Castledine Environmental

LAND CONTAMINATION SURVEYS

Flood Risk Assessment

for

The Conversion of Barn to Two Residential Units

at

Mill Farm Barns
The Green
Millom
Cumbria
LA18 5HL

Date: May 2025

Status:	Final Report
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EXECUTIVE SUMMARY

Castledine Environmental has been instructed by MVC Design Ltd to prepare a site-specific Flood Risk Assessment for the development at Mill Farm Barns, The Green, Millom, Cumbria, LA18 5HL. This assessment is based on the proposal for the conversion of an existing barn to two residential units.

The proposed works would mainly comprise internal refurbishment works and external hardstanding works, such as paths and car parking spaces. At the time of writing no ground level changes are proposed or other above ground structures. The bedrooms of the dwellings would be located solely at the first floor.

The Environment Agency (EA) mapping for Flood Risk, shows the site located partly within Flood Zone 2 (medium risk of fluvial flooding). Flood zone 2 is described as land having between 1 in 100 and 1 in 1,000 annual probability of river or sea flooding.

Site specific EA flood data for the undefended 1 in 1000-year fluvial event indicate maximum flood depths of approximately 0.7m across the eastern site boundary and falling to approximately 0.2m at the western site boundary.

The site is shown to be unaffected by surface water flooding for the 1:30yr and 1:100yr events based on the information taken from the EA. During the 1:1000yr storm event the site could experience up to 0.15m of flooding across the proposed access and car parking areas.

According to the proposed plans, no construction would occur in these areas, therefore no displacement of surface water would occur as a result of the proposed development. As such, the risk of surface water flooding to the proposed development is considered to be negligible.

Regarding other sources of flooding, such as groundwater, reservoir or sewers, the Cumberland Council and Environment Agency flood data indicate that the site is mainly at a low risk of flooding from these sources.

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1.0 QUALITY ASSURANCE

Castledine Environmental confirm that all reasonable efforts have been made to ensure that the information outlined within this report is accurate.

Castledine Environmental would further confirm that due care, attention and technical skill were used in the creation of this report.

2.0 LIMITATIONS

The conclusions and recommendations made in this report are limited to those based on the findings of the investigation. Where comments are made based on information obtained from third parties, Castledine Environmental assumes that all third-party information is true and correct. No independent action has been undertaken to validate the findings of third parties. The assessments and interpretation have been made in line with legislation and guidelines in force at the time of writing, representing best practice at the time.

There may be other conditions prevailing at the site which have not been disclosed by this investigation and which have not been taken into account by this report. Responsibility cannot be accepted for conditions not revealed by the investigation.

3.0 INTRODUCTION

Castledine Environmental has been instructed by MVC Design Ltd to prepare a site-specific Flood Risk Assessment for the development at Mill Farm Barns, The Green, Millom, Cumbria, LA18 5HL.

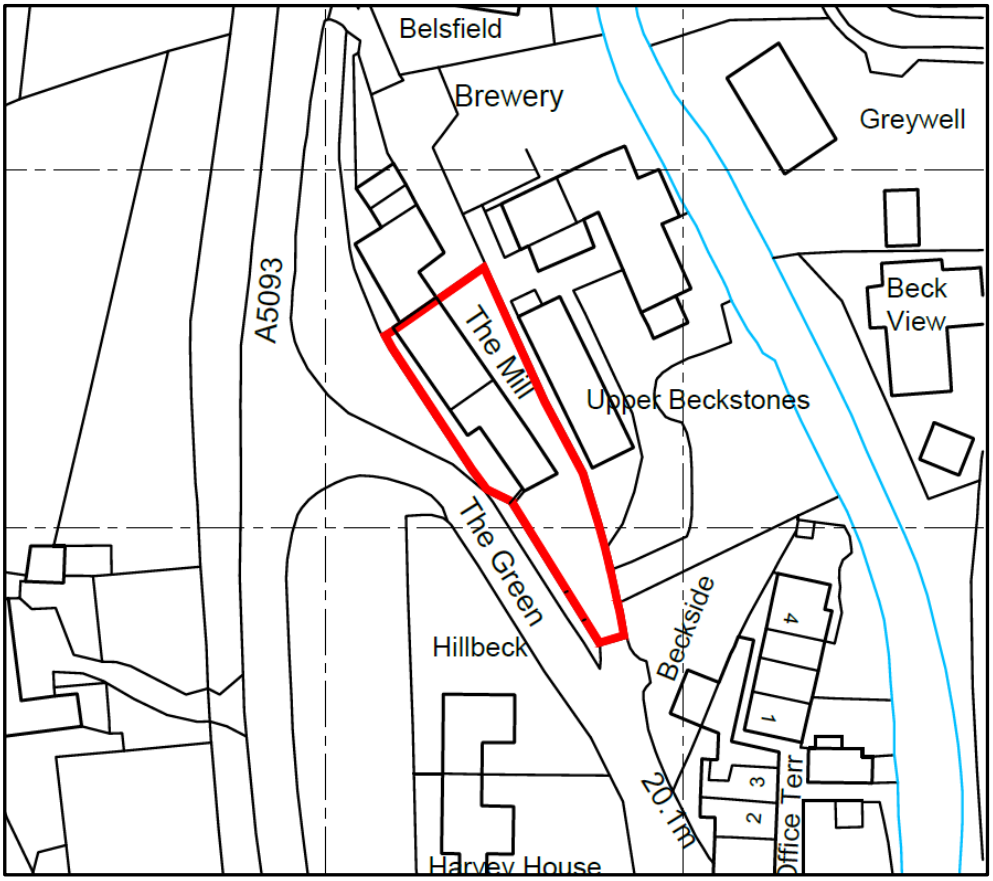


Figure 1: Block Plan (Source: Client)

4.0 SCOPE

Castledine Environmental have prepared this report for the sole use and reliance of MVC Design Ltd and associated appointees for the purpose of ensuring compliance with:

⇒ National Planning Policy Framework

⇒ Cumberland Council Flooding management and prevention

⇒ Copeland Borough Council Strategic Flood Risk Assessment

⇒ Environment Agency

5.0 DEVELOPMENT PROPOSALS

The proposed site of approximately 600m^2 area currently comprises open grassland and a derelict barn.

The proposed works would mainly comprise internal refurbishment works and external hardstanding works, such as paths and car parking spaces.

At the time of writing no ground level changes are proposed or other above ground structures.

The bedrooms of the dwellings would be located solely at the first floor.

6.0 EXISTING DRAINAGE NETWORKS AND WATERCOURSES

The nearest watercourse to the site is Black Beck, an EA main river, located approximately 50m to the east from the site.

Site photographs indicate the presence of some drainage infrastructure, it is recommended to conduct a CCTV drain survey prior to detailed design to reveal the layout and structural condition of any drains, if required.

7.0 GEOLOGY AND HYDROGEOLOGICAL SETTING

The BGS's online geology map shows the superficial geology to be Till, Devensian comprising diamicton directly underlying the site. This member is poorly sorted or unsorted sediment containing a wide range of particle sizes ranging from clay and silt to sand, gravel, cobbles, and boulders. The bedrock geology is shown to be Waberthwaite Tuff Formation - Lapilli-tuff, having a high content of volcanic rocks.

Historical borehole information near the proposed site has been used to determine the ground conditions. The borehole records show sand and gravel to dominate the superficial soil layer composition and bedded tuff below (https://api.bgs.ac.uk/sobi-scans/v1/borehole/scans/items/649914).

The Environmental Agency's (EA) new aquifer designation maps indicate that the site is underlain by a Secondary (Undifferentiated) Superficial aquifer, associated with the Sand and Gravel Member. The Bedrock Aquifer is described as Secondary B, typical to the formation.

A Secondary Undifferentiated aquifer is defined by the EA as aquifers where it is not possible to apply either a Secondary A or B definition, are bodies of groundwater found within the near-surface geological deposits (like mixed sands, gravels, silts, clays, and till) that lie above the older bedrock. Despite their mixed and undifferentiated nature on maps, these shallow deposits collectively store and transmit groundwater, serving as important local water sources often vulnerable to surface impacts due to their proximity to the ground.

Secondary B bedrock aquifers are older, consolidated rock formations (bedrock) where groundwater is primarily stored and transmitted through fractures, joints, faults, or other secondary features, rather than through interconnected pores in the rock matrix itself. Classified as 'B', these aquifers typically have relatively low permeability and yield only limited quantities of groundwater, though they can still be important sources for small-scale supplies or contribute baseflow to rivers.

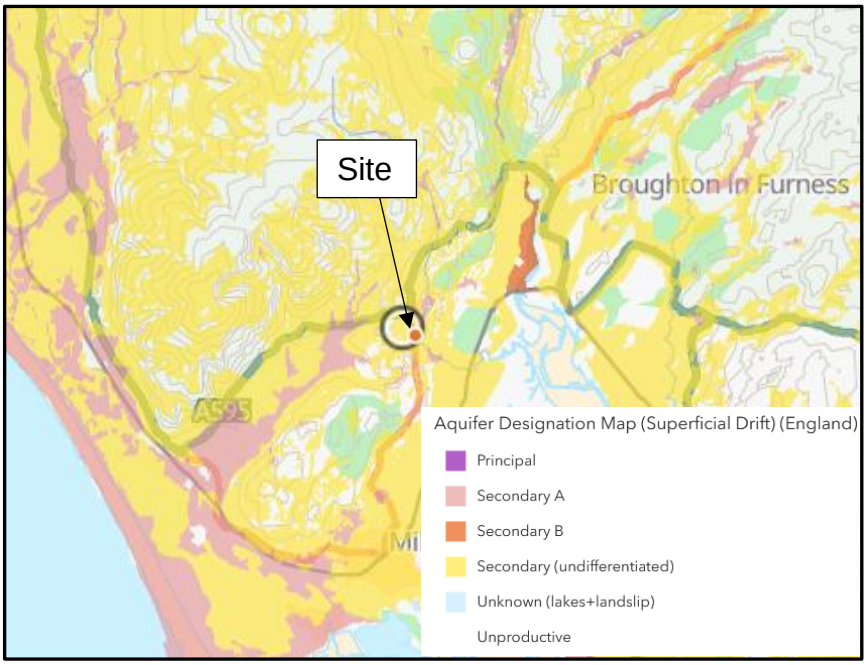


Figure 2 - Superficial Aquifer Designation Map (Source: DEFRA)

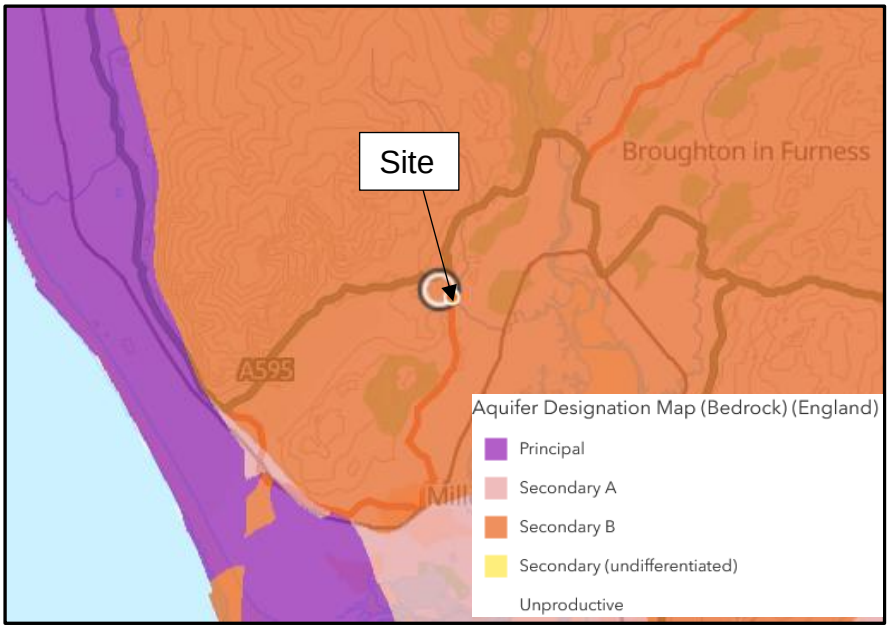


Figure 3 – Bedrock Aquifer Designation Map (Source: DEFRA)

The Environment Agency has identified Source Protection Zones (SPZs) for 2000 groundwater sources such as wells, boreholes and springs used for public drinking water supply. These zones show the risk of contamination from any activities that might cause pollution in the area. The maps show three main zones (inner, outer and total catchment) and a fourth zone of special interest, which is occasionally applied to a groundwater source.

The site is not located in any groundwater SPZ area.

The groundwater vulnerability map defines the site as having Medium Vulnerability. Medium groundwater vulnerability, as defined by the Environment Agency (EA) or DEFRA in the UK, describes areas where groundwater has an intermediate susceptibility to contamination from pollutants at the surface. This classification is typically assigned where there is some, but not complete, natural protection provided by the overlying soil and geological layers or the depth to the water table, resulting in a moderate potential for contaminants to reach the groundwater compared to areas of High or Low vulnerability.

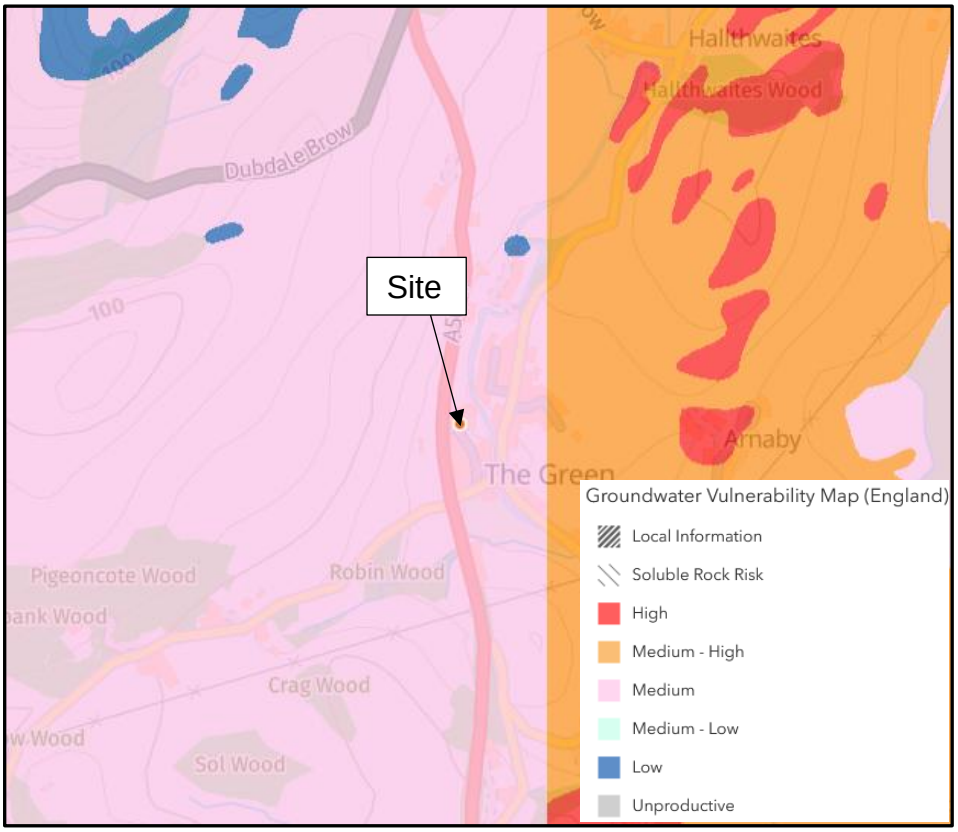


Figure 4 - Groundwater Vulnerability Map (Source: DEFRA)

8.0 FLOOD RISK ASSESSMENT

8.1 FUVIAL AND TIDAL FLOOD RISK VULNERABILITY

This FRA has been undertaken with due regard to the statutory requirements of the NPPF and with reference to the Planning Practice Guidance (PPG) in relation to development and flood risk. This FRA aims to ensure that flood risk is taken into account and to avoid inappropriate development in areas potentially at risk of flooding.

The EA have designated different areas of the UK based on specific risk to assist and steer developments; these are:

⇒ Flood Zone 1 - land assessed as having a less than a 1 in 1,000 annual probability of river or sea flooding (<0.1%)

⇒ Flood Zone 2 - land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year

⇒ Flood Zone 3 - land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year. Flood Zone 3b is land having greater than a 1 in 20 annual probability of flooding (the functional flood plain)

The Environment Agency (EA) flood map for planning shows the site located partially within Flood Zone 2 (Figure 5). Flood zone 2 is described as land having between 1 in 100 and 1 in 1,000 annual probability of river or sea flooding.

Following the published Flood Risk and Coastal Change Planning Policy Guidance (PPG) Table 2 and NPPF guidelines, the proposed development is classed as 'More Vulnerable' development due to its residential use.

The NPPF Sequential Test: Flood Risk Vulnerability and Flood Zone 'Compatibility' Table is reproduced below;

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test Required	✓	✓
	Zone 3a	Exception Test Required	✓	×	Exception Test Required	✓
	Zone 3b	Exception Test Required	✓	×	×	×

Table 1 - The Sequential Test: Flood Risk Vulnerability and Flood Zone 'Compatibility' Table as specified by NPPF. Please note: ✓ means development is appropriate; × means the development should not be permitted.

As such, the proposed development is not subject to the Exception or Sequential Test and therefore requires to prove that the development and its users would be protected against flooding during its lifetime by implementing adequate flood mitigation and resilience measures.

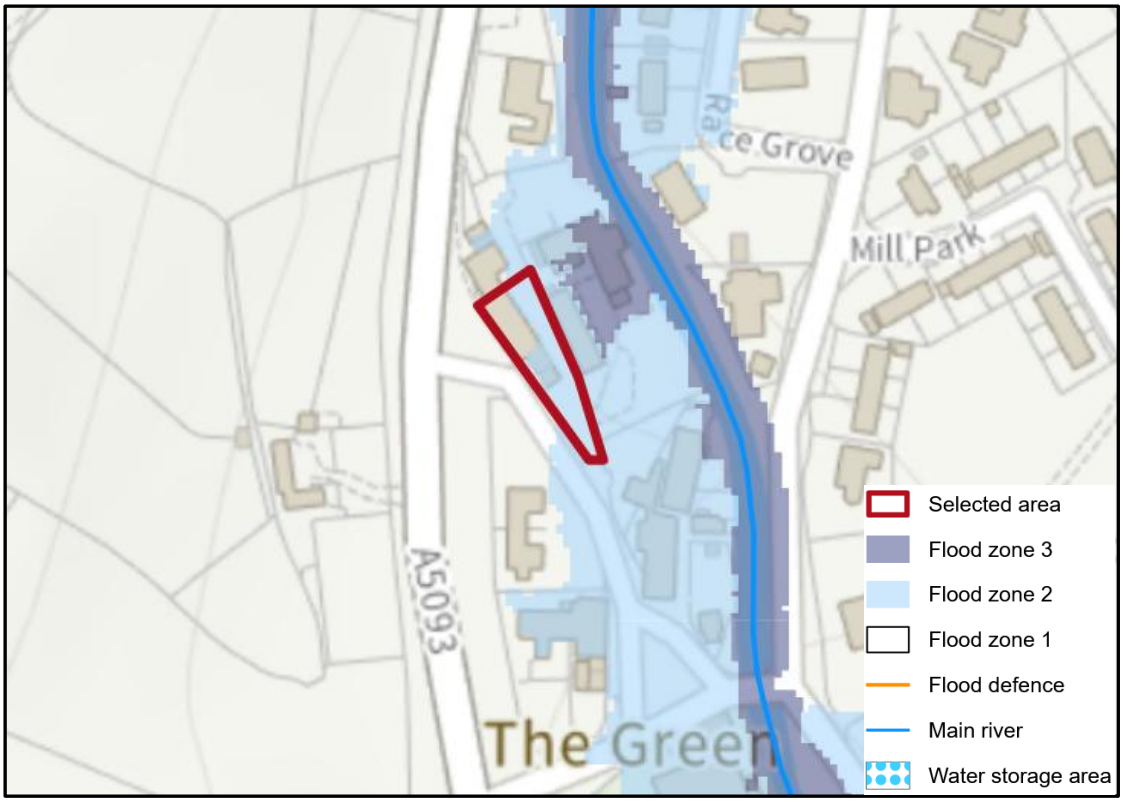
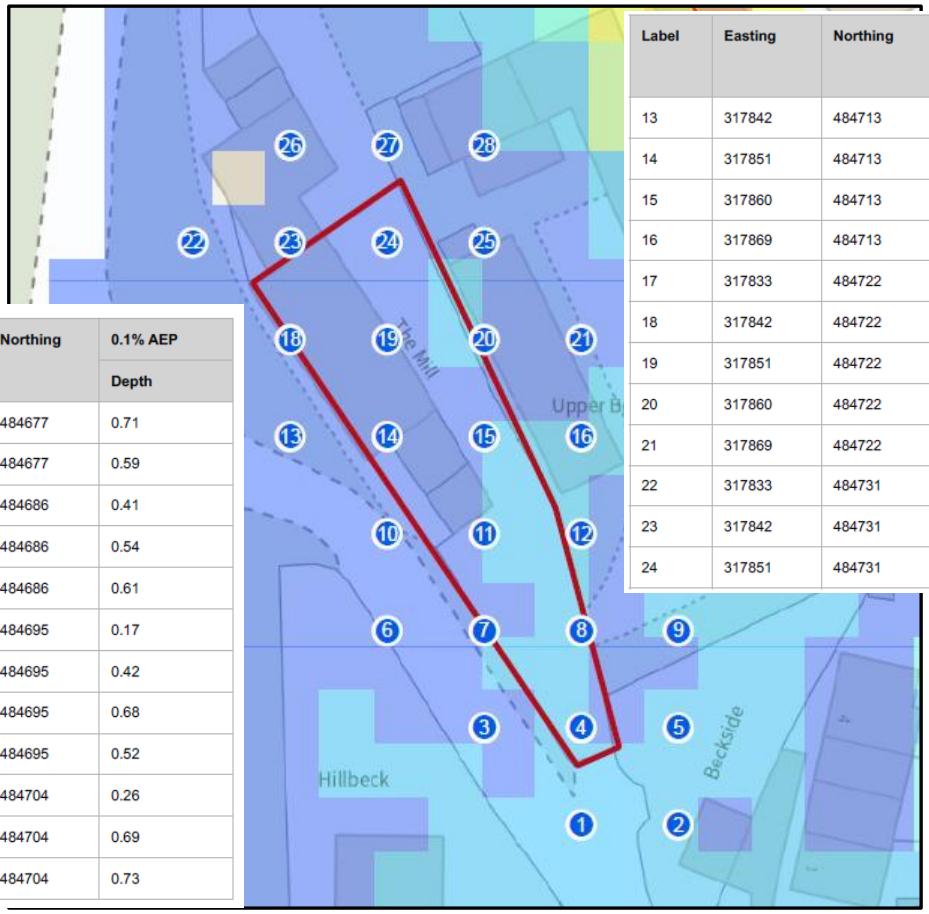


Figure 5 - Extract EA Flood Maps for Planning

Surface water flooding happens when rainwater does not drain away through the normal drainage systems or soak into the ground but lies on or flows over the ground instead.

Site specific EA flood data (Figure 6) for the undefended 1 in 1000-year fluvial event indicate maximum flood depths of approximately 0.7m across the eastern site boundary and falling to approximately 0.2m at the western site boundary.

Point 11 in the modelled flood data, located on the building's southern corner, could experience up to 0.7m of flooding and therefore should be used to guide the flood resilience measures to be adopted by the proposed development.



Label	Easting	Northing	0.1% AEP Depth
1	317869	484677	0.71
2	317878	484677	0.59
3	317860	484686	0.41
4	317869	484686	0.54
5	317878	484686	0.61
6	317851	484695	0.17
7	317860	484695	0.42
8	317869	484695	0.68
9	317878	484695	0.52
10	317851	484704	0.26
11	317860	484704	0.69
12	317869	484704	0.73

Label	Easting	Northing	0.1% AEP Depth
13	317842	484713	0.17
14	317851	484713	0.41
15	317860	484713	0.62
16	317869	484713	0.57
17	317833	484722	0.08
18	317842	484722	0.10
19	317851	484722	0.20
20	317860	484722	0.18
21	317869	484722	0.28
22	317833	484731	0.09
23	317842	484731	0.22
24	317851	484731	0.46

Figure 6 - Modelled 2D Fluvial Storm Extents - 0.1% AEP (Source: Product 4)

8.2 PLUVIAL FLOOD RISK VULNERABILITY

Surface water flooding happens when rainwater does not drain away through the normal drainage systems or soak into the ground but lies on or flows over the ground instead.

The site is shown to be unaffected by surface water flooding for the 1:30yr and 1:100yr events based on the information taken from the EA. During the 1:1000yr storm event the site could experience up to 0.15m of flooding across the proposed access and car parking areas.

According to the proposed plans, no construction would occur in these areas, therefore no displacement of surface water would occur as a result of the proposed development.

As such, the risk of surface water flooding to the proposed development is considered to be negligible.

Figure 7 – Surface Water Flood Risk Map – 0.1%AEP (Source: EA)

Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding.

8.3 GROUNDWATER FLOOD RISK VULNERABILITY

Groundwater flooding is the emergence of groundwater at the ground surface or into subsurface voids arising as a result of:

- ⇒ abnormally high groundwater heads or flows;
- ⇒ the introduction of an obstruction to groundwater flow; or
- ⇒ the rebound of previously depressed groundwater levels.

Groundwater flooding usually occurs following a prolonged period of low intensity rainfall. As groundwater flow is much slower than surface flow, the flooding may not recede for long periods of time, typically weeks or even months. It is important to recognise the risk of groundwater flooding is typically highly variable and heavily dependent upon local geology,

topography and weather conditions, as well as local abstraction regimes. Groundwater flooding is hard to predict and challenging to mitigate.

According to Copeland Borough Council Level 1 SFRA Volume II Report, the towns north of Millom are susceptible to a high risk to groundwater flooding, however no further specific information is provided.

In addition to historical incidents, which are typically sparse, the risk of groundwater flooding can be estimated by consideration of the underlying ground characteristics. The BGS's online geology map shows the superficial geology to be Sand and Gravel directly underlying the site and bedded volcanic rock beneath with low permeability, therefore groundwater flood risk in the site's area could be as a direct result of intense rainfalls occurring over a longer period of time in the wider site region.

8.4 SEWER FLOOD RISK VULNERABILITY

Sewer flooding is often caused by excess surface water entering the drainage network. Water companies, in this case United Utilities, are obliged under the Water Industry Act to facilitate drainage of surface water up to a 1 in 20-year return period event.

Cumberland Council is served by a largely combined sewer system, managed by United Utilities. Flooding can occur along the route of sewers when the flow entering a sewer exceeds its hydraulic capacity and the system becomes surcharged. Under these conditions water will overflow from the pipe network at manholes and storm overflows, often causing flooding in the vicinity.

The *Cumbria Area Preliminary Appraisal Report 2011. Preliminary Flood Risk Assessment, Figure 4-2 UU historic flood data by postcode area* indicates that 1-2 sewer flooding incidents have occurred in the wider site region. This is likely due to a historical lack of centralised recording of such flood incidents across the UK and should not be interpreted as indicating a low probability of future flooding.

9.0 RESERVOIR FLOOD RISK VULNERABILITY

According to the EA Long Term Flood Risk online mapping tool indicating the extent of a potential reservoir flooding event in the wider site area, the proposed development would not be affected by this flood source even if a fluvial flooding event would occur at the same time (Wet Day Scenario).

According to the EA there has been no loss of life in the UK from reservoir flooding since 1925. All large reservoirs must be inspected and supervised by reservoir panel engineers as detailed by the enforcement authority for the Reservoirs Act 1975 in England. The EA are responsible to ensure that reservoirs are inspected regularly, and essential safety work carried out.

10.0 CLIMATE CHANGE ALLOWANCES

Making an allowance for climate change in the design of surface water drainage systems will help to minimise vulnerability and provide resilience to flooding and coastal change in the future. Climate Change allowances vary across the UK subject to catchment conditions and are based on climate change projections and different scenarios of carbon dioxide (CO2) emissions to the atmosphere.

Climate change allowances were recently updated by the EA and the climate change allowances are now defined by River Catchment peak rainfall allowances.

The data published on the DEFRA database shows the site located within the South West Lakes Management Catchment and for residential developments (lifespan 100yrs) an upper end allowance of 50% should be applied to rainfall events as the climate change allowance within this region.

11.0 FLOOD RISK AND MITIGATION

The proposals allow the opportunity to improve flood resilience of the site by incorporating a number of flood mitigation measures, both through the

incorporation of flood resilient building materials, and signing up to the EA Flood Warning/Alert System.

BUILDING MATERIAL MITIGATIONS

The national government produced guidance for improving the flood resilience of building in the Department for Communities and Local Government (DCLG) 2007 'Improving the Flood Performance of New Buildings1' publication. This publication provides recommendations on how to protect buildings in the case of a flood event, and propose two scenarios based on maximum expected flooded depths:

Water Exclusion Strategy *– where emphasis is placed on minimising water entry whilst maintaining structural integrity, and on using materials and construction techniques to facilitate drying and cleaning. This strategy is favoured when low flood water depths are involved (generally 0.3m, but not more than 0.6m). According to the definitions adopted in this Guidance, this strategy can be considered as a resistance measure but it is part of the aim to achieve overall building resilience*

Water Entry Strategy *– where emphasis is placed on allowing water into the building, facilitating draining and consequent drying. Standard masonry buildings are at significant risk of structural damage if there is a water level difference between outside and inside of about 0.6m or more. This strategy is therefore favoured when high flood water depths are involved (greater than 0.6m) by utilising resilient materials, and construction methods.*

Given the primary risk is related to fluvial flooding, it is considered that a ***Water Entry Strategy*** should be adopted.

[1] *https://www.gov.uk/government/publications/flood-resilient-construction-of-new-buildings*

11.1 FLUVIAL/TIDAL FLOODING

- The EA Flood Map for Planning shows the site is located partially within Flood Zone 2. During a 1 in 1000-year fluvial flooding event, flood depths across the site could reach a depth of approximately 0.7m, according to site-specific flood data from the EA (see Product 4 data in Appendix B).

  A number of flood resilient measures can be put in place to reduce flood damage, such as:

  - Raise internal finished floor levels as high as possible;
  - Waterproof walls at least 300mm above the estimated flood depths, ranging from 0.3m to 0.7m, depending on the site area;
  - Provide easy conditions/access for drying and cleaning;
  - Raised electrics and sockets above the estimated flood depths;
  - Provision of flood resistant doors, where possible.

11.2 GROUNDWATER FLOODING

- The site is situated in an area with high groundwater flooding risk.
- No underground building would be conducted; therefore, the groundwater flows will not be obstructed, nor would the construction of the proposed site increase flood risk to the local area.

  No mitigation is considered necessary in relation to Groundwater Flooding.

11.3 SURFACE WATER FLOODING

- No surface water flooding is shown on the majority of the site during the 1 in 30 and 1 in 100 year storm events and only negligible flooding (0.15m max.) during an extreme 1 in 1000 year storm event across the proposed car parking and paths areas.

  No mitigation is considered necessary in relation to surface water flood risk.

  Priority will be given to use of SuDS. Runoff from the site (post development) should not exceed greenfield runoff rates, if possible. The

SuDS design will take into account the groundwater and geological conditions.

11.4 SEWER FLOODING

- There are 1-2 sewer flooding incidents recorded by United Utilities in the wider site region.
- The discharge rate to the existing sewer will be agreed with United Utilities to ensure that there is capacity to receive discharge from the site without significantly increasing flood risk.

All connections to the sewers should include non-return valves or flaps to prevent any backflows.

Further detail can be found in Department for Communities and Local Government (DCLG) 2007 publication 'Improving the flood performance of new buildings - Flood resilient construction'.

12.0 FLOODPLAIN COMPENSATION STORAGE

Planning policy requires that new developments cannot cause detrimental flooding impacts to areas upstream or downstream of a site.

Developments within a floodplain may remove areas where floodwater is stored during a flood and can displace floodwaters. There is thus the potential that flood levels surrounding the site could be increased without careful design consideration.

To ensure there is not a detrimental flood risk impact to neighbouring areas, any development resulting in a loss of floodplain storage may be required to provide compensatory storage to negate these potential impacts.

The amount of compensation required is dependent on a) the footprint of any development within the floodplain, and b) the potential depth of flooding in these areas. Together these factors indicate the potential volume of floodwater that could be displaced by development.

At the time of writing no additional above ground structures are proposed therefore the development would displace any floodwaters elsewhere.

13.0 SUSTAINABLE DRAINAGE SYSTEMS OVERVIEW

The proposed development would increase the impermeable site area post-development, therefore the amount of runoff generated on site would increase. It is recommended that Sustainable Drainage Systems (SuDS) are incorporated in the proposed works to maintain the existing greenfield setting in terms of runoff volume discharges offsite and pollution.

SuDS use approaches which take account of water quantity (flooding), water quality (pollution), amenity and biodiversity issues.

SuDS can be designed to attenuate before it enters streams, rivers and other watercourses, they provide areas to store water in natural contours and can be used to allow water to infiltrate.

Additionally, surface water may evaporated and lost or transpired from vegetation (known as evapotranspiration).

Susdraing.org provides some sustainability benefits for SuDS over traditional drainage methods:

- Mimic nature and manage rainfall close to where it falls
- Manage runoff volumes and flow rates from hard surfaces, reducing the impact of urbanisation on flooding
- Protect or enhance water quality (reducing pollution from runoff)
- Protect natural flow regimes in watercourses
- Are sympathetic to the environment and the needs of the local community
- Provide an attractive habitat for wildlife in urban watercourses
- Provide opportunities for evapotranspiration from vegetation and surface water
- Encourage natural groundwater/aquifer recharge (where appropriate)

14.0 FLOOD EVACUATION AND MANAGEMENT PLAN

The EA Flood Warning and Alert Service covers the site location, and it is strongly advised site users sign up to this service.

It is free sign up at the following address: https://www.gov.uk/sign-up-for-flood-warnings

On receipt of a FLOOD ALERT, the individual property owners and occupiers should:

- Monitor the situation via local media
- Make themselves aware of forecast local weather conditions
- Alert both current visitors, and those scheduled to arrive, of the situation
- Prepare to evacuate if necessary.

On receipt of a FLOOD WARNING, the individual property owners and occupiers should:

- Follow advice to “go in, stay in, and tune in”
- Move all vehicles to an area outside of the potential flood extent, if safe to do so
- Alert scheduled visitors that they should seek alternative accommodation
- Be prepared to follow instruction from the Emergency Services.

On receipt of a SEVERE FLOOD WARNING, the individual property owners and occupiers should:

- Follow advice to “go in, stay in, and tune in”
- Remain attentive to local media forecasts and news bulletins
- Do not evacuate unless instructed to do so by the Emergency Services

If evacuation from site is required, it is advised to travel on A5093 and seek refuge at Thwaites School or St Anne's Church.

If flood waters along any routes leaving the site have exceeded 25cm, site users are advised to seek advice from emergency services.

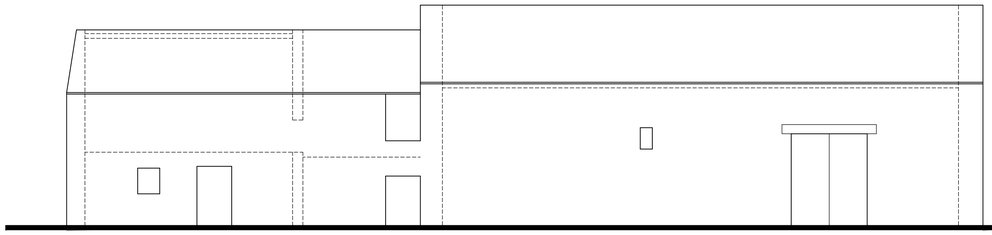
Users sign up to the EA Flood Warning and Alert System for the Rivers Duddon, Crake and Mill Beck area and check regularly for updates from the EA on the flood alert systems, ensuring they are up to date with the latest developments.

15.0 CONCLUSION

- SuDS should be considered for the proposed development, designed to mimic the existing greenfield environment;
- The proposals satisfy relevant national and local policy;
- Implementation of flood resilience and mitigation measures, as per *Department for Communities and Local Government (DCLG) 2007 publication 'Improving the flood performance of new buildings - Flood resilient construction'*, would ensure that the site users and the property would be protected against the potential flood risks
- Sleeping accommodation would be provided only at the first floor.

The Flood Risk Assessment demonstrates that the Proposed Development would be safe, without increasing flood risk elsewhere, and that a positive reduction in flood risk would be achieved through the inclusion of surface water attenuation in accordance with national policy.

APPENDIX A – SITE INFORMATION

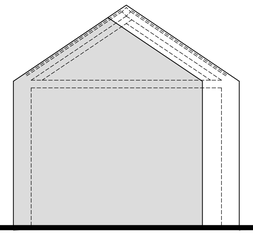


EXISTING FRONT ELEVATION

Scale 1:100

1000mm 3000mm

0 2000mm 4000mm

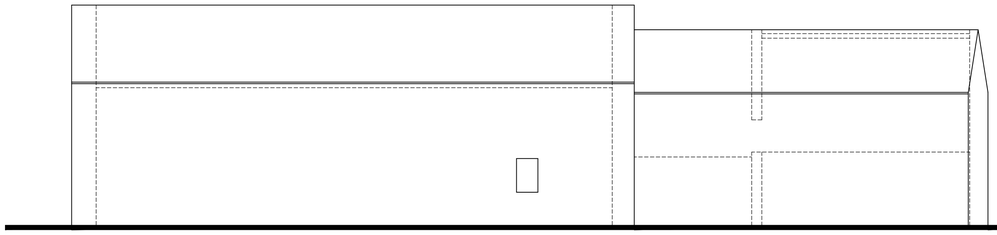


EXISTING SIDE ELEVATION

Scale 1:100

1000mm 3000mm

0 2000mm 4000mm

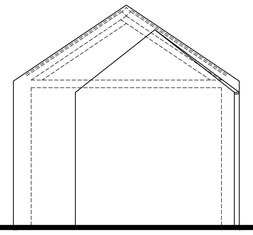


EXISTING REAR ELEVATION

Scale 1:100

1000mm 3000mm

0 2000mm 4000mm

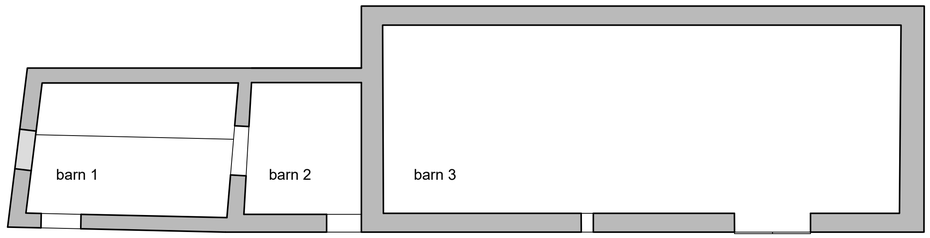


EXISTING SIDE ELEVATION

Scale 1:100

1000mm 3000mm

0 2000mm 4000mm

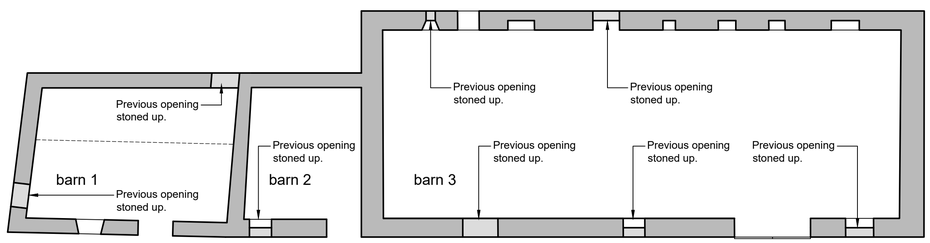


EXISTING FIRST FLOOR PLAN

Scale 1:100

1000mm 3000mm

0 2000mm 4000mm

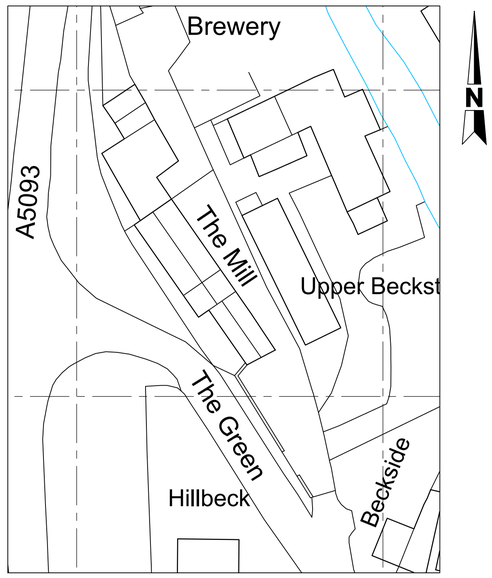


EXISTING GROUND FLOOR PLAN

Scale 1:100

1000mm 3000mm

0 2000mm 4000mm

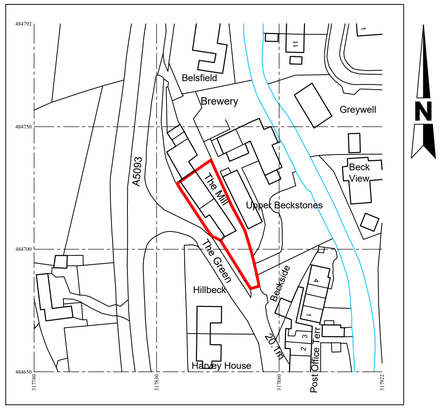


EXISTING SITE PLAN

Scale 1:500

5m 15m 25m

0 10m 20m



LOCATION PLAN

Scale 1:1250

10m 30m 50m

0 20m 40m

No.	Revision/Issue	Date
A	First issue	15/01/24

Site location

Mill Farm Barns
The Green
Millom
Cumbria
LA18 5HL

Project

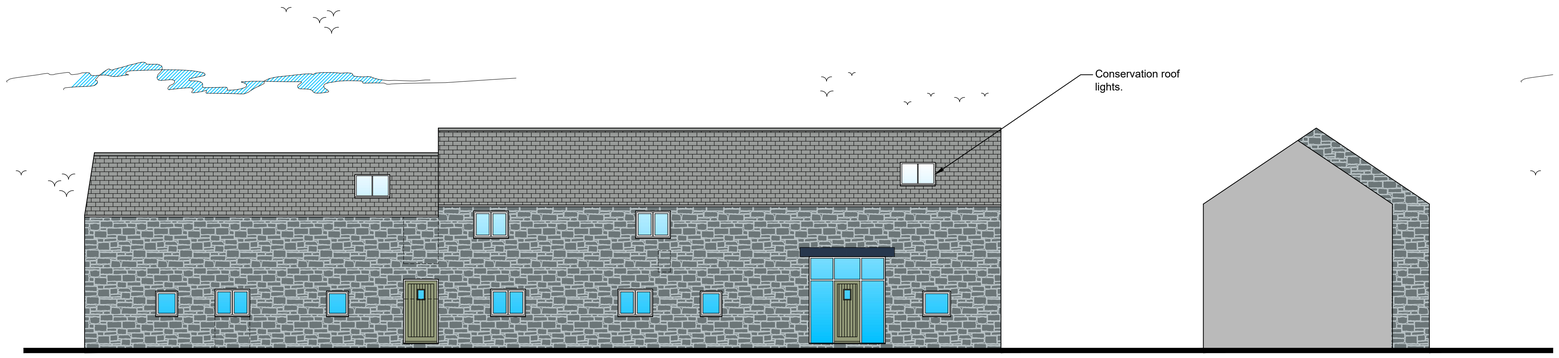
Proposed barn conversion to form two dwellings.

Drawing title

Plans, elevations, site as existing and location plan.

MVC Design Ltd
ARCHITECTURAL DESIGN
11 Meadowside
Swarthmoor
Ulverston
Cumbria
LA12 0XD
Mob: 07730661656
Tel: 01229 588208
Email: mark@mvcdesign.co.uk

Dwg No.	Rev
MVC1065-01	A
Date: 15/01/25	
Scale: As shown at A1	



PROPOSED FRONT ELEVATION

Scale 1:100

1000mm 3000mm

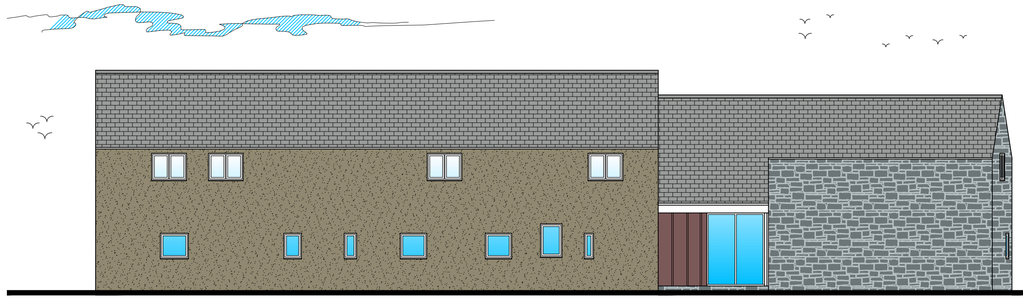
0 2000mm 4000mm

PROPOSED SIDE ELEVATION

Scale 1:100

1000mm 3000mm

0 2000mm 4000mm

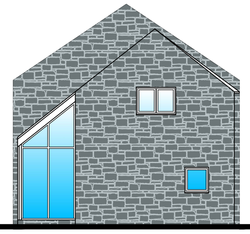


PROPOSED REAR ELEVATION

Scale 1:100

1000mm 3000mm

0 2000mm 4000mm

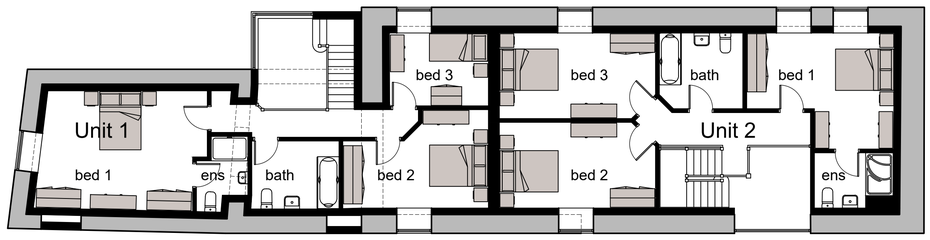


PROPOSED SIDE ELEVATION

Scale 1:100

1000mm 3000mm

0 2000mm 4000mm

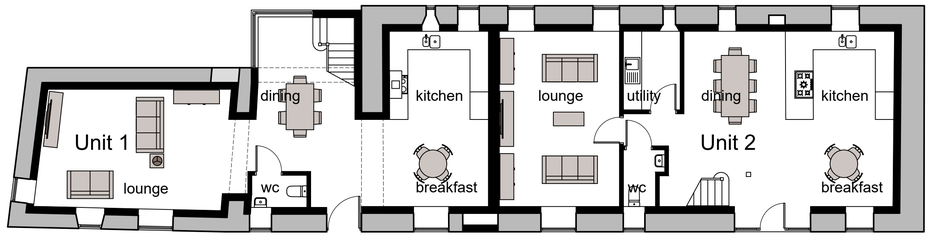


PROPOSED FIRST FLOOR PLAN

Scale 1:100

1000mm 3000mm

0 2000mm 4000mm



PROPOSED GROUND FLOOR PLAN

Scale 1:100

1000mm 3000mm

0 2000mm 4000mm

SITE PLAN

Scale 1:500

5m 15m 25m

0 10m 20m

Planning notes

Roof
Slates to match existing.

Walls
Openings to be blocked up with stone from existing barn.
Antique copper standing seam cladding.

Windows and doors
White uPVC .

Rainwater goods
Black plastic rainwater goods, fascias and soffits.

A	First issue	15/01/24
No.	Revision/Issue	Date

Site location

Mill Farm Barns
The Green
Millom
Cumbria
LA18 5HL

Project

Proposed barn conversion to form two dwellings.

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Proposed plans, elevations and site plan.

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Tel: 01229 588208
Email: mark@mvcdesign.co.uk

Dwg No.	MVC1065-02
Date	15/01/25
Scale	As shown at A1
Rev	A

APPENDIX B – EA DATA

Flood risk assessment data

Location of site: 317856 / 484712 (shown as easting and northing coordinates)
Document created on: 19 April 2025
This information was previously known as a product 4.
Customer reference number: 8WDYAPC51395

Map showing the location that flood risk assessment data has been requested for.

How to use this information

You can use this information as part of a flood risk assessment for a planning application. To do this, you should include it in the appendix of your flood risk assessment.

We recommend that you work with a flood risk consultant to get your flood risk assessment.

Included in this document

In this document you'll find:

- how to find information about surface water and other sources of flooding
- information on the models used
- definitions for the terminology used throughout
- flood map for planning (rivers and the sea)
- flood defences and attributes
- information to help you assess if there is a reduced flood risk from rivers and the sea because of defences
- modelled data
- information about strategic flood risk assessments
- information about this data
- information about flood risk activity permits
- help and advice

Information that's unavailable

This document **does not** contain:

- past floods

We do not have past flooding data for this location.

Please note that:

- flooding may have occurred that we do not have records for
- flooding can come from a range of different sources
- we can only supply flood risk data relating to floodng from rivers or the sea

You can contact your Lead Local Flood Authority or Internal Drainage Board to see if they have other relevant local flood information. Please note that some areas do not have an Internal Drainage Board.

Surface water and other sources of flooding

When using the surface water map on the check your long term flood risk service the following considerations apply:

- surface water extents are suitable for use in planning
- surface water climate change scenarios may help to inform risk assessments, but the available data fall short of what is required to assess planned development
- surface water depth information should not be used for planning purposes

To find out about other factors that might affect the flood risk of this location, you should also check:

- reservoir flood risk
- groundwater flood risk - you could use the British Geological Survey groundwater flooding data, groundwater: current status and flood risk and the guide on mining and groundwater constraints for development - further information may be available from the lead local flood authority (LLFA)
- your local planning authority's SFRA, which includes future flood risk

Your Lead Local Flood Authority is Cumberland.

For information about sewer flooding, contact the relevant water company for the area.

About the model used

Model name: Black Beck 2008
Scenario(s): Defences removed fluvial 0.5% AEP and 0.1% AEP only
Date: 4 February 2009

These model contains the most relevant data for your area of interest.

Terminology used

Annual exceedance probability (AEP)

This refers to the probability of a flood event occurring in any year. The probability is expressed as a percentage. For example, a large flood which is calculated to have a 1% chance of occuring in any one year, is described as 1% AEP.

Metres above ordnance datum (mAOD)

All flood levels are given in metres above ordnance datum which is defined as the mean sea level at Newlyn, Cornwall.

Flood map for planning (rivers and the sea)

Your selected location is in flood zone 2.

Flood zone 3 shows the area at risk of flooding for an undefended flood event with a:

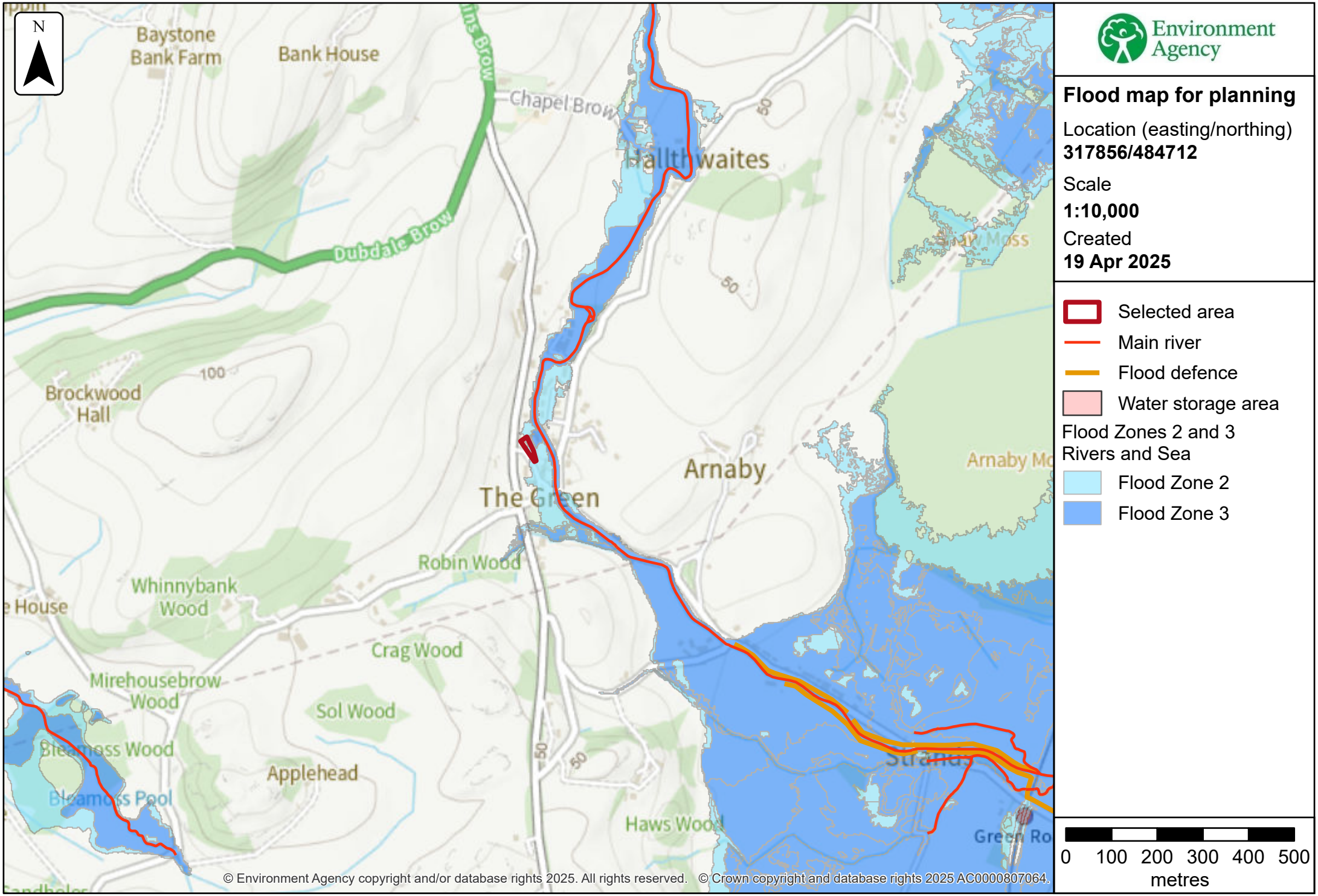
- 0.5% or greater probability of occurring in any year for flooding from the sea
- 1% or greater probability of occurring in any year for fluvial (river) flooding

Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- between a 0.1% and 0.5% probability of occurring in any year for flooding from the sea
- between a 0.1% and 1% probability of occurring in any year for fluvial (river) flooding

It's important to remember that the flood zones on this map:

- refer to the land at risk of flooding and do not refer to individual properties
- refer to the probability of river and sea flooding, ignoring the presence of defences
- do not take into account potential impacts of climate change


N
Baystone Bank Farm
Bank House
Chapel Brow
Dubdale Brow
Hallthwaites
Brockwood Hall
100
50
Arnaby
The Green
Robin Wood
Whinnybank Wood
Crag Wood
Mirehousebrow Wood
Sol Wood
Applehead
Haws Wood
Environment Agency
Flood map for planning
Location (easting/northing)
317856/484712
Scale
1:10,000
Created
19 Apr 2025
Selected area
Main river
Flood defence
Water storage area
Flood Zones 2 and 3
Rivers and Sea
Flood Zone 2
Flood Zone 3
0 100 200 300 400 500
metres
© Environment Agency copyright and/or database rights 2025. All rights reserved. © Crown copyright and database rights 2025 AC0000807064.

Flood defences and attributes

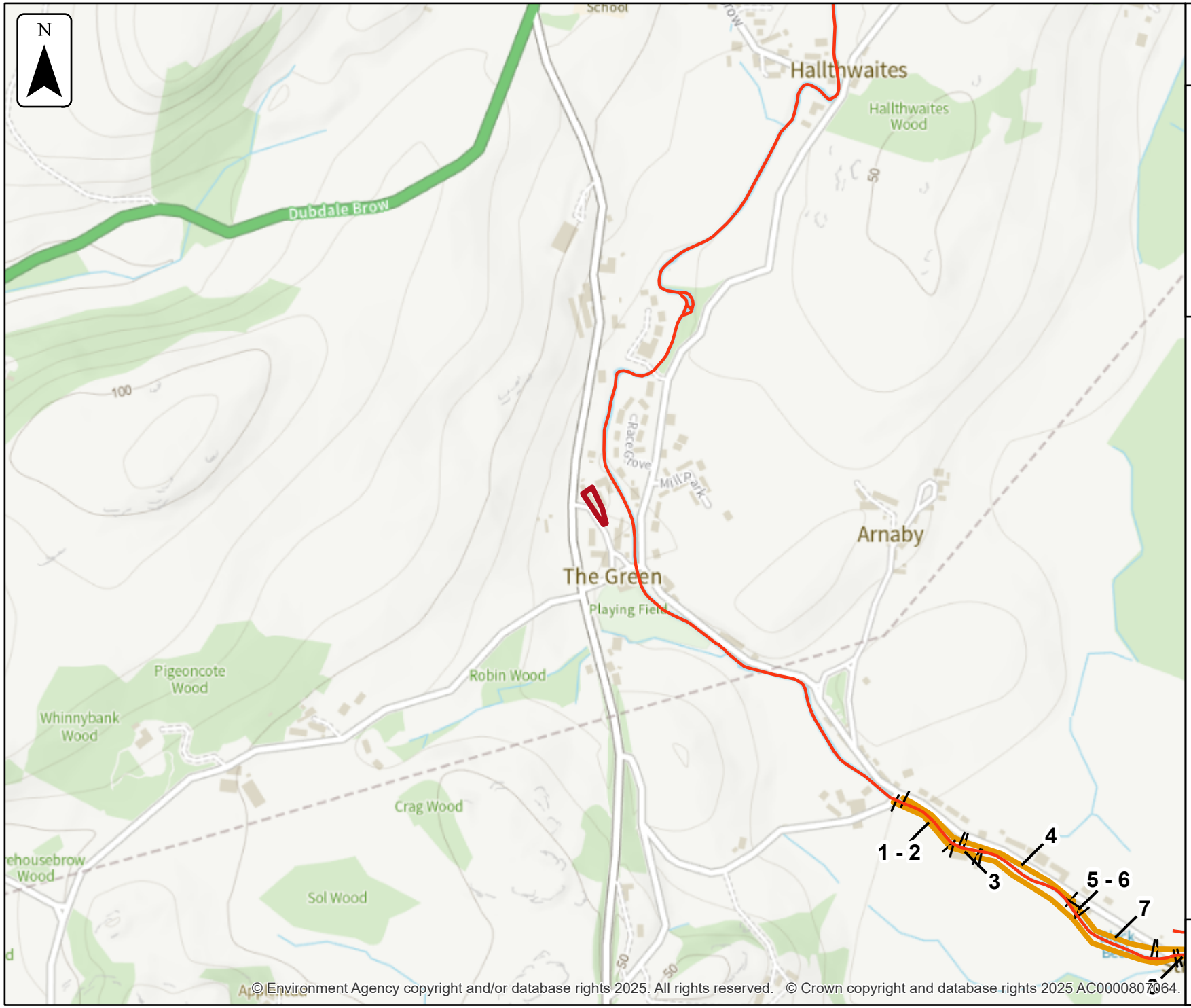
The flood defences map shows the location of the flood defences present.

The flood defences data table shows the type of defences, their condition and the standard of protection. It shows the height above sea level of the top of the flood defence (crest level). The height is In mAOD which is the metres above the mean sea level at Newlyn, Cornwall.

It's important to remember that flood defence data may not be updated on a regular basis. The information here is based on the best available data.

Use this information:

- to help you assess if there is a reduced flood risk for this location because of defences
- with any information in the modelled data section to find out the impact of defences on flood risk



Environment Agency

Flood defences

Location (easting/northing)
317856/484712

Scale
1:7,500

Created
19 Apr 2025

Selected area
Main river
Flood defence

Flood defences data

Label	Asset ID	Asset Type	Standard of protection (years)	Current condition	Downstream actual crest level (mAOD)	Upstream actual crest level (mAOD)	Effective crest level (mAOD)
1	103591	Embankment	100	Fair	8.68	9.66	8.68
2	136436	Embankment	100	Good	10.10	10.10	10.10
3	136437	Wall	100	Fair	10.60	10.60	10.60
4	136435	Wall	100	Fair	8.67	9.02	8.67
5	34761	Embankment	100	Fair	6.69	8.01	6.69
6	137805	Wall	100	Fair	8.45	8.45	8.45
7	89617	Embankment	100	Fair	7.04	9.05	7.04
8	173074	Wall	100	Fair	7.57	7.57	7.57

Any blank cells show where a particular value has not been recorded for an asset.

Modelled data

This section provides details of different scenarios we have modelled and includes the following (where available):

- outline maps showing the area at risk from flooding in different modelled scenarios
- modelled node point map(s) showing the points used to get the data to model the scenarios and table(s) providing details of the flood risk for different return periods
- map(s) showing the approximate water levels for the return period with the largest flood extent for a scenario and table(s) of sample points providing details of the flood risk for different return periods

Climate change

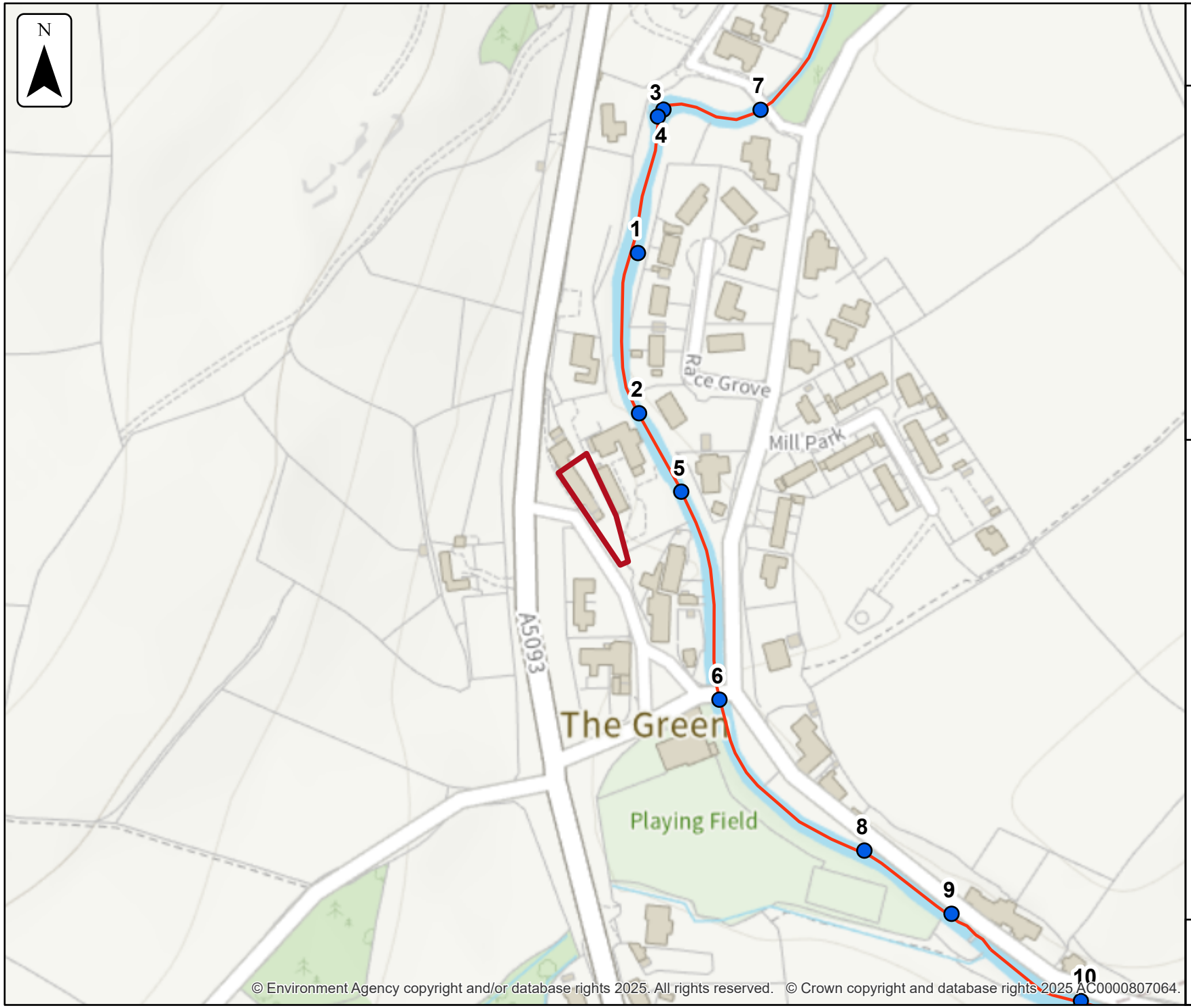
The climate change data included in the models may not include the latest flood risk assessment climate change allowances. Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

The Environment Agency will incorporate the new allowances into future modelling studies. For now, it's your responsibility to demonstrate that new developments will be safe in flood risk terms for their lifetime.

Modelled scenarios

The following scenarios are included:

No defences exist modelled fluvial: risk of flooding from rivers where there are no flood defences



Environment Agency

No defences exist modelled fluvial node locations

Location (easting/northing)
317856/484712

Scale
1:2,500

Created
19 Apr 2025

Model name
Black Beck 2008

- Selected area
- Modelled location
- Main river

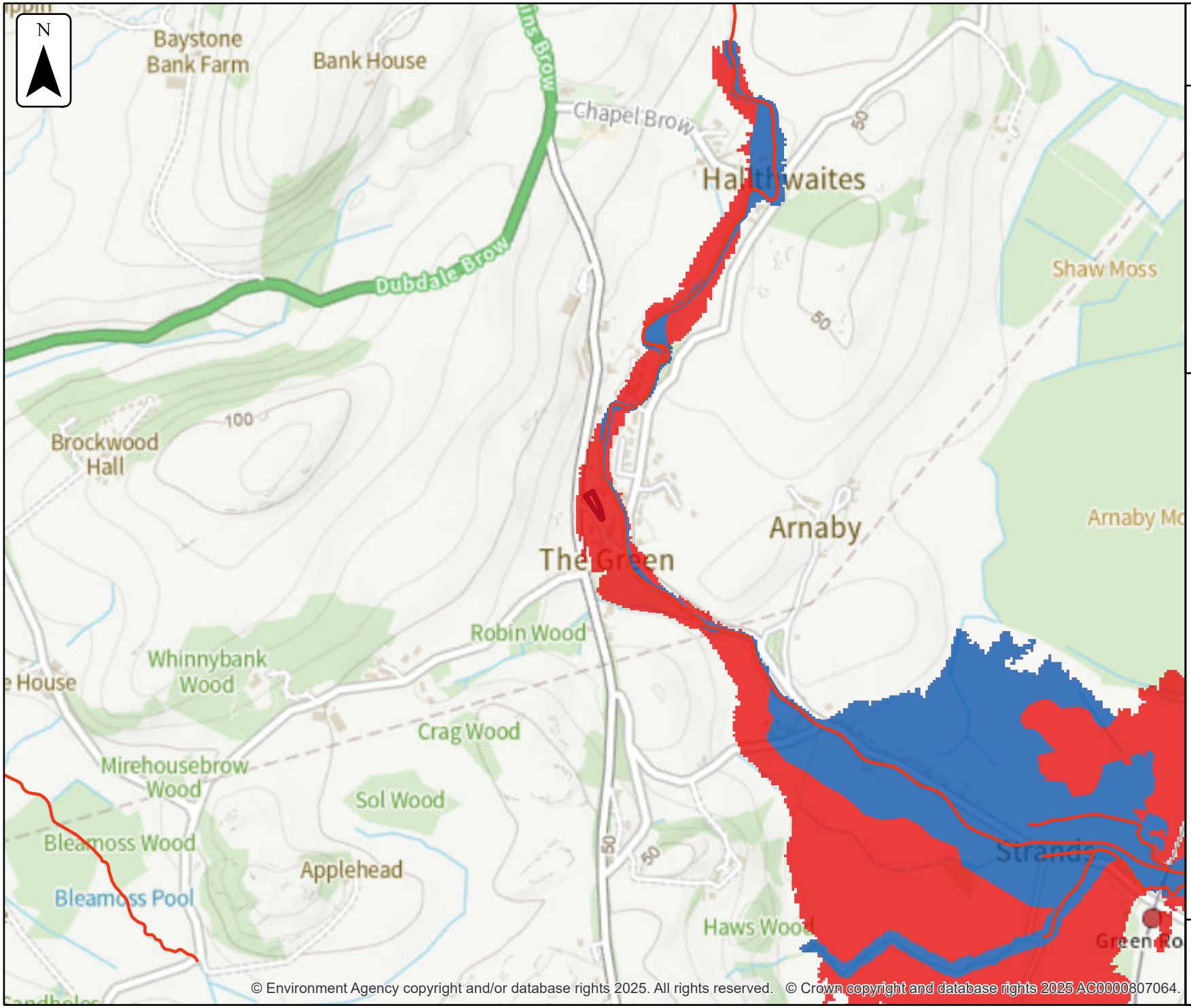
0 25 50 75 100
metres

Modelled node locations data

No defences exist

Label	Modelled location ID	Easting	Northing	0.5% AEP	0.5% AEP
				Level	Flow
1	983613	317877	484834	21.53	23.05
2	983615	317877	484756	20.40	23.12
3	983643	317887	484901	22.68	23.05
4	983622	317889	484904	24.31	23.05
5	983637	317898	484718	19.77	23.21
6	983636	317917	484617	18.25	23.38
7	983610	317937	484904	25.43	23.05
8	983623	317987	484544	16.71	23.38
9	983646	318030	484513	16.16	23.47
10	983644	318093	484470	15.14	23.61

Data in this table comes from the Black Beck 2008 model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.



Environment Agency

No defences exist modelled fluvial extent

Location (easting/northing)
317856/484712

Scale
1:10,000

Created
19 Apr 2025

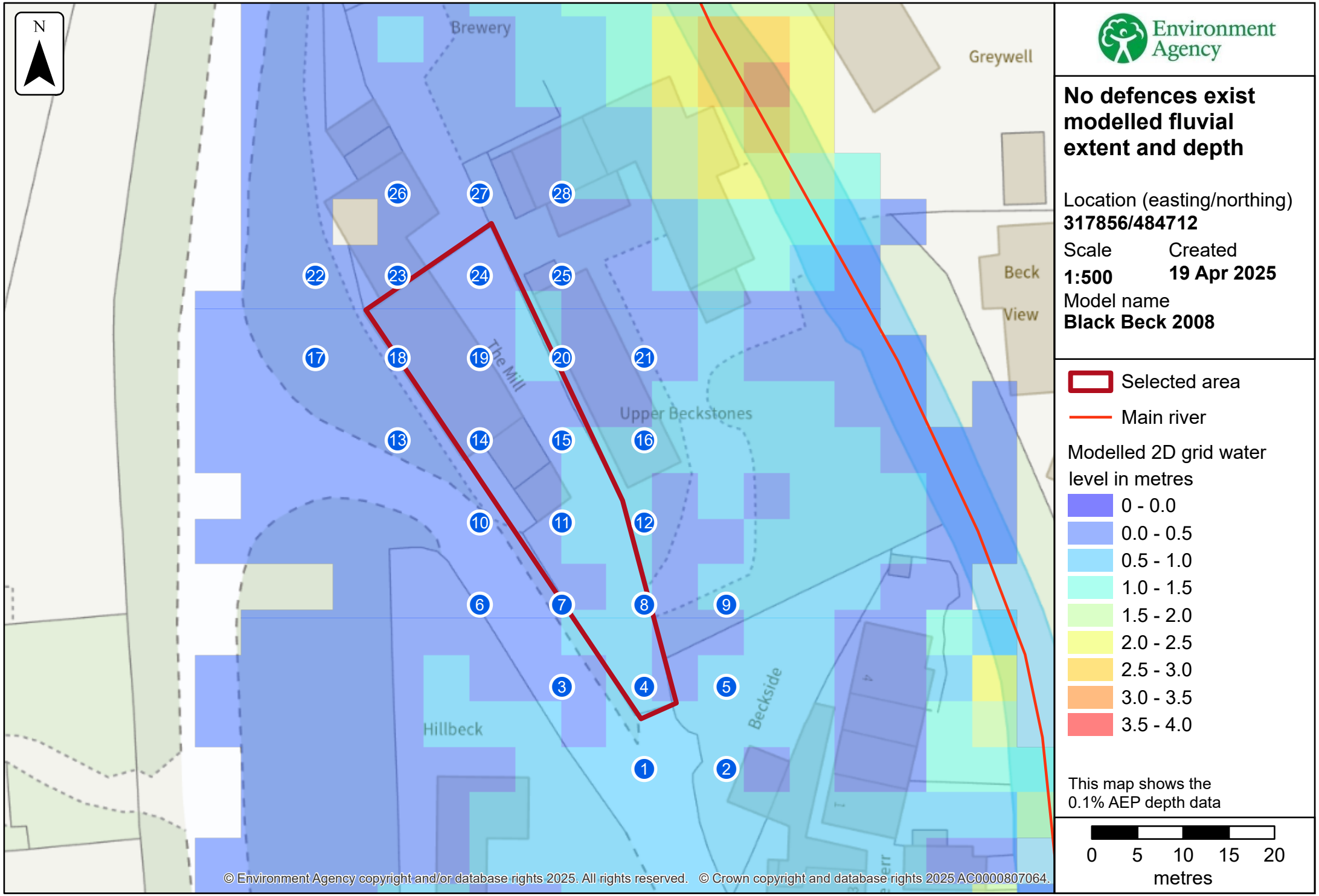
Model name
Black Beck 2008

- Selected area
- Main river

Modelled flood extent
- 0.5% AEP
- 0.1% AEP

Flood extents may not be visible where they overlap other return periods

0 100 200 300 400 500
metres



Environment Agency

No defences exist modelled fluvial extent and depth

Location (easting/northing)
317856/484712

Scale
1:500

Created
19 Apr 2025

Model name
Black Beck 2008

Selected area

Main river

Modelled 2D grid water level in metres

- 0 - 0.0
- 0.0 - 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- 2.0 - 2.5
- 2.5 - 3.0
- 3.0 - 3.5
- 3.5 - 4.0

This map shows the 0.1% AEP depth data

0 5 10 15 20
metres

Sample point data

No defences exist

Label	Easting	Northing	0.1% AEP
			Depth
1	317869	484677	0.71
2	317878	484677	0.59
3	317860	484686	0.41
4	317869	484686	0.54
5	317878	484686	0.61
6	317851	484695	0.17
7	317860	484695	0.42
8	317869	484695	0.68
9	317878	484695	0.52
10	317851	484704	0.26
11	317860	484704	0.69
12	317869	484704	0.73

Label	Easting	Northing	0.1% AEP
			Depth
13	317842	484713	0.17
14	317851	484713	0.41
15	317860	484713	0.62
16	317869	484713	0.57
17	317833	484722	0.08
18	317842	484722	0.10
19	317851	484722	0.20
20	317860	484722	0.18
21	317869	484722	0.28
22	317833	484731	0.09
23	317842	484731	0.22
24	317851	484731	0.46

Label	Easting	Northing	0.1% AEP
			Depth
25	317860	484731	0.29
26	317842	484740	0.07
27	317851	484740	0.42
28	317860	484740	0.55
Max value in selected area:			0.73

Data in this table comes from the Black Beck 2008 model. Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.
'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.

Strategic flood risk assessments

We recommend that you check the relevant local authority's strategic flood risk assessment (SFRA) as part of your work to prepare a site specific flood risk assessment.

This should give you information about:

- the potential impacts of climate change in this catchment
- areas defined as functional floodplain
- flooding from other sources, such as surface water, ground water and reservoirs

Your Lead Local Flood Authority is Cumberland.

About this data

This data has been generated by strategic scale flood models and is not intended for use at the individual property scale. If you're intending to use this data as part of a flood risk assessment, please include an appropriate modelling tolerance as part of your assessment. The Environment Agency regularly updates its modelling. We recommend that you check the data provided is the most recent, before submitting your flood risk assessment.

Flood risk activity permits

Under the Environmental Permitting (England and Wales) Regulations 2016 some developments may require an environmental permit for flood risk activities from the Environment Agency. This includes any permanent or temporary works that are in, over, under, or nearby a designated main river or flood defence structure.

Find out more about flood risk activity permits

Help and advice

Contact the Cumbria and Lancashire Environment Agency team at inforequests.cmblnc@environment-agency.gov.uk for:

- more information about getting a product 5, 6, 7 or 8
- general help and advice about the site you're requesting data for