



**PROPOSED TWO-STOREY
EXTENSION AT 26
LOWGATE STREET, EYE,
SUFFOLK**

FLOOD RISK ASSESSMENT

JULY 2022

REPORT REF: 2990/RE/07-22/01

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CONTRACT

Evans Rivers and Coastal Ltd has been commissioned by Conclomeg Construction Ltd to carry out a flood risk assessment for a proposed two-storey extension at number 26 Lowgate Street, Eye, Suffolk.

QUALITY ASSURANCE, ENVIRONMENT AND HEALTH AND SAFETY

Evans Rivers and Coastal Ltd operates a Quality Assurance, Environmental, and Health and Safety Policy.

This project comprises various stages including data collection; depth analysis; and reporting. Quality will be maintained throughout the project by producing specific methodologies for each work stage. Quality will also be maintained by providing specifications to third parties such as surveyors; initiating internal quality procedures including the validation of third party deliverables; creation of an audit trail to record any changes made; and document control using a database and correspondence log file system.

To adhere to the Environmental Policy, data will be obtained and issued in electronic format and alternatively by post. Paper use will also be minimised by communicating via email or telephone where possible. Documents and drawings will be transferred in electronic format where possible and all waste paper will be recycled. Meetings away from the office of Evans Rivers and Coastal Ltd will be minimised to prevent unnecessary travel, however for those meetings deemed essential, public transport will be used in preference to car journeys.

The project will follow the commitment and objectives outlined in the Health and Safety Policy operated by Evans Rivers and Coastal Ltd. All employees will be equipped with suitable personal protective equipment prior to any site visits and a risk assessment will be completed and checked before any site visit. Other factors which have been taken into consideration are the wider safety of the public whilst operating on site, and the importance of safety when working close to a water source and highway. Any designs resulting from this project and directly created by Evans Rivers and Coastal Ltd will also take into account safety measures within a "designers risk assessment".

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1. INTRODUCTION

1.1 Project Scope

1.1.1 Evans Rivers and Coastal Ltd has been commissioned by Conclomeg Construction Ltd to carry out a flood risk assessment for a proposed two-storey extension at number 26 Lowgate Street, Eye, Suffolk.

1.1.2 It is understood that this Flood Risk Assessment will be submitted to the Planning Authority as part of a planning application. Specifically, this assessment intends to:

- a) Consider the impacts of the 1 in 20 year, 1 in 100 year and 1 in 1000 year flood events (inclusive of climate change), in accordance with NPPF;
- b) Review any literature and guidance specific to this area;
- c) Determine the extents of the aforementioned NPPF Flood Zones across the site, together with depths of floodwater and hazard;
- d) Assess the risks to people and property and propose mitigation measures accordingly;
- e) Review existing evacuation and warning procedures for the area;
- f) Carry out an appraisal of flood risk from any other sources such as groundwater as required by NPPF;
- g) Report findings and recommendations.

1.1.3 This assessment is carried out in accordance with the requirements of the National Planning Policy Framework (NPPF) dated 2021. Other documents which have been consulted include:

- DEFRA/EA document entitled *Framework and guidance for assessing and managing flood risk for new development Phase 2 (FD2320/TR2)*, 2005;
- Communities and Local Government 2007. *Improving the Flood Performance of New Buildings*. HMSO.
- DEFRA/EA document entitled *The flood risks to people methodology (FD2321/TR1)*, 2006;
- EA *Supplementary Note on Flood Hazard Ratings and Thresholds for Development Planning and Control Purpose*, 2008;
- National Planning Practice Guidance – Flood Risk and Coastal Change.
- UK Government’s climate change allowances guidance.
- Environment Agency guidance entitled *Flood risk assessments: Climate change allowances – East Anglia; Essex, Norfolk, Suffolk, Cambridgeshire and Bedfordshire*.
- Suffolk Local Flood Risk Management Plan dated 2012.
- Suffolk County Council Preliminary Flood Risk Assessment dated 2011.

- Babergh and Mid Suffolk Level 1 Strategic Flood Risk Assessment (SFRA) dated 2020.

2. DATA COLLECTION

2.1 To assist with this report, the data collected included:

- Ordnance Survey 1:10,000 street view map (Evans Rivers and Coastal Ltd OS licence number 100049458).
- British Geological Survey *Online Geology Viewer*.
- BGS *Groundwater Flooding Susceptibility Map*.
- 1:250,000 *Soil Map of Eastern England* (Sheet 4) published by Cranfield University and Soil Survey of England and Wales 1983.
- 1:625,000 *Hydrogeological Map of England and Wales*, published in 1977 by the Institute of Geological Sciences (now the British Geological Survey).
- 1:125,000 *Hydrogeological Map of Northern East Anglia* published in 1976 by the Institute of Geological Sciences (now the British Geological Survey).
- Product 6 Waveney Flood Risk Study 2013, and Climate Change model re-runs 2017 by JBA Consulting received from the Agency.
- Filtered LIDAR data at 1m resolution.

3. SITE CHARACTERISTICS

3.1 Existing Site Characteristics and Location

3.1.1 The site is located at number 26 Lowgate Street, Eye, Suffolk. The approximate Ordnance Survey (OS) grid reference for the site is and the location of the site is shown on Figure 1.

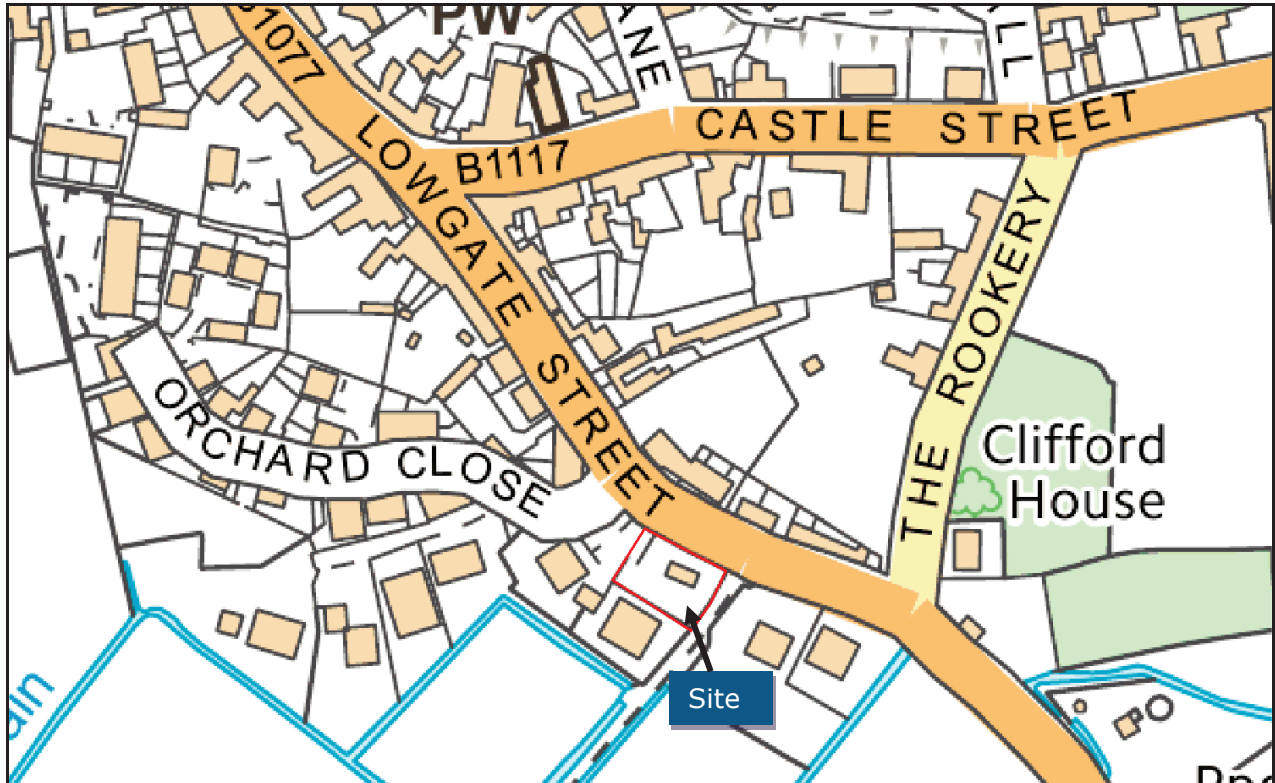


Figure 1: Site location plan (Source: Ordnance Survey)

3.1.2 The site currently comprises an existing two-storey dwelling and garden area as shown on Drawing Number 2209-01. The site is accessed from Lowgate Street adjacent to the north east frontage of the site.

3.1.3 Filtered LIDAR data at 1m resolution has been obtained in order to illustrate the topography across the site and surrounding area (Figure 2).

3.1.4 It can be seen that the area intended for the proposed extension is set between 28.06m AOD and 27.75m AOD. The finished ground floor level of the main dwelling is set 150mm higher than external ground levels and at 28.15m AOD.

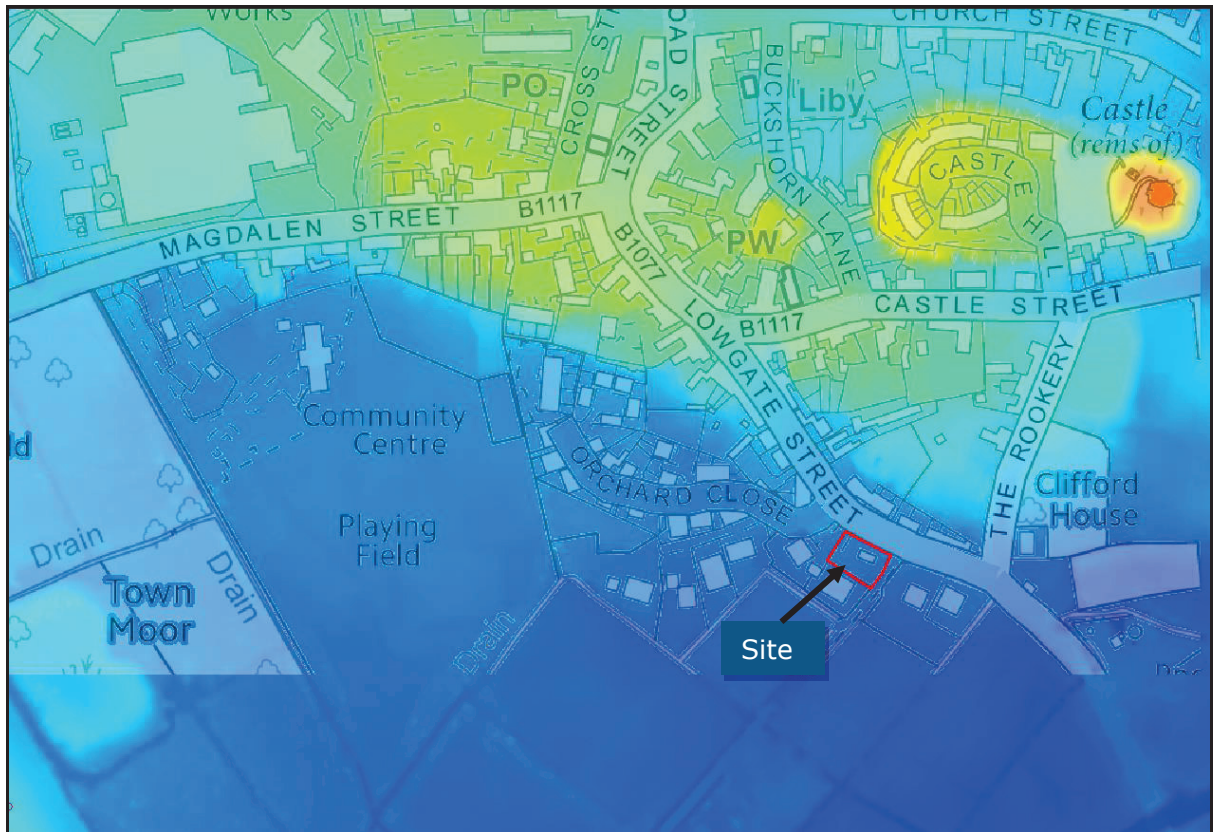


Figure 2: LIDAR survey data where higher ground is denoted as orange and yellow colours and lower areas denoted by blue and green colours

3.2 Site Proposals

- 3.2.1 It is the Client's intention to provide a two-storey rear extension and detached garage. The floor level of the extension will be set the same as the existing dwelling and at 28.15m AOD, which is above the worst-case climate change 1 in 1000 year fluvial flood level.
- 3.2.2 The site proposals can be seen on Drawing Number 2209-02.
- 3.2.3 Paragraph: 066 Reference ID: 7-066-20140306 of the NPPG confirms that residential development is classified as a 'more-vulnerable' use.
- 3.2.4 Paragraph 33 (ID 7-033-20140306) of the NPPF Planning Practice Guidance (NPPG) states that the Sequential Test does not apply to minor householder development.

4. BASELINE INFORMATION

4.1 Environment Agency Flood Zone Map

- 4.1.1 The Environment Agency Flood Map (Figure 3) and Appendix B of the SFRA (Eye Ward) shows that the site is partially located within the NPPF defined Flood Zone 2, and mainly within Flood Zone 1 associated with the River Dove located 192m south east of the site.
- 4.1.2 Flood Zone 2 'Medium Probability' floodplain is defined as having between a 1 in 100 year annual probability and 1 in 1000 year annual probability of flooding. The threshold of the Flood Zone 2 floodplain is the 1 in 1000 year extreme event.
- 4.1.3 The Flood Zone 1 'Low Probability' comprises land as having less than a 1 in 1000 year annual probability of fluvial flooding (i.e. an event more severe than the extreme 1 in 1000 year event).

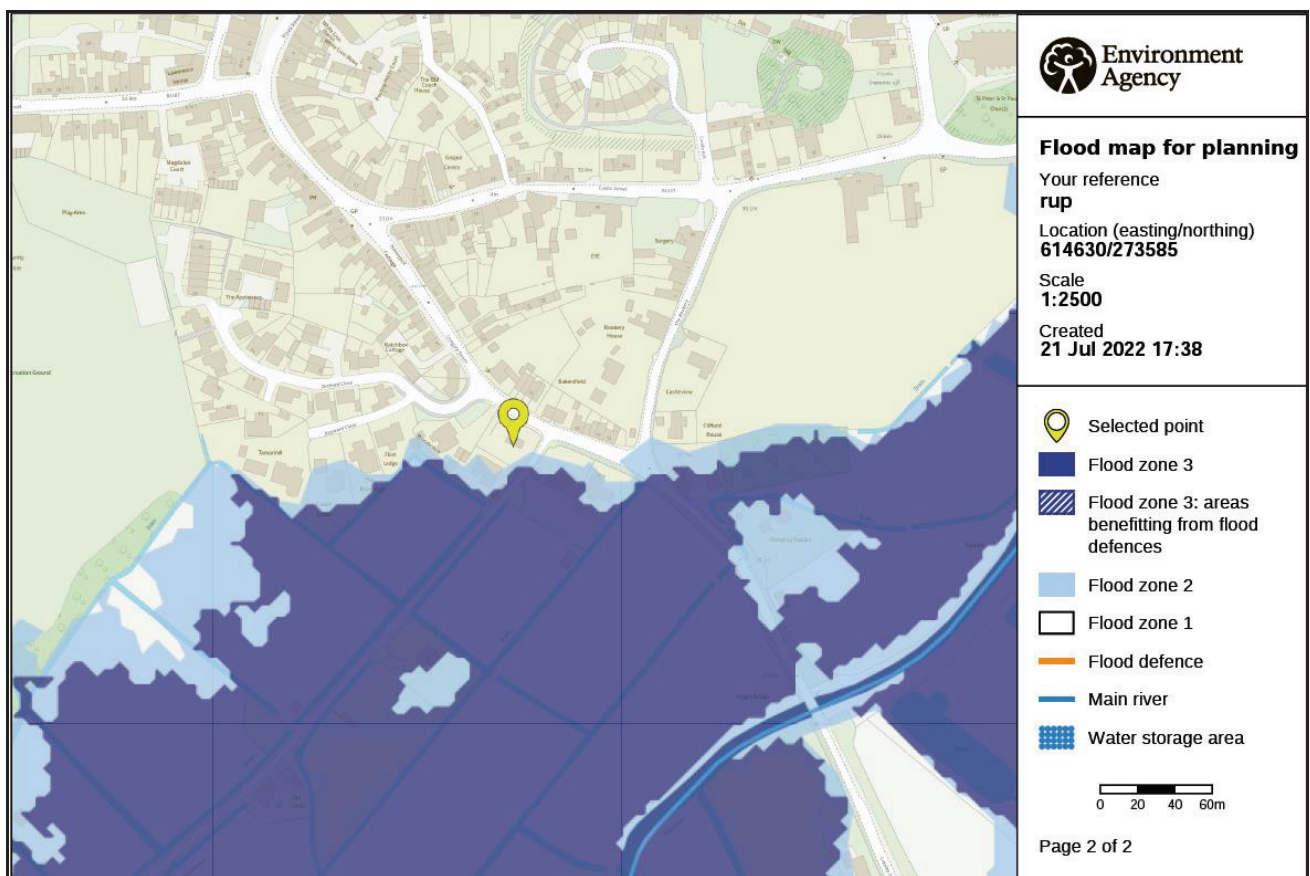


Figure 3: Environment Agency Flood Zone Map (Source: Environment Agency)

4.2 Environment Agency Flood Levels

- 4.2.1 It is understood that there are no Environment Agency flood defences along the River Dove at this location.
- 4.2.2 Product 6 Waveney Flood Risk Study 2013, and Climate Change model re-runs 2017 have been received from the Agency. In-channel results which are relevant to the site's location are summarised in Table 1.

4.2.3 Two-dimensional GIS grid data is also provided in the flood model entitled *Update of Waveney Flood Risk Study 2013* by JBA Consulting and subsequent *Climate Change Model Reruns* dated December 2017, and can be seen on Table 2.

Table 1: In-channel fluvial flood level data

Location	1 in 20 year (mAOD)	1 in 100 year (mAOD)	1 in 100 year plus 25% climate change (mAOD)	1 in 1000 year (mAOD)	1 in 1000 year plus 25% climate change (mAOD)
EA054001_D OVE_042 and DOVE010775 OD	27.32	27.57	27.67	27.80	27.89

Table 2: Floodplain fluvial flood level data

Location	1 in 20 year (mAOD)	1 in 100 year (mAOD)	1 in 100 year plus 25% climate change (mAOD)	1 in 1000 year (mAOD)	1 in 1000 year plus 25% climate change (mAOD)
Site	N/A	27.57	27.67	27.80	27.89

N/A = floodwater doesn't reach site

4.2.4 The UK Government's climate change allowances guidance updated May 2022 states that for more-vulnerable development, the "Central" climate change allowance should be used in FRA's. For the Broadland Rivers management catchment the climate change allowance is 11% up to year 2080s.

4.2.5 Therefore, when considering this scenario, the Agency's fluvial modelling in Table 1 and 2 includes a 1 in 100 plus 25% climate change allowance, which is higher than the required 11% and will also consider the Higher Central allowance up to year 2080s.

4.3 Internal Drainage Board

4.3.1 The site is located within the Waveney Lower Yare & Lothingland Internal Drainage Board (IDB) area.

4.3.2 Information from the IDB's *Policy Statement on Flood Protection and Water Level Management* indicates that the IDB maintains the drainage network and more specifically water levels through the operation and maintenance of its pumping stations. The IDB's infrastructure, including its watercourses and pumping stations, is monitored by the IDB to ensure that their condition meet the standards of protection sought and improvement works are carried out where appropriate and necessary.

4.4 Flood Warning and Emergency Planning

4.4.1 The site is located within an Environment Agency Flood Alert area 054WAFSF1 - The River Waveney from Diss and the River Dove to Ellingham, including Bungay.

4.4.2 Sites at risk of fluvial flooding could have a minimum of 2 hours warning before any of the levels of flood warning is issued (the Agency's warning scheme only applies to areas at risk of flooding from Main Rivers and not IDB controlled drains).

4.4.3 Flood Alerts, Flood Warnings and Severe Flood Warnings are issued to residents and businesses within flood risk areas by the Agency’s *Floodline Warnings Direct* (FWD) service. This system is managed by the Environment Agency and dials out a message to the recipient when a particular category of flood warning is being advised. Owners and occupiers of dwellings or businesses thought to be at risk can sign up to the scheme. **The owners are encouraged to confirm details with the Agency and to sign up for these warnings.**

4.4.4 The various flood warning codes can be seen on Figure 4.



Figure 4: Flood warning codes (Source: Environment Agency)

4.4.5 It is understood that in the event of flooding, evacuation is managed by a multi-agency team in conjunction with the Police. The multi-agency team provides suitable premises for shelter, first aid, refreshments and possible transportation with consideration given to the elderly and vulnerable groups. It is essential that occupants produce robust Emergency Flood Plans to avoid putting themselves or emergency services at risk and that they do not rely solely on emergency services during the event.

5. FLUVIAL FLOOD RISK

- 5.1 The two-dimensional GIS grid data outlined in Table 2 above and outlines provided in the flood model entitled *Update of Waveney Flood Risk Study 2013* by JBA Consulting and subsequent *Climate Change Model Reruns* dated December 2017, has been inspected further.
- 5.2 Figure 5 shows that the site is located partially within the present day 1 in 1000 year flood extent.
- 5.3 Figure 6 shows that the site is partially within the design climate change (25%) 1 in 100 year extent, however, the proposed extension is shown to be set immediately outside of this flood extent. The proposed extension will be located partially within the extreme climate change (25%) 1 in 1000 year extent. The proposed garage will be located outside of all modelled flood extents.
- 5.4 As the proposed extension will be located across parts of the site which are outside of the design climate change (25%) 1 in 100 year flood extent, there would be no flood displacement.
- 5.5 The extension will be set at 28.15m AOD and therefore 0.48m above the design flood level and 0.26m above the extreme flood level, thus providing safe (dry) refuge during all modelled events.

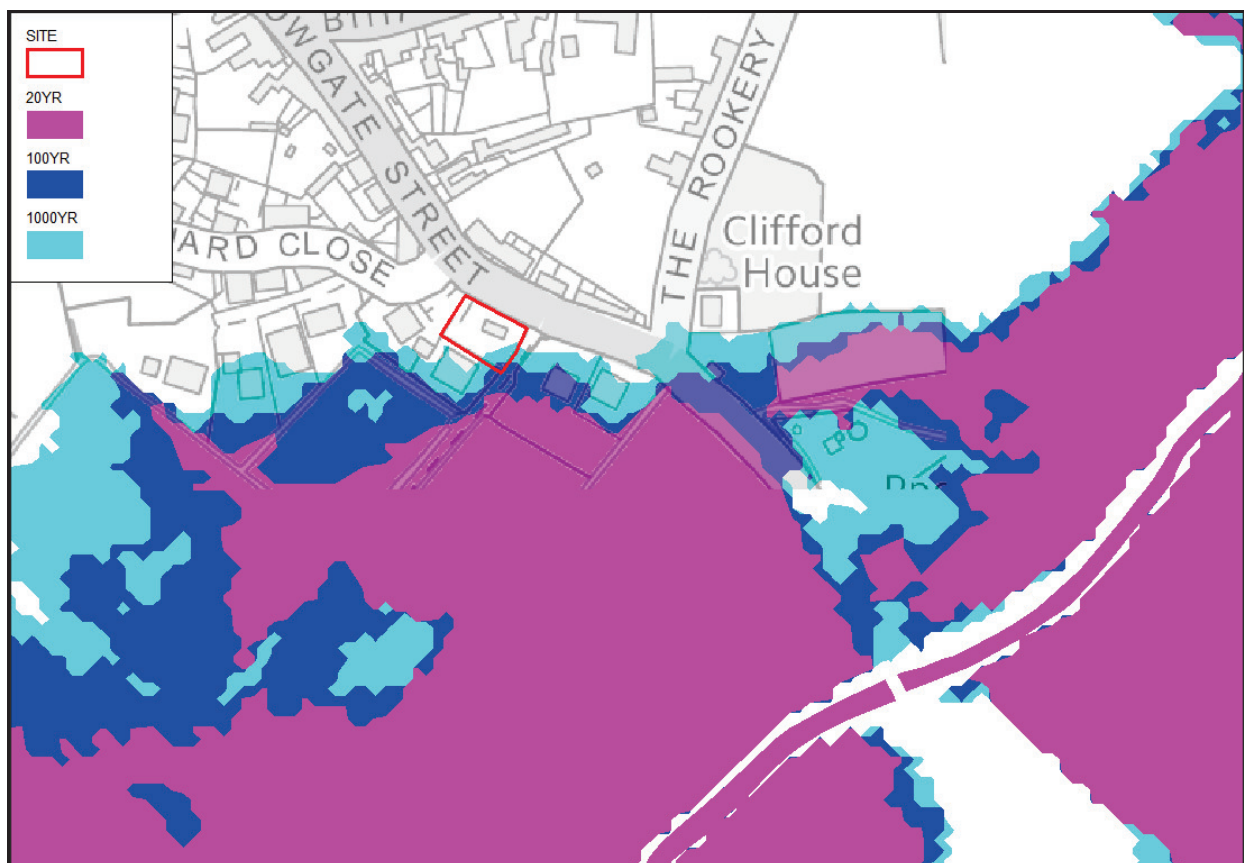


Figure 5: Mapped flood extents during present day events (Source: Waveney Flood Risk Study 2013, and Climate Change model re-runs 2017)

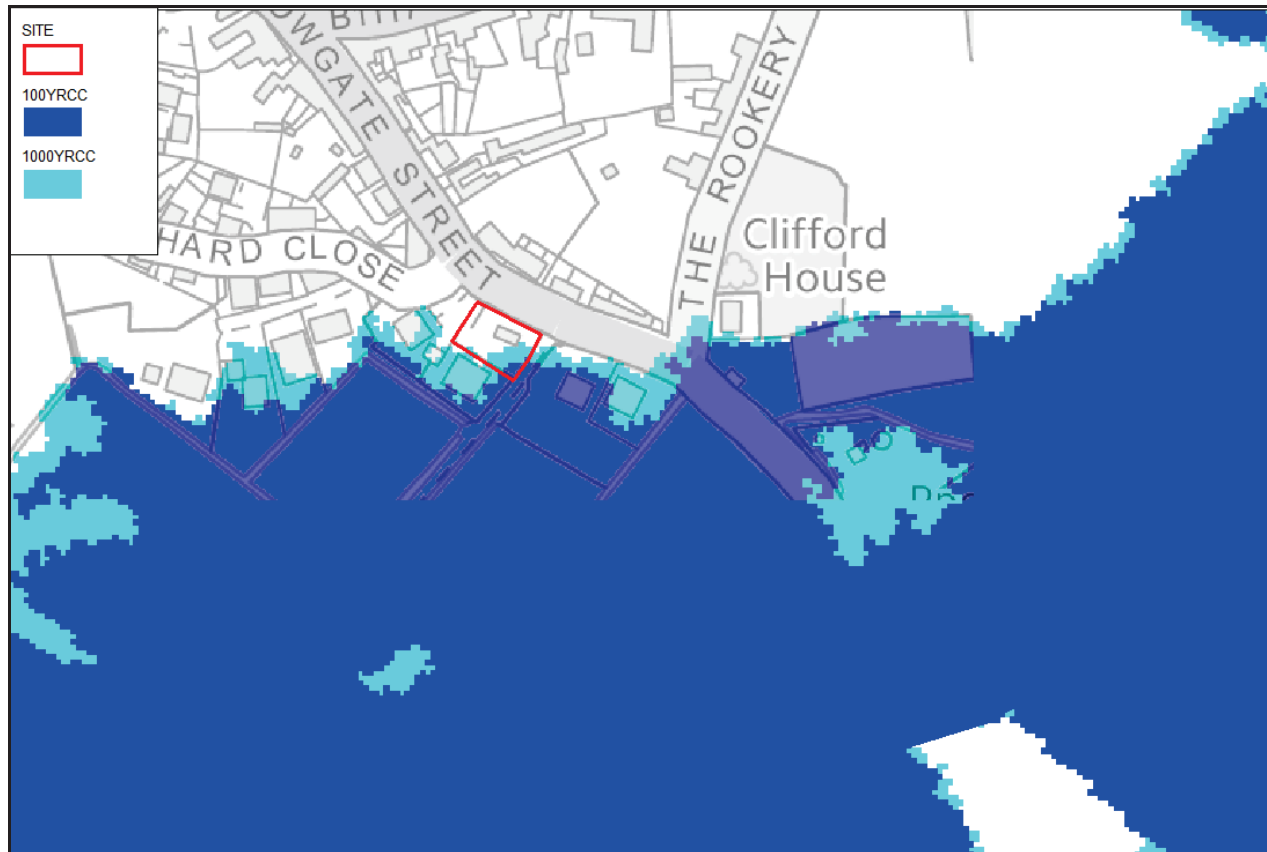


Figure 6: Mapped maximum flood extents during 25% climate change events (Source: Waveney Flood Risk Study 2013, and Climate Change model re-runs 2017)

Internal Drainage Board

- 5.6 It is understood from the IDB's *Policy Statement on Flood Protection and Water Level Management* that the IDB seeks to maintain a general standard capable of providing flood protection to developed areas and agricultural land of 1 in 100 and 1 in 20 years respectively. The IDB, however, stress that these return periods cannot be taken literally but should be considered as the chance of some overspilling from the system occurring in any year being 1% and 5% respectively.
- 5.7 Therefore, it is considered that there is a low risk of flooding to the site from the IDB drainage network.

6. FLOOD RISK MITIGATION AND EVACUATION

6.1 Reducing Exposure to the Hazard

- 6.1.1 In order to assess and reduce the exposure to the hazard and the vulnerability to the hazard after the site has been developed, the guidance outlined in the DCLG/DEFRA/EA document entitled *Flood Risk Assessment Guidance for New Development Phase 2; Flood Risks to People, Phase 2; Improving the Flood Performance of New Buildings* has been consulted.
- 6.1.2 In accordance with the Agency's recommendations and Paragraph 055 (ID 7-055-20140306) of the NPPF Planning Practice Guidance, the "design" event for which mitigation measures should be designed to in this case is the fluvial climate change (25%) 1 in 100 year flood level of 27.67m AOD. The "extreme" climate change 1 in 1000 year flood level is 27.89m AOD.
- 6.1.3 Paragraph 060 (ID 7-060-20140306) of the NPPF Planning Practice Guidance states that the first preference is to avoid flood risk by raising floor levels above the design flood level.
- 6.1.4 The proposed ground floor level will be set 0.48m above the climate change (25%) 1 in 100 year flood level and at 28.15m AOD thus complying with the NPPG and providing safe (dry) refuge during all modelled events.


6.2 Reducing Vulnerability to the Hazard

- 6.2.1 The Agency aims to provide up to 2 hours notice before the issue of a *Flood Alert* for fluvial events. It is understood that the police and other emergency services will assist in the evacuation to rest centres operated by the Council. People at the site will need to make a judgment themselves with regards to the flood hazard if evacuation is attempted and not solely rely on the emergency services.
- 6.4.2 It is recommended that the occupants liaise with the Agency in order to register with the Agency's Flood Warnings Direct service and ensure that they are aware of the flood risk so that they have the option to escape/evacuate upon receipt of a *Flood Alert* or upon the instruction of the emergency services.
- 6.4.3 The occupants should develop a *Family Flood Plan*. Further guidance is offered in the Environment Agency's guidance document entitled *What to do before, during and after a flood*. The *Family Flood Plan* should consider, for example, information about vital medication needed and a *Flood Kit*.
- 6.4.4 A *Flood Kit* is a useful precautionary measure especially if evacuation from the site is prolonged. The kit should be stored in an accessible location to ensure that it is not affected by floodwater. The contents should also be checked every 6 months and items replaced if necessary.
- 6.4.5 It may be sensible to compile two *Flood Kit's* to suit each eventuality. For example, a smaller kit could be compiled which would allow the occupants to carry it during evacuation. A larger kit could also be compiled which included additional food and beverage items in case of ongoing refuge within the property. Both kits should contain the necessary items as suggested below.

1. Important documents
2. Torch and batteries

3. Mobile phone (fully charged)
4. First-aid kit
5. Wind-up radio
6. Important telephone numbers
7. Bottled water
8. Non-perishable food provisions
9. Rubber Gloves and wellington boots
10. Medication or information relating to medication and its location
11. Blankets, warm clothes
12. Essential toiletries
13. Camera to record any damage
14. Emergency cash

Table 3: Flood Event Action Plan

Environment Agency Flood Warning Code	What to do!	Evacuate?
<p>Flood Alert (Flooding Possible. Be aware/prepared! Watch Out).</p> 	<ul style="list-style-type: none"> • Monitor flood risk through media and Floodline Warnings Direct. • Locate people and inform them of risk. If away from the site make assessment on risk if considering returning to site (i.e. how long it will take to return etc). • Begin to implement Flood Plan. • Gather Flood Kit and provisions in the event that evacuation is not possible. • Consider advice given from emergency services/Environment Agency. 	<p>Preferable, although up to occupants discretion.</p> <p>Drive carefully if evacuating as roads may be flooded or closed.</p> <p>If evacuation is not possible people should reside across the building with their flood kit.</p>
<p>Warnings no longer in force (No further flooding is expected in the area. Be careful).</p>	<ul style="list-style-type: none"> • Return to site upon instruction from emergency services and assess any damage. • Contact insurance company depending on damage caused. • Beware of flood debris. • Do not touch sources of electricity. 	<p>Not applicable.</p>

6.3 Vulnerable Groups

- 6.3.1 The occupants at the site may include vulnerable groups such as elderly people, those with sensory or physical disabilities, minority ethnic groups, or the infirm. Priority will need to be given to these people during the flood event.
- 6.3.2 Vulnerable groups should be identified and priority should be given to these groups.

6.4 Safe Access/Egress

- 6.4.1 Safe refuge is available during all flood events.

6.4.2 The hazard rating along the evacuation route has been taken from the GIS model files. When considering the climate change (25%) 1 in 100 year event, the Agency's data shows that the hazard would be *Very low* across the site and along Lowgate Street (providing that people travel in a north westerly direction away from the site).

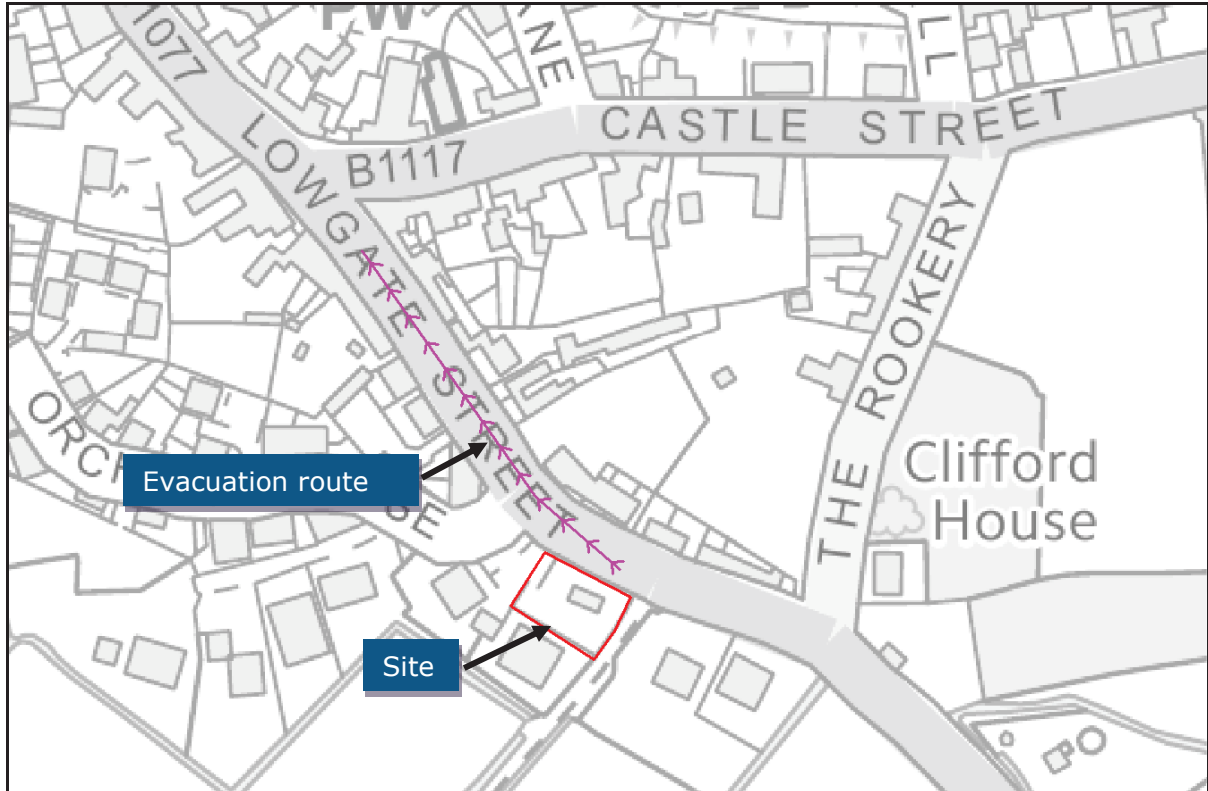


Figure 7: Preferred evacuation route in relation to climate change (25%) 1 in 100 year extent

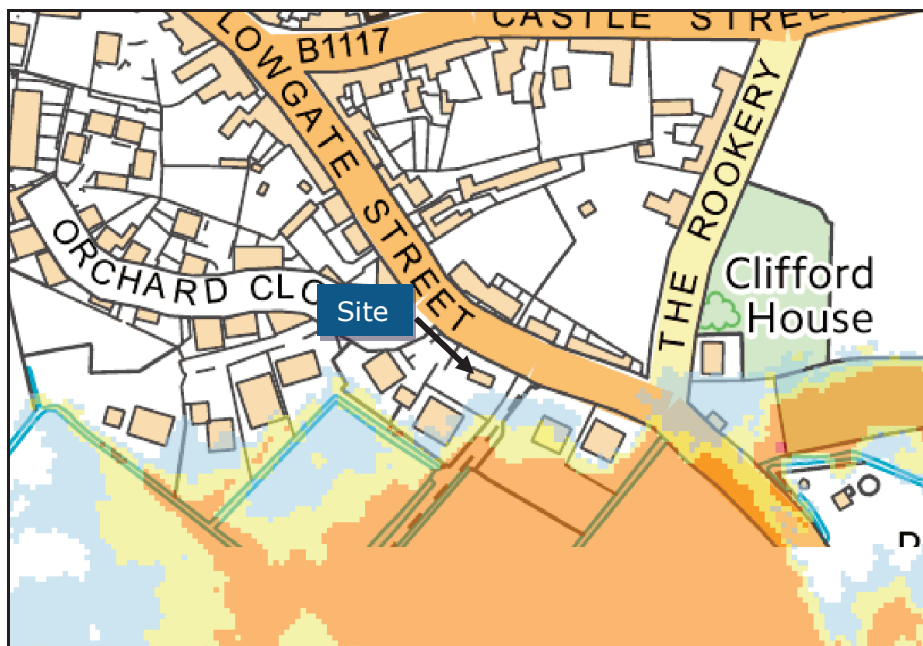


Figure 8: Hazard map during climate change (25%) 1 in 100 year event (where red = *Dangerous for All*, orange = *Dangerous for Most*, yellow = *Dangerous for Some* and blue = *Very low*)

6.5 Insurance

- 6.5.1 The Association of British Insurers (ABI) published a guidance document in 2012 entitled *Guidance on Insurance and Planning in Flood Risk Areas for Local Planning Authorities in England*.
- 6.5.2 The ABI guidance sets out the requirements of the insurance industry when considering flood risk and insurability of the property. The guidance suggests that properties should be protected for flood events up to the 1 in 100 year event in order to access insurance at a competitive price.
- 6.5.3 The guidance also states that insurers would of course prefer to cover properties which are not at risk of flooding, however, for those properties which are at risk of flooding insurers would prefer that the properties are raised above the flood level, over resistance measures which prevent floodwater from entering the building, or resilience measures which allows floodwater to enter the building.
- 6.5.4 The proposed ground floor will be set above the climate change 1 in 100 year event and climate change 1 in 1000 year event. Therefore, the ABI's requirement of protection during a 1 in 100 year event will be met and there will be a good chance of the property being insured at a competitive rate.

7. OTHER SOURCES OF FLOODING

7.1 Groundwater Flooding

- 7.1.1 In order to assess the potential for groundwater flooding during higher return period rainfall events, the Jacobs/DEFRA report entitled *Strategy for Flood and Coastal Erosion Risk Management: Groundwater Flooding Scoping Study*, published in May 2004, was consulted, together with the guidance offered within the document entitled *Groundwater flooding records collation, monitoring and risk assessment (ref HA5)*, commissioned by DEFRA and carried out by Jacobs in 2006.

Soil and Geology at the Site

- 7.1.2 It can be seen from the various soil and hydrogeological data, listed in Section 2, that the soils beneath the site comprise sand and gravel overlying Crag (sand).

Groundwater Flooding Potential at the Site

- 7.1.3 There have been no recorded groundwater flood events across the area between 2000 and 2003, as indicated by the Jacobs study. Appendix G of the SFRA indicates that *within this zone there is a risk of groundwater flooding to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.*
- 7.1.4 The slightly raised extension will reduce the risk of groundwater flooding to acceptable levels.

7.2 Surface Water Flooding and Sewer Flooding

- 7.2.1 Surface water and sewer flooding across urban areas is often a result of high intensity storm events which exceed the capacity of the sewers thus causing them to surcharge and flood. Poorly maintained sewer networks and blockages can also exacerbate the potential for sewer flooding.
- 7.2.3 Appendix E of the SFRA shows that there have been 4 recorded sewer flood incident in this postcode area and there are no recorded flood incidents at the site as shown at <http://maps.midsuffolk.gov.uk/>.
- 7.2.4 The Environment Agency's Surface Water Flooding Map (Figure 9) together with Appendix A of the SFRA indicates that there is largely a very low surface water flood risk across the site (i.e. less than 1 in 1000 year chance).
- 7.2.5 It is generally accepted that the low risk flood event (i.e. between 1 in 1000 years and 1 in 100 years) on the Agency's map is used as a substitute for the climate change 1 in 100 year event to provide a worst-case scenario.

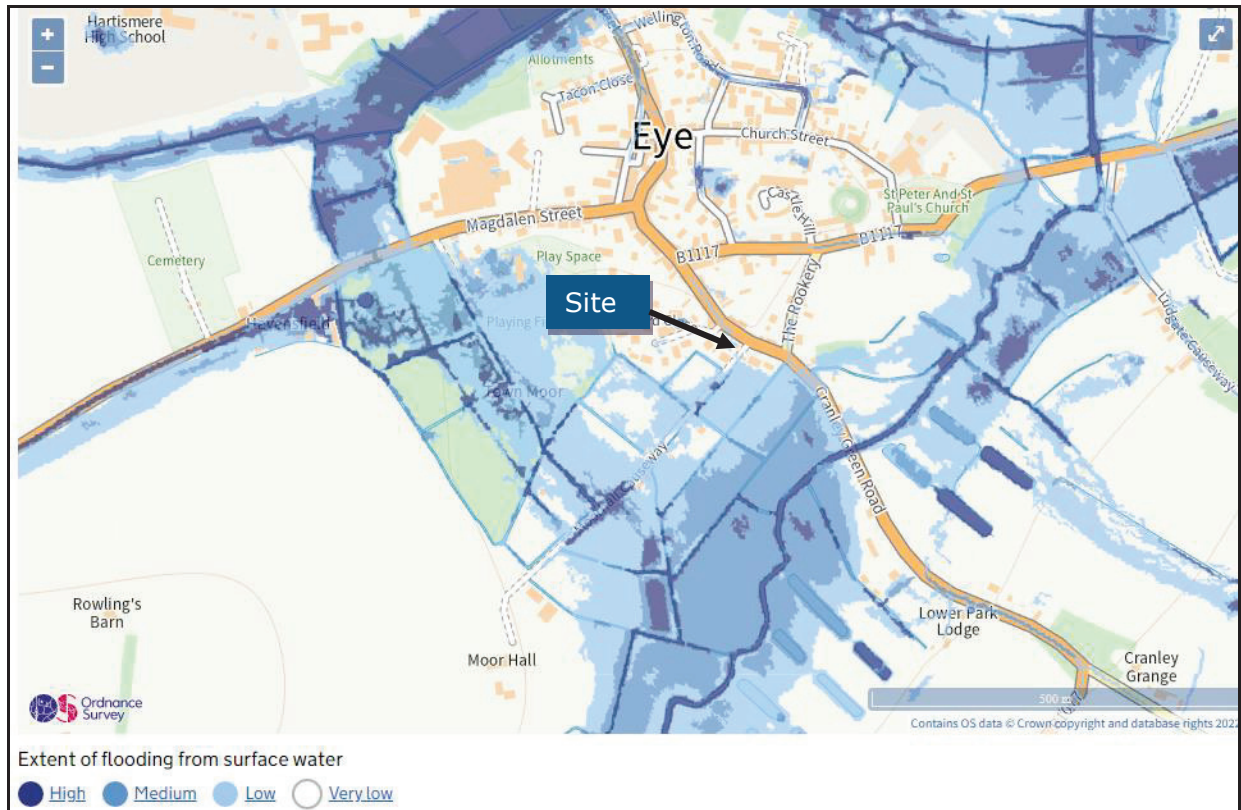


Figure 9: Environment Agency Surface Water Flooding Map (Source: Environment Agency, 2022)

7.3 Reservoirs, Canals And Other Artificial Sources

- 7.3.1 The failure of man-made infrastructure such as flood defences and other structures can result in unexpected flooding. Flooding from artificial sources such as reservoirs, canals and lakes can occur suddenly and without warning, leading to high depths and velocities of flood water which pose a safety risk to people and property.
- 7.3.2 The Environment Agency’s “Risk of flooding from reservoirs” map suggests that the site is not at risk from reservoirs or other artificial sources.

8. CONCLUSIONS

- The site is located within Flood Zone 2 and 1.
- There is a low risk from the Internal Drainage Board system.
- The design climate change (25%) 1 in 100 year flood level at the site has been estimated to reach 27.67m AOD. The extreme climate change 1 in 1000 year flood level is 27.89m AOD.
- The site is partially within the design climate change (25%) 1 in 100 year extent, however, the proposed extension is shown to be set immediately outside of this flood extent. The proposed extension will be located partially within the extreme climate change (25%) 1 in 1000 year extent. The proposed garage will be located outside of all modelled flood extents.
- As the proposed extension will be located across parts of the site which are outside of the design climate change (25%) 1 in 100 year flood extent, there would be no flood displacement.
- The extension will be set at 28.15m AOD and therefore 0.48m above the design flood level and 0.26m above the extreme flood level, thus providing safe (dry) refuge during all modelled events.
- A warning and evacuation strategy has been developed within this assessment. It is proposed that the occupants register with the Agency's *Flood Warnings Direct* and prepare a *Family Flood Plan*.
- Safe access/egress away from the site can be fully achieved during the peak of the design event and extreme event.
- It is considered that there is a low risk of groundwater flooding at the site from underlying deposits and a very low surface water risk.

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