

Mr & Mrs L Riccairdi

**Clapton Farm House, Bevington, Berkeley
GL13 9QX**

Flood Risk Assessment

22nd March 2022 V2

This report is based on the instructions given by our client. It is not intended for use by a third party, and no responsibility will be given to any third party.

The consultant has followed accepted procedure in providing the services, but given the residual risk associated with any prediction and the variability which can be experienced in flood conditions, the consultant takes no liability for and gives no warranty against actual flooding of any property (client's or third party) or the consequences of flooding in relation to the performance of the services.

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Version history

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D1	02.02.22	Pegasus Group, York Associates	Email pdf
V1	12.03.22	Ditto	Ditto
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1. Introduction

Mr Mr & Mrs L Riccairdi propose to demolish an existing outbuilding ancillary to a dwelling and form a new building to provide recreation facilities at Clapton Farm House in Berkeley.

The EA Flood Map for Planning shows the site to be partly within Defended Flood Zone 3, but the South Gloucestershire SFRA maps show the building in Flood Zone 1.

The Environment Agency (EA) Product 4 (Ref: 178798-WX) information has been provided including site specific predicted flood levels; the Product 4 information provides the 0.5% event indicating that the EA considers the flood risk to be from tidal sources.

As the proposal is for householder development of less than 250m² without creating a new dwelling, it is understood from the Planning Consultant that it is not required to pass the Sequential Test.

2. Site Location and Setting

The site is located southwest of Berkeley approximately 1,500m east of the River Severn defences. The address is Clapton Farm House, Bevington, Berkeley, Gloucestershire GL13 9QX.

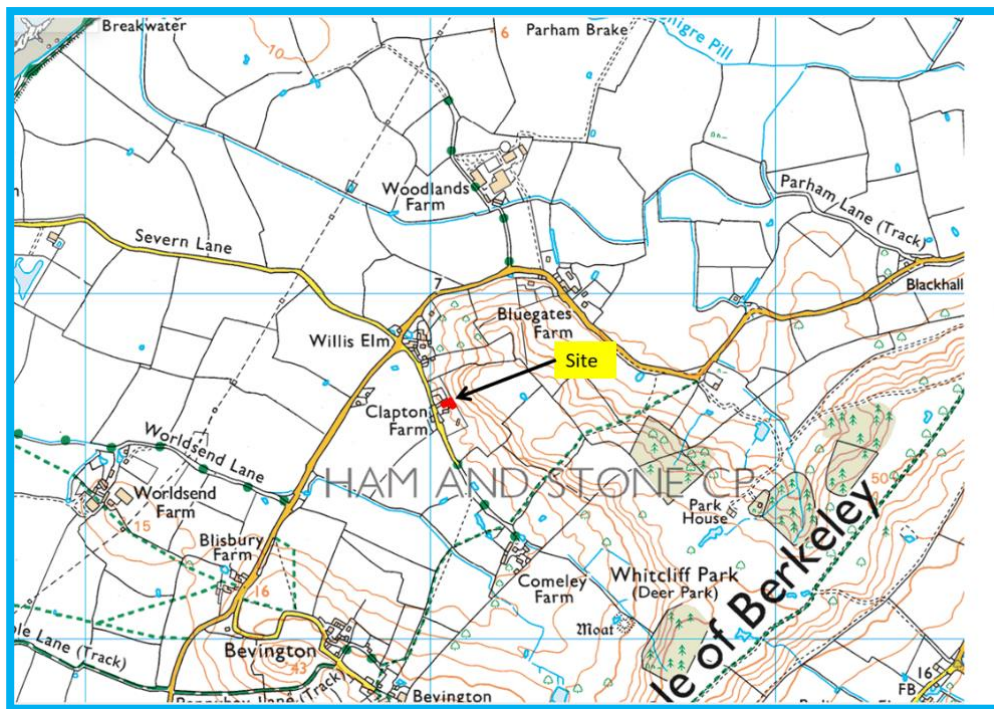


Fig 1 Location of site shown in red outline with River Severn to the northwest (Streetmap).

The site is in the following setting:

- Northwest of the site is a small development comprising a farm and dwellings (Willis Elm) beyond which is open low lying farmland drained by rhynes with the River Severn some 1,500m to the northwest.

- Northeast of the site the land rises steeply forming a ridge through open farmland to a peak of about 38m AOD, approx. 150m to the east.
- South of the site are open fields, a farm and golfcourse 500m to the south.
- West of the site is the main access road, beyond which is low-lying agricultural farmland leading to another ridge 650m to the southwest.

The setting can be summarised as being on the edge of a knoll with low-lying farmland to the west and high ground to the east.



Fig 2 Local area surrounding the site (Bristol Know Your Place).

3. Existing Site

The existing site comprises a barn adjacent to an existing farmhouse. The barn is 'L' shaped and has an area of approximately 125m².

The farmhouse and barn are formed on sloping land as shown on Fig 1.

A detailed topographic survey has been undertaken to Ordnance Datum, to show the existing levels at the site.



Fig 3 Satellite view showing barn to be redeveloped in red outline (Google Earth).

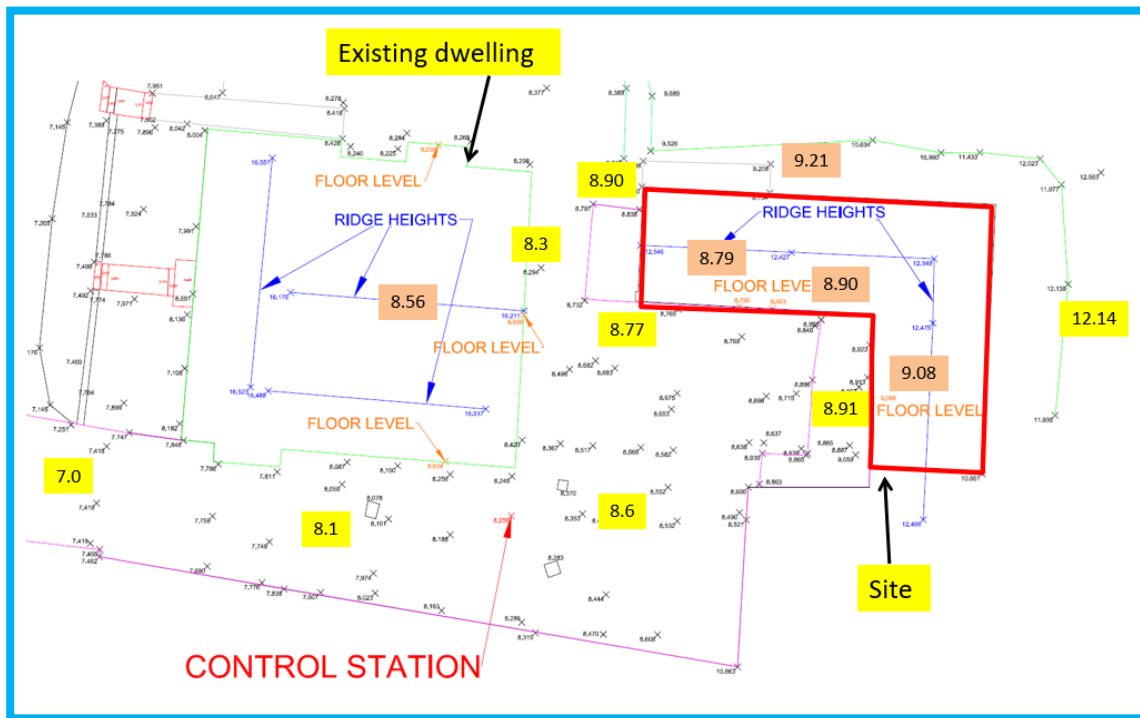


Fig 4 Topographic survey by D&K, annotated with key levels annotated.

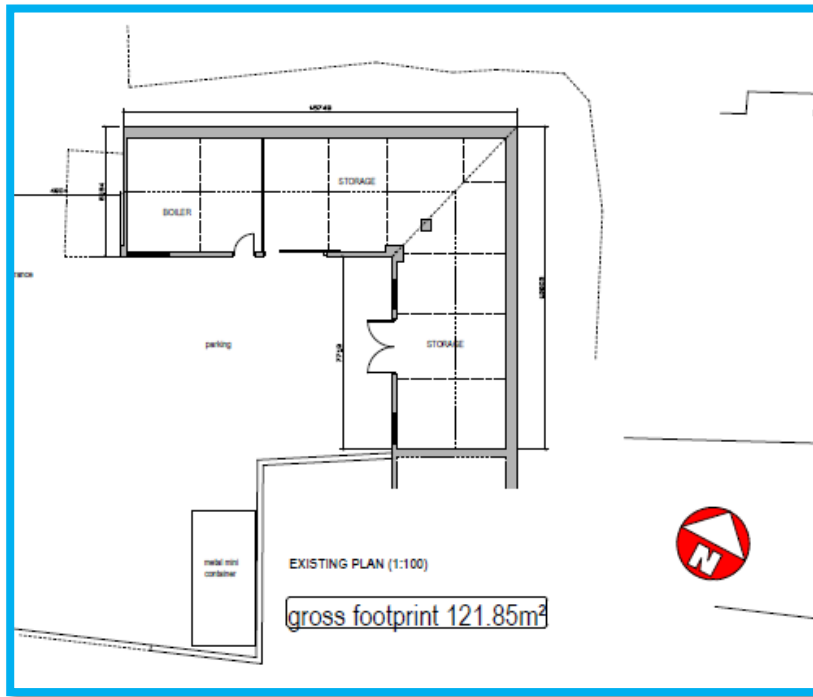


Fig 5 Existing barn (York Associates)

4. Proposed Development

The proposed development is to replace the barn with a new single storey building suited to the proposed uses of recreation, store and parking. The area has been calculated as 180m².

The proposed floor level within the building will be 8.6m AOD, to match the existing main house and provide DDA accessibility between the main house and the recreation building. The external levels will be graded accordingly to preserve the damp proof course.

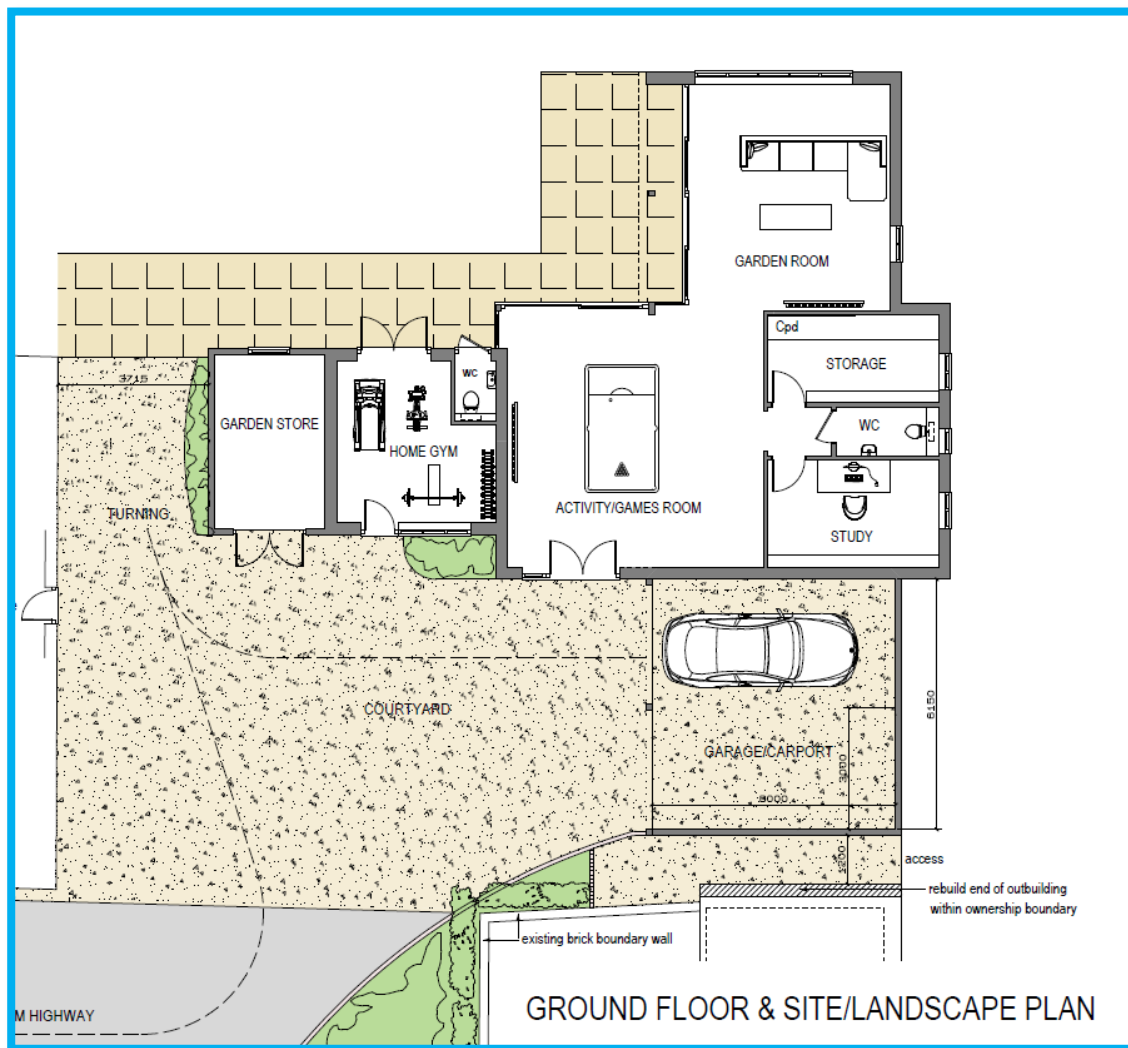


Fig 6 Proposed building and landscaping – note existing house and entrance to the left (York Associates)

5. Flood Risk and Climate Change

The Environment Agency (EA) Flood Risk Map for Planning shows the site to be on the edge of the Defended Flood Zone 3; defended due to EA Registered defences along the bank of the River Severn (See Appendix 1).

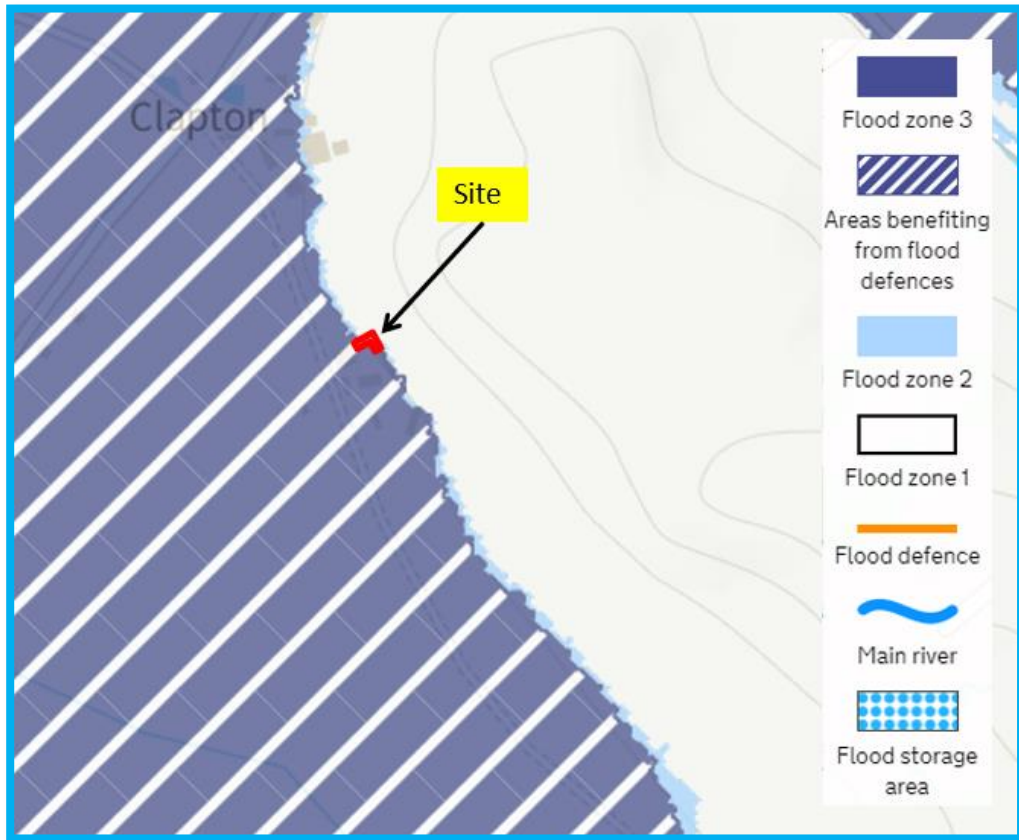


Fig 7 EA Flood Map for Planning showing the site in Defended Flood Zone 3.

The EA has provided site specific Product 4 data (Ref: 178798-WX, dated 19th January 2022) as shown below.

<u>Defended</u>		
AEP	Maximum depth (in metres)	Maximum level (mAOD)
0.5%	0.00	0.00
<u>Undefended</u>		
AEP	Maximum depth (in metres)	Maximum level (mAOD)
0.5%	2.14	9.57
0.1%	2.54	9.98

NB 0.00 (m or mAOD) indicates the data does not reach the site

Fig 8 EA predicted flood levels at site (Product 4 data).

The above figures do not include climate change allowances. Given the proposed Less Vulnerable use, it is considered that Higher Central is the appropriate Allowance.

Applying the adjustments to the figures in the October 2021 climate change guidance, the predicted level with climate change allowance in 2122 would be +1.044m giving a precautionary undefended (ie residual case) predicted Design Flood Level (DFL) of 10.613m AOD.

Area of England	Allowance	2000 to 2035 (mm)	2036 to 2065 (mm)	2066 to 2095 (mm)	2096 to 2125 (mm)	Cumulative rise 2000 to 2125 (metres)
Anglian	Higher central	5.8 (203)	8.7 (261)	11.6 (348)	13 (390)	1.20
Anglian	Upper end	7 (245)	11.3 (339)	15.8 (474)	18.1 (543)	1.60
South east	Higher central	5.7 (200)	8.7 (261)	11.6 (348)	13.1 (393)	1.20
South east	Upper end	6.9 (242)	11.3 (339)	15.8 (474)	18.2 (546)	1.60
South west	Higher central	5.8 (203)	8.8 (264)	11.7 (351)	13.1 (393)	1.21
South west	Upper end	7 (245)	11.4 (342)	16 (480)	18.4 (552)	1.62

Fig 9 Extract from Climate Change Guidance. South West, Higher Central = 1.21m

Adjustments to climate change allowance; $(1.21 \text{ (adjusted by 22 years and to 2122)} - 0.128, - 0.039) = 1.043\text{m}$
 $9.57\text{m (0.5\% undefended)} + 1.043\text{m} = 10.613\text{m AOD}$

The Gloucestershire County Council (GCC) Strategic Flood Risk Assessment (SFRA) map (below) shows that the site to be in Flood Zone 1, at low risk of flooding.

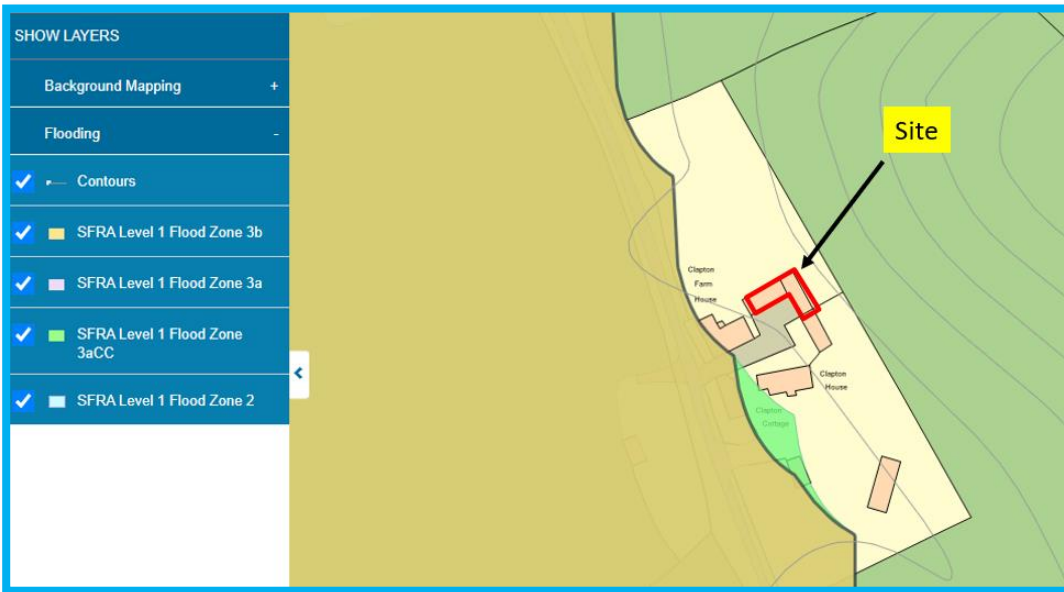


Fig 10 GCC SFRA which is more detailed than the EA Flood Map for Planning showing the site in Flood Zone 1.

The National Planning Policy Framework recommends a site-specific Flood Risk Assessment to determine the flood risk to the site. This site-specific FRA has used EA accepted data and concluded that the predicted undefended flood level in 2122 at this site is 10.613 AOD.

The fact that the SFRA policy map and more detailed, and shows the site to be in Flood Zone 1, confirms that the proposal is not required to pass the Sequential Test

The EA Surface Water Flood Map shows the site to be at very low risk from surface water flooding, consistent with its elevated location.



Fig 11 EA Surface Water Flooding Map showing the site to be at very low risk of surface water flooding.

6. Level Summary

Location	Level
Site Levels – Existing (Topo Survey)	
General ground level in yard	8.6m AOD
Existing main house Finished Flood Level (FFL)	8.56m AOD
External levels adjacent to main house	8.3m AOD
Existing building to be demolished	8.79 – 9.08m AOD
Proposed Floor Level	
Proposed recreation building	8.6m AOD
Flood Levels – EA Product 4 (Ref: 178798-WX)	
1 in 200 year current day	Does not reach site
1 in 200 year current day (undefended)	9.57m AOD
1 in 1000 year current day	9.98m AOD
1 in 200 year level in 2122 (with sea level rise)	10.613m AOD

7. Flood Mitigation and Safe Access

This FRADS assesses that the proposal and its surroundings are protected from a 1 in 200 current day tidal event, due to the EA defences which are 1,500m distance from the defences, and land elevation.

The proposed building is a recreation building with car park ancillary to the house, and is therefore categorised as Less Vulnerable; it does not bring more people into the location and therefore does not increase the risk to people.

The proposed building will be formed in resilient construction to a level of 10.6m AOD, such that in the event of flooding, it can be washed and dried and reused. Barriers are not appropriate at this location, due to the open nature and fenestration – the forces could not be resisted safely, in accordance with the DCLG Flood Resilient Construction guidance.

As the dominant risk is from tidal effects, the duration of the peak of a flood is limited by the tide cycle, and the quantity of water which can enter the flood cell during the period of the peak of the tide (especially the first peak tide) is limited.

As has been experienced recently, the storms which are likely to cause peak tides with surges are predicted some 5 days ahead and broadcast on the news media. The weather will be stormy on the approaches of the high tide. The high tide time is predictable – it is known for the lifetime of the development. The tidal surge is predictable. All the information is on open websites and the Met Office has confirmed to the Author that the forecasting is improving rapidly. The circumstances which could cause flooding at the site will also be flooding Bristol etc – it will be widely broadcast on the news and social media, and what other systems develop over the years.

So the potential hazard/flood level/range will be predicted some days ahead and be reported by the EA's flood warning service, news broadcasts and social media.

However, we should never be complacent, and it is recommended that a Flood Plan is prepared by the homeowner in accordance with EA website guidance, prior to occupation. As the site is shown to be within the EA Flood Warning Area, residents are advised to Register with the EA's flood warning service. People with disabilities should be considered and the precautionary approach adopted by them leaving the site if a serious storm event is predicted.

There is no clear safe route at the peak of the flood for the existing dwelling, and the current homeowner is therefore advised to structure the Flood Plan to recommend leaving the area prior to a predicted flood, or remain at the site (and move to the upper floors) until the peak of the tide has passed and it is safe to access the roads again without entering flood water.

8. Conclusions and Recommendations

It is proposed to demolish a barn and form a single storey recreation building with parking. This is a Less Vulnerable use with no living accommodation (eg no bedrooms) and will not bring additional people into the area.

The site is shown to be in Flood Zone 1 according to GCC SFRA and on that basis is not required to pass the Sequential Test. The EA flood map for planning is less detailed and shows the site within defended floodplain. The EA has confirmed through their Product 4 predicted levels that the site is not at risk of flooding in the current day defended case.

As householder development with less than 250m² footprint and without affecting flood risk/characteristics this would also suggest that the proposal is not required to pass the Sequential Test.

Furthermore the proposed building will be constructed using resilient techniques to allow the building to be cleaned, dried and brought back into use soon after a flood. The existing building was not built with resilient construction techniques in mind.

It is noted that there is a very low residual risk of flooding in the current day, but this risk increases as sea levels rise and climate change affect the river levels. The site is only currently at residual risk, in the event of a breach, which is very unlikely to affect the site in the first tide.

With climate change allowances added to the 1 in 200 year predicted undefended case the site is at risk of flooding, at the same risk as the main dwelling.

As this is a residual case for a Less Vulnerable use, to aid DDA accessibility, the building level is not being raised. Resilient construction will be employed to ensure the building can be brought back into use soon after a flood.

The site does not have safe access in the event of a flood. However the risk of flooding is tidal, which has up to 5 days' warning, given by the EA, news broadcasts and social media. Residents are advised to register with the EA flood warning service, and monitor the weather forecasts accordingly. The homeowner should prepare Flood Plan, including provision for residents and visitors with disabilities, based on the EA's web guidance.

As tidal peak times are known, the occupants should leave the area prior to a predicted potential flood, and only return when it is safe to do so.

Appendix 1 EA Product 4 defence map

