <input type="checkbox"/> Make a flood plan and prepare a flood kit	<input type="checkbox"/> Find out where you can get sandbags <input type="checkbox"/> Identify who can help you/ who you can help	<input type="checkbox"/> Identify what you would need to take with you if you had to leave your home <input type="checkbox"/> Understand the flood warning codes
What can you do if a flood is expected in your area?		Actions		
		Location		
Home <ul style="list-style-type: none"> Move furniture and electrical items to safety Put flood boards, polythene and sandbags in place Make a list now of what you can move away from the risk Turn off electricity, water and gas supplies Roll up carpets and rugs Unless you have time to remove them hang curtains over rods Move sentimental items to safety Put important documents in polythene bags and move to safety 				
Garden and outside <ul style="list-style-type: none"> Move your car out of the flood risk area Move any large or loose items or weigh them down 				
Business <ul style="list-style-type: none"> Move important documents, computers and stock Alert staff and request their help Farmers move animals and livestock to safety 				
Evacuation - Prepare a flood kit in advance <ul style="list-style-type: none"> Inform your family or friends that you may need to leave your home 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 				
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				
Be prepared for flooding. Act now				

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