FLOOD RISK AND DRAINAGE SOLUTIONS LTD

# NPPF Flood Risk Assessment

## Land at Preston Road, Ribchester, PR3 3XL

Report No: 2020-034

Client: L'Escargottiere (Ribble Valley ltd)
Date: 27/08/2020

144 NEW LANE
OSWALDTWISTLE
HYNDBURN
LANCASHIRE
BB5 3QW
TEL: 07961477330
EMAIL: INFO@FLOODRISK-DRAINAGE.CO.UK

WWW.FLOODRISK-DRAINAGE.CO.UK

# Document Control

Document Title: Flood Risk Assessment

Project Number: 2020-034

| Revision | Date | Issued to | Status | Comments |
|---|---|---|---|---|
| / | 27/08/2020 | L'Escargottiere (Ribble Valley ltd) | FINAL | |

# Contract

This report describes work commissioned by L'Escargottiere (Ribble Valley ltd) dated 17th July 2020. Chris Vose of Flood Risk and Drainage Solutions Ltd carried out the work.

# Disclaimer

*This document has been prepared solely as a Flood Risk Assessment for L'Escargottiere (Ribble Valley ltd). Flood Risk and Drainage Solutions Ltd accepts no responsibility or liability for any use that is made of this document other than by the Client for the purposes for which it was originally commissioned and prepared.*

# Executive Summary

Flood Risk and Drainage Solutions Ltd have been appointed by L'Escargottiere (Ribble Valley ltd), to provide a Flood Risk Assessment in support the planning application for development of lodge holiday homes and associated building on land at Preston Road in Ribchester, Lancashire.

The development site is located within Flood Zones 2 and 3 and therefore has a medium to high risk of fluvial flooding.

An initial assessment indicates that the primary flood risk at the proposed development is from the fluvial source Boyces's Brook which forms the north boundary of the application site and pluvial overland flows.

The application site is located north west off Preston Road within the north west extent of the village of Ribchester in Lancashire and currently comprises of an agricultural field.

The closest watercourse to the application site is Boyce's Brook which flows in an easterly direction forming the north/east boundary.

The topographical survey provided identifies that the site falls from south west to the north east with levels ranging from 30.710m AOD down to 29.900m AOD.

Development proposals comprise of the erection of holiday lodges and a building used for Heliciculture purposes set back 12m from the banks of the watercourse. It is understood that the Heliciculture building will not include sleeping accommodation.

### Pluvial/Overland Flow

The area surrounding the proposed development site suffers from pluvial flooding, due to the scale and nature of surface water flooding it would be difficult to pin point the specific reason as to why this occurs. However, in this specific instance engineering judgement suggests that it is caused by an interaction between pluvial and fluvial flows existing the confinements of the watercourse and flowing overland south east onto Preston Road.

Surface Water Flood Depths and Velocities have been provided within the main body of the report.

Providing that mitigation measures are incorporated into the design of the properties as described within this report, the risk of pluvial flooding can be suitably managed.

### Fluvial: Boyce's Brook

The Environment Agency have provided flood plain levels for the application site attributed to flooding from Boyce's Brook taken from the Ribchester Study produced in 2009.

Fluvial Flood Depths have been provided within the main body of the report.

Following a review of the available Environment Agency Flood Data it is concluded that the redline boundary of the application site is located within Flood Zones 2 and 3 and therefore has a medium to high risk of fluvial flooding associated with Boyce's Brook.

Providing that mitigation measures as outlined within this report are implemented the risk of fluvial flooding can be suitably managed resulting in a low risk to persons on-site.

### Mitigation Measures

*Finished Floor Levels*

The ground floor level of any proposed lodges/buildings on-site will be set to no less than 600mm above the 100 year + 70% climate change flood level associated with Green Brook.

- Ground Floor Level = 30.910 + 0.600 = **31.510m AOD**

*Flood Resistance/Resilience Measures*

In order to provide an extra element of safety it is recommended that flood resilience/resistance measures outlined in below are incorporated into the buildings design, set 0.600m above the proposed finished floor level of lodges/building.

- Flood Resilience/Resistance = 31.510 + 0.600 = **32.110m AOD**

Flood Resilience/Resistance measures to be Incorporated into the development

- Careful consideration of materials: use low permeability materials to limit water penetration if dry proofing required.
- Avoid using timber frame and cavity walls. Consider applying a water-resistant coating.
- Avoid use of gypsum plaster if possible or apply plasterboards horizontally rather than vertically
- Avoid use of stud partition walls.
- Wall sockets will be raised to as high as is feasible and practicable in order to minimise damage if flood waters inundate the property.
- The ground floor will be concrete in order to minimise damage and reduce the turnaround time for returning the property to full operation after a flood event. If a suspended floor is to be used, provide facility for drainage of sub-floor void. Use solid insulation materials.
- Any wood fixings on ground floor will be robust and/or protected by suitable coatings in order to minimise damage during a flood event.
- Airbricks will be raised to as high as is feasible and practicable.
- The Damp Proof Membrane will be installed above the main floor slab and tied in to the walls where appropriate, to reduce the turnaround time for returning the property to full operation after a flood event.
- The ground floor waterproofing will be extended to 0.600m above floor level.
- Storage of any materials or possessions that may be susceptible to flood damage should be stored or raised at a level 0.600m above finished floor levels to limit the damage caused in the event of a flood.
- Non-Return Valves fitted to prevent backflow of sewage which can occur during flood conditions.
- Avoid fitted carpets where possible.
- Locate electrical, gas and telephone equipment and systems above flood level

*Land Raising*

Due to the proposed development site being partially located within Flood Zone 3, land raising is not permitted as this will have an impact on displacement of flood volumes, which may result in flooding of properties downstream of the site.

*Flood Storage Compensation*

Due to the application site being located within Flood Zone 3 any increase in footprint compared to the existing property will be required to offset the volume resulting from the new development.

It is proposed that the lodge building will be elevated using stilts and therefore will displace minimal flood volumes and will allow flood water to pass through unimpeded.

Flood voids are used to prevent the loss of floodplain storage, which could potentially increase the flood risk downstream of the application site. It is therefore recommended the any proposed building on the site should incorporate flood voids.

*Environment Agency Flood Warnings*

Due to the site being located within Flood Zone 3 and within close proximity of the Boyce's Brook, it is advised that the residents/staff sign up to receive Environment Agency Flood Warnings to allow for safe evacuation prior to the onset of flooding.

*Emergency Evacuation Route*

Upon receipt of an Environment Agency Flood Warnings staff should evacuate the site via the lowest risk route available as described below:

- South onto Preston Road
- North west along Preston Road
- Into Flood Zone 1 with access to major highway routes

*Business/Personal Flood Plan*

It is also recommended that staff/residents create both Business and Personal flood plans. These are simple documents that assists the staff/residents on site to prioritise actions required at the building before, during and following a flood event.

A copy of the Business and Personal flood plan templates has been provided within the appendices of this report.

*Flood Signage*

It is recommended that flood signage is erected within the site to inform persons on-site about the risk of flooding and should also show the proposed evacuation route to prevent any confusion during such an event.

*Stand Alone Flood Alarm*

Although the site is covered by the Environment Agency's Flood Warning service, it is also recommended that the owners invest in a standalone flood alarm that will act as a primary or secondary flood alert system.

This will ensure that any persons residing within the property are given sufficient time to evacuate the property well in advance of any actual flooding at the application site.

*Environmental Permitting*

Boyce's Brook is considered to be a 'Main River' at the very edge of the east of the site, therefore the Environment Agency may insist on an 8m easement from the top of the banks of the watercourse to allow for maintenance and management.

Any structures within 8m of the watercourse will require an Environmental Permit prior to construction i.e. outfall/headwall structure.

*Surface Water Drainage*

The client/developer is to provide information regarding the proposed surface water drainage strategy of the development.

# Contents

# Figures



# Tables

# Appendices

Appendix A: - Topographical Survey

Appendix B: - Environment Agency Flood Data

Appendix C: - Personal Flood Plan

Appendix D: - Business Flood Plan

# 1.0 Introduction

## 1.1 Terms of Reference

Flood Risk and Drainage Solutions Ltd have been appointed by L'Escargottiere (Ribble Valley ltd), to provide a Flood Risk Assessment in support the planning application for development of lodge holiday homes and associated building on land at Preston Road in Ribchester, Lancashire.

The development site is located within Flood Zones 2 and 3 and therefore has a medium to high risk of fluvial flooding.

It is usual for the Environment Agency to raise an objection to development applications within the floodplain, or Zones 2 and 3 of the flood map, until the issue of flood risk has been properly evaluated. The Agency will also object to developments where the total site area is in excess of 1 Hectare until suitable consideration has been given to the management of surface water runoff.

## 1.2 Objectives

The objective of this assessment is to evaluate the following issues in regard to flood risk at the application site.

- Suitability of the proposed development in accordance with current planning policy.
- Identify the risk to both the proposed development and people from all forms of flooding.
- Provide a preliminary assessment of foul and surface water management.
- Increasing the risk of flooding elsewhere e.g. surface water flows and flood routing.
- Recommendation of appropriate measures to mitigate against flooding both within the proposed development, and neighbouring land and property.

## 1.3 Data Sources

This assessment is based on desk-top study of information from the following sources:

- National Planning Policy Framework (2018)
- Planning Practice Guidance at www.gov.uk
- Building Regulations Approved Document H
- Environment Agency Flood Mapping
- Central Lancashire Strategic Flood Risk Assessment Level 1 Final Report December 2007
- Ribble Valley Borough Council Level 1 Strategic Flood Risk Assessment April 2017
- Ribble Valley District Flood Report February 2017
- British Geological Society – Historic Borehole Logs
- Cranfield University's Soilscape Viewer
- CIRIA C697 The SUDS Manual
- Chronology of British Hydrological Events (Dundee University)
- R&D Technical Report FD2320/TR2 (2005)

# 2.0 Planning Policy Context

## 2.1 Approach to the Assessment

An initial assessment indicates that the primary flood risk at the proposed development is from the fluvial source Boyces's Brook which forms the north boundary of the application site.

Consideration has also been given to the site flooding from secondary sources such as pluvial, groundwater; artificial water bodies; infrastructure failure and ponding.

The requirements for flood risk assessments are generally as set out in the 'Technical Guidance to the National Planning Policy Framework', updated in July 2018; and in more detail from the Environment Agency's 'Standing Advice on Flood Risk' available from https://www.gov.uk/government/publications/national-planning-policy-framework--3.

## 2.2 National Planning Policy Framework (NPPF)

The information provided in the flood risk assessment should be credible and fit for purpose.

Site-specific flood risk assessments should always be proportionate to the degree of flood risk and make optimum use of information already available, including information in a Strategic Flood Risk Assessment for the area, and the interactive flood risk maps available on the Environment Agency's website.

A flood risk assessment should also be appropriate to the scale, nature and location of the development.

### 2.2.1 Site Specific Flood Risk Assessment Checklist

The following checklist has been extracted from Flood Risk & Coastal Change Section available from www.gov.uk , updated in July 2018.

#### 1. Development site and location

Provide a description of the site you are proposing to develop, including, or making reference to, a location map which clearly indicates the development site.

A. Where is the development site located? (e.g. postal address or national grid reference)
B. What is the current use of the site? (e.g. undeveloped land, housing, shops, offices)
C. Which Flood Zone (for river or sea flooding) is the site within? (i.e. Flood Zone 1, Flood Zone 2, Flood Zone 3).

Check the Flood Map for Planning (Rivers and Sea) and the Strategic Flood Risk Assessment for the area available from the local planning authority.

#### 2. Development proposals

Provide a general summary of the development proposals, including, or making reference to, an existing block plan and a proposed block plan, where appropriate.

A. What are the development proposal(s) for this site? Will this involve a change of use of the site and, if so, what will that change be?
B. In terms of vulnerability to flooding, what is the vulnerability classification of the proposed development?
C. What is the expected or estimated lifetime of the proposed development likely to be? (E.g. less than 20 years, 20-50 years, 50-100 years?).

## 3. Sequential test

For developments in flood zones 2 or 3 only.
(If the development site is wholly within flood zone 1, this section can be skipped - go to section 4).

Describe how the sequential test has been applied to the development (if required, and as set out in paragraphs 101-104 of the National Planning Policy Framework); and provide the evidence to demonstrate how the requirements of the test have been met.

See paragraph 033 of the NPPF guidance for further information. (It is recommended that the Developer or Agent contacts the LPA to confirm whether the sequential test should be applied and to ensure the appropriate level of information is provided).

A. What other locations with a lower risk of flooding have you considered for the proposed development?
B. If you have not considered any other locations, what are the reasons for this?

C. Explain why you consider the development cannot reasonably be located within an area with the lowest probability of flooding (flood zone 1); and, if your chosen site is within flood zone 3, explain why you consider the development cannot reasonably be located in flood zone 2.
D. As well as flood risk from rivers or the sea, have you taken account of the risk from any other sources of flooding in selecting the location for the development?

Exception test

Provide the evidence to support certain development proposals in flood zones 2 or 3 if, following application of the sequential test, it is appropriate to apply the exception test, as set out in paragraphs 102-104 of the National Planning Policy Framework.

It is advisable to contact the local planning authority to confirm whether the exception test needs to be applied and to ensure the appropriate level of information is provided.

A. Would the proposed development provide wider sustainability benefits to the community? If so, could these benefits be considered to outweigh the flood risk to and from the proposed development?

B. How can it be demonstrated that the proposed development will remain safe over its lifetime without increasing flood risk elsewhere?
C. Will it be possible to for the development to reduce flood risk overall (e.g. through the provision of improved drainage)?

## 4. Climate Change

How is flood risk at the site likely to be affected by climate change? (The local planning authority's Strategic Flood Risk Assessment should have taken this into account). Further advice on how to take account of the impacts of climate change in flood risk assessments is available from the Environment Agency.

## 5. Site specific flood risk

Describe the risk of flooding to and from the proposed development over its expected lifetime, including appropriate allowances for the impacts of climate change. It would be helpful to include any evidence, such as maps and level surveys of the site, flood datasets (e.g. flood levels, depths and/or velocities) and any other relevant data, which can be acquired through consultation with the Environment Agency, the lead local flood authority for the area, or any other relevant flood risk management authority. Alternatively, you may consider undertaking or commissioning your own assessment of flood risk, using methods such as computer flood modelling.

A. What is/ are the main source(s) of flood risk to the site? (E.g. tidal/sea, fluvial or rivers, surface water, groundwater, other?). You should consider the flood mapping available from the Environment Agency, the Strategic Flood Risk Assessment for the area, historic flooding records and any other relevant and available information.

B. What is the probability of the site flooding, taking account of the maps of flood risk available from the Environment Agency, the local planning authority's Strategic Flood Risk Assessment and any further flood risk information?
C. Are you aware of any other sources of flooding that may affect the site?
D. What is the expected depth and level for the design flood? See paragraph 055 of the NPPF guidance for information on what is meant by a "design flood". If possible, flood levels should be presented in metres above Ordnance Datum (i.e., the height above average sea level).
E. Are properties expected to flood internally in the design flood and to what depth? Internal flood depths should be provided in metres.
F. How will the development be made safe from flooding and the impacts of climate change, for its lifetime? Further information can be found in paragraphs 054 and 059 (including on the use of flood resilience and resistance measures) of the NPPF guidance.
G. How will you ensure that the development and any measures to protect the site from flooding will not cause any increase in flood risk off-site and elsewhere? Have you taken into account the impacts of climate change, over the expected lifetime of the development? (e.g. providing compensatory flood storage which has been agreed with the Environment Agency).
H. Are there any opportunities offered by the development to reduce the causes and impacts of flooding?

## 6. Surface water management*

Describe the existing and proposed surface water management arrangements at the site using sustainable drainage systems wherever appropriate, to ensure there is no increase in flood risk to others off-site.

A. What are the existing surface water drainage arrangements for the site?
B. If known, what (approximately) are the existing rates and volumes of surface water run-off generated by the site?
C. What are the proposals for managing and discharging surface water from the site, including any measures for restricting discharge rates? For major developments (e.g. of ten or more homes or major commercial developments), and for all developments in areas at risk of flooding, sustainable drainage systems should be used, unless demonstrated to be inappropriate.
D. How will you prevent run-off from the completed development causing an impact elsewhere?
E. Where applicable, what are the plans for the ongoing operation and/or maintenance of the surface water drainage systems?

## 7. Occupants and users of the development

Provide a summary of the numbers of future occupants and users of the new development; the likely future pattern of occupancy and use; and proposed measures for protecting more vulnerable people from flooding.

A. Will the development proposals increase the overall number of occupants and/or people using the building or land, compared with the current use? If this is the case, by approximately how many will the number(s) increase?
B. Will the proposals change the nature or times of occupation or use, such that it may affect the degree of flood risk to these people? If this is the case, describe the extent of the change.
C. Where appropriate, are you able to demonstrate how the occupants and users that may be more vulnerable to the impact of flooding (e.g., residents who will sleep in the building; people with health or mobility issues; etc.,) will be located primarily in the parts of the building and site that are at lowest risk of flooding? If not, are there any overriding reasons why this approach is not being followed?

## 8. Residual risk

Describe any residual risks that remain after the flood risk management and mitigation measures are implemented, and to explain how these risks can be managed to keep the users of the development safe over its lifetime.

A. What flood related risks will remain after the flood risk management and mitigation measures have been implemented?
B. How, and by whom, will these risks be managed over the lifetime of the development? (e.g., putting in place flood warning and evacuation plans).

9. Flood risk assessment credentials

Provide details of the author and date of the flood risk assessment.

A. Who has undertaken the flood risk assessment?
B. When was the flood risk assessment completed?

Other considerations

* Managing surface water

The site-specific flood risk assessment will need to show how surface water runoff generated by the developed site will be managed. In some cases, it may be advisable to detail the surface water management for the proposed development in a separate drainage strategy or plan. You may like to discuss this approach with the lead local flood authority.

Surface water drainage elements of major planning applications (e.g., of ten or more homes) are reviewed by the lead local flood authority for the area. As a result, there may be specific issues or local policies, for example the Local Flood Risk Management Strategy or Surface Water Management Plan, that will need to be considered when assessing and managing surface water matters.

It is advisable to contact the appropriate lead local flood authority prior to completing the surface water drainage section of the flood risk assessment, to ensure that the relevant matters are covered in sufficient detail.
Proximity to Main Rivers

If the development of the site involves any activity within specified distances of main rivers, a flood risk activity permit may be required in addition to planning permission.

For non-tidal main rivers, a flood risk activity permit may be required if the development of the site is within 8 metres of a river, flood defence structure or culvert.

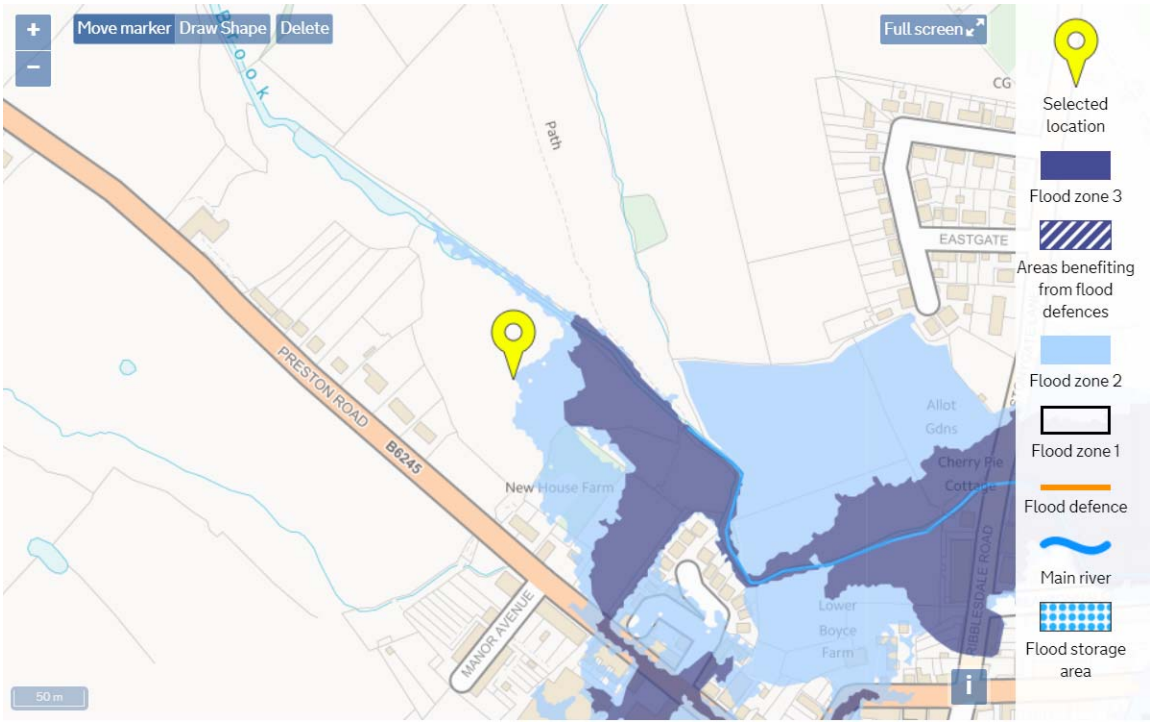
For tidal main rivers, a flood risk activity permit may be required if the development of the site is within 16 metres of a river, flood defence structure or culvert.

Details on obtaining a Flood Risk Activity Permit are available from the Environment Agency.

## 2.2.2 Sources of Flooding

- Rivers (fluvial): Flooding occurs when flow within river channels exceeds capacity; and the type of flood event experienced e.g. flash flooding; depends upon the characteristics of the river catchment.
- The Sea (tidal): Flooding at low lying coastline and tidal estuaries is caused by storm surges and high tides; with overtopping and breach failure of sea defences possible during extreme storm events.
- Pluvial (surface flooding or overland flows): Heavy rainfall, which is unable to soak away via infiltration or enter drainage systems can flow overland, resulting in localised flooding. Topography generally influences the direction and depth of flooding caused by this mechanism.
- Groundwater: Caused when ground water levels rise to the surface; and is most likely to occur in low lying areas underlain by aquifers.
- Sewers and drains: Generally occurs in more urban areas; where sewers and drains are overwhelmed by heavy rainfall or blocked pipes and gullies.
- Artificial Sources (reservoirs, canals, lakes and ponds): Reservoir and canal flooding may occur as a result of capacity exceedance or structural failure.

Figure 2.1: The Environment Agency Flood Map




Source: www.gov.uk

### 2.2.3 Flood Zones

- Flood Zone 1: Low probability (less than 1 in 1000 year (<0.1% AEP) annual probability of river or sea flooding in any year.
- Flood Zone 2: Medium probability (between 1 in 100 year (1.0% AEP) and 1 in 1000 year (0.1% AEP) annual probability of river flooding; or between 1 in 200 year (0.2% AEP) and 1 in 1000 year (0.1% AEP) annual probability of sea flooding in any year).
- Flood Zone 3a: High probability (1 in 100 year (1.0% AEP) or greater annual probability of river flooding in any year or 1 in 200 year (0.5% AEP) or greater annual probability of sea flooding in any year).
- Flood Zone 3b: This zone comprises land where water has to flow or be stored in times of flood. Land which would flood with an annual probability of 1 in 20 (5% AEP), or is designed to flood in an extreme flood (0.1%) should provide a starting point for discussions to identify functional floodplain.

### 2.2.4 Vulnerability of Different Development Types

- Essential Infrastructure: Transport infrastructure (railways and motorways etc...); utility infrastructure (primary sub-stations, water treatment facilities; power stations; and wind turbines).
- Water Compatible Development: Flood control infrastructure; water and sewage infrastructure; navigation facilities.
- Highly Vulnerable: Emergency services; basement dwellings; mobile home parks; industrial or other facilities requiring hazardous substance consent.
- More Vulnerable: Hospitals; residential dwellings; educational facilities; landfill sites caravan and camping sites.
- Less Vulnerable: Commercial premises; emergency services not required during a flood; agricultural land.

### 2.2.5 Climate Change

The NPPF requires the application of climate change over the lifetime of a development. As of 19th February 2016 the Technical Guidance for NPPF has updated the climate change allowances based on the river basin district. The climate change allowance for the North West basin district is tabulated below:

*Table 1: North West Climate Change Allowances*[1]

| Parameter | Allowance Category | 2010 - 2039 | 2040 - 2059 | 2060 - 2069 | 2070 - 2115 |
|---|---|---|---|---|---|
| Peak River Flow | Upper end | + 20% | + 35% | | + 70% |
| | Higher Central | + 20% | + 30% | | + 35% |
| | Central | + 15% | + 25% | | + 30% |

The selection of climate change allowance should be chosen appropriate to the expected lifespan of the proposed development.

Due to the proposed development being considered as 'More Vulnerable' and located within Flood Zones 2 and 3 the higher central and upper end allowance should be applied to peak river flow, using current Environment Agency Guidance.

[1] Extracted from Tables 1-4 of the Technical Guidance for flood risk assessments: Climate change allowances Document (February 2016)

# 3.0 Details of the Site

## 3.1 Site Details

*Table 2: Development Location*

| | |
|---|---|
| Site Name: | Land at Preston Road, Ribchester |
| Purpose of Development: | Holiday Lets/Helicriculture |
| Existing Land Use: | Agricultural |
| OS NGR: | SD6480535582 |
| Country: | England |
| County: | Lancashire |
| Local Planning Authority: | Ribble Valley Borough Council |
| Lead Local Flood Authority | Lancashire County Council |
| Internal Drainage Board: | Not Applicable |
| Other Authority (e.g. British Waterways/ Harbour Authority) | Not Applicable |

Location Plan:


*Source: Google*

## 3.2 Site Description

The application site is located north west off Preston Road within the north west extent of the village of Ribchester in Lancashire and currently comprises of an agricultural field.

The closest watercourse to the application site is Boyce's Brook which flows in an easterly direction forming the north/east boundary.

The topographical survey provided identifies that the site falls from south west to the north east with levels ranging from 30.710m AOD down to 29.900m AOD.

Vehicular access is provided direct from Preston Road from the south east boundary.

## 3.3 Proposed Development Details

Development proposals comprise of the erection of holiday lodges and a building used for Heliciculture purposes set back 12m from the banks of the watercourse.

It is understood that the Heliciculture building will not include sleeping accommodation.

# 4.0 Historic Flooding

## 4.1 Internet Search

An internet search found an extensive history of the village of Ribchester suffering from flooding, most recent where the floods during February 2020.

## 4.2 Ribble Valley Borough Council SFRA April 2017

The Strategic Flood Risk Assessment (SFRA) was undertaken by Ribble Valley Borough Council and was completed in April 2017.

Section 4.4 Table 1 Major Historical Floods Recorded in the Ribble Catchment and RVBC Communities Worst Hit identifies that the village of Ribchester was affected during the following events:

- 1866 – Ribchester - River Ribble
- 1995 – Ribchester – River Ribble
- 2000 – Ribchester– River Ribble

## 4.3 Environment Agency

The Environment Agency have provided Historic Flood Maps which identify that the application was unaffected by the following flood events:

- 09/02/2020
- 26/12/2015
- 05/12/2015
- 10/08/2011
- 03/07/2007
- 25/08/2004
- 26/10/2000
- 06/03/1998
- 31/01/1995

# 5.0 Initial Evaluation of Flood Risk

## 5.1 The Environment Agency Flood Map

The Environment Agency Flood Map illustrated within Figure 2.1, confirms that proposed development site is located within both Flood Zones 2 and 3.

The definition for each of the flood zones highlighted above is provided for reference within Section 2.2.3 of this report.

## 5.2 Sources of Flooding

*Table 3: Possible Flooding Mechanisms*

| Source/Pathway | Significant? | Comment/Reason |
|---|---|---|
| Fluvial | Yes | Flood Zones 2 and 3 (Boyce's Brook) |
| Canal | No | Not Applicable |
| Tidal/Coastal | No | Not Applicable |
| Reservoir | No | EA Map shows that the site is located marginally within the area affected by reservoir flooding. |
| Pluvial (urban drainage) | No | Drainage to be addressed by architect/developer |
| Groundwater | No | SFRA states that groundwater flooding within the area is not considered to be a significant risk |
| Surface Water Flooding | Yes | Site is located within an area that has a high risk of pluvial flooding |
| Overland Flow | Yes | High risk associated with surface water flooding |
| Blockage | No | Not Applicable |
| Infrastructure failure | No | Not Applicable |
| Rainfall Ponding | No | No areas of ponding identified within the boundary of the site. |

From the initial assessment it is concluded that the primary source of flood risk will be from the fluvial source Boyce's Brook and pluvial flooding.

### Fluvial: Boyce's Brook

The closest watercourse to the application site is Boyce's Brook which flows in an easterly direction forming the north/east boundary.

Boyce's Brook is only considered to be a 'Main River' downstream of the application site and 'Ordinary Watercourse' adjacent to the site, therefore the riparian owners have certain roles and responsibilities regarding management and maintenance of the watercourse.

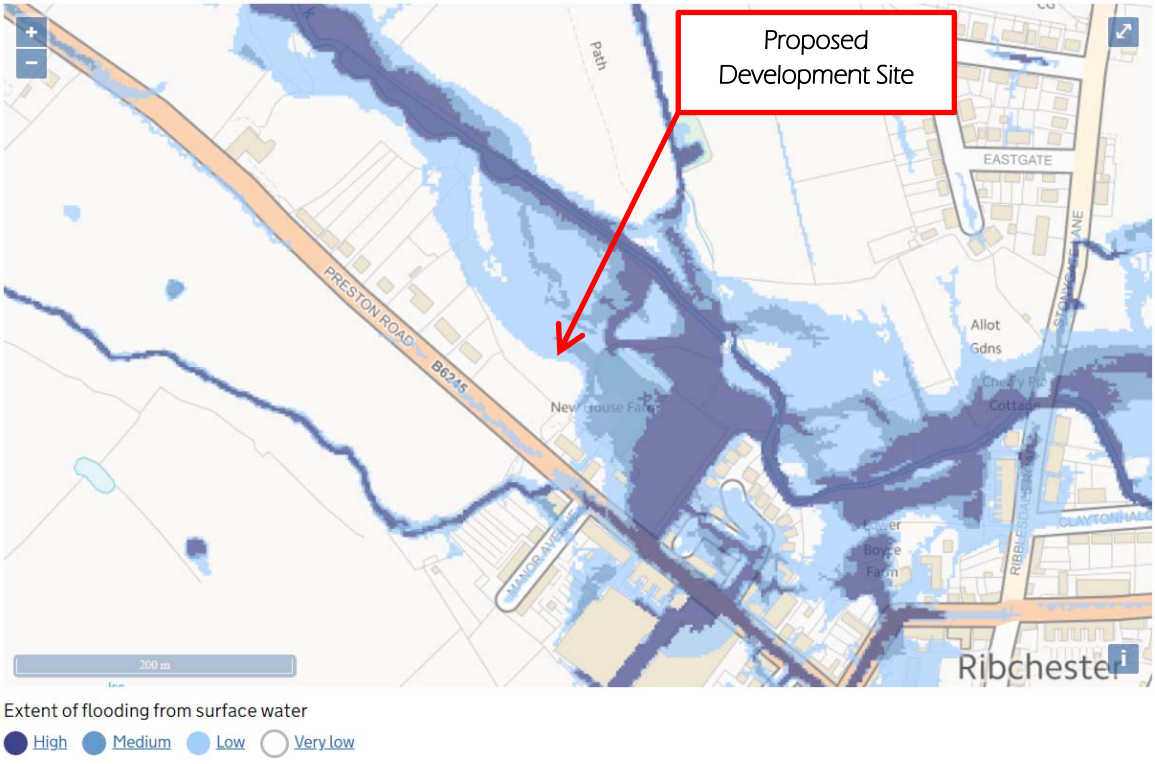
Due to the proposed development being located within both Flood Zones 2 and 3 the risk of fluvial flooding is considered to be medium to high and therefore requires further evaluation, which has been undertaken Section 6 of this report.

### Pluvial: Surface Water Flooding / Overland Flow

The Environment Agency's Surface Water Flood Map identifies that the application site has a high risk associated with pluvial (surface water) flooding.

The area which is affected is considered to be a topographical depression centrally within the site, where fluvial flows exit the bank and travel in a south easterly direction through the application site and the neighbouring site following low lying topography onto Preston Road.

Figure 5.1: Environment Agency Surface Water Flood Map




Source: www.gov.uk

- High risk means that each year this area has a chance of flooding of greater than 3.3%. 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.

Taking the above into consideration flooding from this mechanism is considered to present a high risk and therefore requires further evaluation which has been undertaken within Section 6 of this report.

### Flooding from Reservoirs

The Environment Agency's Flooding from Reservoirs map identifies that the application site will be affected marginally during breach or failure of artificial bodies of water.

However there has been no loss of life within the past 100 years attributed to reservoir breach/failure within the UK, therefore the risk of this actually happening is considered to be low.

### Groundwater

Section 4.2.9 of the Ribble Valley Borough Councils SFRA states the following in relation to groundwater flooding:

*'Following consultation with the EA, no evidence of groundwater flooding in the area has been identified. While no risk has been demonstrated, this is not to say that unrecorded groundwater flooding events may have taken place or that groundwater flooding may not occur in the future, but using the best available information they are not considered to be a significant risk at this time.'*

Taking the above into account the risk of groundwater flooding at the site is considered to be low.

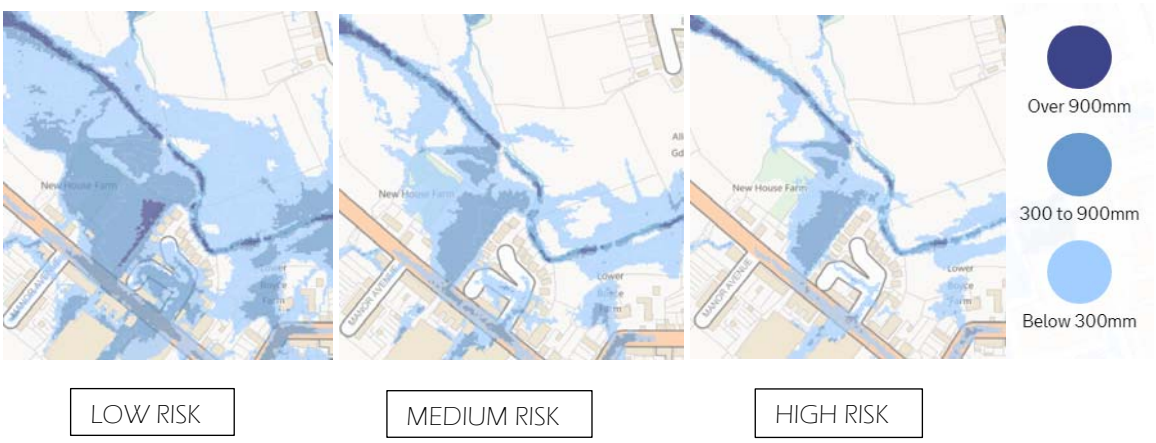
# 6.0 Quantitative Flood Risk Assessment

## 6.1 Pluvial / Overland Flow

### 6.1.1 General

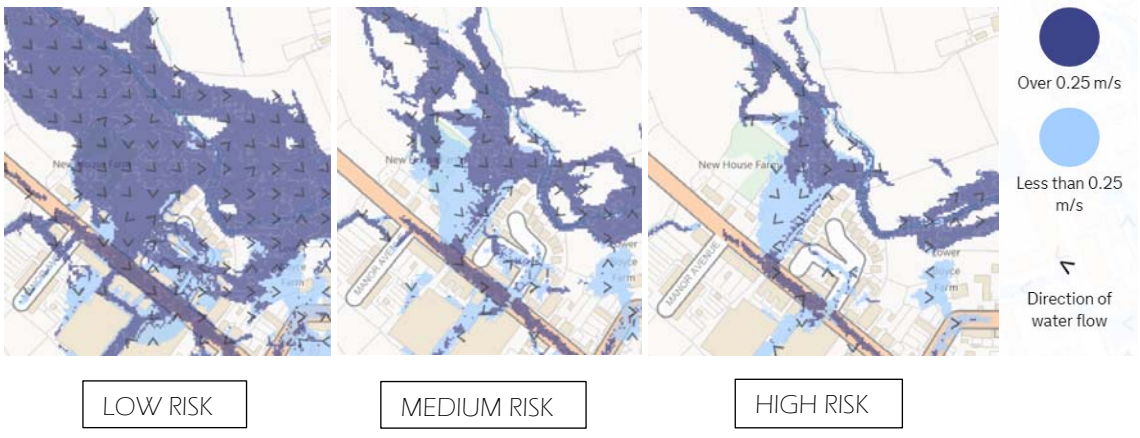
The Environment Agency's Surface Water Flood Map identifies that the application site has a high risk associated with pluvial (surface water) flooding.

Figure 6.1: Environment Agency Surface Water Flood Depth




Source: www.gov.uk

Figure 6.2: Environment Agency Surface Water Flood Velocity




Source: www.gov.uk

Evaluation has been undertaken to determine flood depths and velocities within the curtilage of the redline boundary of the proposed development, this is shown below for a range of events.

### 6.1.2 Low Risk Event

During the low risk event (1:1000 year) the depths and velocities at the site are identified below:

- Depth = over 900mm
- Velocity = More than 0.25m/s

### 6.1.3 Medium Risk Event

During the medium risk event (1:100 year) the magnitude of flooding has reduced compared to the low risk even, the depths and velocities are identified below:

- Between 300mm and 900mm
- Velocity = More than 0.25m/s

### 6.1.4 High Risk Event

During the high-risk event (1:30 year) the magnitude of flooding has reduced compared to the medium risk even, the depths and velocities are identified below:

- Depth = Between 300mm and 900mm
- Velocity = More than 0.25m/s

### 6.1.5 Pluvial: Conclusion

The area surrounding the proposed development site suffers from pluvial flooding, due to the scale and nature of surface water flooding it would be difficult to pin point the specific reason as to why this occurs. However, in this specific instance engineering judgement suggests that it is caused by an interaction between pluvial and fluvial flows existing the confinements of the watercourse and flowing overland south east onto Preston Road.

Providing that mitigation measures are incorporated into the design of the properties as described within Section 7.0 of this report, the risk of pluvial flooding can be suitably managed.

## 6.2 Fluvial: Boyce's Brook

### 6.2.1 Flood Defences

The EA Flood Data identifies that the eastern extent of the application site is protected by high ground along the south banks of Boyce's Brook, Asset Ref: 88345.

However, it is noted that the standard of protection is only considered to be up to the 1 in 5 year event, therefore **the application site is not considered to be formally located within an area benefiting from flood defences.**

### 6.2.2 Environment Agency Modelled Flood Levels

The Environment Agency have provided flood plain levels for the application site attributed to flooding from Boyce's Brook taken from the Ribchester Study produced in 2009.

In order to evaluate the worst-case scenario, flood levels associated with Boyce's Brook for the defended scenario have been used to undertake a comparison against site levels in order to determine flood depths on-site.

Rather than using nodes associated with the watercourse, flood plain levels has been used to give a more accurate evaluation of the anticipated flood levels within the curtilage of the application site.

The current application of climate change i.e. 70% has been estimated using interpolation of the available data provided by the Environment Agency.

*Table 4: Flood Plain Levels Associated with Boyce's Brook*

| Node Ref | 100 Year | 100 Year + 20% CC | 100 Year + 70% CC | 1000 Year |
|---|---|---|---|---|
| Flood Plain Levels | 30.700 | 30.760 | 30.910 | 30.902 |

### 6.2.3 100 Year Event

During the 100 year event the flood plain level onsite at its highest is considered to be 30.700m AOD.

The topographical survey provided identifies that the site falls from south west to the north east with levels ranging from 30.710m AOD down to 29.900m AOD.

Following a review of the EA Flood Plain Map during this event the site will be partially flooded confined to the east and central proportions within low lying areas.

The south west of the site is expected to remain unaffected, whilst the potential depth of the north east is 0.800m.

### 6.2.4 100 Year + 20% Climate Change Event

During the 100 year + 20% climate change event the flood plain level onsite at its highest is considered to be 30.760m AOD.

The topographical survey provided identifies that the site falls from south west to the north east with levels ranging from 30.710m AOD down to 29.900m AOD.

Following a review of the EA Flood Plain Map during this event the flood envelope has increased showing a flow route centrally through the site in a south east direction.

The south west of the site is expected to flood to a depth of 0.010m, whilst the potential depth of the north east is 0.860m.

### 6.2.5 100 Year + 70% Climate Change Event

During the 100 year + 70% climate change event the flood plain level onsite has been estimated using interpolation of the available data, at its highest is considered to be 30.910m AOD.

The topographical survey provided identifies that the site falls from south west to the north east with levels ranging from 31.710m AOD down to 29.900m AOD.

During this event he south west of the site is expected to flood to a depth of 0.080m, whilst the potential depth of the north east is 1.010m.

### 6.2.6 1000 Year Event

During the 1000 year event the flood plain level onsite at its highest is considered to be 30.902m AOD.

The topographical survey provided identifies that the site falls from south west to the north east with levels ranging from 30.710m AOD down to 29.900m AOD.

During this event he south west of the site is expected to flood to a depth of 0.192m, whilst the potential depth of the north east is 1.002m.

### 6.2.7 Fluvial Conclusion

Following a review of the available Environment Agency Flood Data it is concluded that the redline boundary of the application site is located within Flood Zones 2 and 3 and therefore has a medium to high risk of fluvial flooding associated with Boyce's Brook.

Providing that mitigation measures as outlined within this report are implemented the risk of fluvial flooding can be suitably managed resulting in a low risk to persons on-site.

# 7.0 Mitigation Measures

## 7.1 Finished Development Levels

The ground floor level of any proposed lodges/buildings on-site will be set to no less than 600mm above the 100 year + 70% climate change flood level associated with Green Brook.

- Ground Floor Level = 30.910 + 0.600 = **31.510m AOD**

## 7.2 Flood Resistance/Resilience Measures

In order to provide an extra element of safety it is recommended that flood resilience/resistance measures outlined in bold below are incorporated into the buildings design, set 0.600m above the proposed finished floor level of lodges/building.

- Flood Resilience/Resistance = 31.510 + 0.600 = **32.110m AOD**

Flood proofing is a technique by which buildings are designed to withstand the effects of flooding. There are two main categories of flood proofing, which are dry proofing and wet proofing.

Dry proofing methods are designed to keep water out of the building, and wet proofing methods are designed to improve the ability of the property to withstand effects of flooding once the water has entered the building.

In addition, fixtures and fittings should be built to withstand immersion in water or designed to be easily replaced.

Identified below are flood proofing measures which can be incorporated within the design for the proposed redevelopment works. Such measures are put forward in accordance with 'Development and Flood Risk Guidance for the Construction Industry' CIRIA C624.

It would be preferable to avoid external doors as this would remove a potential point of flood inflows. However, since free access and egress into the building will be required, flood resistant doors and/or the use of flood resistant stop logs or flood boards should be considered.

Full details of manufacturer's or suppliers of flood protection equipment may be obtained from the Flood Protection Association (website: www.thefpa.org.uk).

Flood Resilience/Resistance measures to be Incorporated into the development

- Careful consideration of materials: use low permeability materials to limit water penetration if dry proofing required.
- Avoid using timber frame and cavity walls. Consider applying a water-resistant coating.
- Avoid use of gypsum plaster if possible or apply plasterboards horizontally rather than vertically
- Avoid use of stud partition walls.
- Wall sockets will be raised to as high as is feasible and practicable in order to minimise damage if flood waters inundate the property.
- The ground floor will be concrete in order to minimise damage and reduce the turnaround time for returning the property to full operation after a flood event. If a suspended floor is to be used, provide facility for drainage of sub-floor void. Use solid insulation materials.
- Any wood fixings on ground floor will be robust and/or protected by suitable coatings in order to minimise damage during a flood event.
- Airbricks will be raised to as high as is feasible and practicable.
- The Damp Proof Membrane will be installed above the main floor slab and tied in to the walls where appropriate, to reduce the turnaround time for returning the property to full operation after a flood event.
- The ground floor waterproofing will be extended to 0.600m above floor level.

- Storage of any materials or possessions that may be susceptible to flood damage should be stored or raised at a level 0.600m above finished floor levels to limit the damage caused in the event of a flood.
- Non-Return Valves fitted to prevent backflow of sewage which can occur during flood conditions.
- Avoid fitted carpets where possible.
- Locate electrical, gas and telephone equipment and systems above flood level

## 7.3 Land Raising

Due to the proposed development site being partially located within Flood Zone 3, land raising is not permitted as this will have an impact on displacement of flood volumes, which may result in flooding of properties downstream of the site.

## 7.4 Flood Storage Compensation

Due to the application site being located within Flood Zone 3 any increase in footprint compared to the existing property will be required to offset the volume resulting from the new development.

### Raised Lodges

It is proposed that the lodge building will be elevated using stilts and therefore will displace minimal flood volumes and will allow flood water to pass through unimpeded.

### Flood Voids Used for Formal Buildings

Flood voids are used to prevent the loss of floodplain storage, which could potentially increase the flood risk downstream of the application site. It is therefore recommended the any proposed building on the site should incorporate flood voids.

An example of flood voids used on a previous development we have been involved in is shown below:

Figure 7.1: Typical Example of Flood Voids


*Source: FRDS*

To allow flood water to pass through the building the voids should be designed to the following specification and signed off by the council/EA as a pre-commencement plan:

- Foundation walls within void to be oriented to maximise flow of the likely flood waters

- Underside of the under croft/void to be set higher than the 100 year + 70% climate change flood level of 30.910m AOD
- Void openings to open all the way down to existing ground levels to allow free flow during a flood event
- Minimum width of void 1m
- Spaced at a minimum of 2.5m apart
- Void grills to be hinged to allow for access to the under croft for maintenance
- Void grills bars spaced at 10cm centres to reduce the risk of blockage
- Slab to be sloped to facilitate flood waters escaping the property
- Under croft to remain open at all times and not used for storage
- Periodic maintenance of grills and under croft
- Maintenance to be undertaken following a flood event

## 7.5 Environment Agency Flood Warnings

The application site is situated within an area covered by the Environment Agency's Flood Warning's Direct Service.

Due to the site being located within Flood Zone 3 and within close proximity of the Boyce's Brook, it is advised that the residents/staff sign up to receive Environment Agency Flood Warnings to allow for safe evacuation prior to the onset of flooding.

The Flood Warning's Direct Service is a free service which enables the Environment Agency to send a direct message when flooding is expected and may affect the development. Flood warnings are designed to provide businesses the time to prepare for flooding. Flood warnings can be sent by telephone, mobile, email SMS text message or fax.

The Environment Agency also provides the Floodline 0845 988 1188 service, where occupants can listen to recorded flood warning information for the area or speak to an operator for advice 24 hours a day.

Should a flood event reach the level where development is at risk of inundation, then the Environment Agency will issue a Severe Flood Warning.

Using the latest available technology, the Environment Agency is able to monitor rainfall, river levels and sea conditions 24 hours a day and use this information to forecast the possibility of flooding.

If flooding is forecast, they are able to issue warnings using a set of three different warning types.

Table 5: Environment Agency Flood Warning Codes

| Flood Warning Code | What it means | When it's used | What to do |
|---|---|---|---|
|  | Flooding is possible.<br><br>Be prepared. | 2 hours – 2 days in advance of flooding. | • Be prepared to act on you flood plan<br>• Prepare a flood kit<br>• Monitor local water levels and the flood forecast of the EA website |
|  | Flooding is expected. Immediate action is required. | ½ hour – 1 day in advance of flooding. | • Move people to a safe place<br>• Turn of gas, electricity and water supplies if safe to do so<br>• Put flood protection equipment in place |

| | | | |
|---|---|---|---|
|  | Severe flooding. Danger to life. | When flooding poses a significant threat to life. | • Stay in a safe place with means of escape<br>• Be ready to evacuate<br>• Co-operate with the emergency services<br>• Call 999 if you are in immediate danger |
| Warnings no longer in force | No further flooding is currently expected in your area | When river or sea conditions begin to return to normal | • Be careful as flood water may still be around for several days<br>• If you have been flooded, ring your insurance company as soon as possible |

How are Flood Warnings issued?

- Direct to you – receive warnings by phone, text, email or fax. Sign up for the Environment Agency's FREE Floodline Warnings Direct service via this website link: https://www.fws.environment-agency.gov.uk/app/olr/register or by calling Floodline on 0845 988 1188.
- On the flood warnings website – view up-to-date information about flood warnings in force, monitor the river or sea levels in your area and check out the latest flood risk forecast for your county.
- By calling Floodline on 0845 988 1188 – you can listen to recorded information on the latest warnings and predictions or speak to an operator for more general information 24 hours a day. Environment Agency operators can also provide a quick dial number which gives you faster access to information for your area.
- Through the media – you may see or hear Environment Agency warnings on television and in radio broadcasts. You can also view the latest warnings on Digital Ceefax page 405.
- Flood Wardens – in some areas Flood Wardens are there to alert and support their local community when a flood warning is issued. Call Floodline on 0845 988 1188 to find out if this service is available in your area.
- Sirens/loudhailers – in some areas the Environment Agency uses loudhailer or siren systems to warn people that a flood warning has been issued. Call Floodline on 0845 988 1188 to find out if this type of service operates in your area.
- Flood warning feeds – Flood warning (RSS) feeds shows national and regional flood warnings in force and are updated every 15 minutes. The feeds contain a brief summary and link to the full information on the Environment Agency website.

## 7.6 Emergency Evacuation Route

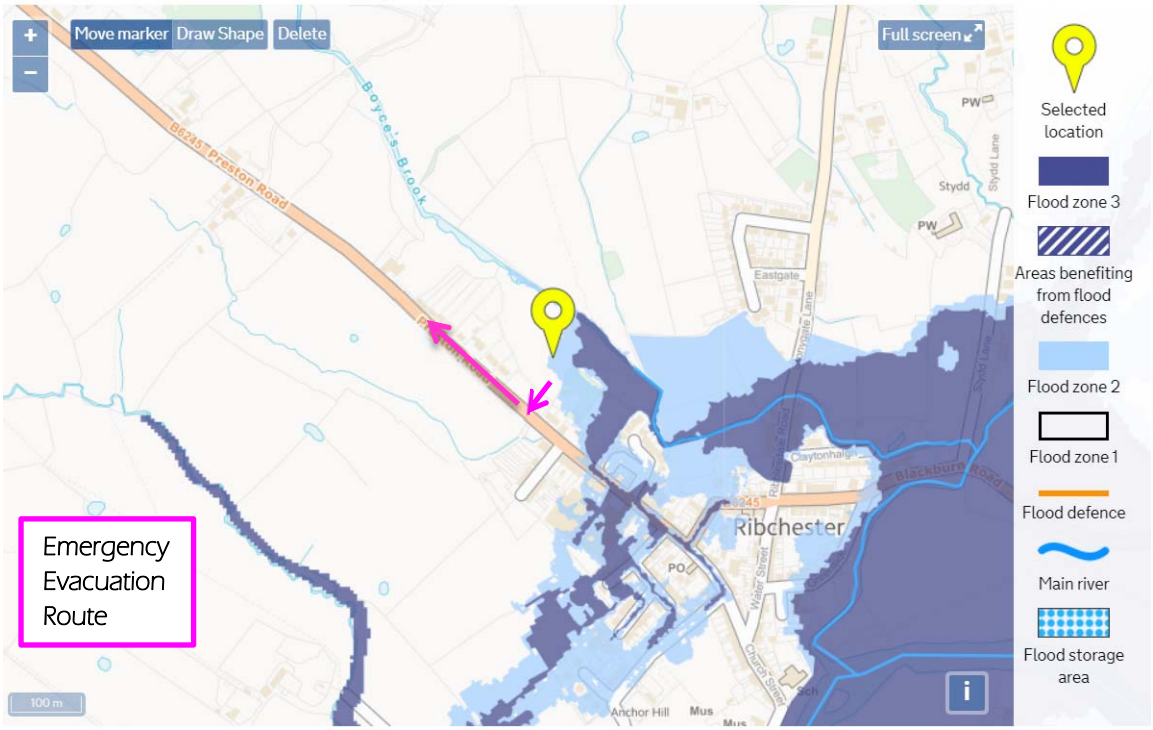
It is recommended that residents/staff on site are prepared to evacuate away from the site, if advised to do so by the EA Flood Warning Service, the emergency services and/or local authority, in the advance of the onset of any flooding.

Evacuation away from the site during fluvial flood events should be directed to an appropriate location within Flood Zone 1, to allow access to all major highway routes away from Flood Zones 2 and 3.

Upon receipt of an Environment Agency Flood Warnings staff should evacuate the site via the lowest risk route available as described below:

- South onto Preston Road
- North west along Preston Road
- Into Flood Zone 1 with access to major highway routes

Figure 7.2: Suggested Evacuation Route




*Source: GOV.UK*

## 7.7 Business/Personal Flood Plan

It is also recommended that staff/residents create both Business and Personal flood plans. These are simple documents that assists the staff/residents on site to prioritise actions required at the building before, during and following a flood event.

A copy of the Business and Personal flood plan templates has been provided within the appendices of this report.

## 7.8 Flood Signage

It is recommended that flood signage is erected within the site to inform persons on-site about the risk of flooding and should also show the proposed evacuation route to prevent any confusion during such an event.

## 7.9 Stand Alone Flood Alarm

Although the site is covered by the Environment Agency's Flood Warning service, it is also recommended that the owners invest in a standalone flood alarm that will act as a primary or secondary flood alert system.

This will ensure that any persons residing within the property are given sufficient time to evacuate the property well in advance of any actual flooding at the application site.

## 7.10 Environmental Permitting

Boyce's Brook is considered to be a 'Main River' at the very edge of the east of the site, therefore the Environment Agency may insist on an 8m easement from the top of the banks of the watercourse to allow for maintenance and management.

Any structures within 8m of the watercourse will require an Environmental Permit prior to construction i.e. outfall/headwall structure.

Figure 7.3: Stand Alone Flood Alarm Example

*Source: ultrasecuredirect*

## 7.11 Surface Water Statement

### 7.11.1 General

The client/developer is to provide information regarding the proposed surface water drainage strategy of the development.

# 8.0 Conclusions & Recommendations

### Pluvial/Overland Flow

The area surrounding the proposed development site suffers from pluvial flooding, due to the scale and nature of surface water flooding it would be difficult to pin point the specific reason as to why this occurs. However, in this specific instance engineering judgement suggests that it is caused by an interaction between pluvial and fluvial flows existing the confinements of the watercourse and flowing overland south east onto Preston Road.

Surface Water Flood Depths and Velocities have been provided within the main body of the report.

Providing that mitigation measures are incorporated into the design of the properties as described within this report, the risk of pluvial flooding can be suitably managed.

### Fluvial: Boyce's Brook

The Environment Agency have provided flood plain levels for the application site attributed to flooding from Boyce's Brook taken from the Ribchester Study produced in 2009.

Fluvial Flood Depths have been provided within the main body of the report.

Following a review of the available Environment Agency Flood Data it is concluded that the redline boundary of the application site is located within Flood Zones 2 and 3 and therefore has a medium to high risk of fluvial flooding associated with Boyce's Brook.

Providing that mitigation measures as outlined within this report are implemented the risk of fluvial flooding can be suitably managed resulting in a low risk to persons on-site.

### Mitigation Measures

*Finished Floor Levels*

The ground floor level of any proposed lodges/buildings on-site will be set to no less than 600mm above the 100 year + 70% climate change flood level associated with Green Brook.

- Ground Floor Level = 30.910 + 0.600 = **31.510m AOD**

*Flood Resistance/Resilience Measures*

In order to provide an extra element of safety it is recommended that flood resilience/resistance measures outlined in below are incorporated into the buildings design, set 0.600m above the proposed finished floor level of lodges/building.

- Flood Resilience/Resistance = 31.510 + 0.600 = **32.110m AOD**

Flood Resilience/Resistance measures to be Incorporated into the development

- Careful consideration of materials: use low permeability materials to limit water penetration if dry proofing required.
- Avoid using timber frame and cavity walls. Consider applying a water-resistant coating.
- Avoid use of gypsum plaster if possible or apply plasterboards horizontally rather than vertically
- Avoid use of stud partition walls.
- Wall sockets will be raised to as high as is feasible and practicable in order to minimise damage if flood waters inundate the property.
- The ground floor will be concrete in order to minimise damage and reduce the turnaround time for returning the property to full operation after a flood event. If a suspended floor is to be used, provide facility for drainage of sub-floor void. Use solid insulation materials.

- Any wood fixings on ground floor will be robust and/or protected by suitable coatings in order to minimise damage during a flood event.
- Airbricks will be raised to as high as is feasible and practicable.
- The Damp Proof Membrane will be installed above the main floor slab and tied in to the walls where appropriate, to reduce the turnaround time for returning the property to full operation after a flood event.
- The ground floor waterproofing will be extended to 0.600m above floor level.
- Storage of any materials or possessions that may be susceptible to flood damage should be stored or raised at a level 0.600m above finished floor levels to limit the damage caused in the event of a flood.
- Non-Return Valves fitted to prevent backflow of sewage which can occur during flood conditions.
- Avoid fitted carpets where possible.
- Locate electrical, gas and telephone equipment and systems above flood level

*Land Raising*

Due to the proposed development site being partially located within Flood Zone 3, land raising is not permitted as this will have an impact on displacement of flood volumes, which may result in flooding of properties downstream of the site.

*Flood Storage Compensation*

Due to the application site being located within Flood Zone 3 any increase in footprint compared to the existing property will be required to offset the volume resulting from the new development.

It is proposed that the lodge building will be elevated using stilts and therefore will displace minimal flood volumes and will allow flood water to pass through unimpeded.

Flood voids are used to prevent the loss of floodplain storage, which could potentially increase the flood risk downstream of the application site. It is therefore recommended the any proposed building on the site should incorporate flood voids.

*Environment Agency Flood Warnings*

Due to the site being located within Flood Zone 3 and within close proximity of the Boyce's Brook, it is advised that the residents/staff sign up to receive Environment Agency Flood Warnings to allow for safe evacuation prior to the onset of flooding.
*Emergency Evacuation Route*

Upon receipt of an Environment Agency Flood Warnings staff should evacuate the site via the lowest risk route available as described below:

- South onto Preston Road
- North west along Preston Road
- Into Flood Zone 1 with access to major highway routes

*Business/Personal Flood Plan*

It is also recommended that staff/residents create both Business and Personal flood plans. These are simple documents that assists the staff/residents on site to prioritise actions required at the building before, during and following a flood event.

A copy of the Business and Personal flood plan templates has been provided within the appendices of this report.

*Flood Signage*

It is recommended that flood signage is erected within the site to inform persons on-site about the risk of flooding and should also show the proposed evacuation route to prevent any confusion during such an event.

*Stand Alone Flood Alarm*

Although the site is covered by the Environment Agency's Flood Warning service, it is also recommended that the owners invest in a standalone flood alarm that will act as a primary or secondary flood alert system.

This will ensure that any persons residing within the property are given sufficient time to evacuate the property well in advance of any actual flooding at the application site.

*Environmental Permitting*

Boyce's Brook is considered to be a 'Main River' at the very edge of the east of the site, therefore the Environment Agency may insist on an 8m easement from the top of the banks of the watercourse to allow for maintenance and management.

Any structures within 8m of the watercourse will require an Environmental Permit prior to construction i.e. outfall/headwall structure.

*Surface Water Drainage*

The client/developer is to provide information regarding the proposed surface water drainage strategy of the development.

# APPENDICES

# Appendix A: - Topographical Survey

| Number | SF-TO 1 | | |
|---|---|---|---|
| | Easting | Northing | Height |
| N2L | 364708.157 | 435518.330 | 32.405 |
| N3L | 364735.774 | 435495.642 | 30.546 |
| N1L | 364728.275 | 435517.669 | 31.376 |


Site Surveying Services Ltd

Unit 9
Twin Brook Business Park
Twin Brook Road
Clitheroe BB7 1QX
Tel: 01200 438320

surveyors@sitesurvey.co.uk


**Setting out & Control Surveys**
**Topographic & Volumetric Surveys**
**GPS Specialists using GPS post process to tie in any site to OS without trig points or BM.**

**Construction Line Registered.**
**TSA Member.**

construction line

THE SURVEY ASSOCIATION

Client / Location: David Liversidge
Pendle View, Ribchester

Revision: A
Revision Details:

All work to our standard terms & conditions (see website for details)

To local grid based on ostn15/osgm15
All work to sss specification, some by gps
Contact us regarding details

Drawing Number: sss-9251

Drawn By: MK

Checked By: HW

Date: 05/05/2020

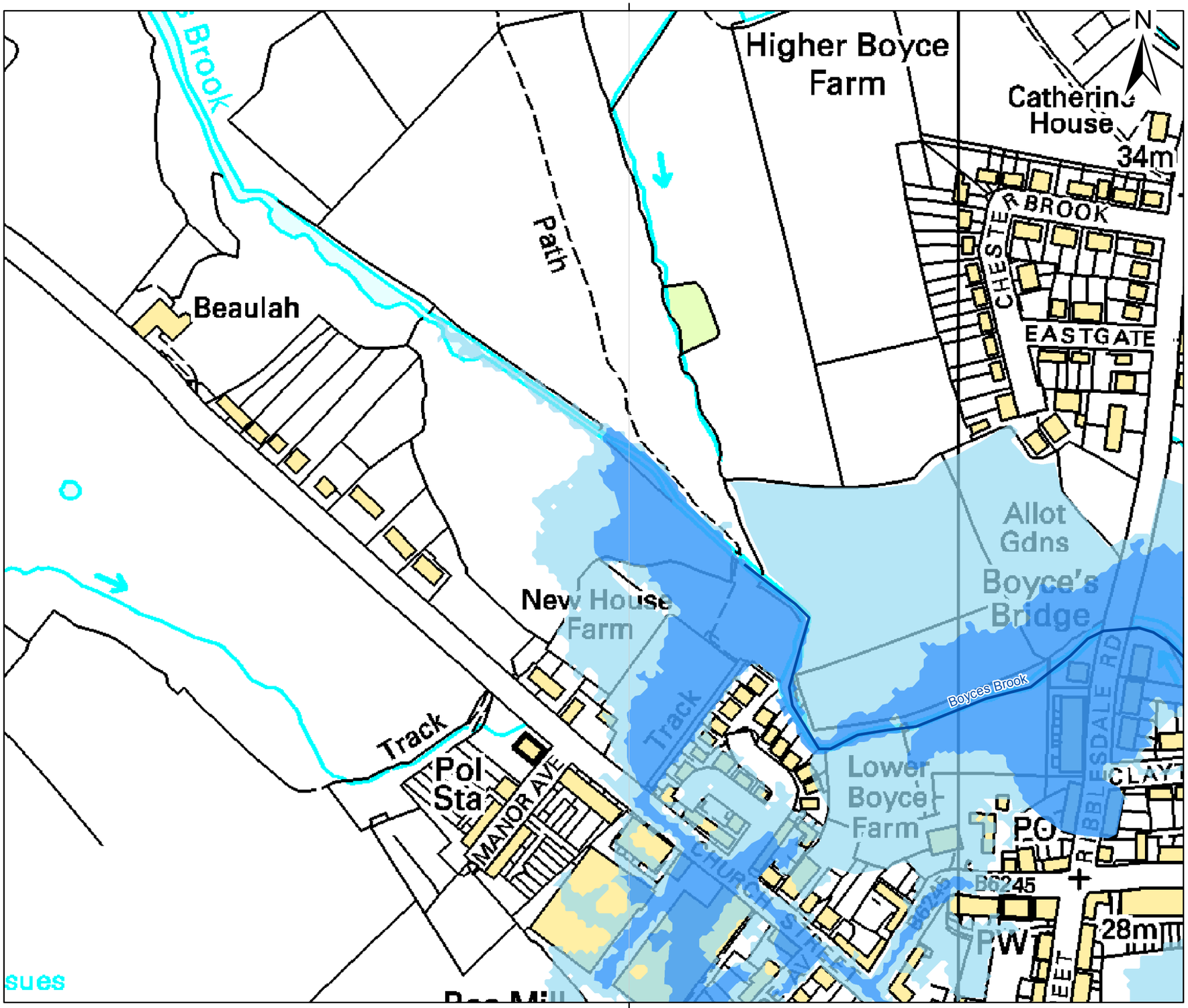
Scale: 1:500 @ A3

# Appendix B: - Environment Agency Flood Data

Environment Agency

**Flood Zones Map:**
**PENDLE VIEW, PRESTON ROAD, RIBCHESTER, PR3 3XL**

*Produced: 13 August 2020*
*Our Ref: CL178452*
*NGR: 364791,435615*




**Key:**

- Main River
- Areas Benefitting from Defences
- Flood Zone 3
- Flood Zone 2

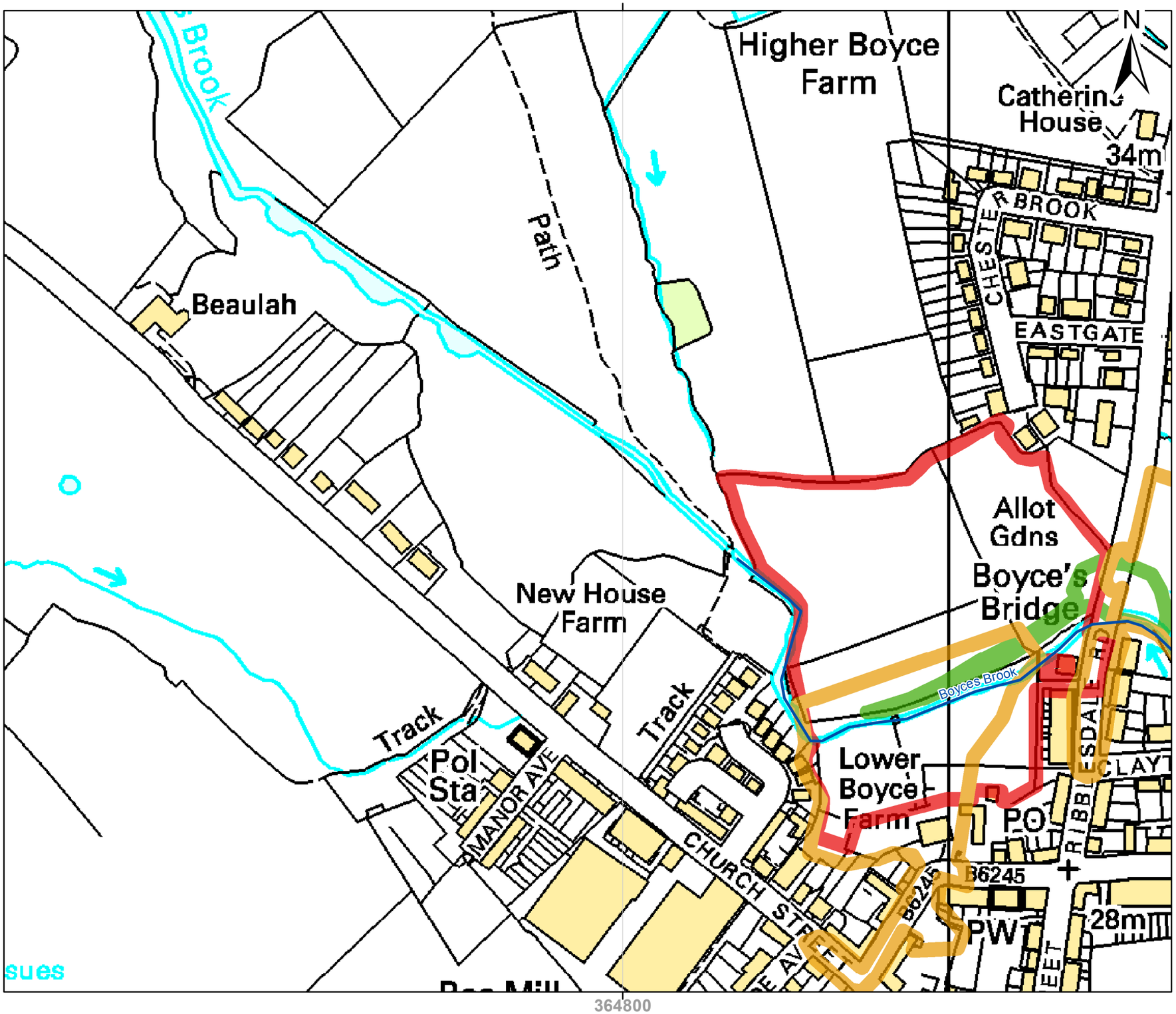
**Flood Zone 3** shows the area that could be affected by flooding:
- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

**Flood Zone 2** shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

**ABDs** (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.



**Contact Us:** National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk





**Contact Us:** National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Environment Agency

**Flood History Map:**
**PENDLE VIEW, PRESTON ROAD, RIBCHESTER, PR3 3XL**

*Produced: 13 August 2020*
*Our Ref: CL178452*
*NGR: 364791,435615*

**Key:**

Main River

26/10/2000
06/03/1998
31/01/1995

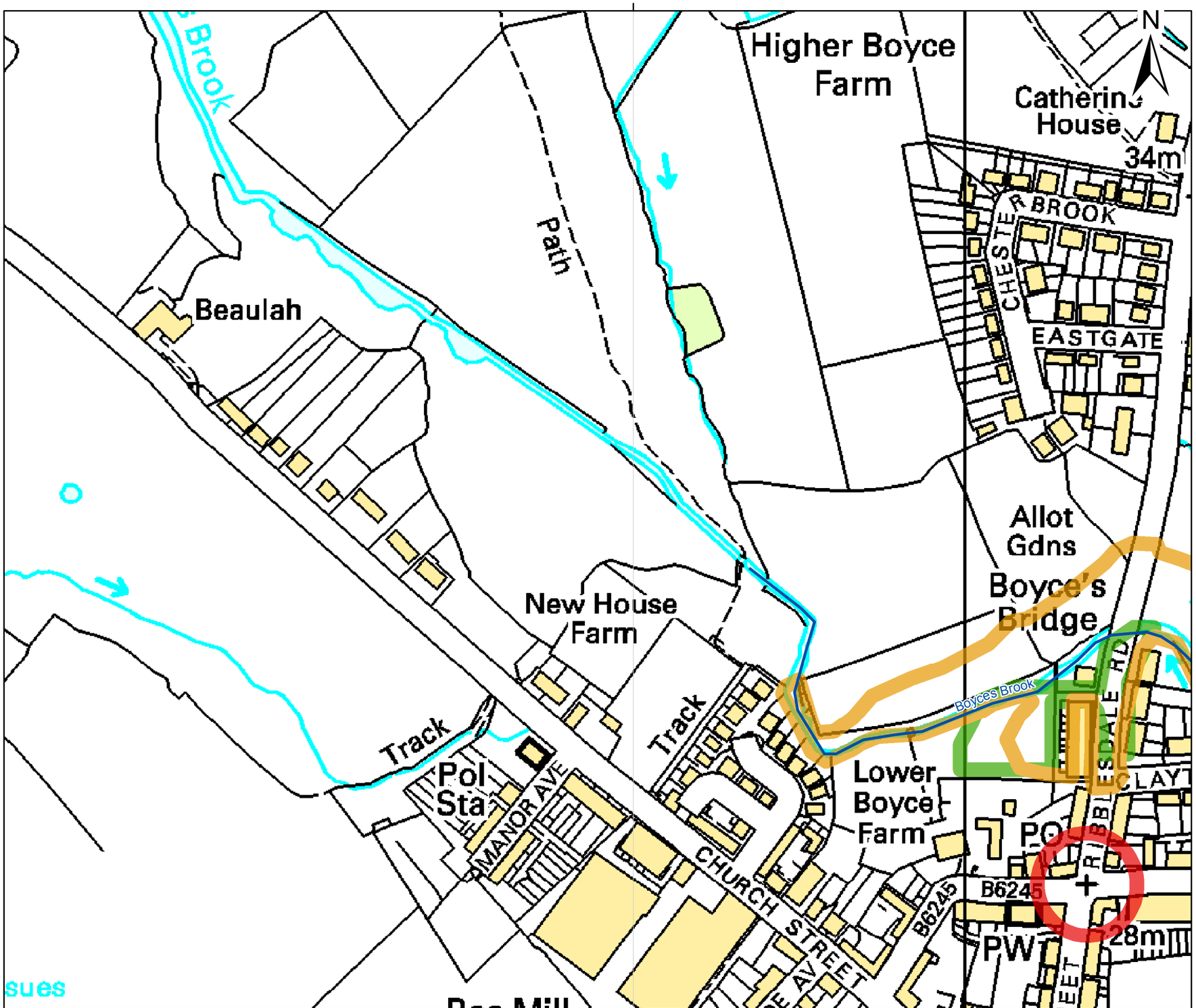
**Flood Zone 3** shows the area that could be affected by flooding:
- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

**Flood Zone 2** shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

**ABDs** (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.

# Flood History Map:
# PENDLE VIEW, PRESTON ROAD, RIBCHESTER, PR3 3XL

*Produced: 13 August 2020*
*Our Ref: CL178452*
*NGR: 364791,435615*




**Key:**

Main River

10/08/2011

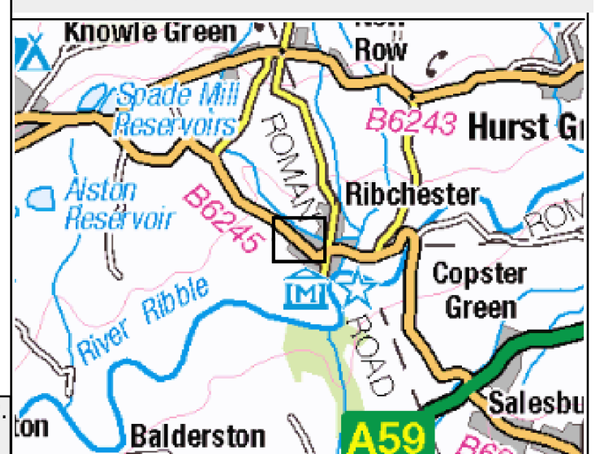
03/07/2007

25/08/2004

**Flood Zone 3** shows the area that could be affected by flooding:
- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

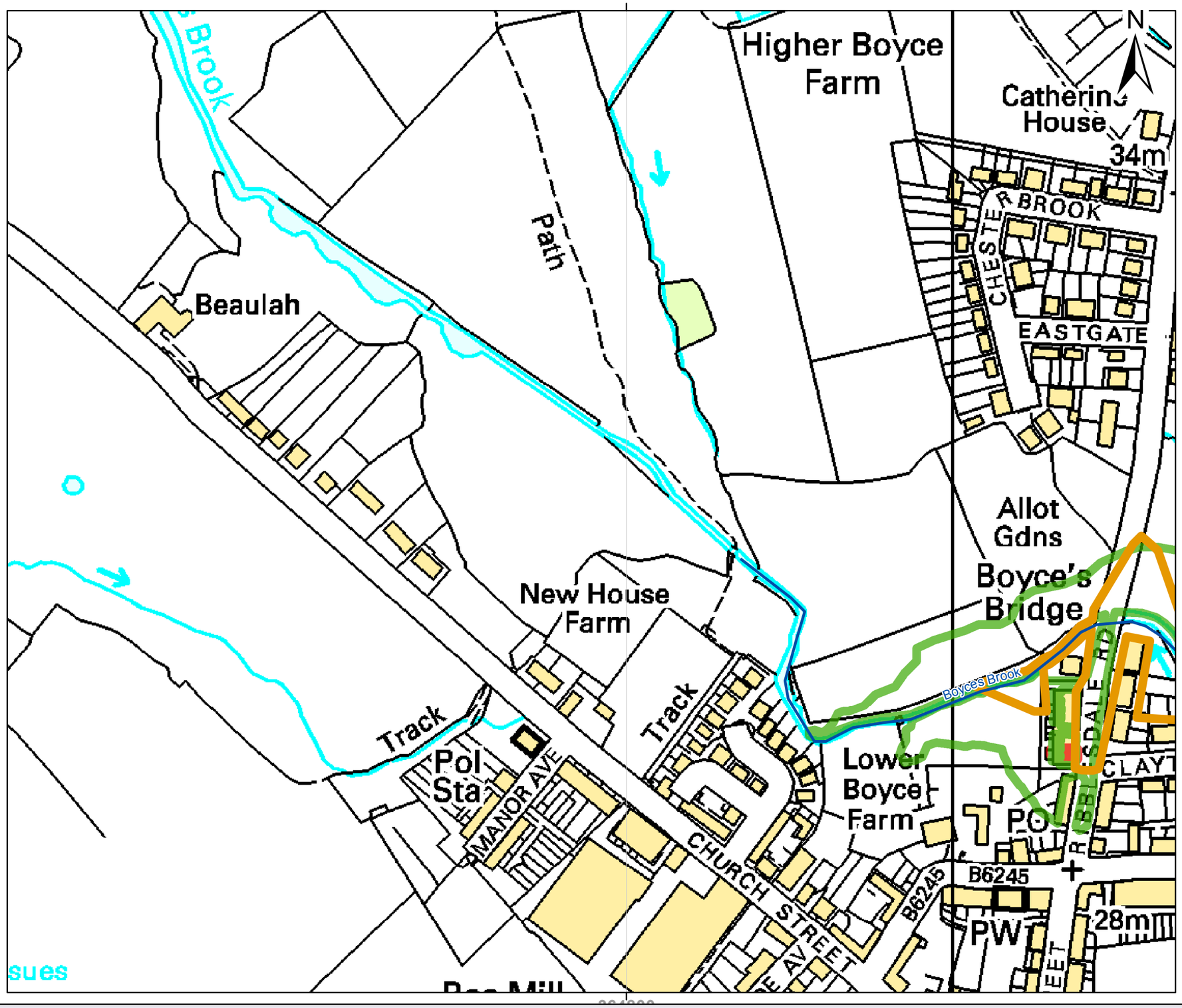
**Flood Zone 2** shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

**ABDs** (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.





**Contact Us:** National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk




Modelled water levels with climate change using +20% flow allowances are not suitable for the majority of planning purposes. New climate change allowances can be checked on the following website; www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances.


**Contact Us:** National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Environment Agency

**Flood History Map:**
**PENDLE VIEW, PRESTON ROAD, RIBCHESTER, PR3 3XL**

*Produced: 13 August 2020*
*Our Ref: CL178452*
*NGR: 364791,435615*

**Key:**

Main River

09/02/2020

26/12/2015

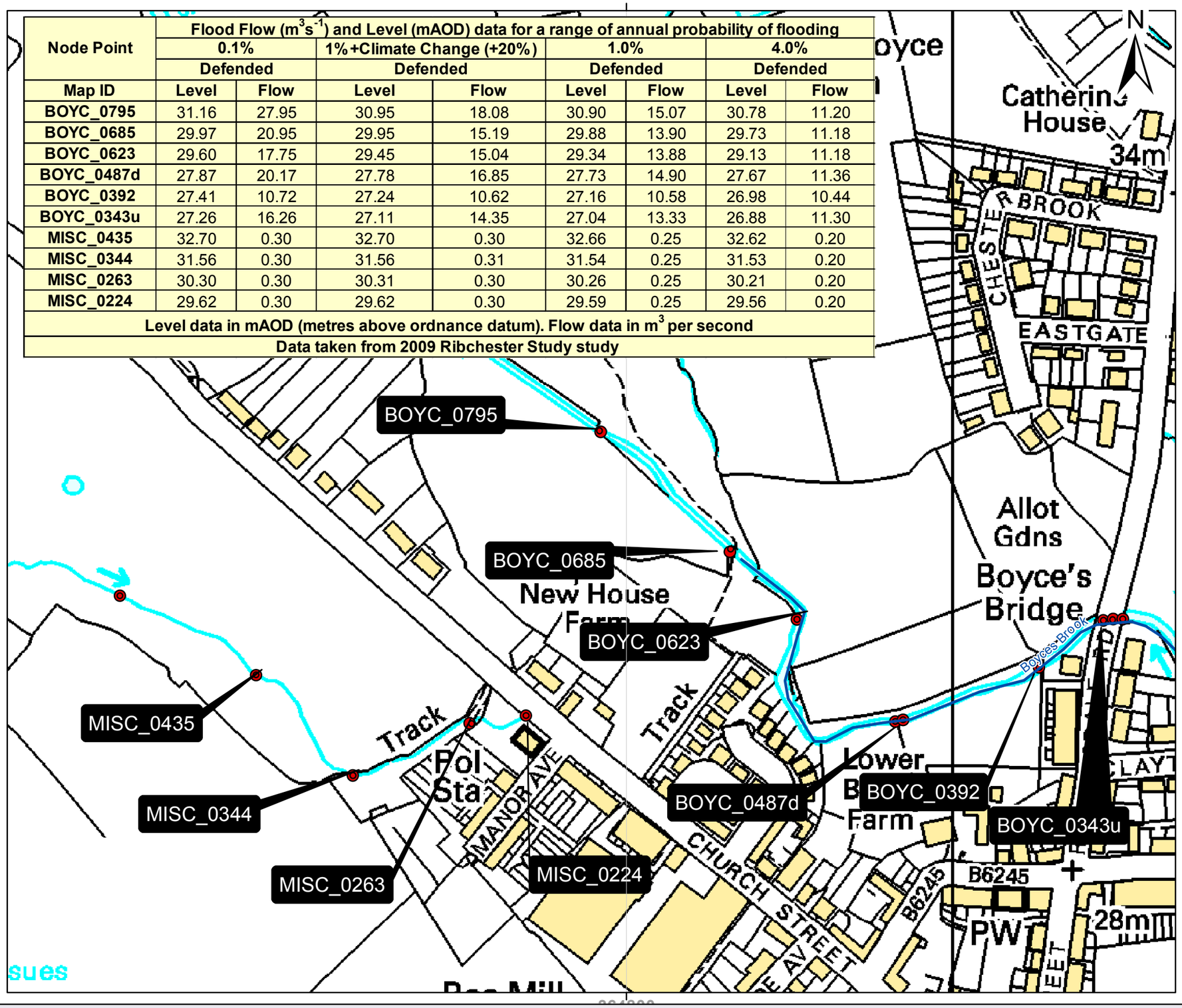
05/12/2015

**Flood Zone 3** shows the area that could be affected by flooding:
- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

**Flood Zone 2** shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

**ABDs** (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.

| Node Point | Flood Flow ($m^3s^{-1}$) and Level (mAOD) data for a range of annual probability of flooding | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 0.1% | | 1%+Climate Change (+20%) | | 1.0% | | 4.0% | |
| | Defended | | Defended | | Defended | | Defended | |
| Map ID | Level | Flow | Level | Flow | Level | Flow | Level | Flow |
| BOYC_0795 | 31.16 | 27.95 | 30.95 | 18.08 | 30.90 | 15.07 | 30.78 | 11.20 |
| BOYC_0685 | 29.97 | 20.95 | 29.95 | 15.19 | 29.88 | 13.90 | 29.73 | 11.18 |
| BOYC_0623 | 29.60 | 17.75 | 29.45 | 15.04 | 29.34 | 13.88 | 29.13 | 11.18 |
| BOYC_0487d | 27.87 | 20.17 | 27.78 | 16.85 | 27.73 | 14.90 | 27.67 | 11.36 |
| BOYC_0392 | 27.41 | 10.72 | 27.24 | 10.62 | 27.16 | 10.58 | 26.98 | 10.44 |
| BOYC_0343u | 27.26 | 16.26 | 27.11 | 14.35 | 27.04 | 13.33 | 26.88 | 11.30 |
| MISC_0435 | 32.70 | 0.30 | 32.70 | 0.30 | 32.66 | 0.25 | 32.62 | 0.20 |
| MISC_0344 | 31.56 | 0.30 | 31.56 | 0.31 | 31.54 | 0.25 | 31.53 | 0.20 |
| MISC_0263 | 30.30 | 0.30 | 30.31 | 0.30 | 30.26 | 0.25 | 30.21 | 0.20 |
| MISC_0224 | 29.62 | 0.30 | 29.62 | 0.30 | 29.59 | 0.25 | 29.56 | 0.20 |
| Level data in mAOD (metres above ordnance datum). Flow data in $m^3$ per second | | | | | | | | |
| Data taken from 2009 Ribchester Study study | | | | | | | | |




Modelled water levels with climate change using +20% flow allowances are not suitable for the majority of planning purposes. New climate change allowances can be checked on the following website; www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances.


**Contact Us:** National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Environment Agency

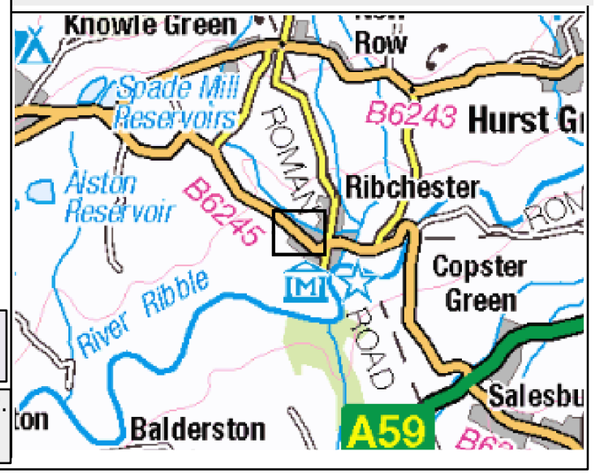
# Fluvial Levels Map: PENDLE VIEW, PRESTON ROAD, RIBCHESTER, PR3 3XL

*Produced: 13 August 2020*
*Our Ref: CL178452*
*NGR: 364791,435615*

**Flood Zone 3** shows the area that could be affected by flooding:
- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

**Flood Zone 2** shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

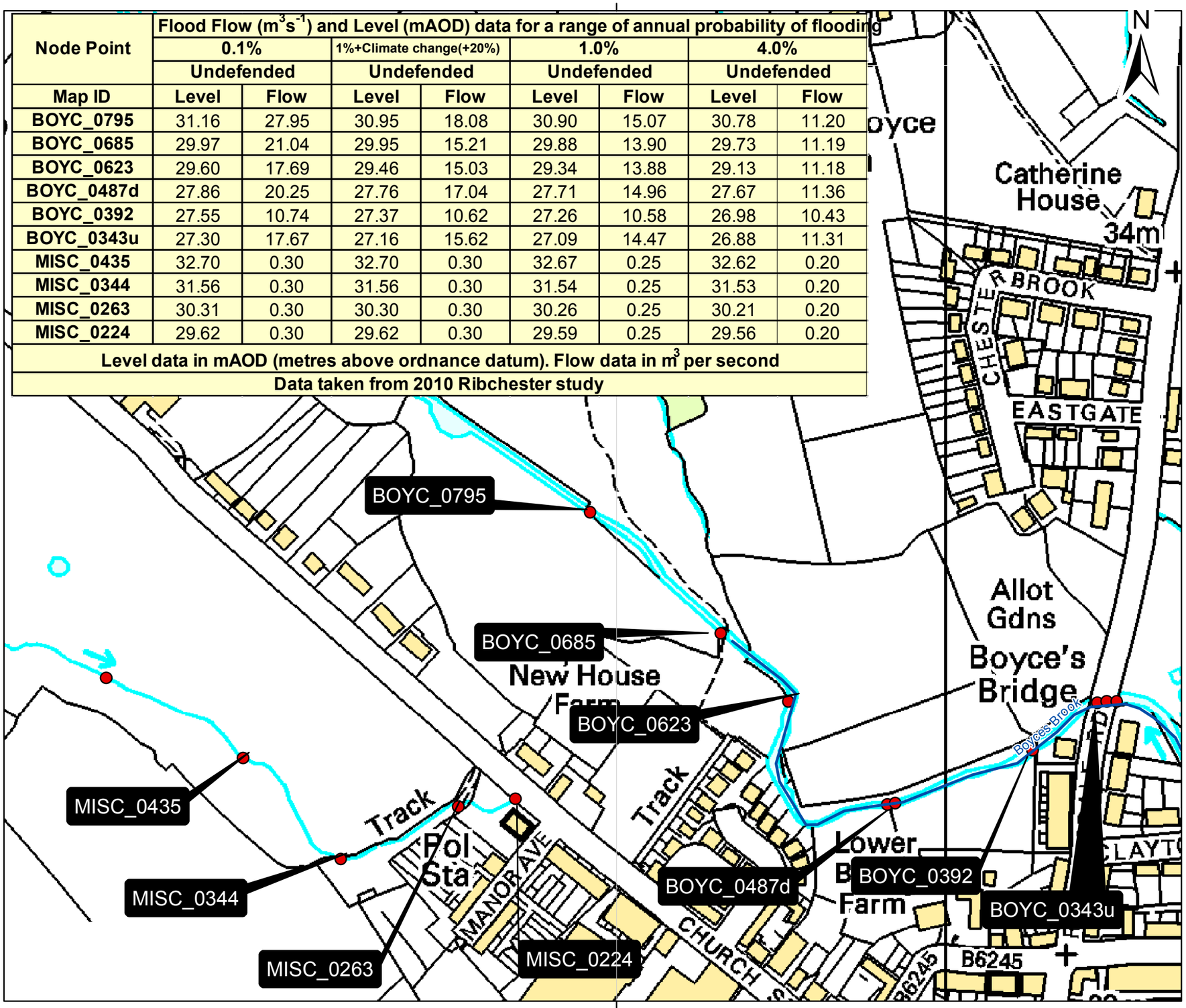
**ABDs** (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.



| Node Point | Flood Flow ($m^3s^{-1}$) and Level (mAOD) data for a range of annual probability of flooding | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 0.1% | | 1%+Climate change(+20%) | | 1.0% | | 4.0% | |
| | Undefended | | Undefended | | Undefended | | Undefended | |
| Map ID | Level | Flow | Level | Flow | Level | Flow | Level | Flow |
| BOYC_0795 | 31.16 | 27.95 | 30.95 | 18.08 | 30.90 | 15.07 | 30.78 | 11.20 |
| BOYC_0685 | 29.97 | 21.04 | 29.95 | 15.21 | 29.88 | 13.90 | 29.73 | 11.19 |
| BOYC_0623 | 29.60 | 17.69 | 29.46 | 15.03 | 29.34 | 13.88 | 29.13 | 11.18 |
| BOYC_0487d | 27.86 | 20.25 | 27.76 | 17.04 | 27.71 | 14.96 | 27.67 | 11.36 |
| BOYC_0392 | 27.55 | 10.74 | 27.37 | 10.62 | 27.26 | 10.58 | 26.98 | 10.43 |
| BOYC_0343u | 27.30 | 17.67 | 27.16 | 15.62 | 27.09 | 14.47 | 26.88 | 11.31 |
| MISC_0435 | 32.70 | 0.30 | 32.70 | 0.30 | 32.67 | 0.25 | 32.62 | 0.20 |
| MISC_0344 | 31.56 | 0.30 | 31.56 | 0.30 | 31.54 | 0.25 | 31.53 | 0.20 |
| MISC_0263 | 30.31 | 0.30 | 30.30 | 0.30 | 30.26 | 0.25 | 30.21 | 0.20 |
| MISC_0224 | 29.62 | 0.30 | 29.62 | 0.30 | 29.59 | 0.25 | 29.56 | 0.20 |

Level data in mAOD (metres above ordnance datum). Flow data in $m^3$ per second

Data taken from 2010 Ribchester study




# Environment Agency

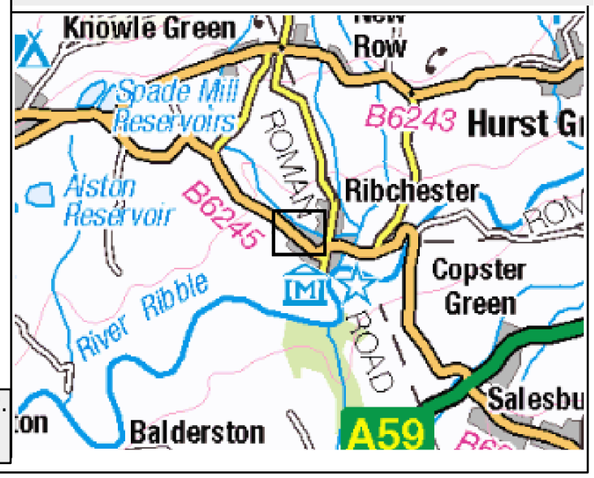
## Fluvial Levels Map: PENDLE VIEW, PRESTON ROAD, RIBCHESTER, PR3 3XL

*Produced: 13 August 2020*
*Our Ref: CL178452*
*NGR: 364791,435615*

**Flood Zone 3** shows the area that could be affected by flooding:
- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

**Flood Zone 2** shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

**ABDs** (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.

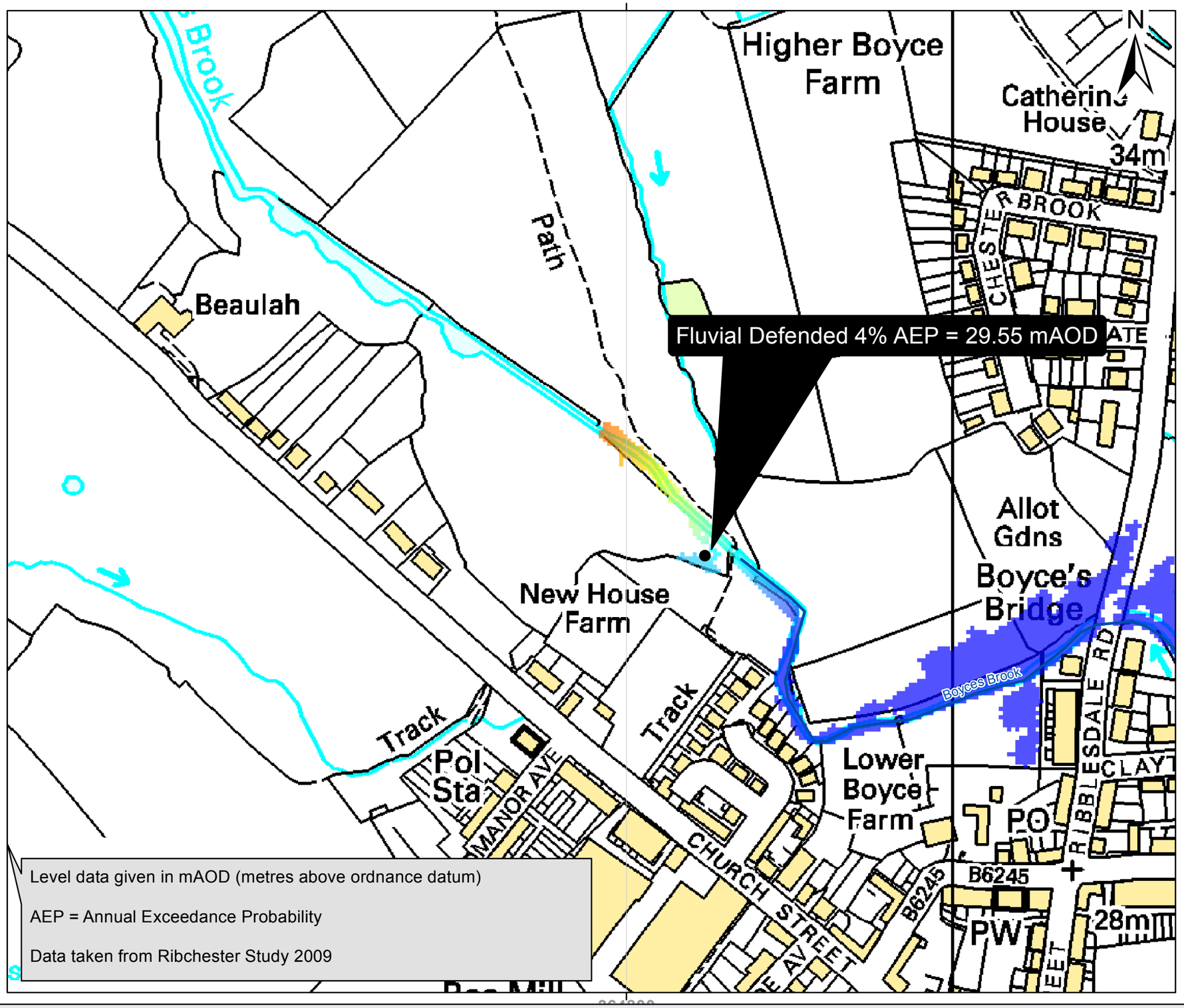




**Contact Us:** National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

# Fluvial Flood Levels Map: PENDLE VIEW, PRESTON ROAD, RIBCHESTER, PR3 3XL

*Produced: 24 August 2020*
*Our Ref: CL178452*
*NGR: 364791,435615*




**Key:**

Main River

**Fluvial Defended 4% annual probability of flooding**

**mAOD**

High : 31

Low : 29

**Flood Zone 3** shows the area that could be affected by flooding:
- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

**Flood Zone 2** shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

**ABDs** (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.

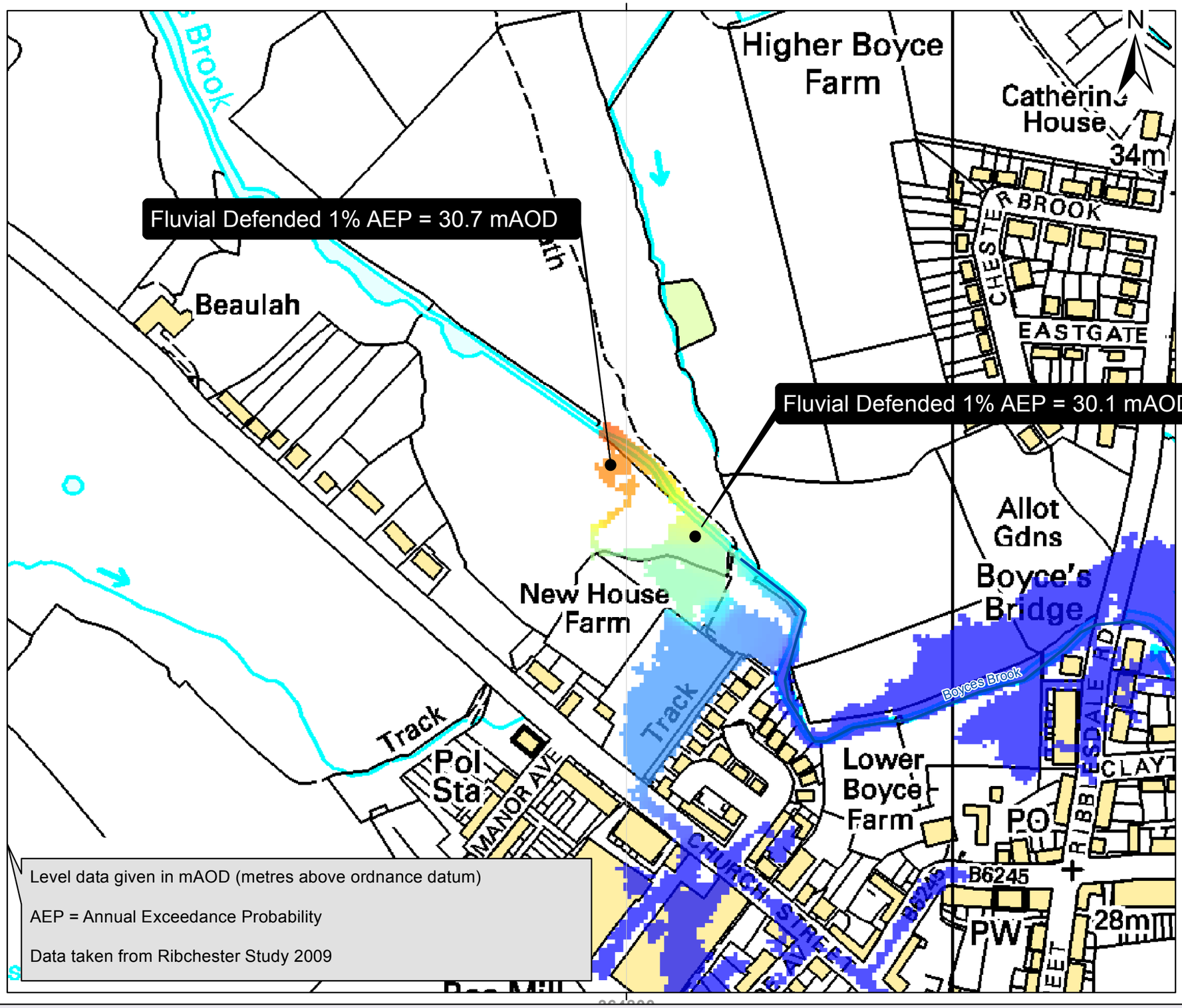

Modelled water levels with climate change using +20% flow allowances are not suitable for the majority of planning purposes. New climate change allowances can be checked on the following website; www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances.


**Contact Us:** National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Environment Agency

# Fluvial Flood Levels Map: PENDLE VIEW, PRESTON ROAD, RIBCHESTER, PR3 3XL

*Produced: 24 August 2020*
*Our Ref: CL178452*
*NGR: 364791,435615*




**Key:**

Main River

**Fluvial Defended 1% annual probability of flooding**

**mAOD**

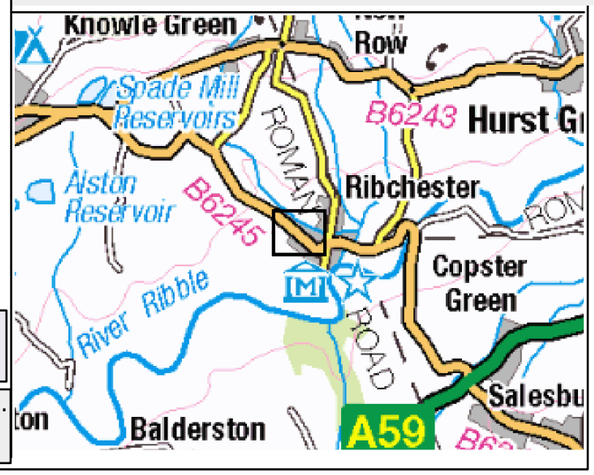
High : 31

Low : 29

**Flood Zone 3** shows the area that could be affected by flooding:
- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

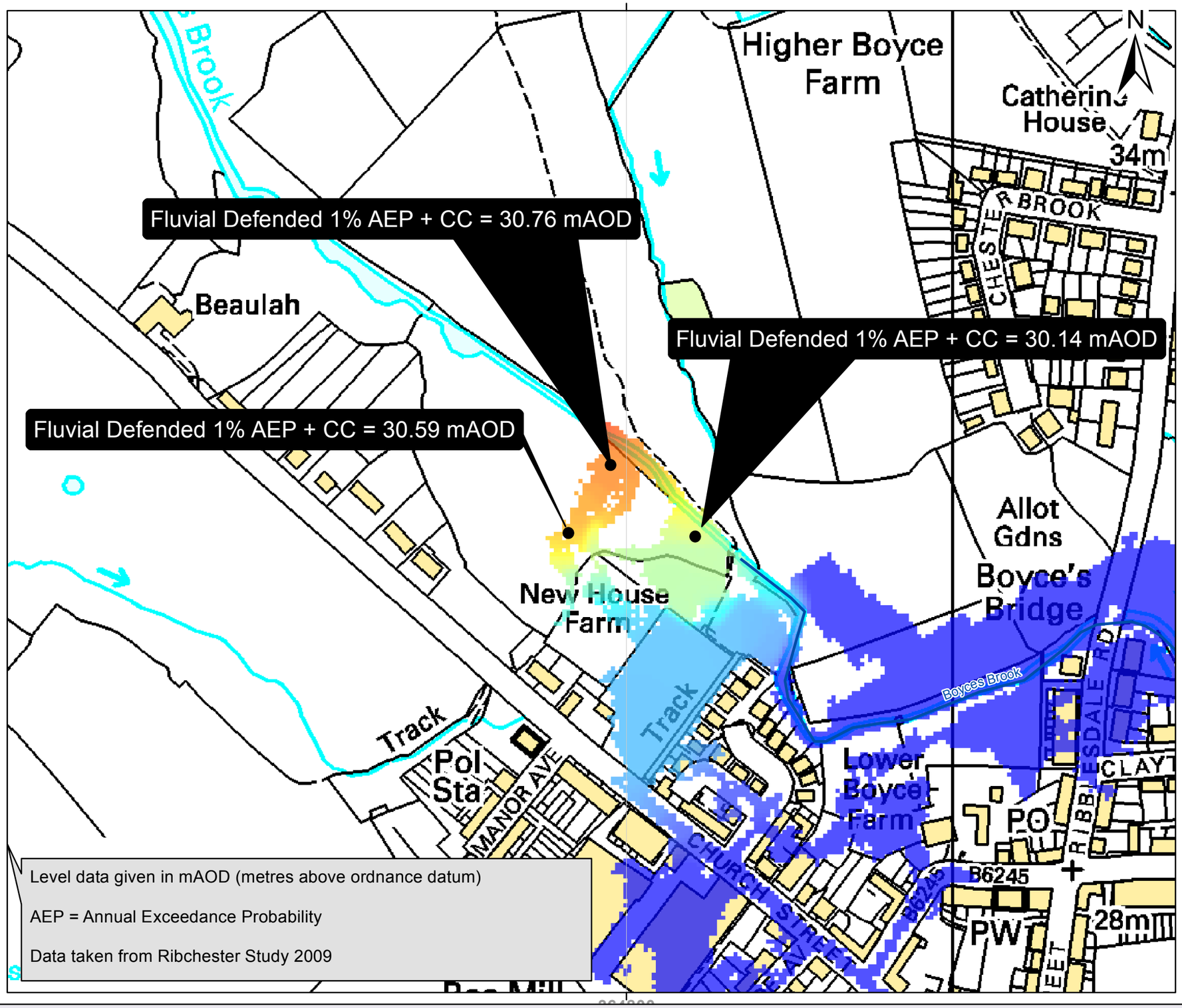
**Flood Zone 2** shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

**ABDs** (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.




Modelled water levels with climate change using +20% flow allowances are not suitable for the majority of planning purposes. New climate change allowances can be checked on the following website; www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances.


**Contact Us:** National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk




Modelled water levels with climate change using +20% flow allowances are not suitable for the majority of planning purposes. New climate change allowances can be checked on the following website; www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances.


**Contact Us:** National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Environment Agency

# Fluvial Flood Levels Map: PENDLE VIEW, PRESTON ROAD, RIBCHESTER, PR3 3XL

*Produced: 24 August 2020*
*Our Ref: CL178452*
*NGR: 364791,435615*

**Key:**

Main River

**Fluvial Defended 1% annual probability of flooding + Climate change**

**mAOD**

High : 31

Low : 29

**Flood Zone 3** shows the area that could be affected by flooding:
- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

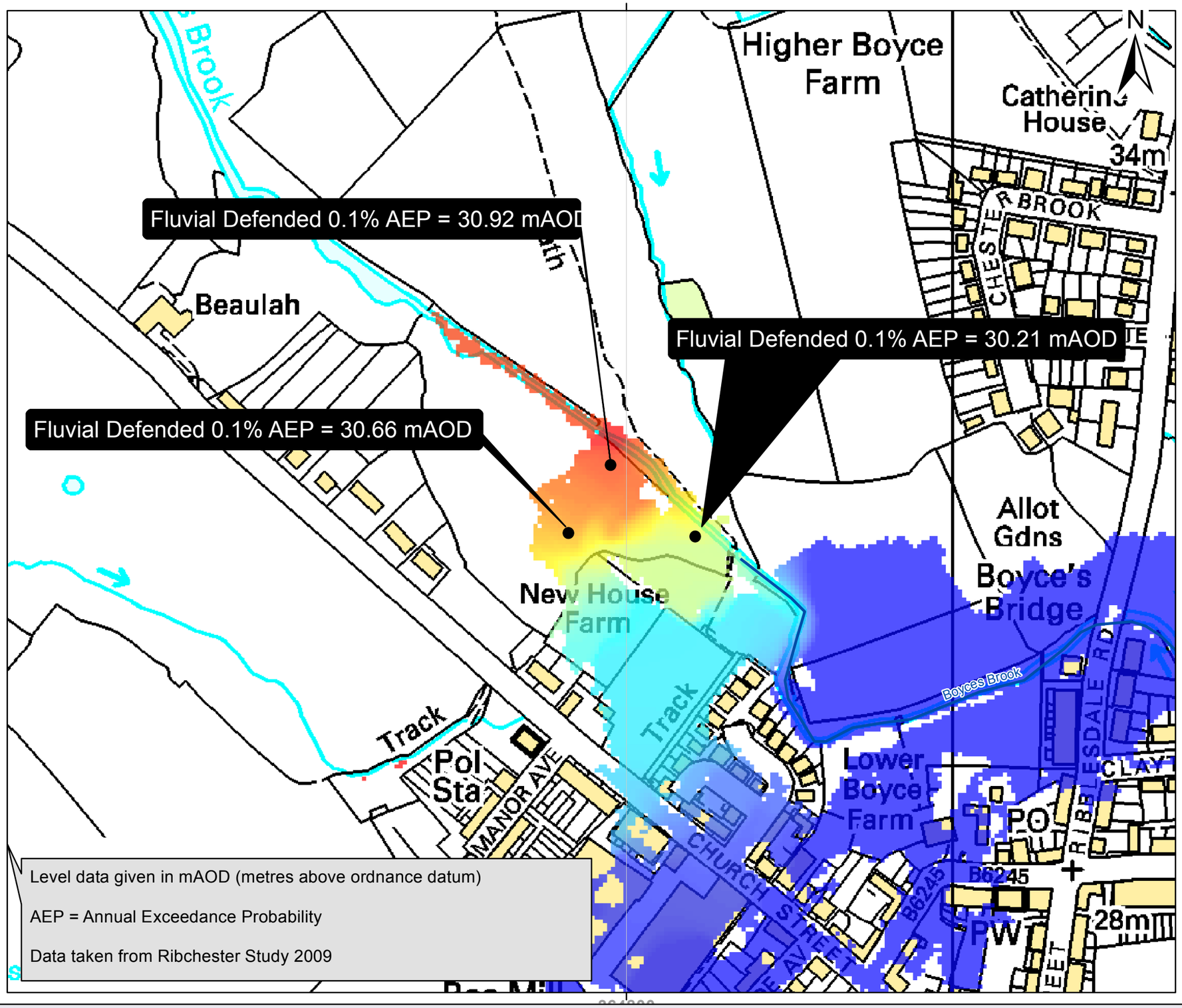
**Flood Zone 2** shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

**ABDs** (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.

Environment Agency

# Fluvial Flood Levels Map: PENDLE VIEW, PRESTON ROAD, RIBCHESTER, PR3 3XL

*Produced: 24 August 2020*
*Our Ref: CL178452*
*NGR: 364791,435615*




**Key:**

Main River

**Fluvial Defended 0.1% annual probability of flooding**

**mAOD**

High : 31

Low : 29

**Flood Zone 3** shows the area that could be affected by flooding:
- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

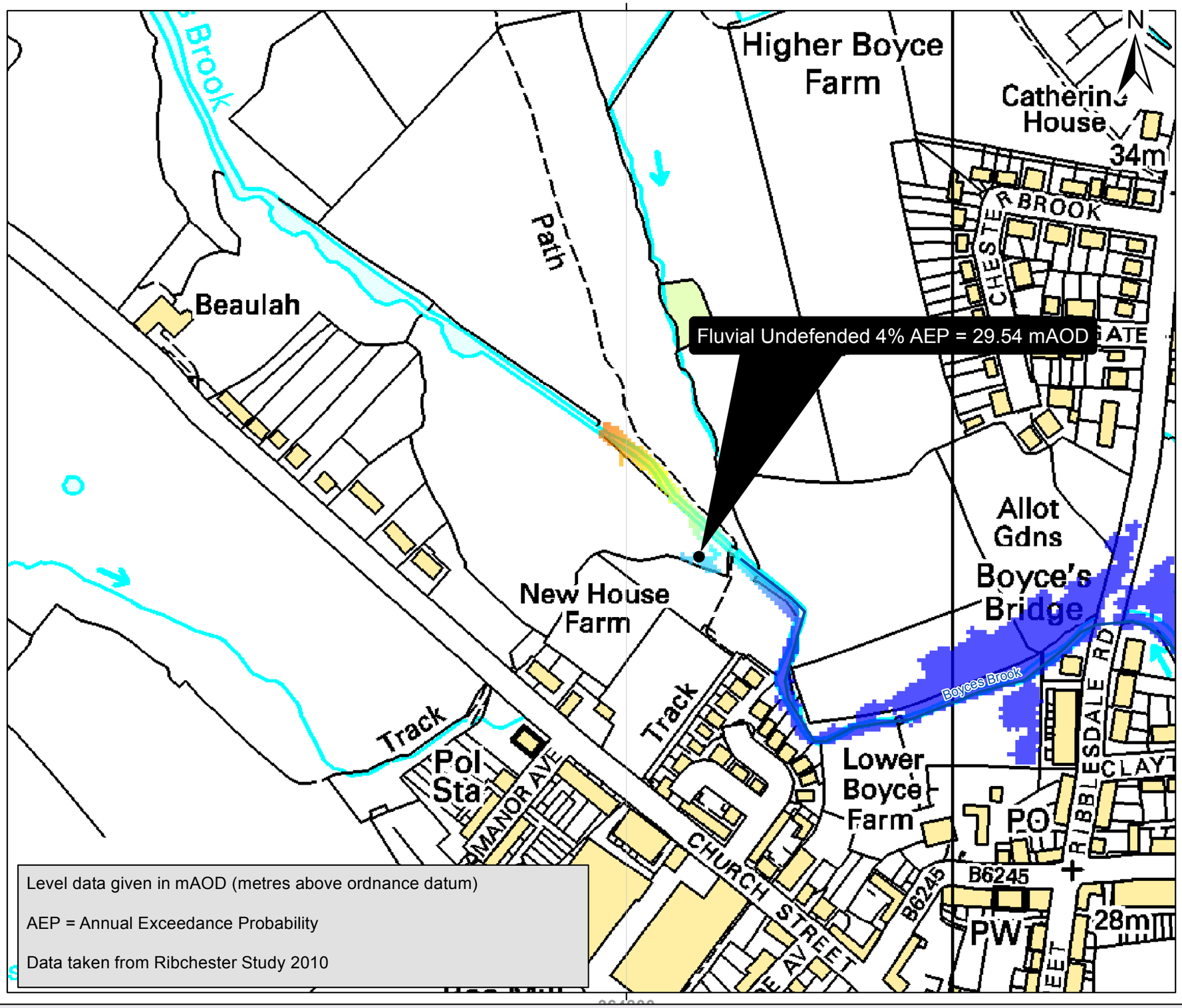
**Flood Zone 2** shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

**ABDs** (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.


Modelled water levels with climate change using +20% flow allowances are not suitable for the majority of planning purposes. New climate change allowances can be checked on the following website; www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances.



**Contact Us:** National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk




Modelled water levels with climate change using +20% flow allowances are not suitable for the majority of planning purposes. New climate change allowances can be checked on the following website; www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances.


**Contact Us:** National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Environment Agency

# Fluvial Flood Levels Map: PENDLE VIEW, PRESTON ROAD, RIBCHESTER, PR3 3XL

*Produced: 13 August 2020*
*Our Ref: CL178452*
*NGR: 364791,435615*

**Key:**

Main River

**Fluvial Undefended 4% annual probability of flooding**

**mAOD**

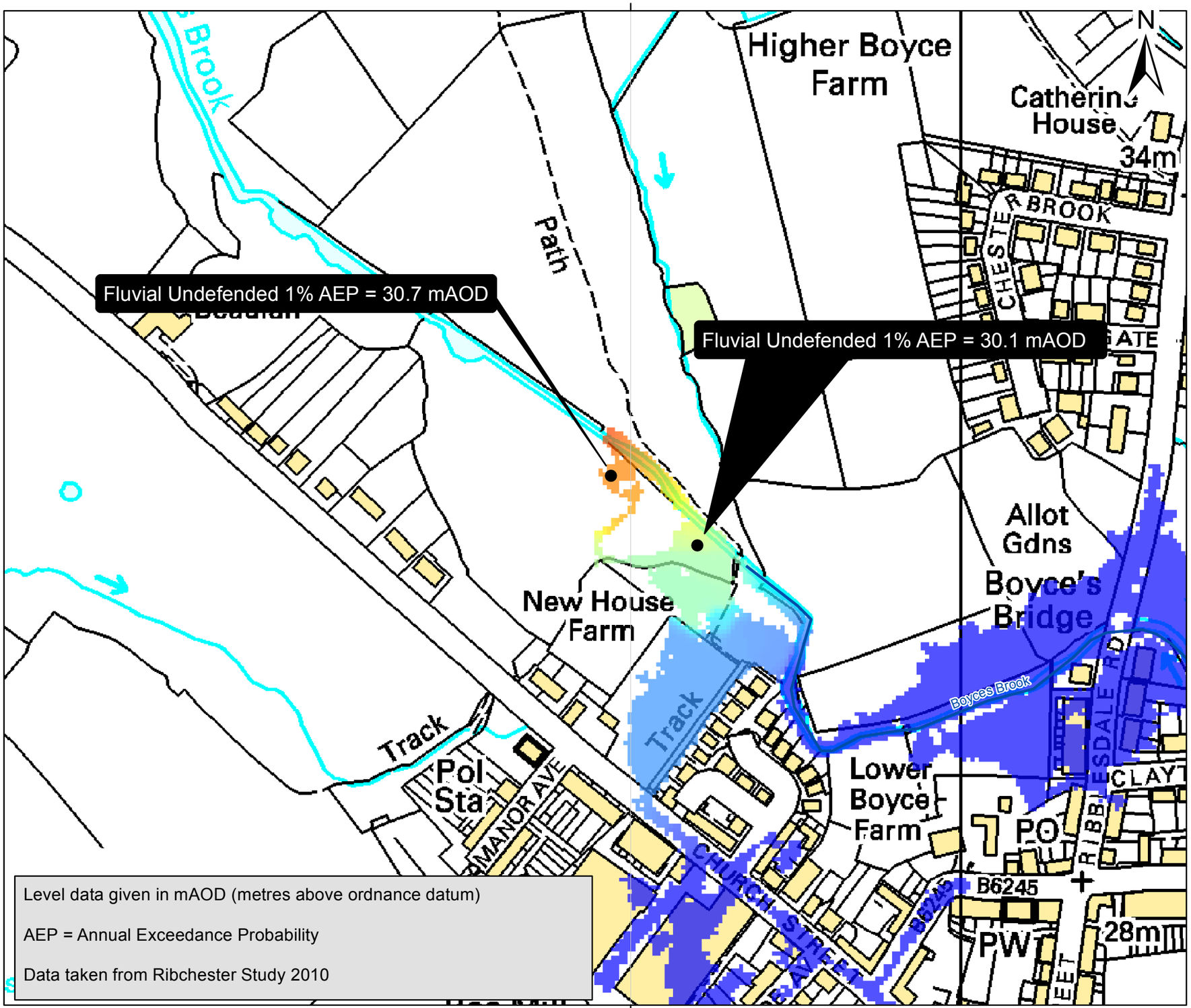
High : 31

Low : 29

**Flood Zone 3** shows the area that could be affected by flooding:
- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

**Flood Zone 2** shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

**ABDs** (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.




Modelled water levels with climate change using +20% flow allowances are not suitable for the majority of planning purposes. New climate change allowances can be checked on the following website; www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances.



**Contact Us:** National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Environment Agency

# Fluvial Flood Levels Map: PENDLE VIEW, PRESTON ROAD, RIBCHESTER, PR3 3XL

*Produced: 13 August 2020*
*Our Ref: CL178452*
*NGR: 364791,435615*

**Key:**

Main River

**Fluvial Undefended 1% annual probability of flooding**

**mAOD**

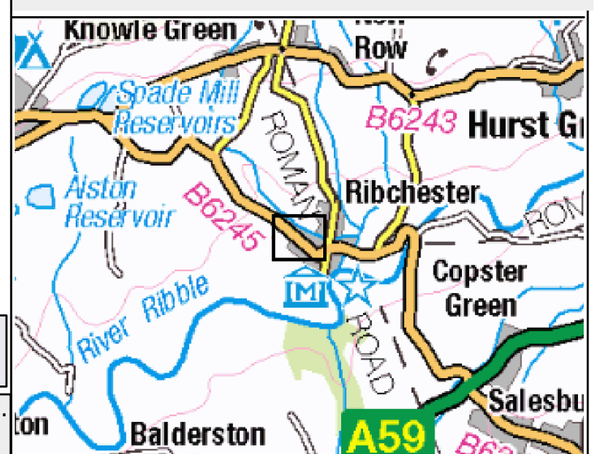
High : 31

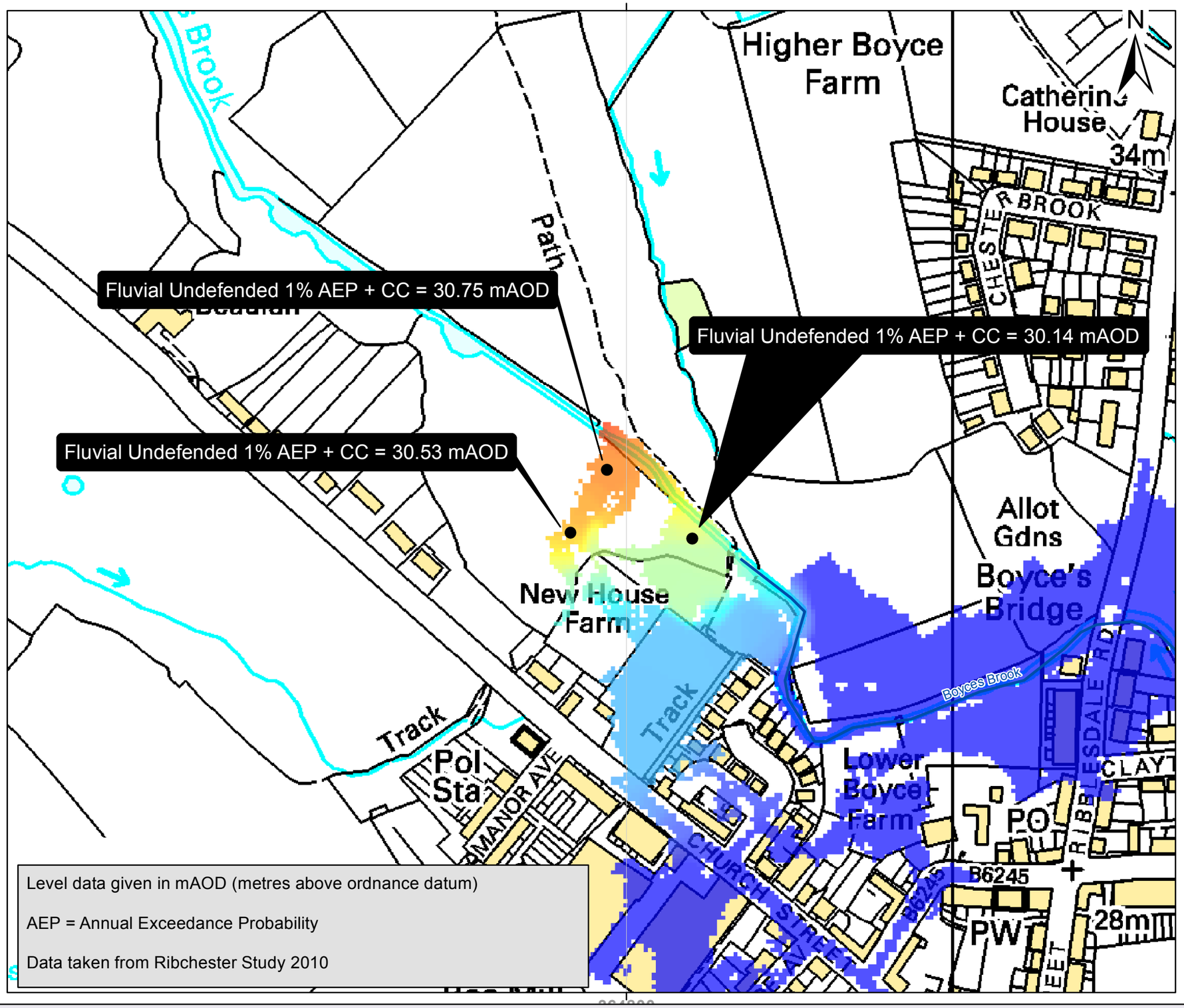
Low : 29

**Flood Zone 3** shows the area that could be affected by flooding:
- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

**Flood Zone 2** shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

**ABDs** (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.






Modelled water levels with climate change using +20% flow allowances are not suitable for the majority of planning purposes. New climate change allowances can be checked on the following website; www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances.


**Contact Us:** National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Environment Agency

# Fluvial Flood Levels Map: PENDLE VIEW, PRESTON ROAD, RIBCHESTER, PR3 3XL

*Produced: 13 August 2020*
*Our Ref: CL178452*
*NGR: 364791,435615*

**Key:**

Main River

**Fluvial Undefended 1% annual probability of flooding + Climate change**

**mAOD**

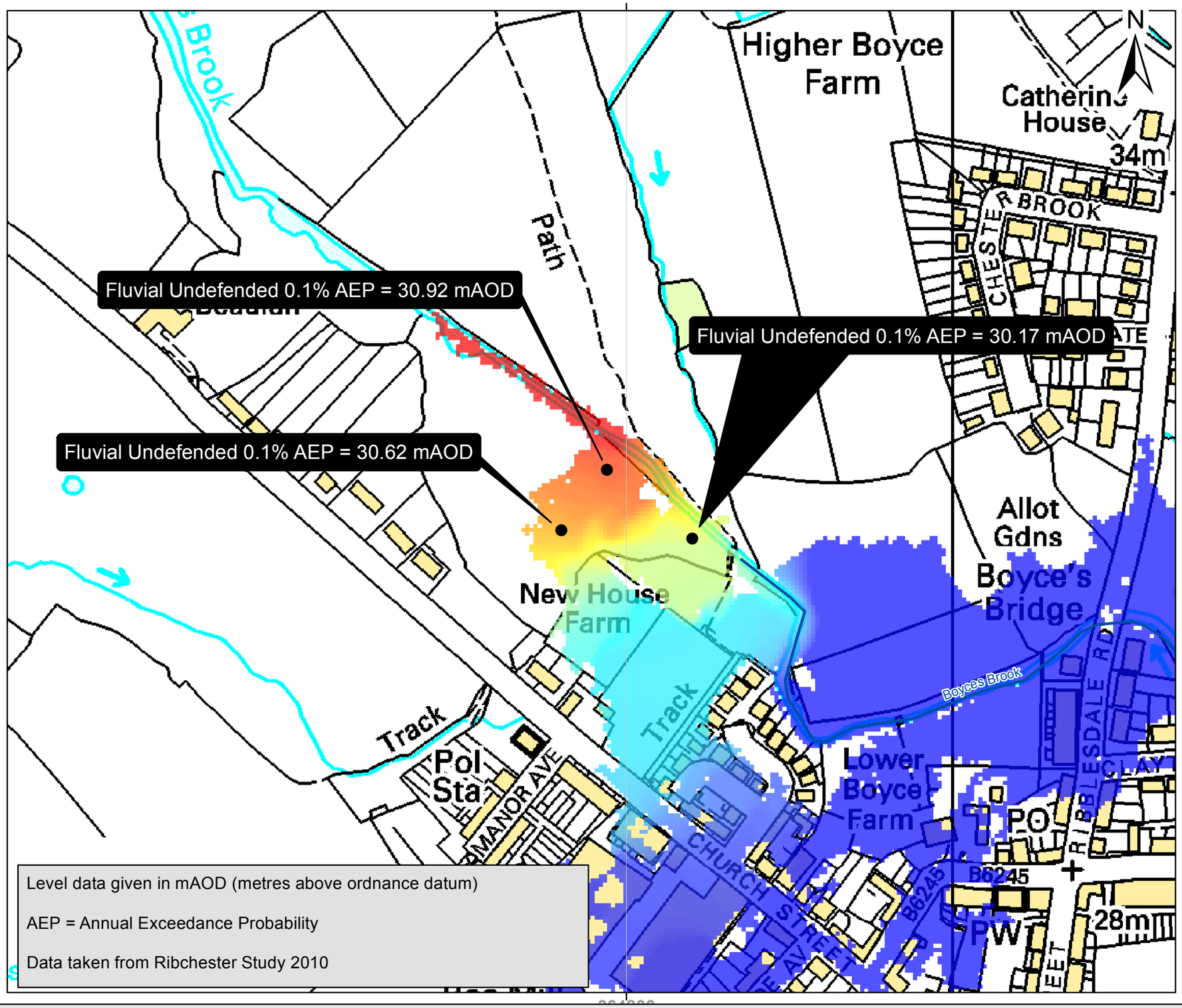
High : 31

Low : 29

**Flood Zone 3** shows the area that could be affected by flooding:
- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

**Flood Zone 2** shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

**ABDs** (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.




Modelled water levels with climate change using +20% flow allowances are not suitable for the majority of planning purposes. New climate change allowances can be checked on the following website; www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances.


**Contact Us:** National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Environment Agency

# Fluvial Flood Levels Map: PENDLE VIEW, PRESTON ROAD, RIBCHESTER, PR3 3XL

*Produced: 13 August 2020*
*Our Ref: CL178452*
*NGR: 364791,435615*

**Key:**

Main River

**Fluvial Undefended 0.1% annual probability of flooding**

**mAOD**

High : 31

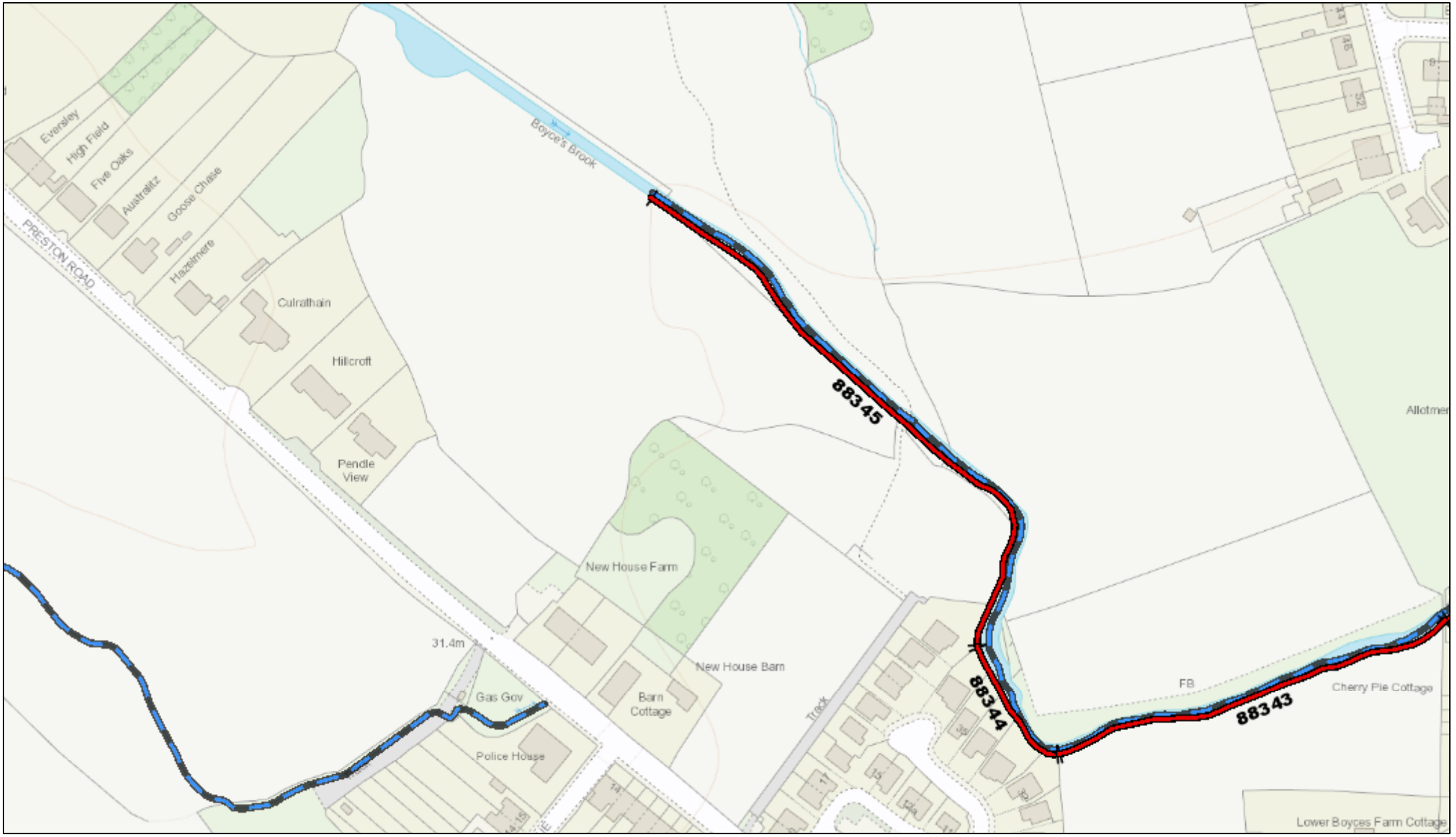
Low : 29

**Flood Zone 3** shows the area that could be affected by flooding:
- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

**Flood Zone 2** shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

**ABDs** (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.

# CL178452 Pendle View, Preston Road, Ribchester




July 22, 2020

Structures

Defences

Channels

Blank

1:1,830

0 0.015 0.03 0.06 mi

0 0.025 0.05 0.1 km

| Site Location | Pendle View, Preston Road, Ribchester | CL178452 |
|---|---|---|

**Fluvial Defences**

| Asset ID | National Grid Reference | Asset Type | Protection Type | Location | Maintained By | Design Standard (Return Period) | Overall Condition Grade (Excellent 1- 5 Very Poor) | Effective Crest Level (m) | | E.C.L Data Quality (Reliable 1-4 Unreliable) | Length (m) | Height (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | UCL (mAOD) | DCL (mAOD) | | | |
| 88343 | SD 65055 35521 | Embankment | Fluvial | Footbridge to End of Emb (Estate) | Unknown | 5 | 4 | 28.6 | 26.89 | - | 146.01 | - |
| 88344 | SD 64919 35474 | High Ground | Fluvial | End of Emb (Estate) to Weir | Unknown | 10 | 3 | - | - | - | 49.68 | - |
| 88345 | SD 64891 35511 | High Ground | Fluvial | Weir to MRL rear of New House Farm | Unknown | 5 | 3 | - | - | - | 219.72 | - |

**The Environmental Permitting (England and Wales) Regulations 2016 require a permit to be obtained for any activities which will take place:**

- **on or within 8 metres of a flood defence structure or culvert (16 metres if tidal)**
- **on or within 16 metres of a sea defence**

| | | |
|---|---|---|
| **Site Location** | Pendle View, Preston Road, Ribchester | CL178452 |

**Fluvial Structures**

| Asset ID | National Grid Reference | Asset Type | Protection Type | Location | Maintained By | Design Standard (Return Period) | Overall Condition Grade (Excellent 1- 5 Very Poor) | Width (m) | Height (m) |
|---|---|---|---|---|---|---|---|---|---|
| None | | | | | | | | | |

# Appendix C: - Personal Flood Plan

# Personal flood plan

**Name**

Environment Agency

**Are you signed up to receive flood warnings?** ☐
If not call Floodline on 0345 988 1188 to see if your area receives free flood warnings.

**Let us know** when you've completed your flood plan by calling Floodline on **0345 988 1188.** This will help us learn more about how people are preparing for flooding.

| General contact list | Company name | Contact name | Telephone |
|---|---|---|---|
| Floodline | Environment Agency | | 0345 988 1188 |
| Electricity provider | | | |
| Gas provider | | | |
| Water company | | | |
| Telephone provider | | | |
| Insurance company and policy number | | | |
| Local council | | | |
| Local radio station | | | |
| Travel/weather info | | | |

**Key locations**

| Service cut-off | Description of location |
|---|---|
| Electricity | |
| Gas | |
| Water | |

**Who can help/who can you help?**

| Relationship | Name | Contact details | How can they/you help? |
|---|---|---|---|
| Relative | | | |
| Friend or neighbour | | | |

Be prepared for flooding. Act now

# Personal flood plan

## What can I do NOW?

Environment Agency

- Put important documents out of flood risk and protect in polythene ☐
- Check your insurance covers you for flooding ☐
- Look at the best way of stopping floodwater entering your property ☐
- Make a flood plan and prepare a flood kit ☐
- Find out where you can get sandbags ☐
- Identify who can help you/ who you can help ☐
- Identify what you would need to take with you if you had to leave your home ☐
- Understand the flood warning codes ☐

**What can you do if a flood is expected in your area?**

| Actions | Location |
|---|---|
| **Home** | |
| • Move furniture and electrical items to safety | |
| • Put flood boards, polythene and sandbags in place | |
| • Make a list now of what you can move away from the risk | |
| • Turn off electricity, water and gas supplies | |
| • Roll up carpets and rugs | |
| • Unless you have time to remove them hang curtains over rods | |
| • Move sentimental items to safety | |
| • Put important documents in polythene bags and move to safety | |
| **Garden and outside** | |
| • Move your car out of the flood risk area | |
| • Move any large or loose items or weigh them down | |
| **Business** | |
| • Move important documents, computers and stock | |
| • Alert staff and request their help | |
| • Farmers move animals and livestock to safety | |
| **Evacuation - Prepare a flood kit in advance** | |
| • Inform your family or friends that you may need to leave your home | |
| • Get your flood kit together and include a torch, warm and waterproof clothing, water, food, medication, toys for children and pets, rubber gloves and wellingtons | |

There are a range of flood protection products on the market to help you protect your property from flood damage. A directory of these is available from the **National Flood Forum** at **www.bluepages.org.uk**

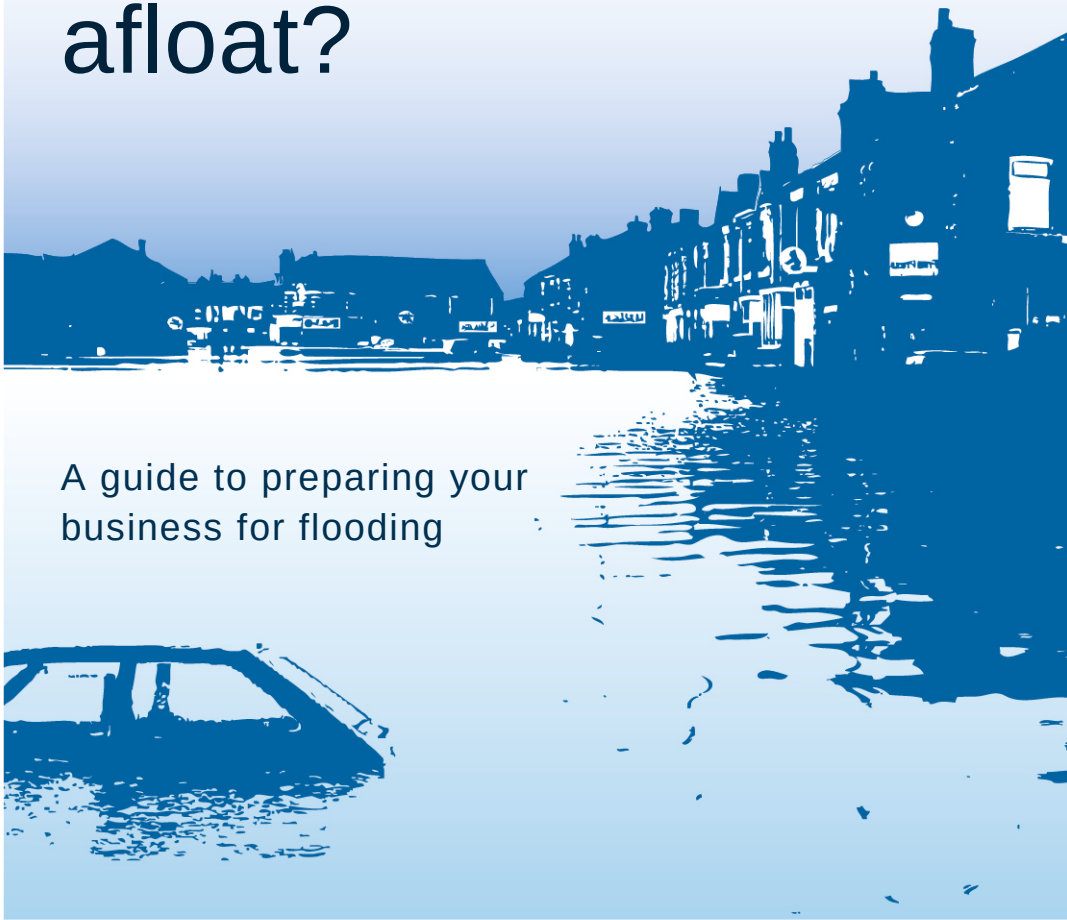
Be prepared for flooding. Act now

GEHO0709BQPU-E-E

# Appendix D: - Business Flood Plan

Environment Agency

# would your business stay afloat?



A guide to preparing your business for flooding

Flooding is the most common and widespread natural disaster in the UK. Since 1998 there has been at least one serious flood every year. Businesses like yours are more likely to be flooded than destroyed by fire. As our climate changes we can expect to see more extreme weather – and more floods.

We aim to reduce the likelihood of flooding by managing land, rivers, coastal systems and flood defences. While we do everything we can to reduce the chance of flooding, it is a natural process and can never be completely eliminated.

By taking action to prepare in advance for flooding, most businesses can save between 20 and 90 per cent on the cost of lost stock and movable equipment, as well as some of the trouble and stress that goes with such an event.

This is a simple guide to some of the easy actions that you can take to make sure that your business is as well prepared as possible.

It tells you about how to find out if your business is at risk, our flood warning service and what our flood warning codes mean. It also has a simple template to use to design a flood plan for your company.

For more information about flooding, visit our website at **www.gov.uk/flood** or call Floodline on **0345 988 1188**.

Make sure that your business is prepared for flooding.

# How do I find out if my business is at risk from flooding?

There are two quick and easy ways for you to find out if you're at risk.

## call us on
## 0345 988 1188

Our Floodline service is open 24 hours, calls are charged at local rate. By taking your postcode, our operators will check and see if your business is in a flood risk area.

## Look at our website
www.gov.uk/flood

You need to be aware of flooding and keep an eye on the water levels and weather situation at all times. You can do this by checking the flood forecasts and the river and sea levels on our website.

Our online flood map uses the latest technology and data gathered over many years to give the most accurate view of flooding in your area.

By entering your postcode you can find out if your business is at risk. Areas at risk from flooding are shown in dark blue and areas at risk from extreme flooding in light blue.

# My business is at risk from flooding. What should I do now?

Start preparing now. If the weather conditions are right, flooding can happen at any time.

Remember, floods can happen at any time and any day – make sure you provide a number that can be contacted at all times – even out of working hours.

## Sign up for flood warnings.

The first thing you should do is find out if you can receive flood warnings. In areas of high flood risk, we offer a service called Floodline Warnings Direct. This is a free, 24 hour service that sends automated flood warnings by telephone, SMS text, email, fax or pager.

To find out if you can receive this service, call Floodline on 0345 988 1188.

If your business isn't in an area covered by our warnings you can still check the latest flood warnings in force on our website.

When the situation is serious, flood warnings will also be broadcast on local television and radio news.

# What practical steps can I take to protect my business?

Now that you've checked your risk and found out about flood warnings, it's time to start thinking about preparing a flood plan specifically for your business.

Taking simple steps can go a long way to protecting your business from flooding. Preparing a flood plan could:

- Significantly reduce financial losses, damage to property and business interruption;
- Help compliance with regulatory requirements (for example, Occupier's Liability Act 1984);
- Reduce exposure to civil or criminal liability;
- Enhance your company's image and credibility with employees, customers, suppliers and the community;
- Help fulfil your moral responsibility to protect employees, the community and the environment;
- Help you to obtain insurance cover.

# What is a flood plan?

Just as many businesses have health and safety policies and contingency plans for an emergency, they should also have flood plans.

A flood plan is a written document that outlines how your business will respond to a flood.

This might include a list of steps you will take in case of a flood and the order you will take them in. It could also include the purchase of flood products and insurance.

A written plan can make information **easy** to access during a flood, **easy** to communicate to staff, and **easy** to remember.

**Small** businesses should make sure there is a plan of action in case of flooding. As the business owner, this may be your responsibility.

If your business is **medium sized**, flood preparation might be the responsibility of a team of people from different areas of the business.

If your business decides to have a flood planning team, this could be led by the business owner or Managing Director.

The leader of the flood planning team will need to let staff know about the plan once it is finished.

All members of the team should also keep a copy of important flood contacts at home for easy access.

Key areas to consider in your flood plan are:

- human resources;
- maintenance/facilities;
- finance and purchasing.

Once you have completed your plan don't forget about it. Look at it regularly and make sure it is up to date and in the event of a flood **use it**.

# business flood plan

## A written flood plan is recommended for businesses.

## It should include:

- A list of important contacts, including Floodline, building services, suppliers and evacuation contacts for staff;
- A description or map showing locations of key property, protective materials and service shut-off points;
- Basic strategies for protecting property, preventing business disruption and assisting recovery;
- Checklists of procedures that can be quickly accessed by staff during a flood.

If a flood is imminent, your main priority is to make sure that your staff are safe. However there may be other actions that you can take to prepare your building and it's contents to minimise damage and post-flood repair and restoration costs.

## Business flood plan

Flood plan for _____ dated _____

Registered address _____

_____

Postcode _____

## Staff contact list

| Name | Address | Telephone/mobile | Emergency contact | Emergency telephone and address |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

## Note staff who may require assistance in the event of a flood.

| Name | Office location |
|---|---|
| | |
| | |
| | |
| | |
| | |

## Key locations

| Service cut-off | Description of location |
|---|---|
| Electricity | |
| Gas | |
| Water | |
| | |
| | |
| | |
| | |

## Answer the following if applicable

| | Description of location | How to protect from a flood (for example, move, cover, tie down) |
|---|---|---|
| First Aid Kit | | |
| Oil based products (gasoline, oil, cooking oil etc.) | | |
| Chemicals (including cleaning products) | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

## Protective actions

Identify stock, equipment and possessions that may need special protective measures, and describe the actions you will take to prevent damage in the event of a flood. We have suggested items and ways to protect them, but make sure you follow through on your plans.

### think about:

- Computers;
- Tables / heavy furniture;
- Vehicles;
- Paper files;
- Electrical items;
- Chairs / stools;
- Databases;
- Soft furnishings;
- Computer files;
- Staff files.

### ways to protect items

- Make a copy of important documentation and store in safe location;
- Raise items above ground level;
- Buy flood protection products;
- Buy new flood-resistant items;
- Move items to a safer location if possible – to an upper level of the building or off site.

| Valuable item | Protective action | New location (if applicable) | Done |
|---|---|---|---|
| | | | ☐ |
| | | | ☐ |
| | | | ☐ |
| | | | ☐ |
| | | | ☐ |
| | | | ☐ |
| | | | ☐ |
| | | | ☐ |
| | | | ☐ |

## Suggested basic building materials to help protect your property

If materials are not needed, leave the relevant section blank

| Materials | Used for | Items to protect / where to use | Storage location | Done |
|---|---|---|---|---|
| Sand and sand bags (unfilled), shovel | Creating flood barriers (used with plastic sheeting) | | | ☐ |
| Tools – hammer, nails, saw | Boarding up doors, windows and openings, creating shelves | | | ☐ |
| Wood – plywood, blocks of wood | Boarding up doors, windows and openings, creating shelves | | | ☐ |
| Sturdy plastic sheeting | Sandbag barriers, pulling up around furniture and appliances | | | ☐ |
| Strong plastic bags | Putting around legs of tables and chairs | | | ☐ |
| Pallets | Raising stored stock above flood level | | | ☐ |
| Emergency power generator | Maintaining function of air conditioning units (can help dry out a building), running fridges and freezers, medical equipment if appropriate | | | ☐ |

Identify people who can help you before, during and after a flood, and what they can do.

We have suggested ways they might be able to help, but you'll need to discuss this with them.

| Name | Address | Telephone day | Telephone evening | Mobile |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

## Ways people can help

- assistance with installing flood products;
- assistance with transporting stock/materials to new location if possible;
- provision of emergency storage;
- provision of emergency supplies or medical support if required.

# discussion guide

This discussion guide sums up the key areas of flood planning. Some of this information can be found in this pack to help get you started.

## Research

- Look at your existing business policies, and think about whether they are appropriate in the event of a flood.

## Staff

- Make a list of **employees' contact details in the event of an evacuation**. This might include mobile telephone numbers, or numbers for their home or the home of a friend or relative;
- Think about staff who **may need special assistance** in the event of a flood (for example, elderly, deaf, blind etc.)

## Security procedures

- **Locking windows, doors** and **setting the alarm**. You might need more than one person to help do this;
- Insurance policies – **Are you insured for flood damage**, business interruption and lost revenue?
- Employee manuals – You might **add flood safety to staff information packs**, or adapt job descriptions to include flood warden duties;
- Hazardous materials plan – You must ensure that **chemicals, oils** and other **substances in your possession are kept safe** and do not contaminate flood water;
- Health and safety assessment – Plan to **check the functioning of flood products and flood warning systems regularly**, just as you do for fire safety equipment.

## Check codes and regulations that might apply to your business in the event of a flood. The following could provide guidance on the right actions to take:

- Occupational health and safety regulations;
- Environmental regulations.

## Important contacts

Make a list of important telephone numbers, including contacts for gas, electricity, water and telephone providers.

## Key locations

- **Know the location** of cut-off points for gas, electricity and water. Ideally, these should be marked on a map that is stored with your flood plan;
- Know the location of chemicals, oils or other materials that could be dangerous or contaminate flood water. These should be stored safe from floods and other damage.

## Protective actions

- Note key stock, equipment and possessions that may need special protection from flood water;
- Consider things you may need during or after a flood (for example, sandbags, plastic sheeting, loudspeaker);
- See if it's **possible to move key operations**, such as shipping or customer services, to another building.

## Suppliers and external links

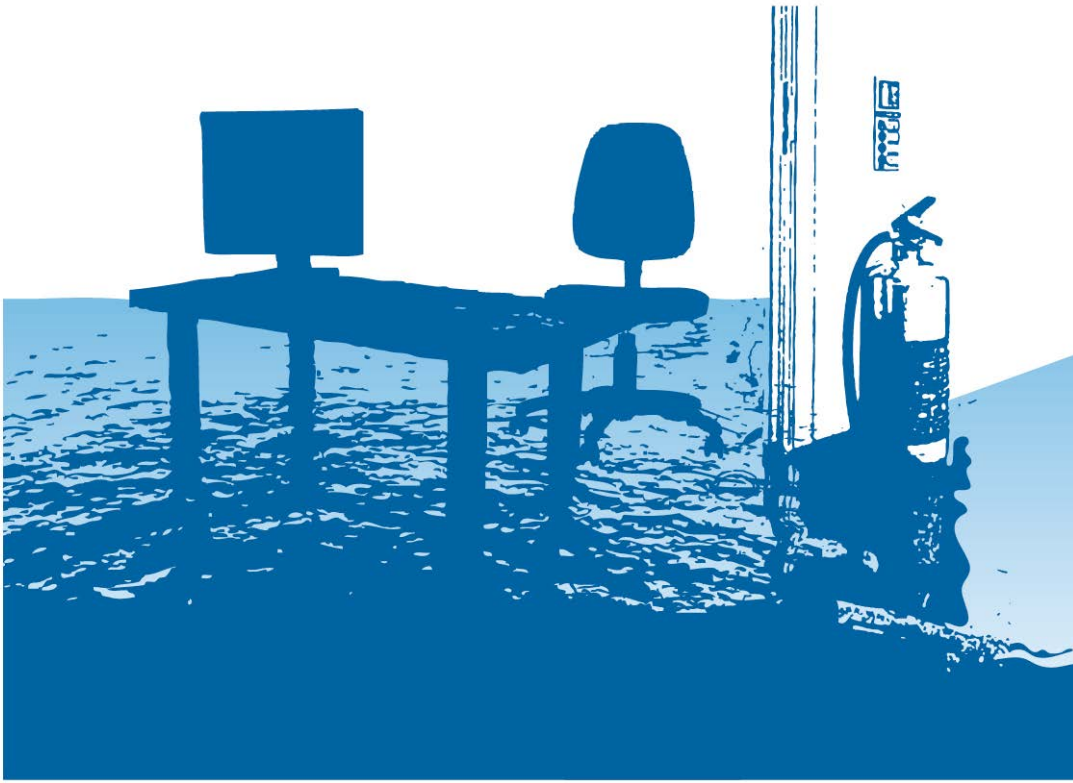
- Identify products and services you won't need in the event of a flood, or which suppliers may not be able to provide. **Make back-up plans** or arrangements for short-notice cancellation of deliveries;
- Consider contracting in advance with companies whose help you may need after a flood.

# business checklist

## Are you prepared for flooding?

If you answer no to any of the questions overleaf, there may be more you can do to protect your business.

The individual sections will give you valuable information on effective actions you can take to prepare for a flood.



If you can answer yes, please ☒, otherwise leave blank for no.

## Know if you're at risk

- ☐ Do you know if you're at risk of flooding?
- ☐ Are flood warnings available in your area?
- ☐ Do you know how you can receive flood warnings?

## Preparing a flood plan

- ☐ Do you know how your business will respond to a flood?
- ☐ Do you have a list of useful numbers including Floodline, local authority and insurance company?
- ☐ Do you know how to shut off your gas/electric/water supplies?
- ☐ Are your stock, fittings and valuable equipment stored above flood level?
- ☐ Have you developed flood contingency plans with suppliers and/or clients?
- ☐ Can you call someone to help you in the event of a flood?

## Staff training and evacuation

- ☐ Are you aware of correct flood safety procedures for you and your staff?
- ☐ Have you trained your staff on flood safety procedures?
- ☐ Can your staff work quickly and efficiently to protect your business in the event of a flood?

## Protecting your property

- ☐ Have you installed flood protection products?
- ☐ Do you have a stockpile of useful materials including plywood, plastic sheeting, sandbags (unfilled), sand, nails, hammer, shovel, blocks of wood and a saw?
- ☐ Have you installed non return valves in your toilets and drains?
- ☐ Do you and your staff have high ground where you can park your cars?
- ☐ Are your electrical sockets above flood level?
- ☐ Do you have computer equipment in the basement?

## Flood insurance

- ☐ Do you have sufficient insurance cover in the event of a flood situation?
- ☐ Do you know what information your insurer will require to support a claim?

## Evacuation

- ☐ Do you have an easy way to let your staff know about an evacuation?
- ☐ Do you know which roads will stay open in your area during a flood?
- ☐ Have you identified where staff can shelter in the event of a flood?
- ☐ Could you control staff panic during a flood?

# understand your flood warning codes

Our warning service has three types of warnings - Flood Alert, Flood Warning and Severe Flood Warning - that will help you prepare for flooding and take necessary actions.

## ONLINE FLOOD RISK FORECAST

**What it means**

Be aware.
Keep an eye on the weather situation.

**When it's used**

Forecasts of flooding on the Environment Agency website are updated a least once a day.

**What to do**

- Check weather conditions.
- Check for updated flood forecasts on our website.

## FLOOD ALERT

**What it means**

Flooding is possible.
Be prepared.

**When it's used**

Two hours to two days in advance of flooding.

**What to do**

- Be prepared to act on your flood plan.
- Prepare a flood kit of essential items.
- Monitor local water levels and the flood forecast on our website.

## FLOOD WARNING

### What it means

Flooding is expected. Immediate action required.

### When it's used

Half an hour to one day in advance of flooding.

### What to do

- Move staff, stock and valuables to a safe place.
- Turn off gas, electricity and water supplies if safe to do so.
- Put flood protection equipment in place.

## SEVERE FLOOD WARNING

### What it means

Severe flooding. Danger to life.

### When it's used

When flooding poses a significant risk to life.

### What to do

- Stay in a safe place with means of escape.
- Be ready should you need to evacuate.
- Co-operate with the emergency services.
- Call 999 if you are in immediate danger.

## WARNING NO LONGER IN FORCE

### What it means

No further flooding is currently expected in you area.

### When it's used

When river or sea conditions begin to return to normal.

### What to do

- Be careful. Flood water may still be around for several days.
- If you've been flooded, ring your insurance company as soon as possible.

# useful contacts

Fill in the contact details you may need if your business floods. Keep it in a safe place, where you can hold of it quickly.

| | Company name | Telephone number/s |
|---|---|---|
| **Environment Agency Floodline** | | 0345 988 1188 |
| **Electricity supplier and meter number** | | |
| **Gas supplier and meter number** | | |
| **Water supplier and meter number** | | |
| **Telephone provider** | | |
| **Local authority emergency services** | | |
| **Insurance company 24-hour number and policy number** | | |
| **Insurance agent** | | |
| **Local radio station for news alerts and weather updates** | | |
| **Companies that may be able to help you after a flood** | | |
| **Electrician** | | |
| **Plumber** | | |
| **Builder** | | |
| **Equipment repair/suppliers** | | |
| **Security services** | | |
| **Water pumping services** | | |
| **Emergency power suppliers** | | |

## Would you like to find out more about us, or about your environment?

## Then call us on
**08708 506 506* (Mon-Fri 8-6)**

## email
**enquiries@environment-agency.gov.uk**

## or visit our website
**www.gov.uk/environment-agency**

## incident hotline 0800 80 70 60 (24hrs)
## floodline 0345 988 1188 (24hrs)

*** Weekday Daytime calls cost 8p plus up to 6p/min from BT Weekend Unlimited. Mobile and other providers' charges may vary.**

Environment first: Are you viewing this on-screen? Please consider the environment and only print if absolutely necessary. If you're reading a paper copy, please don't forget to reuse and recycle if possible.

GEHO0111BTJI-E-E