



**PROPOSED EXTENSION AT
4 BRIDGE FARM
COTTAGES, ASH ROAD,
LOWER HACHESTON,
SUFFOLK**

FLOOD RISK ASSESSMENT

APRIL 2024

REPORT REF: 3440/RE/04-24/01

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CONTRACT

Evans Rivers and Coastal Ltd has been commissioned by Mr and Mrs Keeble to carry out a flood risk assessment for a proposed extension at number 4 Bridge Farm Cottages, Ash Road, Lower Hacheston, 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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DISCLAIMER

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1. INTRODUCTION

1.1 Project Scope

1.1.1 Evans Rivers and Coastal Ltd has been commissioned by Mr and Mrs Keeble to carry out a flood risk assessment for a proposed extension at number 4 Bridge Farm Cottages, Ash Road, Lower Hacheston, 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 fluvial events in accordance with NPPF;
- b) Review any literature and guidance specific to this area such as the SFRA;
- 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 2023. 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.

- Suffolk Coastal and Waveney District Strategic Flood Risk Assessment Level 1 (2018 SFRA) dated 2018.
- Suffolk Coastal and Waveney District Strategic Flood Risk Assessment Level 2 (Level 2 SFRA) dated 2018.
- EA Standing Advice for Minor Extensions (<https://www.gov.uk/guidance/flood-risk-assessment-standing-advice#advice-for-minor-extensions>)

2. DATA COLLECTION

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

- Ordnance Survey 1:10,000 street view map obtained via Promap (Evans Rivers and Coastal Ltd OS licence number 100049458).
- British Geological Survey, *Online Geology of Britain Viewer*.
- 1:625,000 *Hydrogeological Map of England and Wales*, published in 1977 by the Institute of Geological Sciences (now the British Geological Survey).
- Filtered LIDAR data at 1m resolution.
- British Geological Survey *Online Geology Viewer*.
- Environment Agency defence information via <https://environment.data.gov.uk/asset-management/index.html>
- Product 4 and 6 Deben 2017 model outputs received from the Agency.

3. SITE CHARACTERISTICS

3.1 Existing Site Characteristics and Location

3.1.1 The site is located at number 4 Bridge Farm Cottages, Ash Road, Lower Hacheston, Suffolk. The approximate Ordnance Survey (OS) grid reference for the site is 630824 256556 and the location of the site is shown on Figure 1.

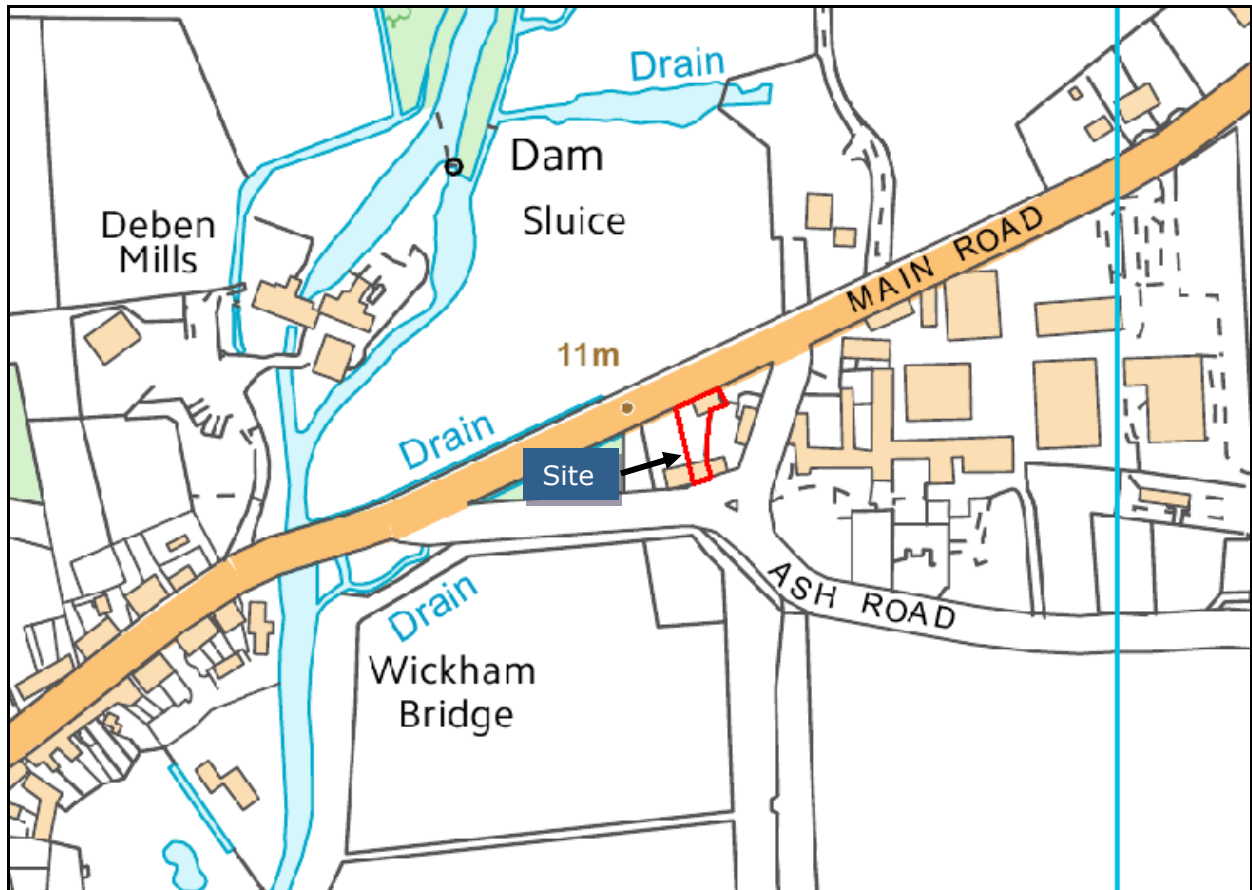


Figure 1: Site location plan (Source: Ordnance Survey)

- 3.1.2 The site comprises an existing two-storey dwelling together with front and rear garden. The site is accessed from Ash Road adjacent to the southern frontage of the site.
- 3.1.3 The existing site layout can be seen on Drawing Number BFC_23_01.
- 3.1.4 Filtered LIDAR data at 1m resolution has been obtained to determine and illustrate the topography of the site and surrounding area (Figure 2).
- 3.1.5 It can be seen from the survey data and on-site inspections that the ground floor is set approximately 100mm-150mm higher than external ground level and at 10.95m AOD.

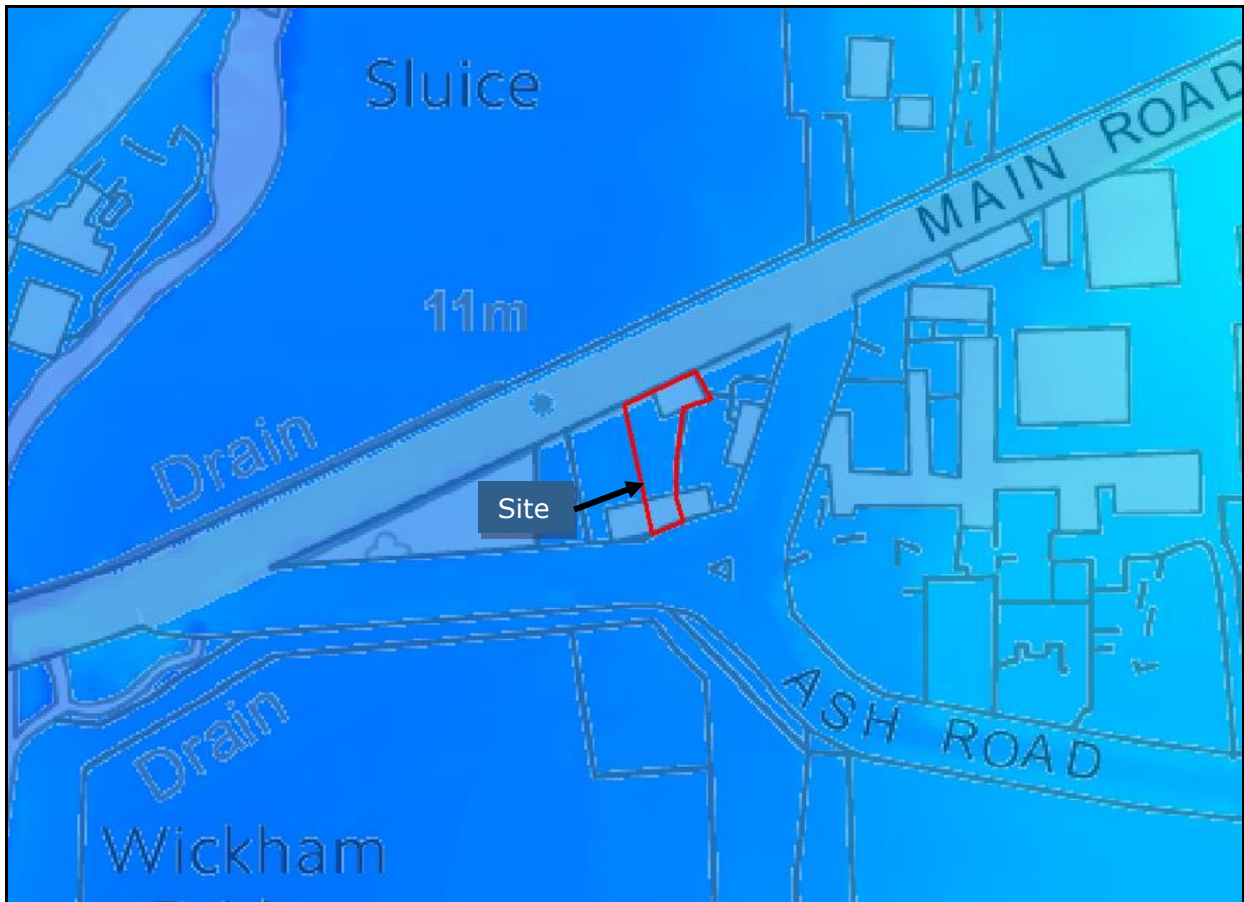


Figure 2: Filtered LIDAR survey data at 1m resolution where higher ground is denoted by red and orange colours and lower ground is denoted by blue colours

3.2 Site Proposals

- 3.2.1 It is the Client's intention to construct a two-storey extension at the rear of the property.
- 3.2.2 The ground floor level of the extension will be the same as the dwelling and at 10.95m AOD.
- 3.2.3 The site proposals can be seen on Drawing Number BFC_23_02.
- 3.2.4 Annex 3 of the NPPF confirms that residential development is classified as a 'more-vulnerable' use.
- 3.2.5 Paragraph 27 of the NPPG and paragraph 168 of the NPPF 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 and Figure 05.22/4 of the 2018 SFRA (Figure 3) shows that the site is located within the NPPF defined Flood Zone 3 associated with the River Deben located 161m west of the site.

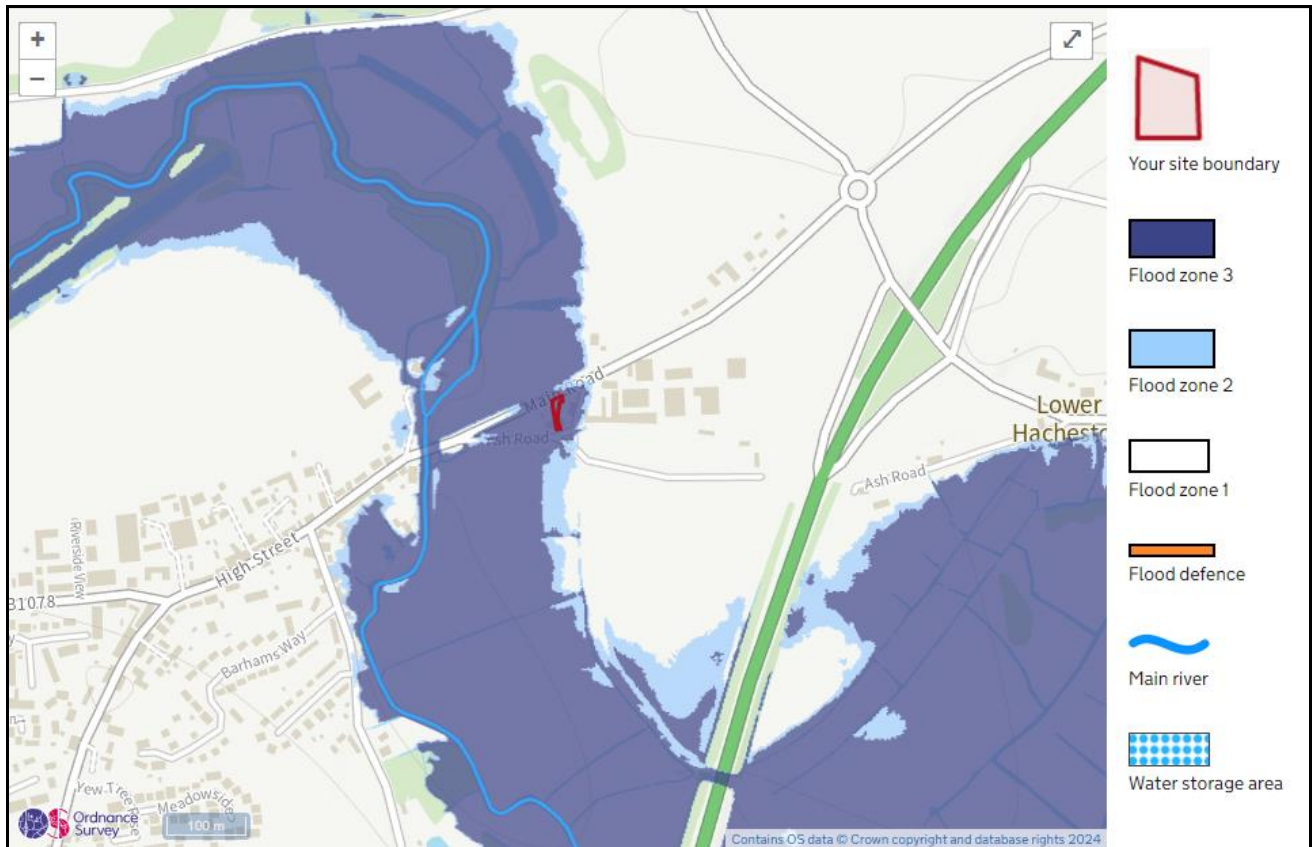


Figure 3: Environment Agency Flood Zone Map (Source: Environment Agency, 2024)

4.2 Environment Agency Flood Levels

4.2.1 The Environment Agency flood defence information via <https://environment.data.gov.uk/asset-management/index.html>, indicates that there are no raised flood defences at this location.

4.2.2 In-channel Product 4 and 6 Deben 2017 model outputs have been received from the Agency and are summarised in Table 1.

Table 1: Fluvial flood level data

Location	1 in 30 year (mAOD)	1 in 100 year (mAOD)	1 in 100 year plus 20% climate change (mAOD)	1 in 1000 year (mAOD)	1 in 1000 year plus 20% climate change (mAOD)
DEBEN10849	10.36	10.49	10.60	10.84	11.08

- 4.2.3 The UK Government’s climate change allowances guidance states that for more-vulnerable development, the “Central” climate change allowance should be used in FRA’s. For the East Suffolk management catchment the climate change allowance is 19% up to year 2080s.
- 4.2.4 Therefore, when considering this scenario, the Agency’s fluvial modelling includes a 1 in 100 plus 20% climate change allowance, which is higher than the required 19% and will also consider the Higher Central allowance up to year 2080s.

4.3 Flood Warning and Emergency Planning

- 4.3.1 The site is located within Environment Agency Flood Warning area 054FWFSF4B - The River Deben from downstream of Cretingham to Ufford.
- 4.3.2 Sites at risk of fluvial flooding could have a minimum of 2 hours warning before any of the levels of flood warning is issued.
- 4.3.3 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. The message is conveyed by a constant ringing of the telephone or can alternatively be communicated to mobile phones and computers. The system functions at all times, issuing flood warnings and alerts in conjunction with announcements on radio and other media. 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.** The various flood warning codes can be seen on Figure 4.

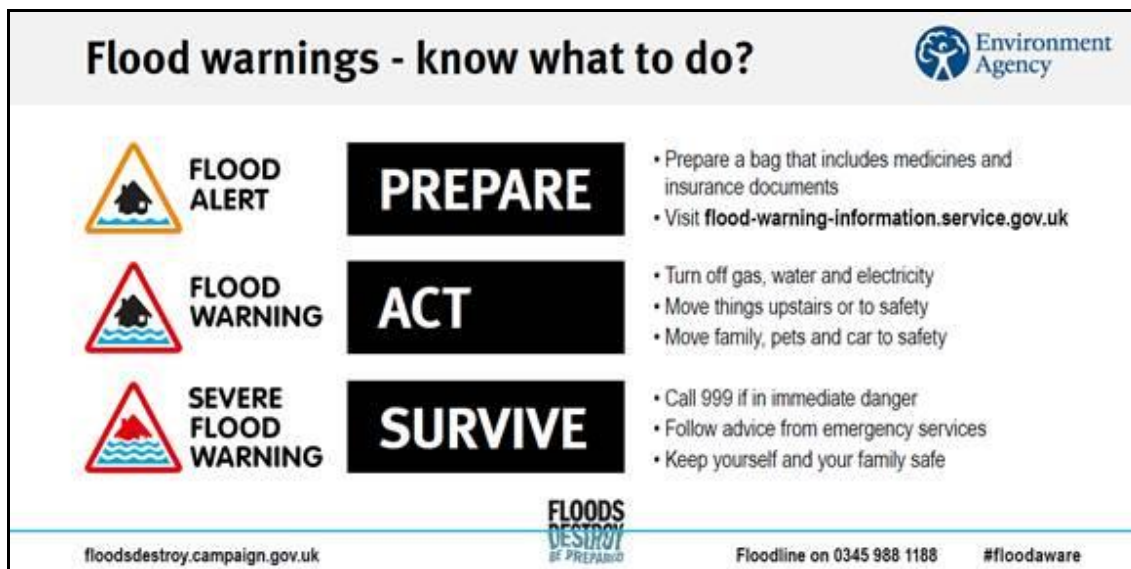


Figure 4: Flood warning codes (Source: Environment Agency)

- 4.3.4 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.

4.4 Internal Drainage Board

- 4.4.1 The site is located within the East Suffolk Internal Drainage Board (IDB) area (River Deben C). There are no IDB controlled watercourses within the vicinity of the site.
- 4.4.2 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.

5. FLUVIAL FLOOD RISK

- 5.1 In order to adopt a worst-case scenario the in-channel flood levels provided by the Agency have been applied directly at the site. Table 2 shows the flood depth and hazard across the site.
- 5.2 In order to determine the flood hazard at the site the hazard categories outlined in Table 13.1 of *FD2320/TR2* (Figure 5 below), which is defined by the depth and velocity of the floodwater and the ability of people to evacuate once flooding occurs, has been used (assuming 0.5 m/s velocity). It should be noted that the white cells shown on Figure 5 denote a *Very low* hazard.

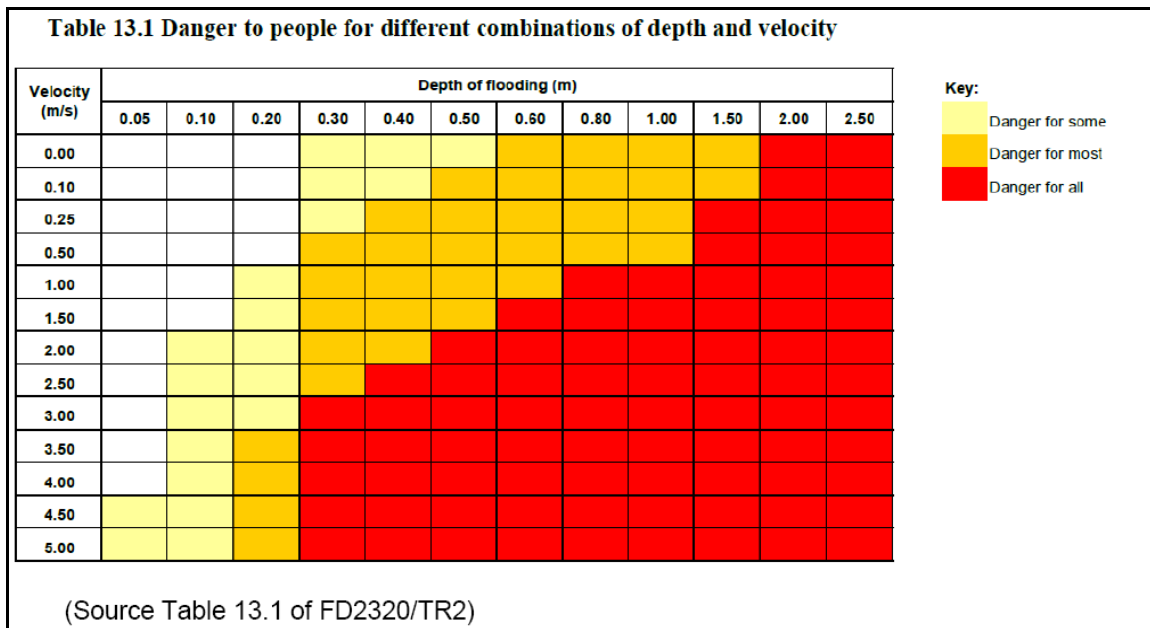


Figure 5: Hazard Classification

Table 2: Fluvial flood levels, depths and hazard across site

Location	1 in 30 year (mAOD)	1 in 100 year (mAOD)	1 in 100 year plus 20% climate change (mAOD)	1 in 1000 year (mAOD)	1 in 1000 year plus 20% climate change (mAOD)
DEBEN10849	10.36m AOD	10.49m AOD	10.60m AOD	10.84m AOD	11.08m AOD
Flood depth (m) across dwelling ground floor at 10.95m AOD.	0	0	0	0	0.13
	<i>Very low hazard</i>				
	<i>Dangerous for Some</i>				
	<i>Dangerous for Most</i>				
	<i>Dangerous for All</i>				

- 5.3 Table 2 show that flooding across the dwelling would occur only during the climate change 1 in 1000 year event.

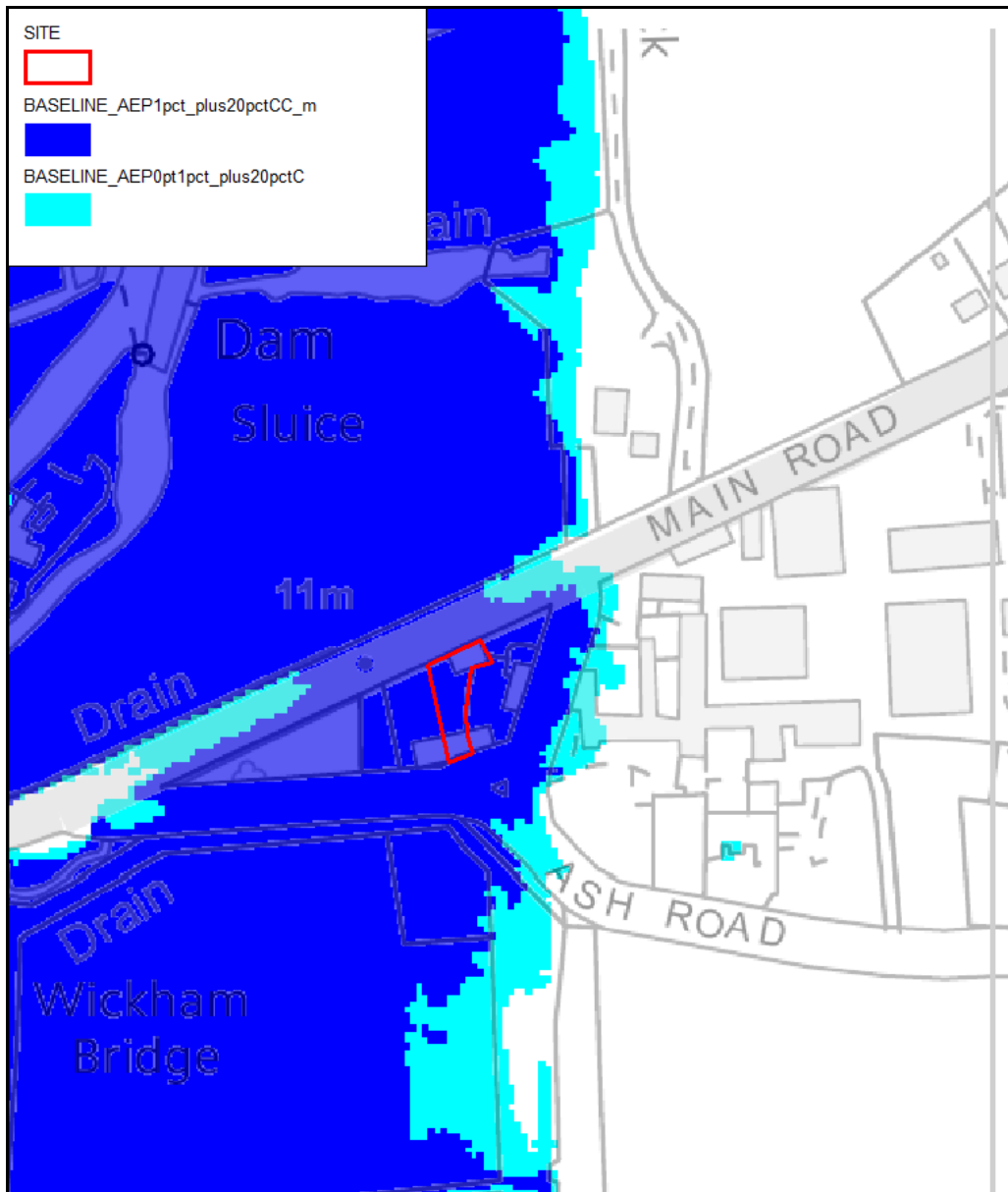


Figure 6: Mapped climate change extents (Source: Deben 2017 model)

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 002 of the NPPF Planning Practice Guidance, the "design" event for which mitigation measures should be designed to is the climate change 1 in 100 year flood level of 10.60m AOD. The climate change 1 in 1000 year flood level of 11.08m AOD can be considered as the "extreme" event flood level.
- 6.1.3 Paragraph 004 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 As discussed in Chapter 5, the ground floor level will be set above the design flood level thus complying with the NPPG and providing safe refuge at all times.
- 6.1.5 However, the ground floor would be affected during the extreme event to a depth of up to 0.13m. Further mitigation measures are proposed in Section 7.2.


6.2 Reducing Vulnerability to the Hazard

- 6.2.1 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.
- 6.2.2 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 evacuate upon receipt of a *Flood Warning* or upon the instruction of the emergency services.
- 6.2.3 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*.
- 6.2.4 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.
- 6.2.5 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 family members 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). • Check flood kit, check occupants, check pets – BE PREPARED in case the situation gets worse. 	<p>Not necessary.</p> <p>Occupants can evacuate themselves if they feel unsafe providing that they make a judgement in relation to any external flood hazard. Take flood kit, occupants and pets with you.</p>
<p>Flood Warning (Flooding of homes, businesses and main roads is expected. Act now!).</p> 	<ul style="list-style-type: none"> • Maintain communication through Floodline Warnings Direct and the media. • Begin to implement Flood Plan. • Consider advice given from emergency services/Environment Agency. • Check insurance, Check flood kit, Check Pets. • Check alternative accommodation arrangements. 	<p>Occupants can evacuate themselves if they feel unsafe providing that they make a judgement in relation to any external flood hazard. Take flood kit, occupants and pets with you.</p> <p>No formal evacuation or rest centre set-up will be undertaken at this warning level, however, if flooding is experienced across the area emergency services will rescue people.</p>
<p>Severe Flood Warning (Severe flooding is expected. Imminent danger to life and property. Act now!).</p>	<ul style="list-style-type: none"> • Leave site immediately if not already done so. • Take flood kit, occupants and pets with you. • Follow advice given by Emergency Services and Council. 	<p>Leave site according to advice given by Emergency Services and Council. Take flood kit, occupants and pets with you.</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. • Arrange for utilities to reconnect services. • Do not dispose of damaged property until your insurance company has agreed. 	<p>Not applicable, however site may be uninhabitable.</p> <p>Return to site upon instruction from emergency services as floodwater may not have receded.</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 by the occupants and priority should be given to these groups during the event.

6.4 Safe Access/Egress

6.4.1 The Agency’s data and survey data indicates that during the design climate change 1 in 100 year event the hazard to people leaving the site would be *Very low*.

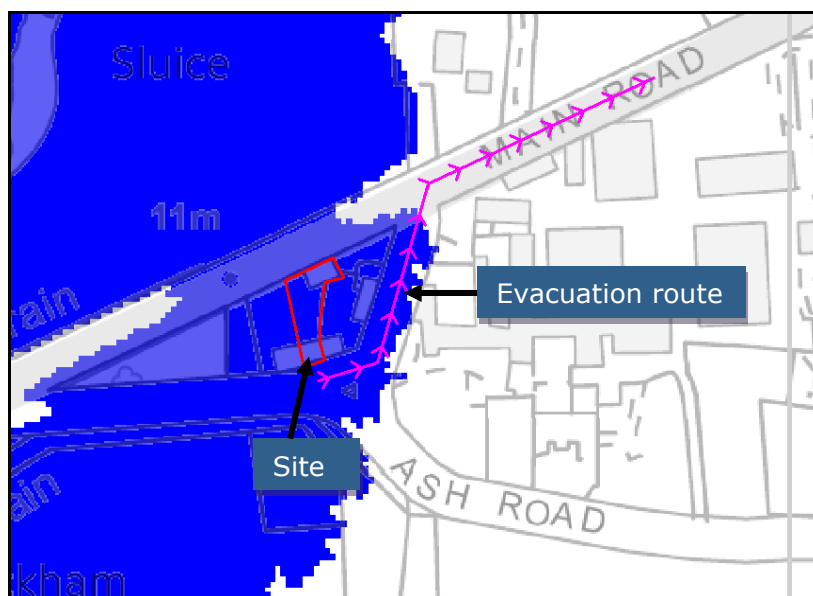


Figure 6: Preferred evacuation route and 100yrCC extent

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.

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.
- 7.1.4 The BGS Groundwater Flooding Susceptibility Map and Figure 07.8/3 of the 2018 SFRA indicates that there is "Potential for Groundwater Flooding to Occur at Surface.
- 7.1.5 The building footprint 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.
- 7.2.2 The Agency's Surface Water Flooding Map (Figure 7 and 8) and Figure 06.22/2 of the 2018 SFRA indicates that there is a very low surface water flood risk across the site (i.e. chance less than 1 in 1000 years).
- 7.2.3 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.
- 7.2.4 Figure 04.6/3 of the 2018 SFRA shows no historical flood incidents at the site. However, it is understood that the property was flooded on 20th October 2023. The flood depth reached less than one foot (<300mm). The neighbours, who have lived here for 43 years, have informed the Client that whilst the neighbouring fields flood occasionally, the water level has never overtopped the road.
- 7.2.5 Further detailed version of the data has been obtained via the Data.gov.uk site (<https://environment.data.gov.uk/DefraDataDownload/?Mode=rofsw>). The flood extent, depth and hazard GIS *shape file* was downloaded from Data.gov.uk (for tile TM_35).

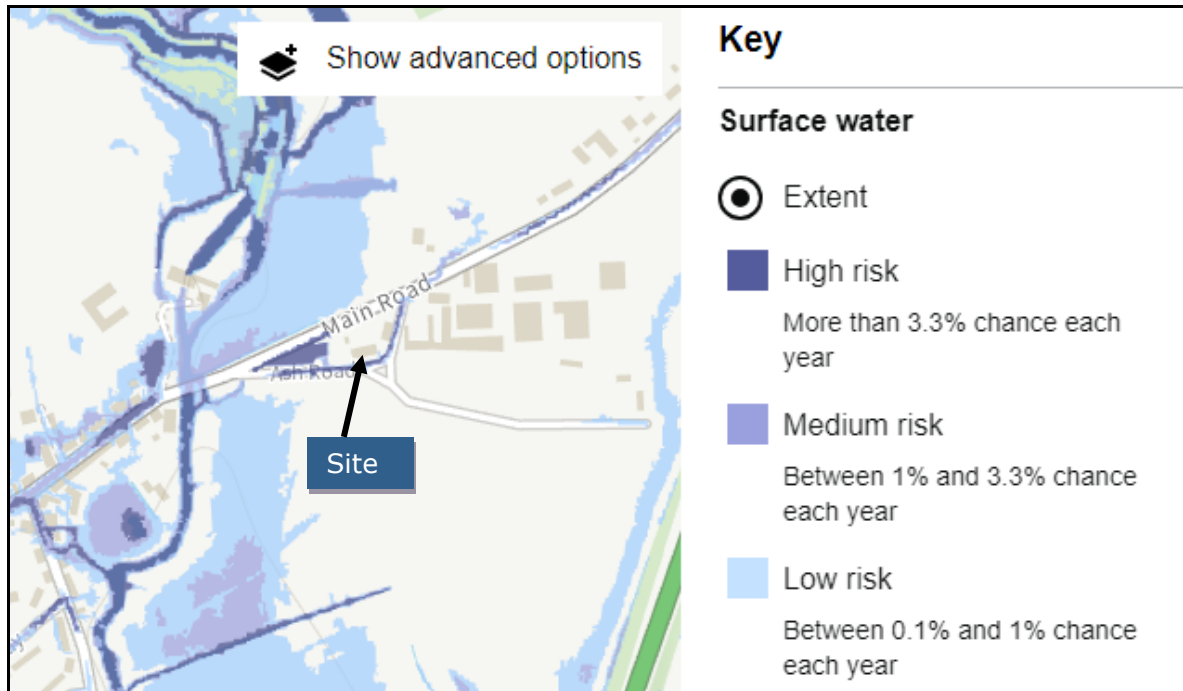


Figure 7: Environment Agency Surface Water Flooding Map (Source: Environment Agency, 2024)

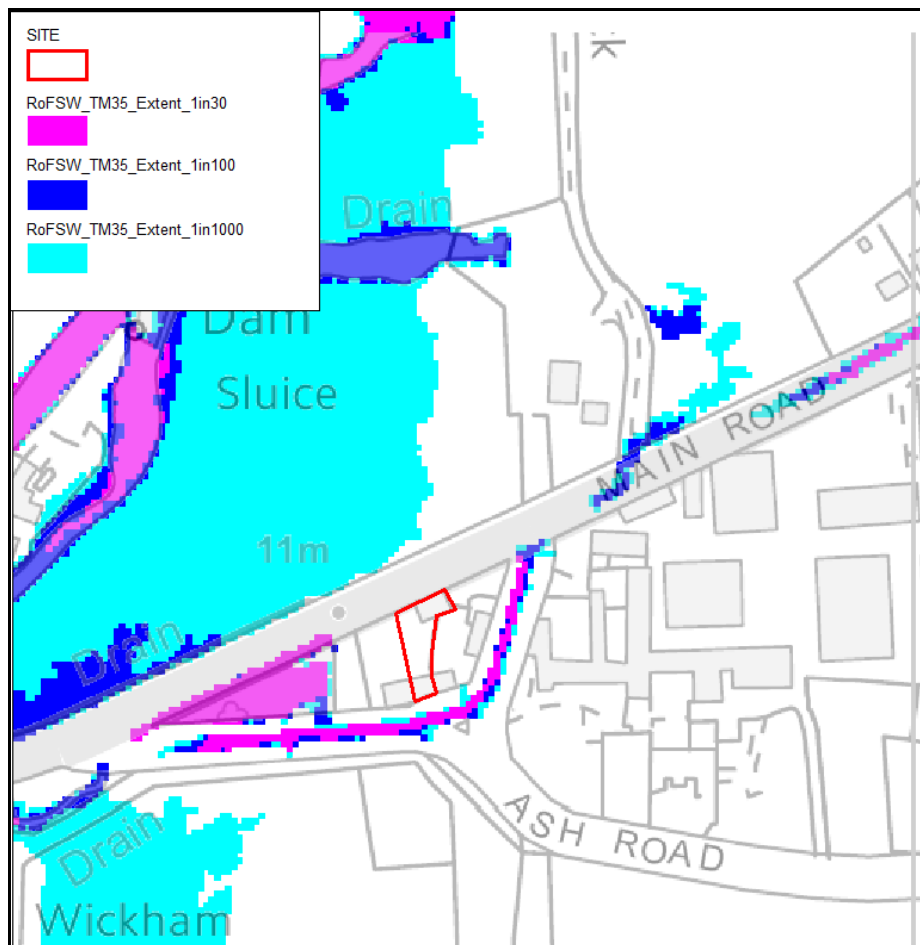


Figure 8: Environment Agency Surface Water Flooding Map (Source: Environment Agency, 2024)

Surface Water Flood Risk Mitigation

- 7.2.6 It has been established that the site has been flooded before and that the flood depth was approximately 0.3m. Therefore, despite the Agency's mapping indicating that there is a very low surface water risk, it is considered that the design flood level is approximately 11.25m AOD.
- 7.2.7 The fluvial climate change 1 in 1000 year flood level has been estimated to be 11.08m AOD.
- 7.2.8 The EA Standing Advice for Minor Extensions (<https://www.gov.uk/guidance/flood-risk-assessment-standing-advice#advice-for-minor-extensions>), states that when considering flood resilience measures a freeboard allowance of 300mm above the estimated flood level should be included (i.e. to 11.38m AOD for fluvial events and 11.55m AOD for surface water flood events).
- 7.2.9 Paragraph 004 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. However, it is not practical to set the floor level above the flood level.
- 7.2.10 The DEFRA/EA document entitled *Improving the Flood Performance of New Buildings*, dated 2007, suggests that there is some damage to buildings if the depth differential between the outside and inside water levels exceeds 0.6m. Severe damage can occur if this reaches 1m even if the buildings are flood proofed.
- 7.2.11 Despite the differential depth being lower than the critical threshold, it is proposed that floodwater is allowed across the extension and a *Water Entry Strategy* is adopted.
- 7.2.12 As the site has been flooded in the past then consideration should be given to prevent water entry into the ground floor during flood events (up to 11.55m AOD) by introducing a *Water Exclusion Strategy* (e.g. flood barriers across doorways and air brick covers).

Water Entry Strategy

- 7.2.13 In accordance with the ODPM guidance document *Preparing for Floods* together with the aforementioned DCLG/DEFRA/EA document and CIRIA C790B – *Guidance on the code of practice for property flood resilience* dated 2020, a *Water Entry Strategy* should be incorporated to reduce the consequences of flooding up to a level of 11.55m AOD.

Floors

- 7.2.14 Suitable floor finishes such as ceramic or concrete based flooring are recommended.

Walls

- 7.2.15 Suitable flood proofing measures will need to be incorporated within the walls up to the flood level.

Fittings

- 7.2.16 Durable fittings which are not affected by floodwater could be used internally (e.g. plastic or stainless steel units). Wood fittings should be avoided; however sacrificial fittings can be installed which can then be replaced easily after the flood. There should be gaps behind the fittings to promote drainage and drying.

Services

7.2.17 It may be practical to set electrical sockets above the design level (i.e. 0.60m higher than floor level), however, the mains supply of electric should be turned off in the event of a flood, and any boiler units should be placed as high as possible and above the flood level. Wiring for communications should also be insulated to prevent damage. Non-return valves are recommended to prevent back-flow of foul water.

Reducing Vulnerability to the Hazard

7.2.18 Flood Warnings for surface water flooding do not currently exist, however, the occupants should sign up to the Met Office weather warning system <https://www.metoffice.gov.uk/public/weather/warnings>.

Table 4: Flood Event Action Plan

Alert	Level Definition	Action	Responsibility
Yellow: be aware	<p>Yellow warnings can be issued for a range of weather situations.</p> <p>Many are issued when it is likely that the weather will cause some low level impacts, including some disruption to travel in a few places.</p> <p>Other yellow warnings are issued when the weather could bring much more severe impacts to many people but the certainty of those impacts occurring is much lower.</p> <p>It is important to read the content of yellow warnings to determine which weather situation is being covered by the yellow warning.</p>	<p>Monitor flood risk through media.</p> <p>Locate family members 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).</p> <p>Check flood kit, check occupants, check pets – BE PREPARED in case the situation gets worse.</p>	Occupants
Amber: be prepared	<p>There is an increased likelihood of impacts from severe weather, which could potentially disrupt your works plans.</p>	<p>Monitor weather through media and local observations.</p> <p>Consider advice given</p>	Occupants

	<p>This means there is the possibility of travel delays, road and rail closures, power cuts and the potential risk to life and property.</p>	<p>from authorities including Council, Environment Agency and emergency services.</p> <p>Begin to implement Flood Plan.</p> <p>Check insurance, Check flood kit, Check Pets.</p>	
Red: Take Action	<p>Dangerous weather is expected and, if you haven't already done so, you should take action now to keep yourself and your works force safe from the impact of the severe weather.</p> <p>It is very likely that there will be a risk to life, with substantial disruption to travel, energy supplies and possibly widespread.</p> <p>You should avoid travelling, where possible, and follow the advice of the emergency services and local authorities.</p>	<p>Follow advice given by Emergency Services, Environment Agency and Council.</p> <p>Maintain communication through the media.</p> <p>Occupants can evacuate themselves if they feel unsafe providing that they make a judgement in relation to any external flood hazard. Take flood kit, occupants and pets with you.</p> <p>People who do not evacuate should reside across building.</p>	Occupants

Safe Access/Egress

7.2.19 The Agency's map shows that there is a low to high risk along Ash Road adjacent to the site.

7.2.20 The flood hazard is calculated based on different combinations of floodwater depth and velocity, and subsequently by using the hazard equation as cited in the DEFRA/EA R&D Document *Framework and guidance for assessing and managing flood risk for new development Phase 2 (FD2320/TR2)*. The numerical hazard rating extracted from the model is then categorised into four degrees of flood hazard (Table 5) in accordance with Table 3.2 of *FD2321/TR1* and Table 4.2 of *FD2321/TR2*.

Table 5: Hazard to people categories (taken from Table 3.2 of *FD2321/TR1* and Table 4.2 of *FD2321/TR2*)

Hazard Rating	Degree of Flood Hazard	Description
< 0.75	Very low hazard	Caution "Flood zone with shallow flowing water or deep standing water"
0.75 – 1.25	Danger for Some	Dangerous for some (i.e. children) "Danger: Flood zone with deep or fast flowing water"
1.25 – 2.0	Danger for Most	Dangerous for most people (i.e. general public) "Danger: Flood zone with deep fast flowing water"
> 2.0	Danger for All	Dangerous for all "Extreme danger: flood zone with deep fast flowing water"

4.3.21 By reviewing the flood hazard GIS *shape file* downloaded from Data.gov.uk (<https://environment.data.gov.uk/DefraDataDownload/?Mode=rofsw>) it can be seen that the hazard to people leaving the dwelling during low risk events would be *Very low*.

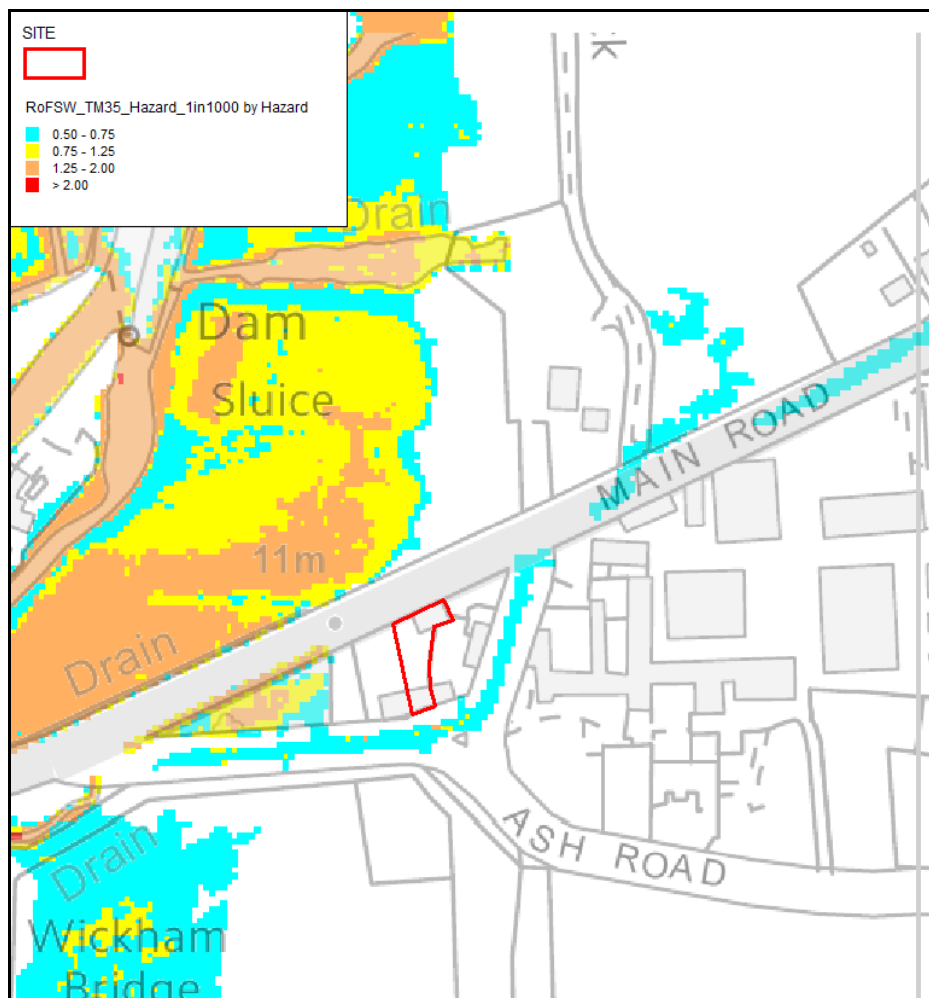


Figure 9: Hazard at the site and surrounding area (see Table 5 for hazard classification)

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 indicates that the site is not at risk of flooding from reservoirs.

8. CONCLUSIONS

- It is the Client's intention to construct a two-storey extension at the rear of the property. The ground floor level of the extension will be the same as the dwelling and at 10.95m AOD.
- The site is located within the NPPF Flood Zone 3.
- The design climate change 1 in 100 year flood level has been estimated to reach 10.60m AOD. The extreme climate change 1 in 1000 year flood level has been estimated to reach 11.08m AOD.
- The ground floor level is set above the design flood level. However, the ground floor would be affected during the extreme event to a depth of up to 0.13m.
- There is a low groundwater flood risk and low risk from reservoirs.
- The Environment Agency's Surface Water Flooding Map indicates that there is a very low surface water flood risk across the site (i.e. less than 1 in 1000 year chance), however, it is understood that the site flooded on the 20th October 2023 and the depth was <300mm (i.e. approximately 11.25m AOD).
- The EA Standing Advice for Minor Extensions (<https://www.gov.uk/guidance/flood-risk-assessment-standing-advice#advice-for-minor-extensions>), states that when considering flood resilience measures a freeboard allowance of 300mm above the estimated flood level should be included (i.e. to 11.38m AOD for fluvial events and 11.55m AOD for surface water flood events).
- Paragraph 004 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. However, it is not practical to set the floor level above the flood level.
- Despite the differential depth being lower than the critical threshold, it is proposed that floodwater is allowed across the extension and a *Water Entry Strategy* is adopted.
- As the site has been flooded in the past then consideration should be given to prevent water entry into the ground floor during flood events (up to 11.55m AOD) by introducing a *Water Exclusion Strategy* (e.g. flood barriers across doorways and air brick covers).
- 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*.

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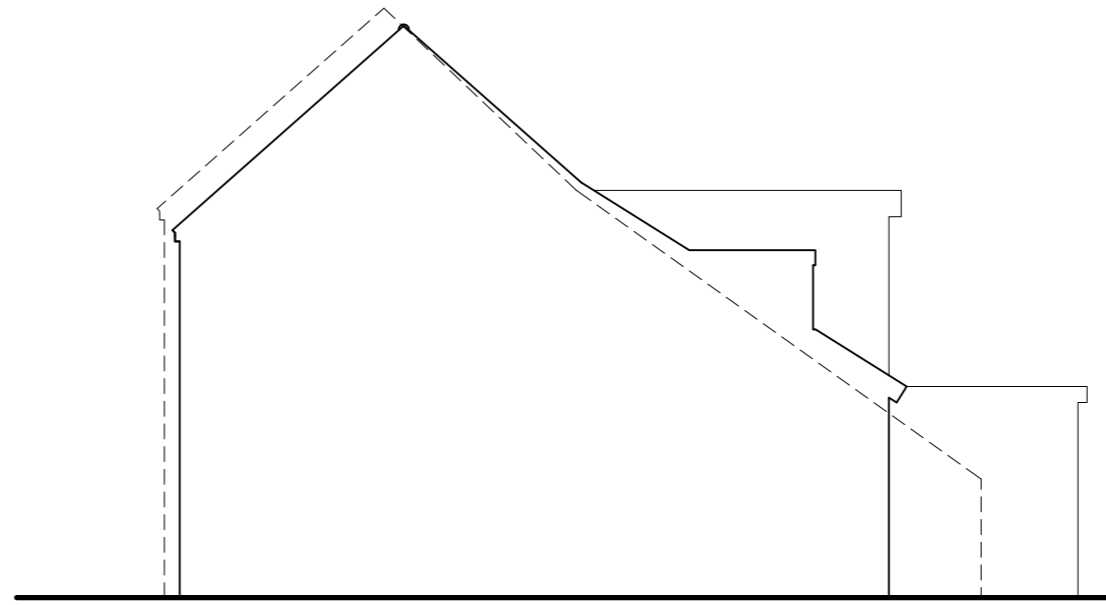
DRAWINGS



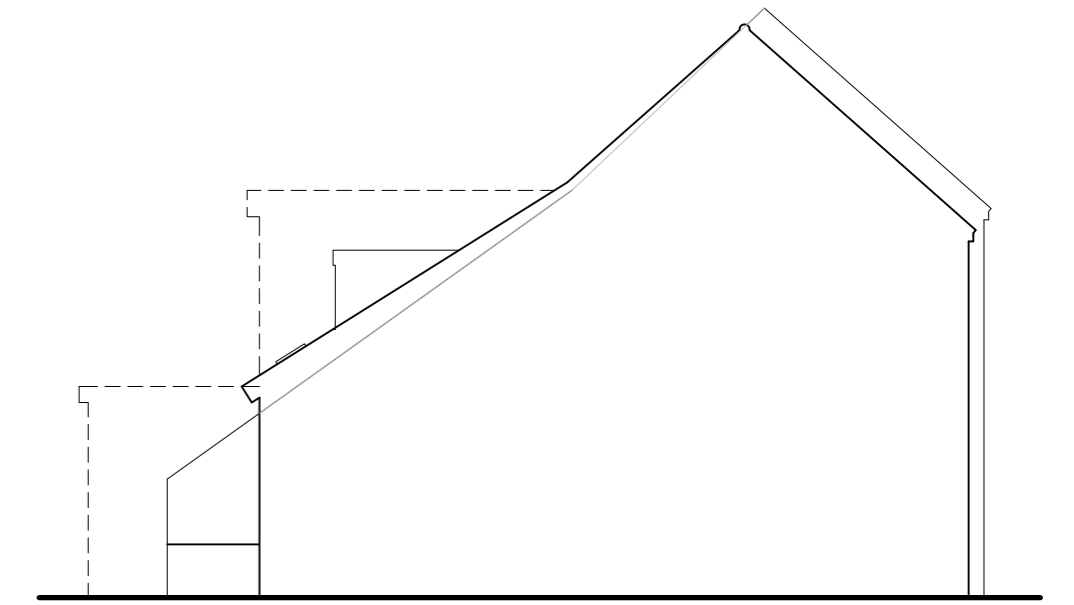
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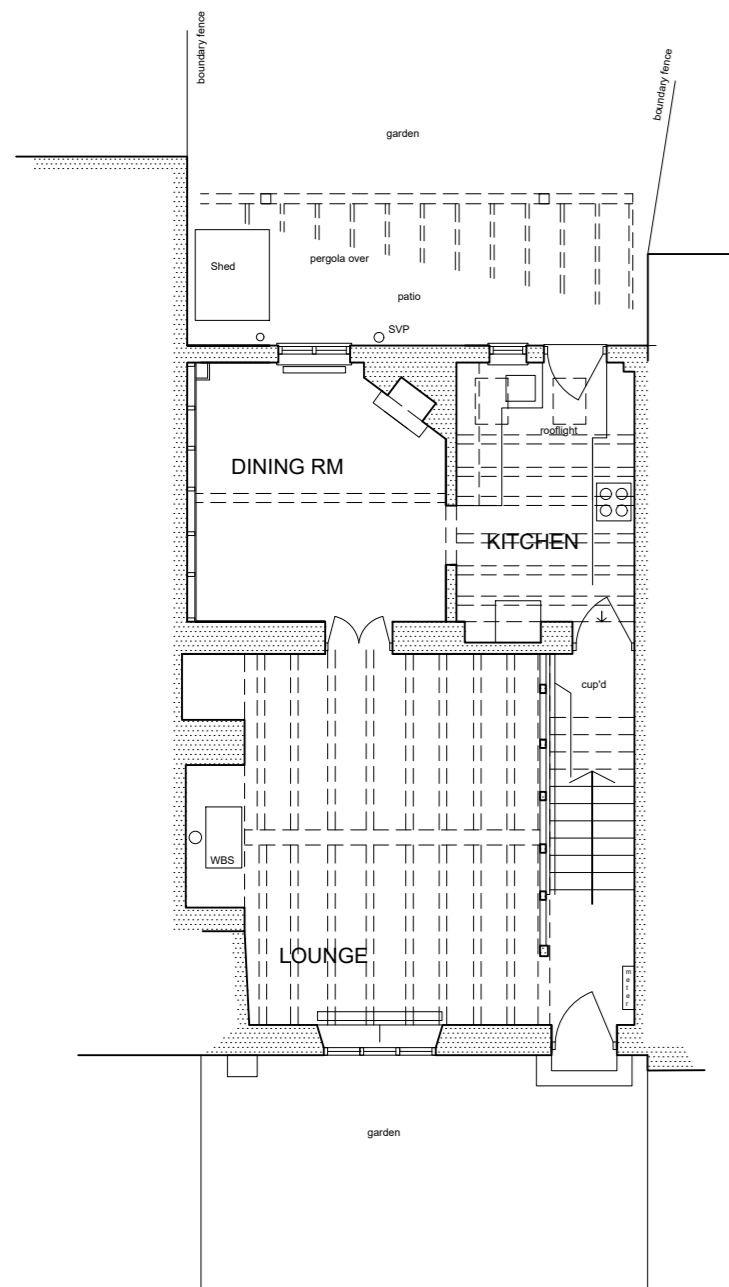
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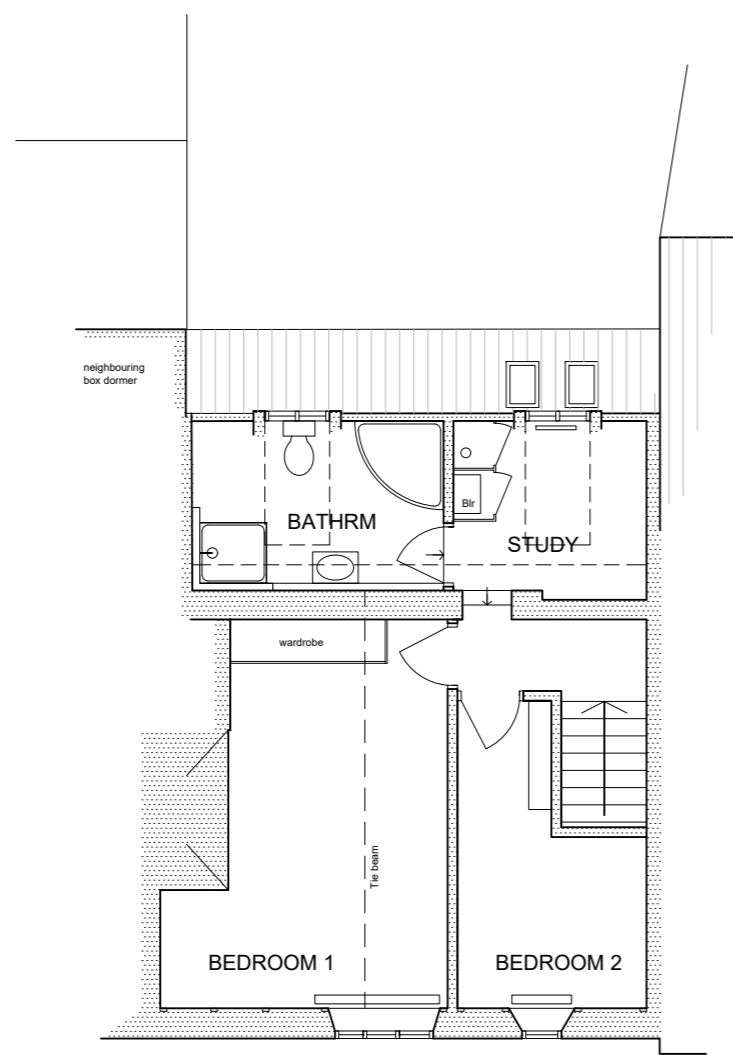
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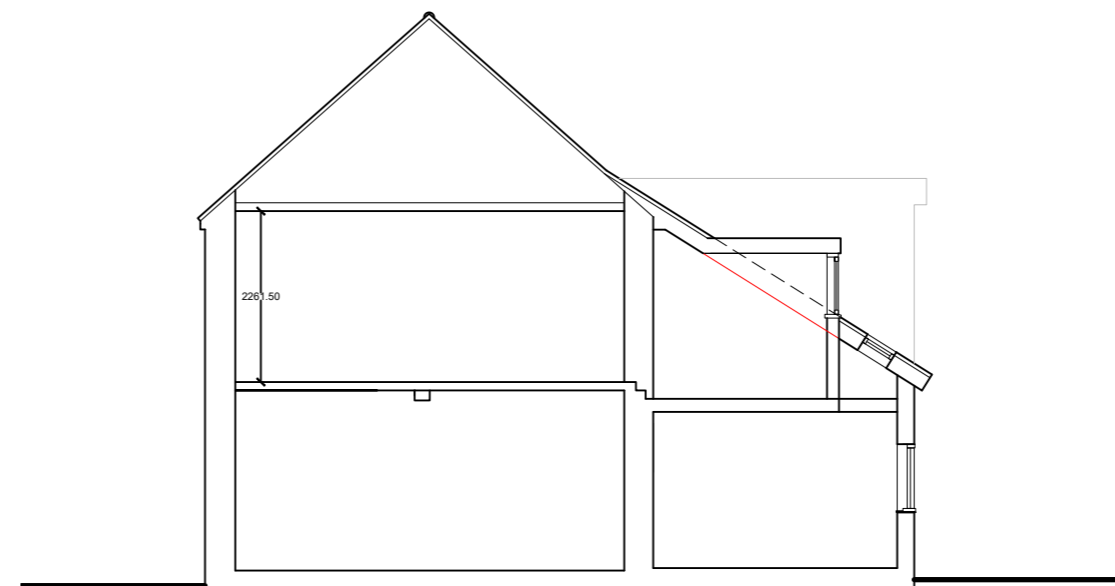
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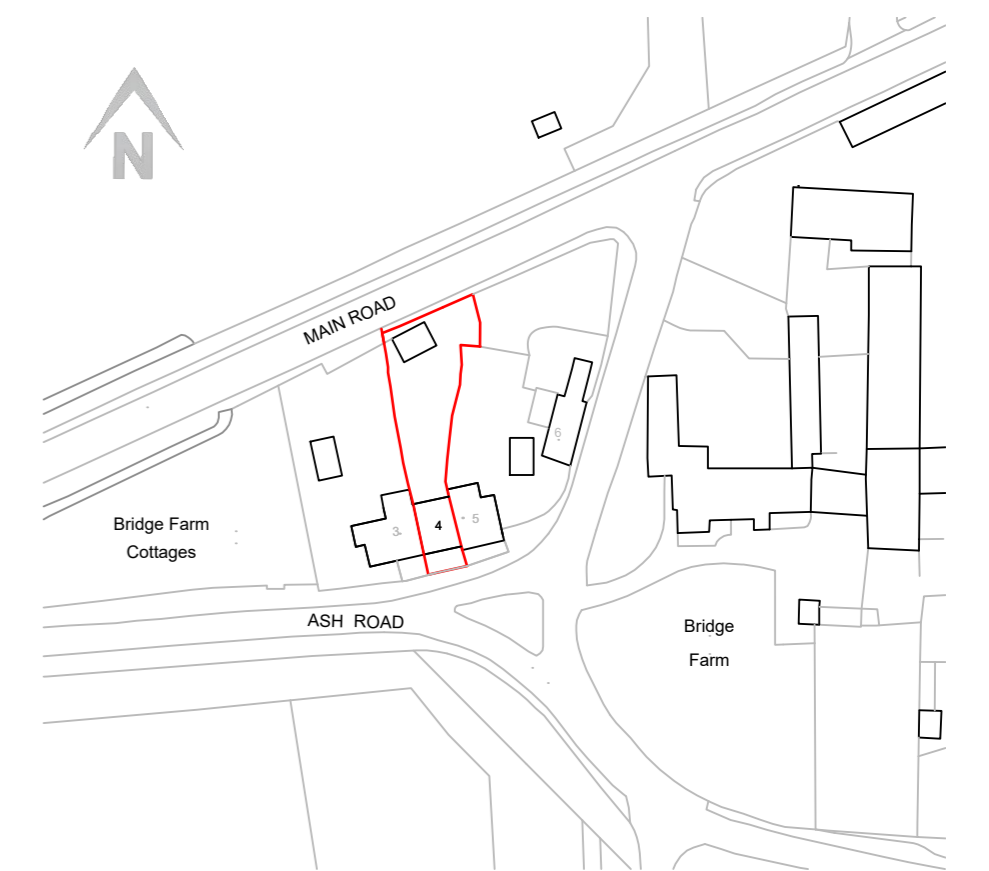
EXISTING GROUND FLOOR PLAN



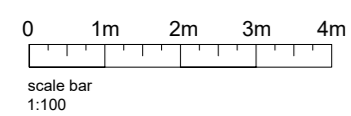
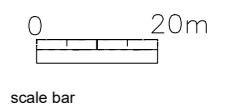
EXISTING FIRST FLOOR PLAN



SECTION A-A



LOCATION PLAN
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Project: PROPOSED CONVERSION		drawing number: BFC.23.01	
scale: 1:100@A2	date: December 2023	drawn:	

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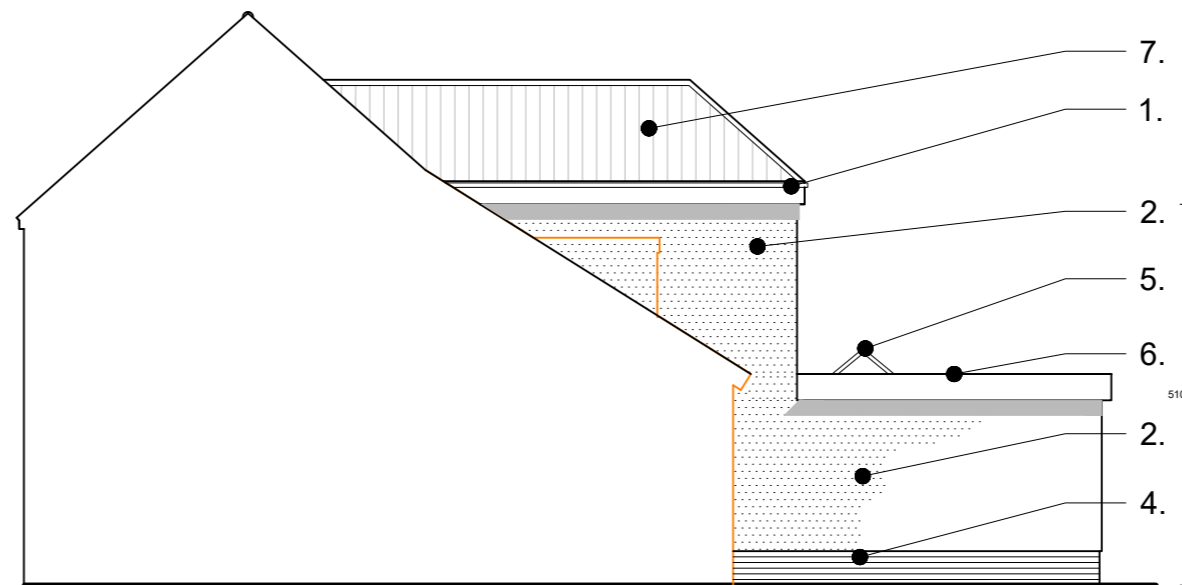
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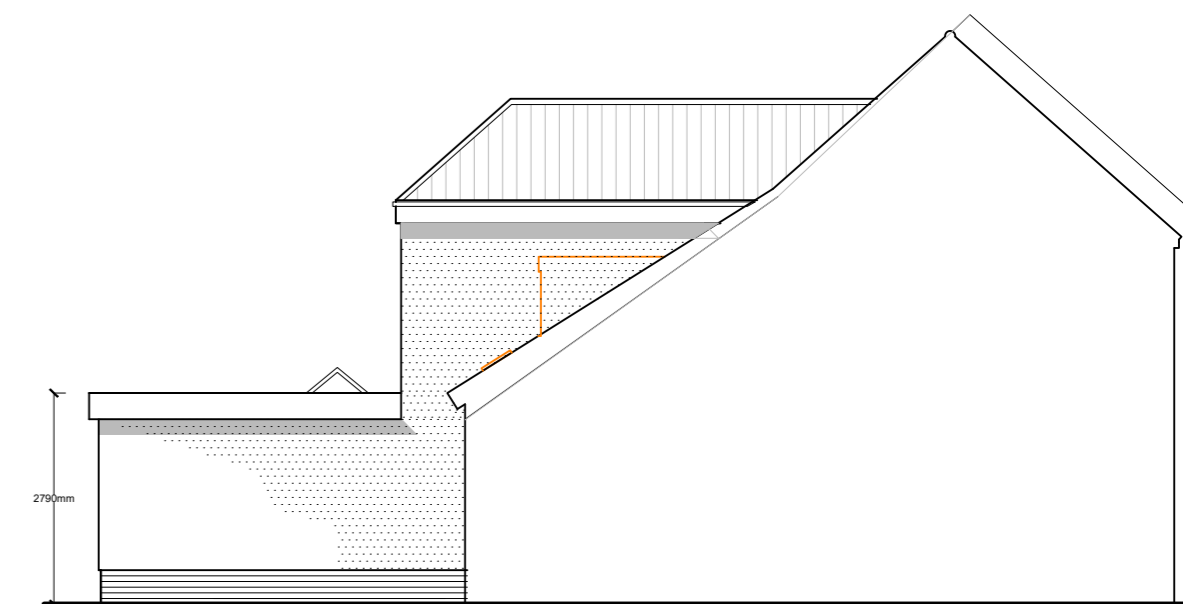
EXISTING SOUTH ELEVATION
(no change)



PROPOSED NORTH ELEVATION



PROPOSED EAST ELEVATION



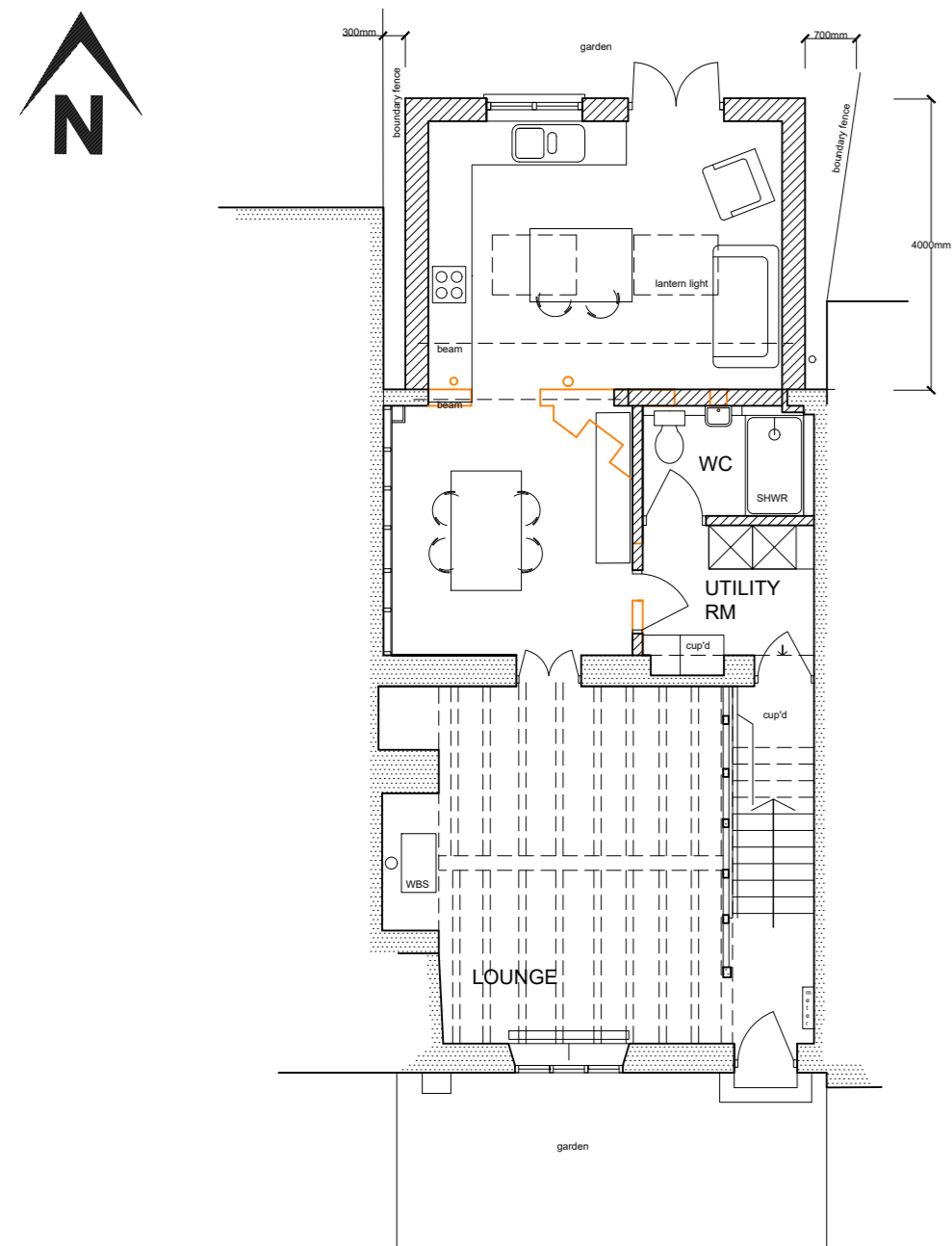
PROPOSED WEST ELEVATION

MATERIALS LIST

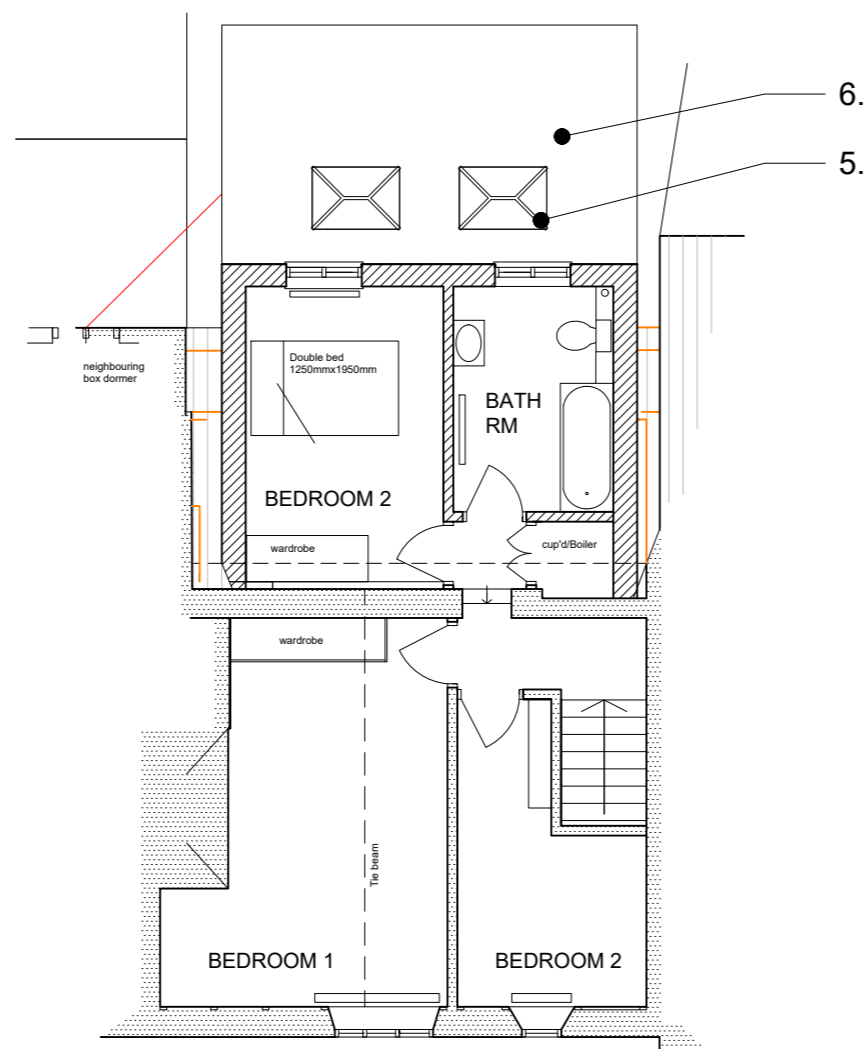
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2. Render finish
3. Upvc double glazed window units
4. Brick plinth
5. Lantern Light
6. EDPM Roof membrane
7. Roof tiles to match existing

- Existing structure to be removed.
- New Works and Alterations.

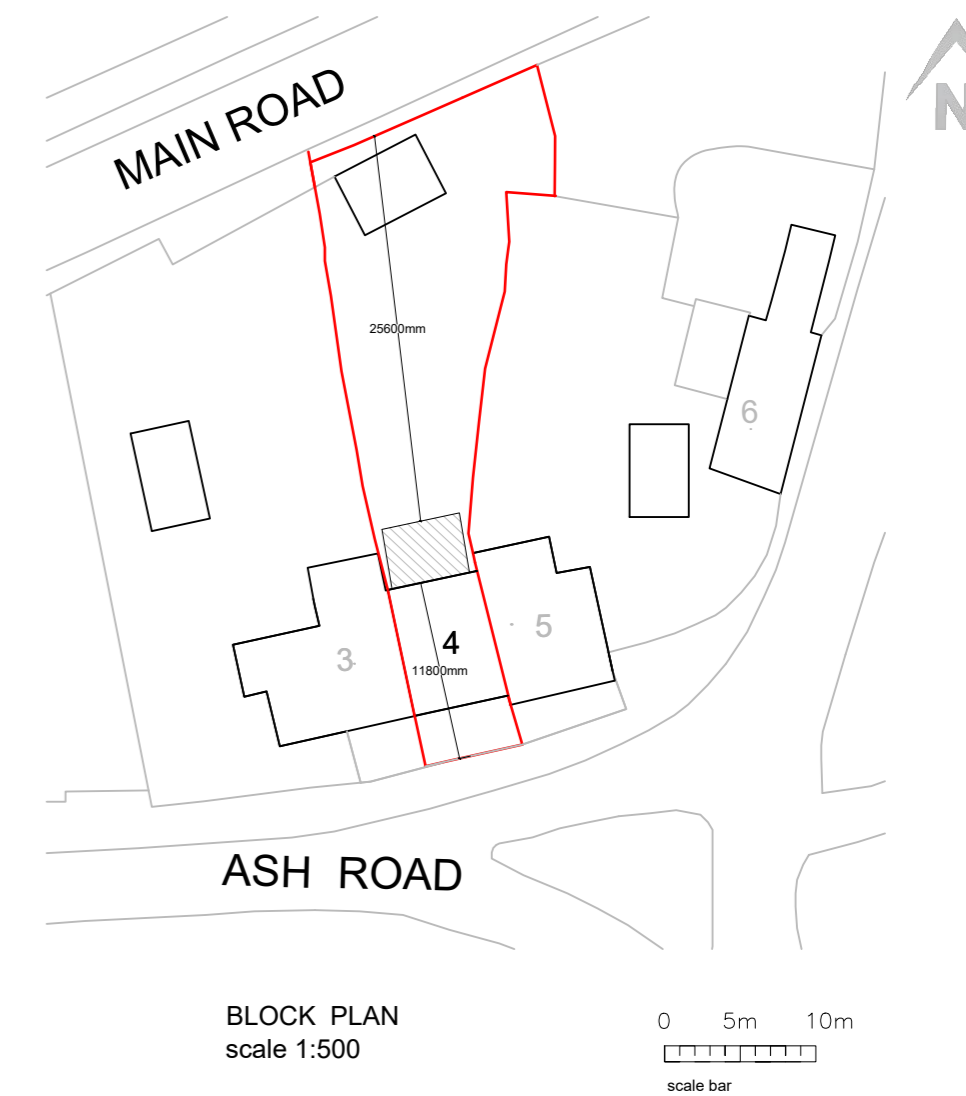
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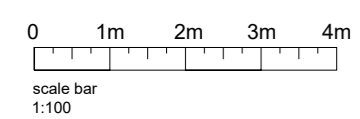
PROPOSED GROUND FLOOR PLAN



PROPOSED FIRST FLOOR PLAN



BLOCK PLAN
scale 1:500



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Project: PROPOSED REAR EXTENSION		drawing number: BFC.23.02	
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