

Wilsham Consulting

Civil Engineering Consultants

301 Gosbrook Rd

Flood Risk Assessment

for Ms Goodings

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Project no. 884



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APPENDIX

General Constraints and Limitations

This flood risk assessment has been prepared for Ms Goodings in relation to the redevelopment proposal. It is not to be provided to insurers or any other third parties without our agreement. Although the report sets out the mitigation of flood risk, we do not warranty that following these measures will avoid all flood damage or eliminate all risk.

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The report summarises information from a number of external sources, such as the EA and we cannot offer any guarantees or warranties for the completeness or accuracy of information relied upon. Wilsham has not verified information from third parties unless otherwise stated in this report. This report is copyright of Wilsham.

Written and approved by:



Director

1 INTRODUCTION

1.1 Background

This Flood Risk and Consequence Assessment (FRCA) independently reviews the hydraulic elements of the proposal at 301 GOSBROOK ROAD, CAVERSHAM, READING, RG4 8DY

The proposed scheme involves the demolition of an existing rear single storey extension conservatory and removal of existing side extension pitched roof. Erection of a new single storey rear extension and replacement flat roof over existing side extension.

The plot has a small, largely paved patio area to the rear, with a gravel area to the front.

The new building closely matches the existing building footprint. The existing building has no flood resilience, or flood protection measures.

The closest river is the River Thames located 320m to the South (See figure 2.1). The largest flood risk relates to the passage of the River Thames as it passes through Reading. There is a lock, weir and bridge at Reading. This site is located in relation to the upper side of the weir, as a consequence the River level does not vary anything like as much as on the downstream side. The client and previous owners are not aware of any previous flooding from the River reaching any of the properties on Gosbrook Road. It is accepted that the site is located at the far end of the Zone 2 – medium flood risk and as such a FRA is required.

Wilsham Consulting Ltd ('Wilsham') has been commissioned by the client to undertake an independent professional flood risk assessment that is specific to the elements and issues associated with this site's redevelopment.

1.2 Aims and introduction

The aim of this FRA document is to provide *an independent professional review of the flooding risks associated with the land and proposed development*. It is to inform the Client and Authorities of the risk and mitigating measures.

It is central to the production of professional flood risk reports that they should not be written to attempt to justify a development which is not suitable. Such reports must be written by experienced Civil Engineers, based on review of the evidence.

A FRA to be carried out must consider all potential forms of flooding including that from river, sea, estuarial, land drainage, groundwater, overland flow, vadose, private drainage, surface water run-off, sewer systems, and artificial water bodies (lakes, reservoirs, canals etc).

The purposes of this report are:

- To identify and discuss the risk of flooding to the new replacement house from all sources of flooding.
- For each risk identify and to propose practical mitigation measures.
- Identify and discuss the risk of the development on flooding to others.
- Consider the effect of predicted climate change on future flood risk to the site
- Determine an appropriate surface water drainage strategy
- To provide reference for the development proposals against the requirements of NPPF, local flooding policy and provide recommendations for consideration by the Authorities.
- Recommend appropriate flood risk mitigation measures

NOTE:

Flood risk is a product of both the likelihood and consequences of flooding. Throughout this document, flood events are defined according to their likelihood of occurrence. Floods are described according to an 'annual chance', meaning the chance of a particular flood occurring in any one year. This is directly linked to the probability of a flood. For example, a flood with an annual chance of 1 in 100 (a 1 in 100 chance of occurring in any one year), has an annual probability of 1% AEP (Annual Exceedance Probability).



Figure 1.1 A site location plan showing the existing building outline in bounded in red

2 PROPOSED DEVELOPMENT

2.1 The existing site and locality

This site is in a terraced residential area towards the centre of Caversham (Reading). Located at **301 GOSBROOK ROAD, CAVERSHAM, READING, RG4 8DY**

The general topography is reasonably flat levels, falling to the South.

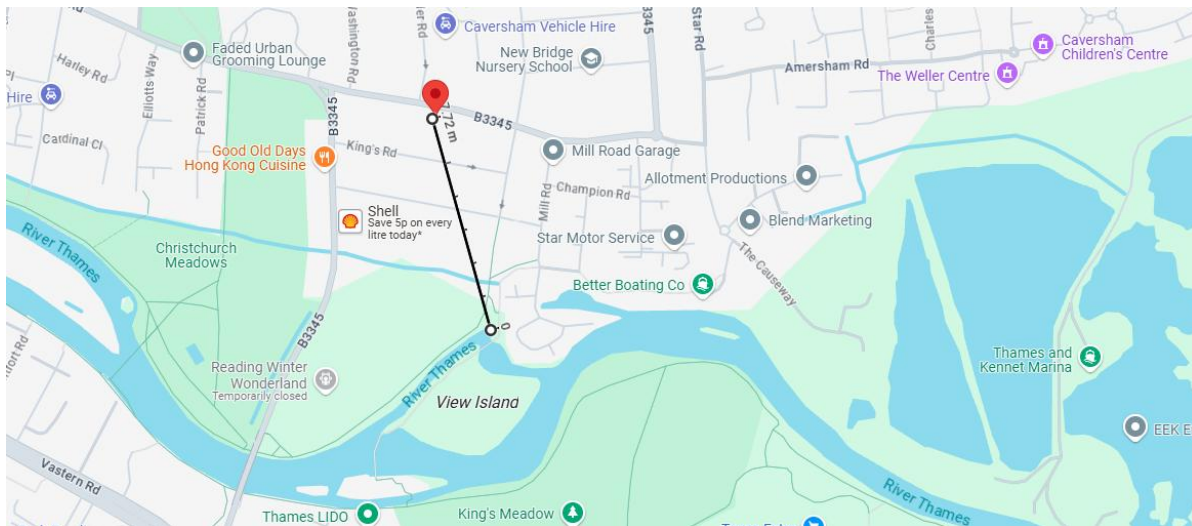


Figure 2.1 Plan showing the main River Thames (and distance to closest channel of.
Copyright Google Maps



Figure 2.2 Photo of the rear of the existing property

3 PLANNING POLICY CONTEXT

3.1 Development and flood risk

The technical guidance sets out government policy on development in areas at risk of flooding. The principal aim of the policy is to ensure that flood risk is taken into account at all stages of the planning process, to avoid inappropriate development in areas at risk of flooding and to direct development away from those areas where risks are highest. It is also a requirement that new developments do not result in increased flood risk elsewhere and, where possible, act to reduce overall flood risk.

Table 3.1 Flood Zones

Flood Zone	Annual Probability of Flooding (%) from rivers (fluvial) or the sea (tidal)	Corresponding Annual Chance of Flooding (1 in x)
1. Low Probability	Fluvial and Tidal <0.1%	>1,000
2. Medium Probability	Fluvial 0.1-1.0%	1,000-100
	Tidal 0.1-0.5%	1,000-200
3a. High Probability	Fluvial >1.0%	<100
	Tidal >0.5%	<200
3b. The Functional Floodplain	Fluvial and Tidal >5.0%	<20
	Or, areas designed to flood during an extreme (0.5%) flood, or another probability agreed between the LPA and the EA.	

FRAs are required to accompany applications for planning permission for all developments in Flood Zones 2 and 3, to demonstrate how good practice has been applied to the development proposals.

It is accepted that the development is proposed in Zone 2. Medium Probability of between 1 in 100 and 1:1000 years.

The proposed use as domestic dwellings, is classified as “More Vulnerable”.

As such standing advice is that “In such cases, the applicant will need to show in their flood risk assessment that future users of the development will not be placed in danger from flood hazards throughout its lifetime.

Of specific note is that the proposal does not result in more people living in a medium risk zone. The population will be unchanged.

It is also not possible for the extension to be located elsewhere.

The Flood Risk (table 3.2) suggests that More Vulnerable developments such as this are acceptable in Zone 2.

Table 3.2 Flood Risk Vulnerability

Flood Zone	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	✓	Exception Test required	✓	✓
Zone 3a	Exception Test required	✓	x	Exception Test required	✓
Zone 3b	Exception Test required	✓	x	x	x

Key:

✓ Development is appropriate

x Development should not be permitted

3.2 Other relevant policy and guidance

CIRIA (Construction Industry Research and Information Association) publication C624 provides guidance to developers and the construction industry on the implementation of good practice in relation to flood risk and the development process.

The following should be important considerations:

- All new developments should be designed so that runoff from the development is considered and, if appropriate, controlled;
- Safe access to and from the development should be allowed for during a flood event and should be met for the lifetime of the development including considerations of climate change. There is no requirement for dry access, but such a situation is ideal.

Table 3.3 General information sources used in this report

Variable Factor	Components	Public data sources
Meteorology	Climate, weather, rainfall, E/T, runoff, Infiltration	Met Office; EA
Topography	Height, slope, relief, artificial/made-ground	Site survey combined with Ordnance Survey maps
Geology	Rock type, hard/soft, mineralogy, reactivity	BGS - Geological maps
Hydrogeology	Porosity & permeability, aquifer type	BGS-Hydro maps; EA-GW-vulnerability maps
Soils	Composition, particle and pore sizes, classification, infiltration rate and leaching/drainage potential	SSRC/LRC – Cranfield soils maps
Vegetation	Coverage, type, land-use, urbanisation	EA, Natural England
Drainage	Watercourses (natural, and man-made drains & sewers)	EA, LPA

4 FORMS OF FLOODING

4.1 Overview

In order to identify the flooding mechanisms which require further assessment in this FRA, this section makes reference to the forms of flooding as summarised in Table 4-1.

Table 4.1 Forms of flooding

Source of Flooding	Description
Flooding from rivers	Flood water originating from a nearby watercourse when the amount of water exceeds channel capacity
Flooding from the sea	High tides, storm surges and wave action, often in combination, flooding low-lying coastal land
Flooding from land	Flooding caused by intense rainfall exceeding the available infiltration and/or drainage capacity of the ground
Flooding from groundwater	Flooding caused when groundwater levels rise above ground level following prolonged rainfall
Flooding from sewers	Flooding from surface water, foul or combined drainage systems e.g. caused by limited capacity or blockages
Flooding from reservoirs, canals and other artificial sources	Failure of infrastructure that retains or transmits water or controls its flow, such as reservoirs or water mains.

4.2 Flooding from rivers, Critical Ordinary Watercourses (COWS) or ordinary watercourses

The EA modelling suggests the site is within Flood Zone 2. This is considered reasonable.





Figure 4.1 EA zone extract showing light blue (Zone 2). However, the house is effectively surrounded by Zone 3 (a) areas.

The risk in relation to the River, is the main risk and will be considered further in more detail later in this report.

4.3 Flooding from the sea

The application site is not located near to the coast or at risk.

4.4 Flooding from land / surface water

Flooding from land (or surface water flooding) occurs when extreme rainfall exceeds the infiltration or drainage capacity of the ground surface. This form of flooding can impact on a proposed re-development or neighbouring sites, and changes associated with new development can affect the surface water runoff regime of a site and increase flooding if unmitigated.

The existing building is not in a low position in relation to the surrounding topography. A general fall away from the building to the front and back. Increased use of sustainable surface based sustainable drainage should result in a small net reduction in localised flood risk.

The EA surface water modelling shows that there is a low to minimal risk of surface water flooding and this is compliant with the topography.

New soakaways are proposed which will reduce the localised flood risk. Surface water is a very low, to minimal, flood risk at this location.

The flooding identified essentially relates to a risk to lower lying public highway areas, largely excluding domestic properties. Potentially surface water drains could back up and cause flooding, however not in isolation to the main fluvial flood risk already identified.

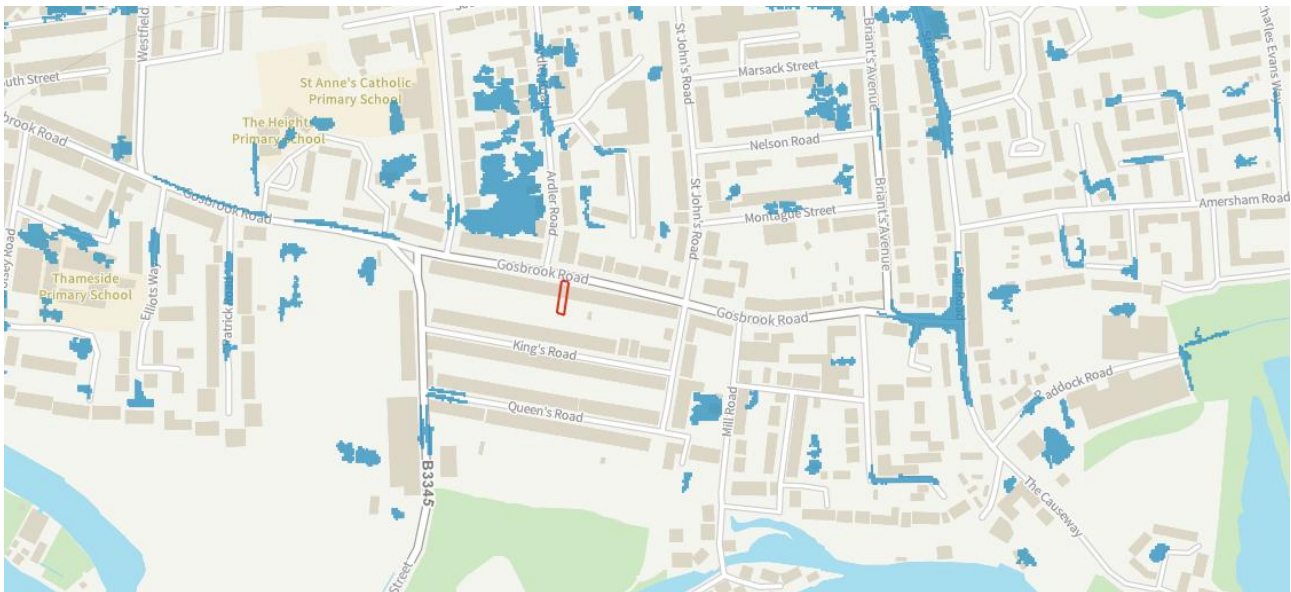


Figure 4.2 EA surface water map extract with location identified. EA Copyright.

4.5 Flooding from groundwater or vadose flows

The site sits on superficial Langley Silts – comprising fluvial geological floodplain clays and silts like most of central Reading and Caversham. Pockets of Kempton Park Gravels and Alluvium is to be expected. The underlying bedrock is the Seaford Chalk Formation.

There are no boreholes in the direct vicinity, but the closest for the Snowflake Laundry in Caversham has a record of groundwater 6 feet below ground level. As such groundwater will not be an issue which would prevent traditional soakaways.

There is no risk to the house that rising groundwater would present flooding, or obstruct safe access. It would be best for soakaways to be shallow, so to ensure maximised attenuation performance.

4.6 Flooding from sewers

It is understood that there is a foul in the vicinity to which the development connects currently and there has been no experience of foul flooding at the property, or would the risk be higher here than elsewhere.

4.7 Flooding from Reservoirs, canals and other artificial sources

Reservoir flooding is extremely unlikely to happen. There has been no loss of life in the UK from reservoir flooding since 1925. There are no canals or other sources in the vicinity. There is no increased risk to this site.

5 FLOODING FROM RIVERS

5.1 Overview

The EA plan shows the site suggests, reasonably that the site is in Flood Zone 2 – medium risk.

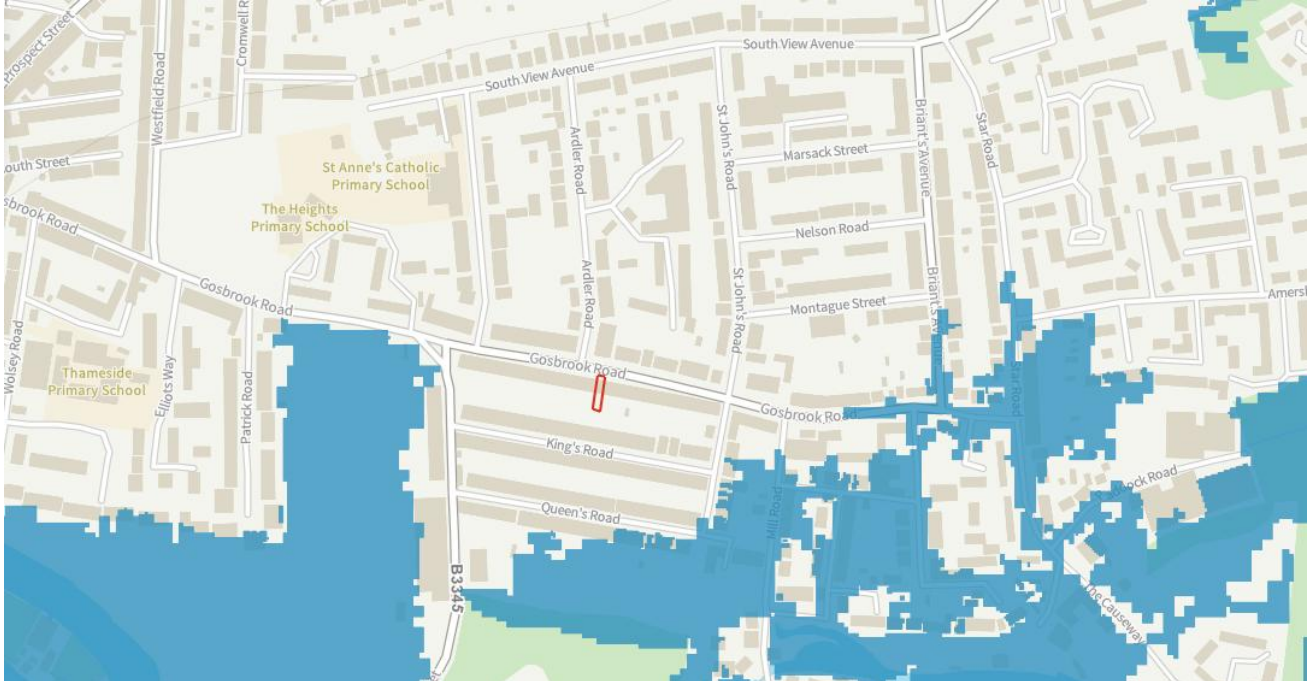


Figure 5.1 Location with flood defences included in modelling (EA)

The site is provided with some enhanced protection from formal flood defences on this section of the River Thames. See the reduced risk in figure 5.1 compared to figure 4.1.

With these defences then most of the residential area of Caversham is protected. This would enable dry and safe exit access to the property.

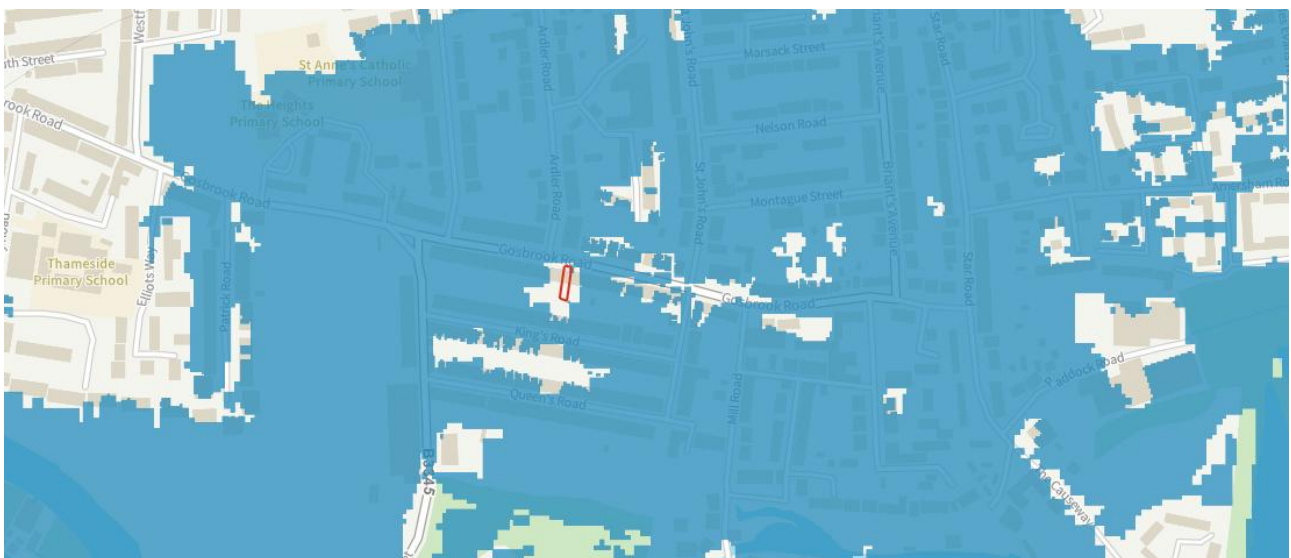


Figure 5.2 Modelling with flood defences 1:30, including allowance for Climate Change (EA)

Figure 5.2 Suggests that even with an allowance for climate change the property would not experience flooding in a 1:30 year event. It would be reasonable to assume there could be some access issues for a short period, for example minimal flooding in the public highway, with a low flow rate.

In a 1:100-year event or greater, with an allowance for climate change flooding should be expected, along with even greater depth of flooding in a 1:1000-year event.

It would be appropriate therefore to make some allowances for resilience as set out in 5.3, but does not provide justification for the proposal being rejected.

5.2 Access, egress and safety during period of exceptional flooding

The occupier should be aware of the concept of flooding in an exceptional situation. Given that the main risk is fluvial rather than due to isolated flash storms, the threat level will rise relatively slowly over several days, flooding in streets in lower areas of Caversham will occur in advance of risk to the property, or access to it, perhaps by at least a day.

If highway flooding is observed in the Queen's or Kings Road and high rainfall is continuing to be forecast then first actions should be taken such as the relocation of vehicles to the North and the raising of items, so far as reasonably possible above the ground level. Simply putting things which are below kitchen table level on a table or upstairs can significantly reduce any potential disruption and damage, without costing anything. The occupier should continue to review EA and other Local Authority flood advice.

The flow is likely to be slow, given the location, so safe access, with welly boots, is likely to be reasonably practical in all but the most extreme situations.

5.3 Consequence of flooding

The consequence of flooding during an extreme event on the structural safety would be negligible. However, some damage to the lowest section of the building fabric and resident's content could take place.

Were the flooding to result in a loss of key services (such as electricity), at any point in the lifetime of the home then people may not be able to stay for a prolonged period and consideration given to short term alternative accommodation should be given, for example a friend's house.

A series of mitigating measures are therefore proposed (so far as reasonably possible – i.e. either throughout the house during refurbishment or at least in the new areas):

a) Clean Water – This is an entirely sealed system and would not be contaminated or likely to be in any way adversely effected for residents. The only total failure would relate the flooding of the utility companies clean water infrastructure, but this would equally affect the entire region. Outside taps for example set 0.6m minimum up a wall and with an isolation valve.

b) Electricity – Opportunity should be taken to ensure electrical connections to the new house rooms are only exposed 0.5m or more above the next floor. Any fuses boards and such exposed apparatus should be located above 1m. Electrical cabling should come from the 1st floor down. Sockets should be at 0.5m above the floor. The aim is that electricity can be sustained even with an exceptional flood.

c) Gas - Similar to Water is an entirely sealed system above 0.5m.

d) Sewerage – Although there is a clear risk of public sewer surcharge within Caversham, the hydraulic head means that effective use of the drainage would most likely not be affected in the short term, although sewerage flooding in the streets may be possible.

e) Phone/Internet – Similar to electrical supplies this could easily be waterproofed to 0.5m or greater.

In conclusion there is no reason why residents here would be affected to an extent that there was a need to evacuate, unless in a very exceptional 1:100 +climate change situation and then only for a very short period.

The use of flood resilient materials is recommended for the new ground floor rooms. Such as tiles or water resilient skirting boards. The walls should use plaster which is water resilient and does not crack or warp, or other techniques. Easily removable rugs are more appropriate than permanent carpets.

There is no requirement for flood compensation land.

6 CONCLUSIONS AND RECOMMENDATIONS

This FRA has assessed the proposal to replace the existing residential house for a new more flood resilient and lower risk house on the same plot.

With respect to current Flood Standing Advice, this FRA has concluded the following:

- The application site is located within Flood Zone 2, medium risk 1:100 to 1:1000 years. Given the site-specific levels existing the risk is approximately a 1 in 1:500 year. The exact impact of climate change is unknown.
- The proposal is acceptable and compliant in principle.
- A flood management plan is advised for the property. With consideration of checking EA advice on live flood risk levels and consideration an exceptional event alternative location for a few nights. Consideration also needed to raising everything possible to a higher level in advance to limit impact of flooding.
- The new floor level needs to be the same as the existing, which is reasonable and practical.
- Other passive protection flood resilient measures will be installed as part of the new build rooms to limit impact for any more extreme floods.

The proposal is considered to appropriately address the flood risks in accordance with current Flood Standing Advice and Local Planning Policy. The new building, with its more sustainable features, will have provide a small contribution to reducing flooding risk for local residents, as well as reducing the risk of flood damage to the owner.

7 REFERENCES

1. National Planning Policy Framework Technical Guidance 2012
2. Development and Flood Risk: Guidance to the Construction Industry (C624), 2004, CIRIA.
3. British Geological Survey Borehole viewer.
4. Adapting to Climate Change: Advice for Flood and Coastal Erosion Risk Management Authorities, 2011, Environment Agency
5. Supplementary Note on Flood Hazard Ratings and Thresholds for Development Planning and Control Purpose – Clarification of Table 13.1 of FD2320/TR2 and Figure 3.2 of FD2321/TR1, 2008, Environment Agency and HR Wallingford.
6. Handbook of Flood Risk Mitigation for Existing Properties (RAB Consultants Ltd)
7. English Heritage – “Flooding and historic buildings”
8. EA Current Standing Advice.