PROPOSED CHANGE OF USE OF EXISTING BARN AT HOME FARM, WEST STREET, WALSHAM-LE-WILLOWS, SUFFOLK

FLOOD RISK ASSESSMENT

NOVEMBER 2022

REPORT REF: 3082/RE/11-22/01

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CONTRACT

Evans Rivers and Coastal Ltd has been commissioned by Lynn Smith to carry out a Flood Risk Assessment for a proposed change of use of existing barn into residential dwellings at Home Farm, West Street, Walsham-Le-Willows, 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; hydrological and hydrogeological assessments; surface water drainage designs; and reporting. Quality will be maintained throughout the project by producing specific methodologies for each work stage. Quality will also be maintained by 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".

Report carried out by:

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DISCLAIMER

This report has been written and produced for Lynn Smith. No responsibility is accepted to other parties for all or any part of this report. Any other parties relying upon this report without the written authorisation of Evans Rivers and Coastal Ltd do so at their own risk.

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1. INTRODUCTION

1.1 Project Scope

1.1.1 Evans Rivers and Coastal Ltd has been commissioned by Lynn Smith to carry out a Flood Risk Assessment for a proposed change of use of existing barn into residential dwellings at Home Farm, West Street, Walsham-Le-Willows, Suffolk.

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

1) Review any literature and guidance specific to this area such as the SFRA;

2) Assess the flood risk from all sources to people and property and propose mitigation measures accordingly;

3) Review existing evacuation and warning procedures for the area;

4) 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.
- 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 obtained via Promap (Evans Rivers and Coastal Ltd OS licence number 100066376).
- British Geological Survey, *Online Geology of Britain Viewer*.
- Filtered LIDAR data at 1m resolution covering the site and surrounding area.
- 1:625,000 *Hydrogeological Map of England and Wales*, published in 1977 by the Institute of Geological Sciences (now the British Geological Survey).

3. SITE CHARACTERISTICS

3.1 Existing Site Characteristics and Location

3.1.1 The site is located at Home Farm, West Street, Walsham-Le-Willows, Suffolk. The approximate Ordnance Survey (OS) grid reference for the site is 598636 270868 and the location of the site is shown on Figure 1.

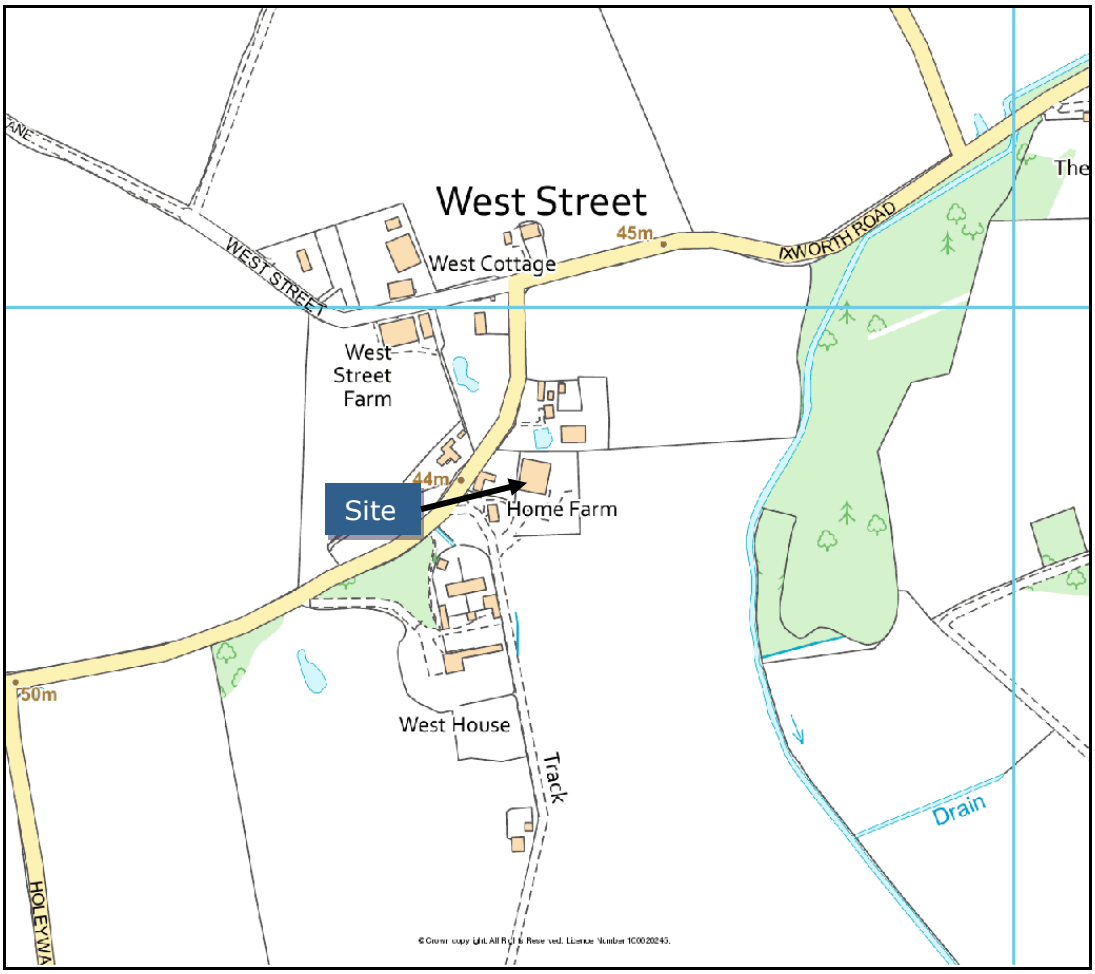

Figure 1: Site location plan (Source: Ordnance Survey)

3.1.2 The site comprises an existing barn associated with Home Farm. The site is accessed from West Street to the west.

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

3.1.4 The survey data indicates that the ground floor slab level across the barn is 43.90m AOD which is similar to external ground levels at the front entrance of the building along its southern frontage.

3.1.5 Ground levels along the eastern frontage are set at 43.70m AOD, and along the western and northern frontages the ground levels are set at 43.75m AOD.

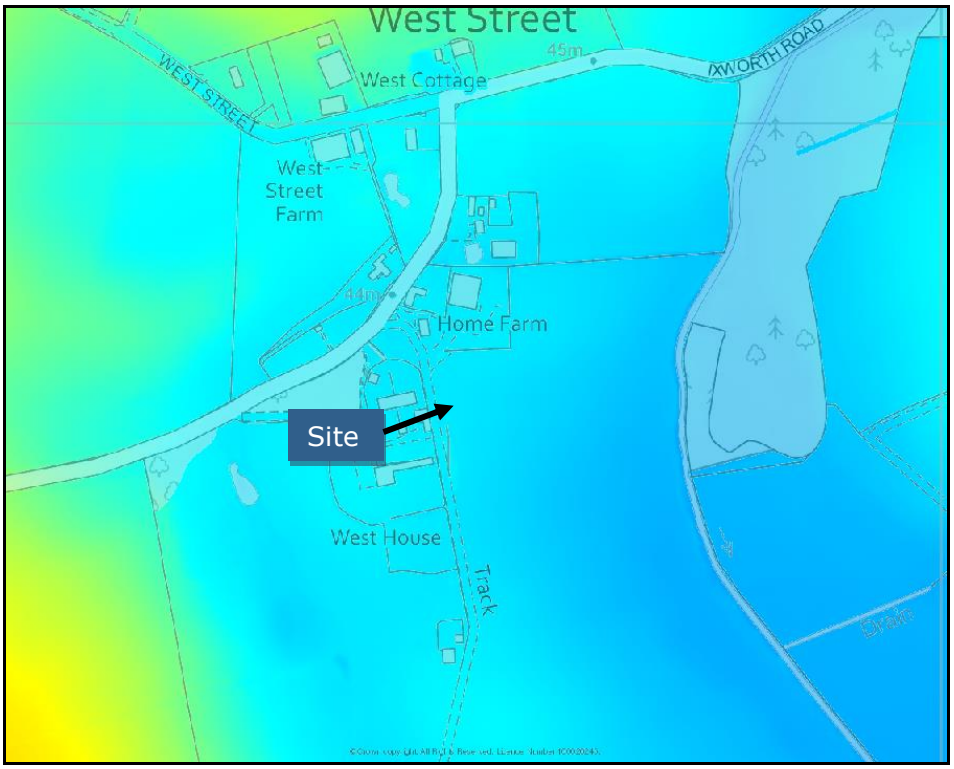

Figure 2: Filtered LIDAR survey data at 1m resolution where higher ground is denoted by red and orange colours and lower ground is denoted by blue colours

3.2 Site Proposals

3.2.1 It is the Client's intention to change the use of the barn to a residential use. The ground floor will be set 0.30m higher than existing and at 44.20m AOD in order to provide safe refuge during the surface water flood event.

3.2.2 Paragraph 33 (ID 7-033-20140306) of the NPPF Planning Practice Guidance (NPPG) states that the Sequential Test does not apply to change of use applications.

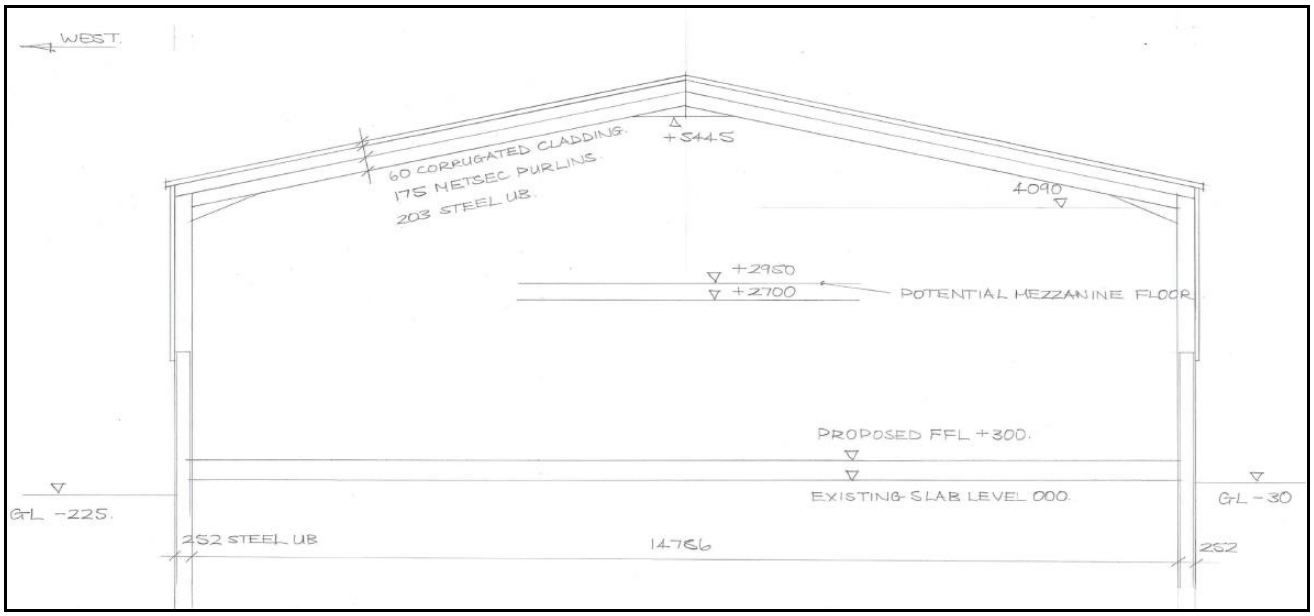

Figure 3: Site section

4. SOURCES OF FLOODING

4.1 Fluvial

4.1.1 The Environment Agency Flood Map (Figure 4) and Appendix B of the SFRA (Badwell Ash Ward) shows that the site is located within the NPPF Flood Zone 1, 'Low Probability' which comprises land as having less than a 1 in 1000 year annual probability of fluvial or tidal flooding (i.e. an event more severe than the extreme 1 in 1000 year event). NPPF states that all uses of land are appropriate in this zone.

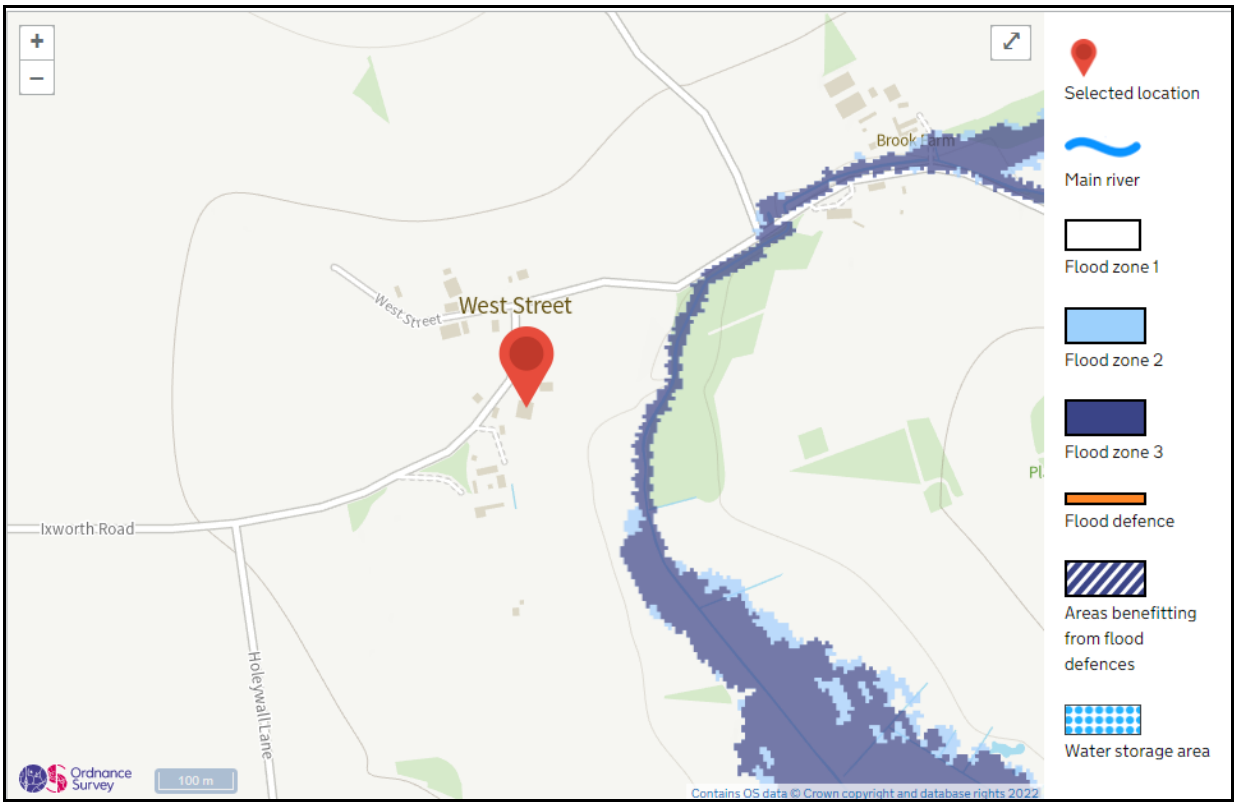

Figure 4: Environment Agency Flood Zone Map (Source: Environment Agency)

4.2 Groundwater Flooding

4.2.1 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

4.2.2 The British Geological Survey's *Online Geology of Britain Viewer* indicates that the soils beneath the site comprise clay deposits.

Groundwater Flooding Potential at the Site

4.2.3 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

across this area there is a risk of flooding to subsurface assets but surface manifestation of groundwater is unlikely.

4.3 Surface Water Flooding and Sewer Flooding

4.3.1 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. Surface water flooding can also occur as a result of overland flow across poorly drained rural areas.

4.3.2 Appendix E of the SFRA shows that there have been 1 recorded sewer flood incident in this postcode area, however, Appendix D of the SFRA indicates that there have been no recorded flood incidents at the site. There are also no flood incidents that have been investigated at the site by Suffolk County Council.

4.3.3 The Environment Agency's Surface Water Flooding Map (Figure 5 and 6) together with Appendix A of the SFRA indicates that there is a very low surface water flood risk across the building (i.e. less than 1 in 1000 year chance).

4.3.4 However, the mapping shows a very low to high risk around the building (i.e. between a less than 1 in 1000 year chance to events greater than 1 in 30 years).

4.3.5 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.

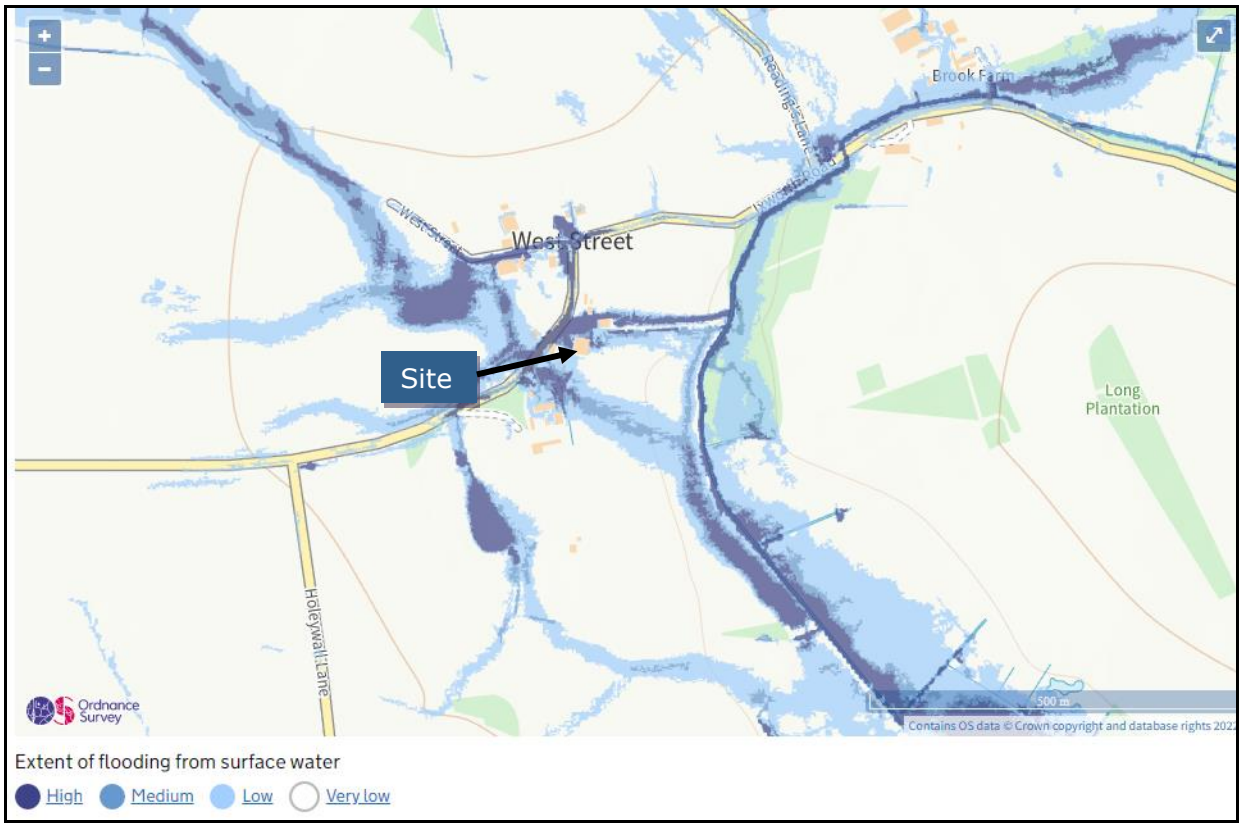

Figure 5: Environment Agency Surface Water Flooding Map (Source: Environment Agency, 2022)

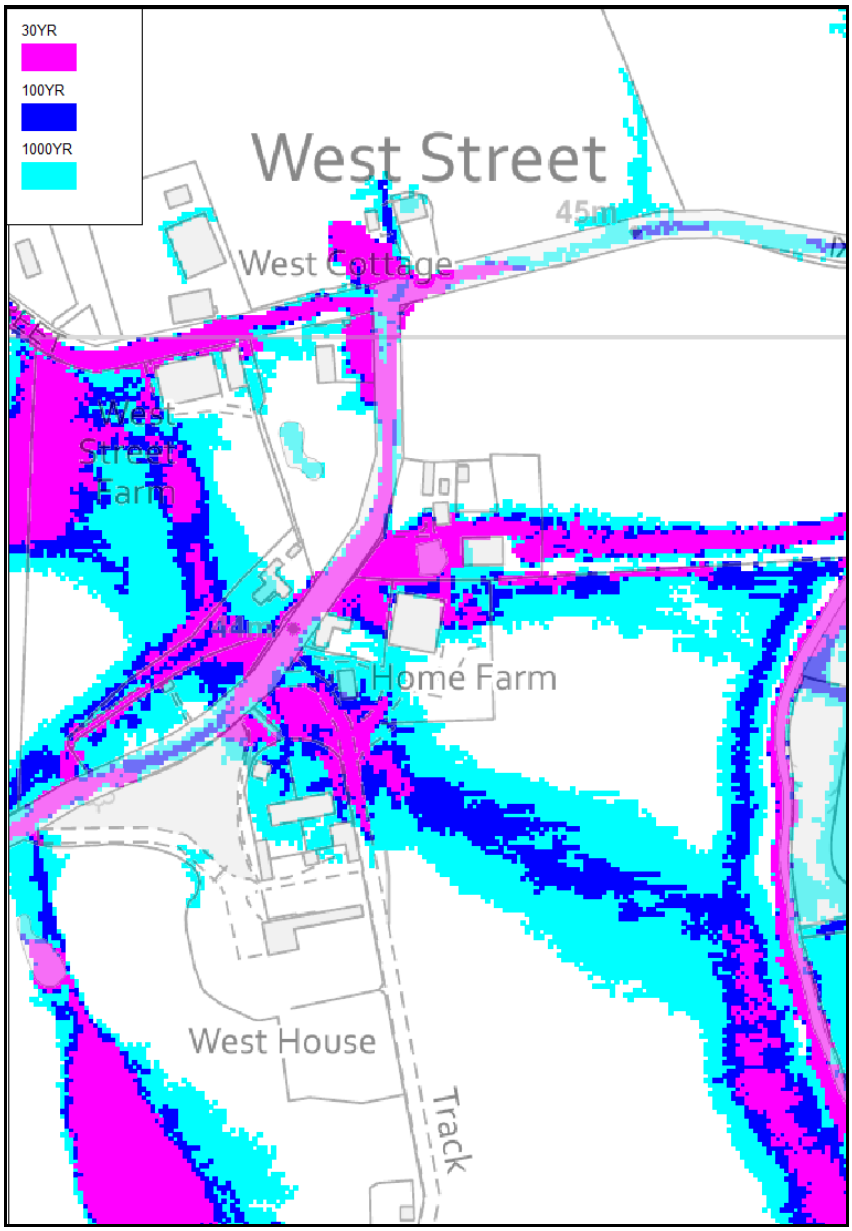

Figure 6: Environment Agency Surface Water Flooding Map (Source: Environment Agency, 2022)

4.3.6 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 TL_97).

4.3.7 Inspection of the data indicates that as the flow path is in a west to east direction, floodwater builds up behind the western and northern frontage of the building which is currently blockwork as shown on Figure 7. The low risk flood depth along these frontages could be between 0.30m-0.60m. The flood level along these frontages could therefore be up to 44.35m AOD.

4.3.8 Adjacent to the front entrance of the building along its southern frontage, the flood depth is shown to be lower and between 0m-0.30m during low risk events. The flood level at this point would be up to 44.20m AOD. Along the eastern frontage the depth would be 0.15m-0.30m and the flood level would be up to 44m AOD.

Figure 7: View along western frontage of site showing no flood pathways into building

4.3.9 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 is then categorised into four degrees of flood hazard in accordance with *FD2320/TR2*, shown on Table 1 below.

4.3.10 The hazard rating has been extracted from the surface water hazard map which was downloaded from Data.gov.uk and is identified as being 0.50-0.75 (*Very low)* along the front entrance/southern frontage as well as the eastern frontage during worst-case low risk events. Along the western and northern frontages, the hazard is 1.25-2.00 (*Dangerous for Most*).

Table 1: Hazard to people categories (based on *FD2320/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"

Surface Water Flood Risk Mitigation

4.3.11 It has been established that the low risk (1000yr/100yr plus climate change) surface water flood level is 44.35m AOD along the western and northern frontages, and 44.20m AOD along the southern frontage. The flood level along the eastern frontage is 44m AOD.

4.3.12 It is proposed that the ground floor level is set at 44.20m AOD (i.e. 0.30m higher than existing) to ensure it is above the flood level along the front entrance/southern frontage and eastern frontage.

4.3.13 Currently the existing blockwork along the western and northern frontages prevents floodwater entering the building. Therefore, it is proposed that the blockwork is retained along these frontages to a level of 44.35m AOD (i.e. 150mm higher than the proposed floor level), in order to continue to prevent any ingress of floodwater.

4.3.14 A *Water Exclusion Strategy* should be adopted along these frontages up to this level in accordance with DCLG/DEFRA/EA document entitled *Improving the Flood Performance of New Buildings*.

Reducing Vulnerability to the Hazard

4.3.15 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 and safe refuge is available at all times.

4.3.16 There are additional ways in which the residents can reduce the risk themselves. 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*.

Table 2: Flood Event Action Plan

Alert	Level Definition	Action	Responsibility
Yellow: be aware	Yellow warnings can be issued for a range of weather situations. 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. Other yellow warnings are issued when the weather could bring much more severe impacts to many people but the certainty of	Monitor flood risk through media. 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.	Occupants

	those impacts occurring is much lower. It is important to read the content of yellow warnings to determine which weather situation is being covered by the yellow warning.		
Amber: be prepared	There is an increased likelihood of impacts from severe weather, which could potentially disrupt your works plans. This means there is the possibility of travel delays, road and rail closures, power cuts and the potential risk to life and property.	Monitor weather through media and local observations. Consider advice given from authorities including Council, Environment Agency and emergency services. Begin to implement Flood Plan. Check insurance, Check flood kit, Check Pets.	Occupants
Red: Take Action	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.	Follow advice given by Emergency Services, Environment Agency and Council. Maintain communication through the media.	Occupants

	It is very likely that there will be a risk to life, with substantial disruption to travel, energy supplies and possibly widespread. You should avoid travelling, where possible, and follow the advice of the emergency services and local authorities.	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. People who do not evacuate should reside across building.	

Safe Access/Egress

4.3.17 By reviewing the flood hazard GIS *shape file* (for tile TL_97) downloaded from Data.gov.uk (https://environment.data.gov.uk/DefraDataDownload/?Mode=rofsw) it can be seen that the hazard to people leaving the front of the building would be *Very low* up to West Street.

4.3.18 Along West Street the hazard would be *Dangerous for Most* for 153m, *Dangerous for Some* for 5m then *Very low* thereafter.

4.3.19 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.

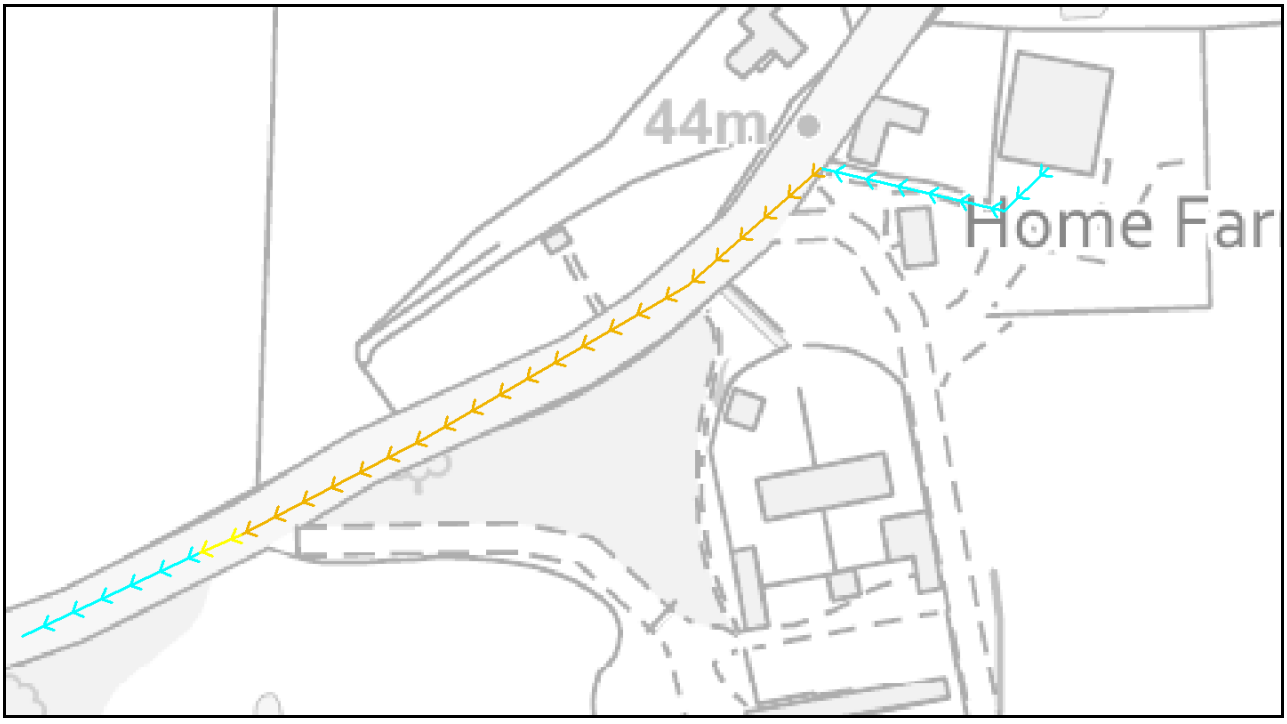

Figure 8: Preferred evacuation route and hazard (see Table 1 above for hazard classification)

4.4 Reservoirs, Canals And Other Artificial Sources

4.4.1 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.

4.4.2 The Environment Agency's "Risk of flooding from reservoirs" map suggests that the site is not at risk from reservoirs.

5. CONCLUSIONS

- The site is located within Flood Zone 1.
- There is a low groundwater flood risk and low risk from reservoirs.
- There is a very low surface water flood risk across the building, however there is a very low to high risk around the building.
- 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.
- A more detailed analysis of the flood risk has been undertaken using the Data.gov.uk GIS data. It has been established that the low risk (1000yr/100yr plus climate change) surface water flood level is 44.35m AOD along the western and northern frontages, and 44.20m AOD along the southern frontage. The flood level along the eastern frontage is 44m AOD.
- It is proposed that the ground floor level is set at 44.20m AOD (i.e. 0.30m higher than existing) to ensure it is above the flood level along the front entrance/southern frontage and eastern frontage.
- Currently the existing blockwork along the western and northern frontages prevents floodwater entering the building. Therefore, it is proposed that the blockwork is retained along these frontages to a level of 44.35m AOD (i.e. 150mm higher than the proposed floor level), in order to prevent any ingress of floodwater.
- A *Water Exclusion Strategy* should be adopted along the western and northern frontages up to 44.35m AOD in accordance with DCLG/DEFRA/EA document entitled *Improving the Flood Performance of New Buildings*.

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