FLOOD RISK AND DRAINAGE SOLUTIONS

NPPF Flood Risk Assessment

The Stables, Off King Street, Whalley, Clitheroe

Report No: 2018-012

Client: Lino Della Pesca
(Whalley Leisure Ltd)

Date: 16/01/2019

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Contract

This report describes work commissioned by Jensen Kos on behalf of Lino Della Pesca (Whalley Leisure Ltd) dated 07th January 2019. Chris Vose of Flood Risk and Drainage Solutions carried out the work.

Disclaimer

This document has been prepared solely as a Flood Risk Assessment for Lino Della Pesca (Whalley Leisure Ltd). Flood Risk and Drainage Solutions 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 have been appointed by Lino Della Pesca (Whalley Leisure Ltd), to provide a Flood Risk Assessment in support of a planning application for the change of use of an existing building named 'The Stables' to a restaurant, with the addition of a small extension within the associated court yard area of the property, located off King Street, Whalley, Clitheroe, Lancashire.

The site is shown to be situated within Flood Zone 2 of the Environment Agency Flood Map and therefore has a medium risk of fluvial flooding.

An initial assessment indicates that the primary flood risk at the proposed development is from the fluvial source the River Calder.

The application site at present comprises of the old stable building, court yard to the north and associated car parking area to the west, vehicular access is provided from an access road from King Street to the east.

At the time of writing a topographical survey was not available, therefore LIDAR Data was used to estimate the levels onsite, which range from 45.40m AOD at the southern extent of the site, rising to 45.86m AOD at the north of the site.

The footprint on which the new extension will be located within the court yard area has a level of **45.86m AOD.**

The Environment Agency have provided Historic Flood Information in relation to historic flood events which shows that the application site was flooded during the floods of December 2015, but was not affected during the floods of June 2012.

Fluvial: River Calder

The Environment Agency have provided flood plain levels associated with the River Calder reflecting the most recent modelling, approximately 100m south of the application site for a range of return periods.

To provide a worst-case scenario Undefended levels have been used in order to evaluate the flood levels at the application site.

100 Year Event (Flood Zone 3)

The flood level associated with the 100-year event is identified to be 45.02m AOD.

The ground level on which the footprint of the proposed extension is to be located has been derived using LIDAR Data as approximately 45.86m AOD.

As such during the 100 year return period the application site is sufficiently elevated by 0.84m.

100 Year + 20% Climate Change

The flood level associated with the 100-year + 20% event is identified to be 45.36m AOD.

Therefore during the 100 year + 20% climate change return period the proposed extension is sufficiently elevated by 0.50m.

100 Year + 30% Climate Change Event

The EA have not provided flood levels for the 100 year event with the application of 30% climate change as required by current EA Guidance, therefore the flood level has been estimated using interpolation as 45.53m AOD.

During the 100 year + 30% climate change return period the proposed extension is sufficiently elevated by 0.33m.

1000 Year Event (Flood Zone 2)

The flood level associated with the 1000-year event is identified to be 46.33m AOD.

Therefore during the 1000 year return period the application site is expected to flood to a depth of approximately 0.47m.

Following a review of the Environment Agency's Flood Data the application site is located within Flood Zone 2 and will not be affected during the 100 year, 100 year + 20% climate change and the 100 year + 30% climate change event.

However the footprint of the proposed extension is expected to flood to a depth of 0.47m during the 1000 year event, which is considered to corelate well with the Environment Agency's Flood Map for Planning.

In conclusion it is considered that suitable mitigation measures can be incorporated into the proposed development to limit the damage caused in the event of a flood, as outlined within Section 7.0 of this report.

Drainage

At present the application site is considered to be 100% impermeable comprising of roof area and car parking space.

The application comprises of 'change of use' of an existing building and a minor extension of 150m^2.

Due to the scale and nature of the development, excavation of the existing car parking area to provide SUDS is not considered appropriate, due to there being no increase in runoff compared to the existing situation

In the event that attenuation was to be imposed by the Statutory Authorities the use of soakaways would not be viable due to the presence of high groundwater. Furthermore, in order to restrict discharge from the proposed extension (150m^2) the flow control device would have to be less than 50mm, which would result in an increased flood risk due to blockage and siltation.

As such it is recommended that flows from the roof of the new extension should connect onto the existing drainage network currently serving the site unimpeded, mimicking the existing situation.

To reduce the time of concentration of surface water flows into the system it is recommended that the development incorporates rainwater harvesting, however ultimately this would be the decision of the developer/architect.

It is anticipated that the proposed drainage network will remain private and therefore the land/property owner will be responsible for maintaining all the drainage elements.

Are any foul flows from the new extension theses should be connected to the existing foul drainage network currently serving the site

Mitigation Measures

Due to the application comprising of an extension to an existing building, in order to provide level access for wheel chairs etc finished floor levels should be set in line with the existing building, which are approximately 150mm above existing ground levels i.e. 45.86 + 0.15 = **46.01m AOD** (with the addition of flood resilience/resistance measures as described below).

This is considered to be 0.48m above the 100 year + 30% climate change event of 45.53m AOD.

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 0.6m above the proposed finished floor level of the extension.

- Flood Resilience/Resistance = 46.01m OAD + 0.6 = **46.61m 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.
- Provide fitting for flood boards or other temporary barriers across openings in the walls.
- Avoid use of gypsum plaster and plasterboards; use more flood resistant linings (e.g. hydraulic lime, ceramic tiles), 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 0.6m above existing ground levels.
- Storage of any materials or possessions that may be susceptible to flood damage should be stored or raised at a level 0.6m 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.
- Locate electrical, gas and telephone equipment and systems above flood level
- Use mountable/demountable flood barriers for large opening such as doors and windows, alternatively use flood resistant doors which do not need installing prior to the onset of a flood.

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 2 and within close proximity of the River Calder, it is advised that staff sign up to receive flood warnings.

It is recommended that persons on site are prepared to evacuate away from the property, 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 property during fluvial flood events should be directed out of the site north through Whalley Parish Church grounds and into Flood Zone 1. In addition, if persons require access to the main highway network, they should follow the route outlined below.

Persons can then continue along Church Lane, before heading north through public walkways past George Street, north along Abby Road, before exiting onto the main highway Station Road, which should allow access to all local road networks.

It is also recommended that staff create a business flood plan. This is a simple document that assists the staff/customers to prioritise actions required at the property before, during and following a flood event. A copy of a business flood plan template has been provided within the appendices of this report.

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1.0 Introduction

1.1 Terms of Reference

Flood Risk and Drainage Solutions have been appointed by Lino Della Pesca (Whalley Leisure Ltd), to provide a Flood Risk Assessment in support of a planning application for the change of use of an existing building named 'The Stables' to a restaurant, with the addition of a small extension within the associated court yard area of the property, located off King Street, Whalley, Clitheroe, Lancashire.

The site is shown to be situated within Flood Zone 2 of the Environment Agency Flood Map and therefore has a medium 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
- 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 the River Calder.

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.

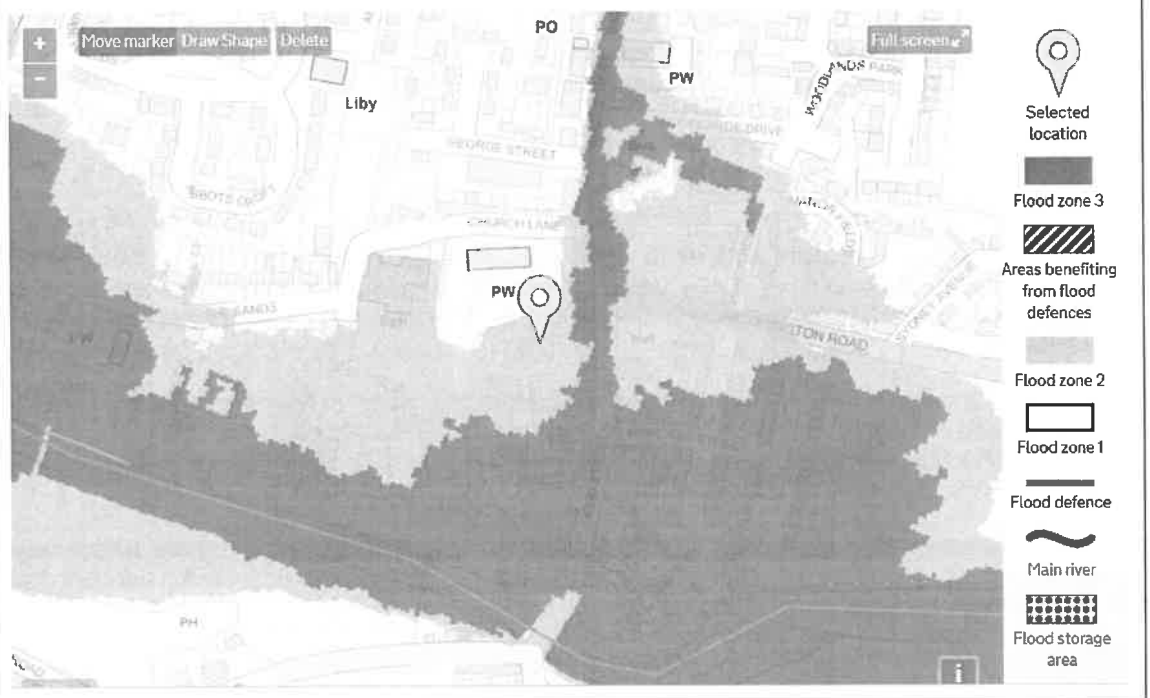
For tidal main rivers, a flood risk activity permit may be required if the development of the site is within 16 metres of a river, flood defence structure or culvert.

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 Sequential & Exceptions Test

As set out in the National Planning Policy Framework, the aim of the Sequential Test is to steer new development to areas at the lowest probability of flooding.

The Flood Zones are the starting point for the sequential approach.

The Environment Agency Flood Map shows the development site to be located within Flood Zone 2, which is defined as land with a greater than 1 in 1000 (<0.1% AEP) annual probability of river flooding in any one year.

Due to the proposed development being 'change of use' with only a minor extension it is not considered necessary to apply the Sequential and Exceptions Tests.

2.2.6 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 Rainfall Intensity	Upper end	+ 10%	+ 20%	+ 40%	
	Central	+ 5%	+ 10%	+ 20%	
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.

Commercial development is anticipated to have a lifespan approximating less than 100 years; and as such an additional 20% should be applied to peak rainfall intensities to assess the range of impact for this development.

Due to the development being less vulnerable and located within Flood Zone 2 the central allowance of 30% should be applied to peak river flow.

[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:	The Stables
Purpose of Development:	Change of use to restaurant with extension
Existing Land Use:	Commercial/industrial and court yard
OS NGR:	SD732361
Country:	England
County:	Lancashire
Local Planning Authority:	Ribble Valley Borough 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 currently named The Stables and is located west off King Street, centrally within the village of Whalley, Clitheroe.

The application site at present comprises of the old stable building, court yard to the north and associated car parking area to the west, vehicular access is provided from an access road from King Street to the east.

At the time of writing a topographical survey was not available, therefore LIDAR Data was used to estimate the levels onsite, which range from 45.40m AOD at the southern extent of the site, rising to 45.86m AOD at the north of the site.

The footprint on which the new extension will be located within the court yard area has a level of **45.86m AOD.**

The closest watercourse to the application site is the River Calder which is located approximately 200m south and is considered to be a 'Main River'.

Table 3: Boundaries

North	Directly north of the site is the grave yard area associated with Whalley Parish Church, beyond which is Church Lane and properties/businesses associated with King Street.
East	Directly east is the site are the rear of properties and businesses associated with King Street, beyond which is Whalley Village Hall and development surrounding Accrington Road.
South	Directly south of the site is the access road and a a number of small units to the rear of King Street used by local businesses, beyond which is Abbey Mews and then the River Calder approximately 200m south.
West	Directly west of the site is the grave yard area associated with Whalley Parish Church, beyond which is Whalley COE Primary School grounds and then Whalley Abbey.

Figure 3.1: Existing Site Aerial View

Source: Google

3.3 Proposed Development Details

Development proposals include 'change of use' to the existing building, as well as erection of an extension physically attached to the existing building, within the current court yard area at the north of the site and will be used for dining.

4.0 Historic Flooding

4.1 Internet Search

An internet search for historic flooding within the area of Whalley found numerous historic flood events within the vicinity of the application site.

The most severe flood event was on Boxing Day of 2015 when the River Calder burst its banks leading to extensive flooding in and around Whalley.

An article taken from the Telegraph Newspaper on 26/12/2015 reported the following:

'Residents in Whalley and Ribchester were told to abandon their houses when flood waters poured through the streets after torrential downpours.

Forecasters said up to 4.7ins (120mm) of rain could fall in some areas already saturated by wave after wave of winter squalls.

The average rainfall for the whole of December in the North West is 5.7ins (145mm) - so not far off a month's rain could lash the region in hours.

The severe flood warnings - the EA's highest level of warning - are for two locations on the River Ribble at Ribchester, three locations on the River Calder at Whalley and two on the River Wyre at St Michaels.

People are advised to move valuables and take advice from emergency services about evacuation.

Around 120 flood alerts and 145 warnings were also issued by the EA, mainly for the North West, North East and Wales.'

Figure 4.1: YouTube Video Kings Street 26/12/2015

Source: YouTube

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 Whalley was affected during the following events:

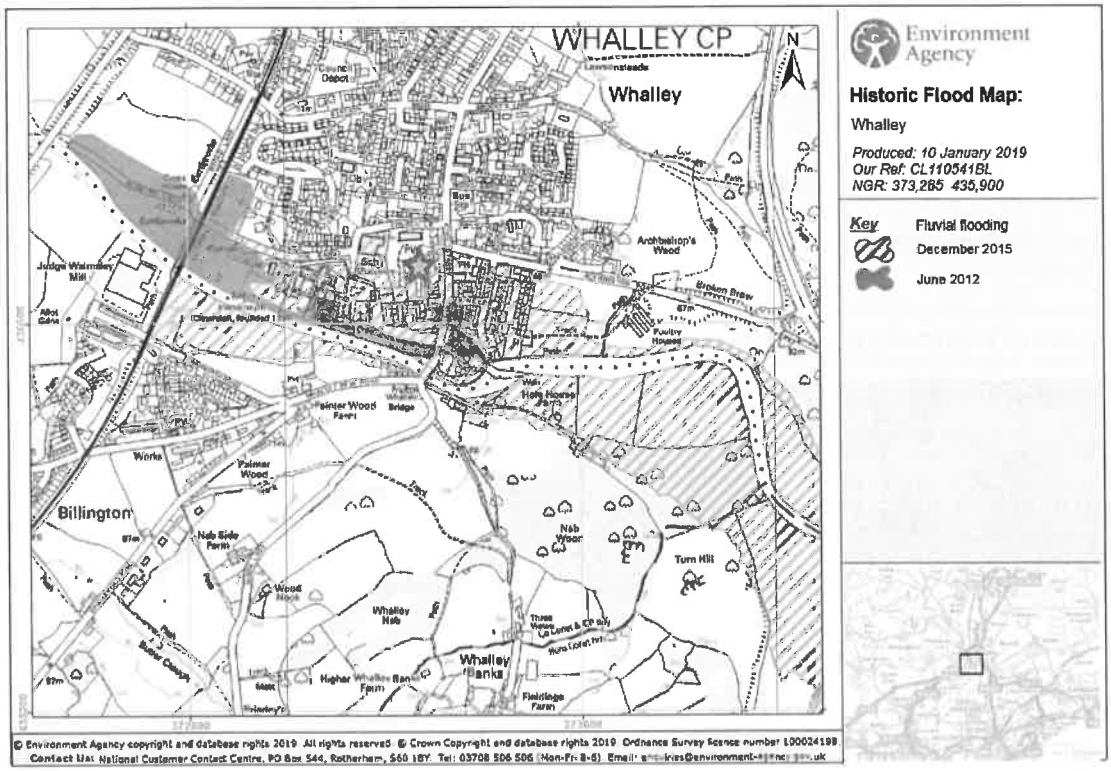
- 1866 – Whalley - River Ribble
- 2002 – Whalley – River Calder, River Darwen
- 2012 – Whalley – River Calder
- 2015 – Whalley – River Ribble, River Calder

In Whalley during 2015 the event approached a 1 in 1,000 chance of occurring.

4.3 Environment Agency Historic Flooding

The Environment Agency have provided Historic Flood Information in relation to historic flood events which shows that the application site was flooded during the floods of December 2015, but was not affected during the floods of June 2012.

Figure 4.2: Environment Agency Historic Flood Map



Source: EA Data

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 in Flood Zone 2.

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 4: Possible Flooding Mechanisms

Source/Pathway	Significant?	Comment/Reason
Fluvial	Yes	Flood Zone 2 (River Calder)
Canal	No	Not Applicable
Tidal/Coastal	No	Not Applicable
Reservoir	No	EA Map shows that the site is only marginally affected by reservoir flooding.
Pluvial (urban drainage)	No	Site is less than 1 Hectare
Groundwater	No	SFRA states that groundwater flooding within the area is not considered to be a significant risk
Surface Water Flooding	No	Site is located within an area that has a very low risk of flooding
Overland Flow	No	Relatively flat topography within the area.
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 the River Calder.

Fluvial: River Calder

The main body of the River Calder flows in a westerly direction approximately 200m south of the application site, joining with the River Ribble approximately 2.50km west within the vicinity of Brockhall Village.

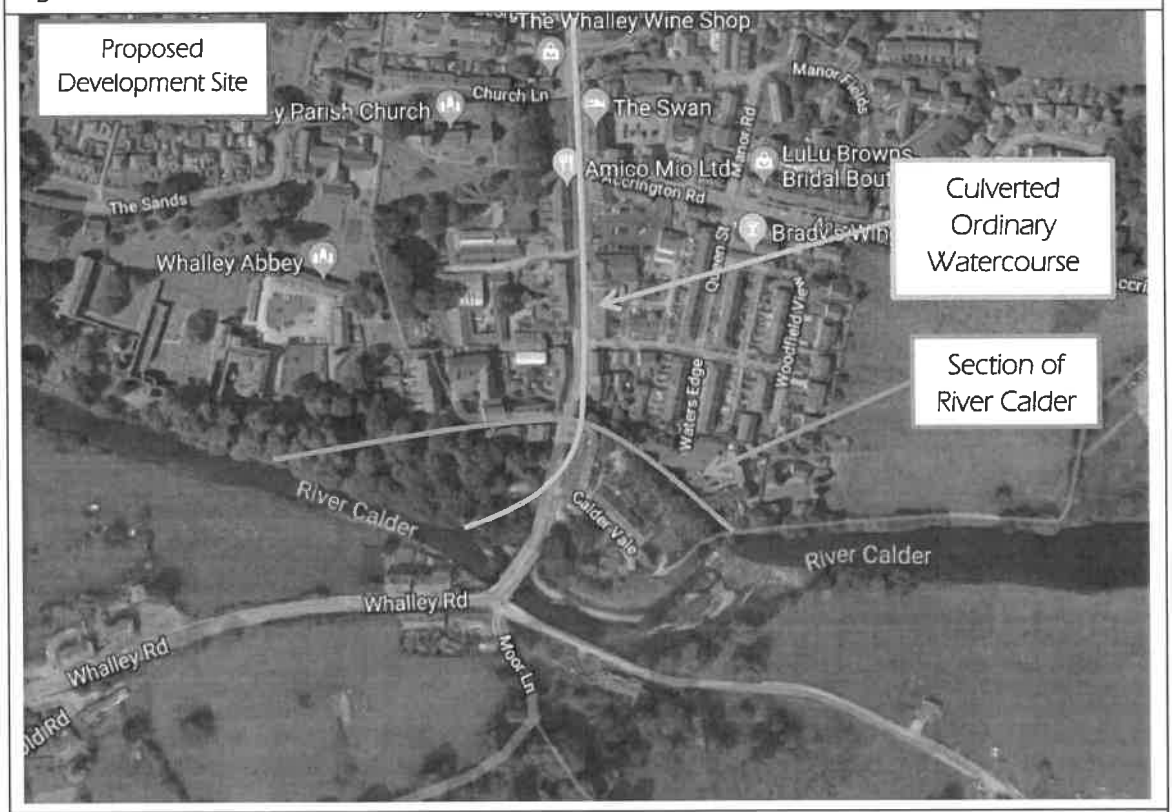
A section of the watercourse splits from the main body upstream of Whalley Road Bridge, where it flows north of the street named Calder Vale in a westerly direction, then under King Street, before re-joining the main body of the river downstream of Whalley Road Bridge adjacent to Whalley Abbey.

It is also noted that the Environment Agency Flood Data identifies what looks to be an Ordinary Watercourse culverted under King Street flowing in a southernly direction, discharging into the River Calder downstream of Whalley Road Bridge.

The River Calder is considered to be a 'Main River' and therefore the Environment Agency have certain roles and responsibilities regarding maintenance and management.

Due to the proposed development site being located within Flood Zones 2 and therefore having a medium risk of fluvial flooding, further evaluation is required and is undertaken within Section 6.1 of this report.

Figure 5.1: River Calder



Source: Google Maps

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.'

A review of local borehole logs taken the BGS online service from approximately 50m north east identifies that water was struck at 0.20m BGL with the water level raising to ground level. The borehole records are available for reference within the appendix of this report.

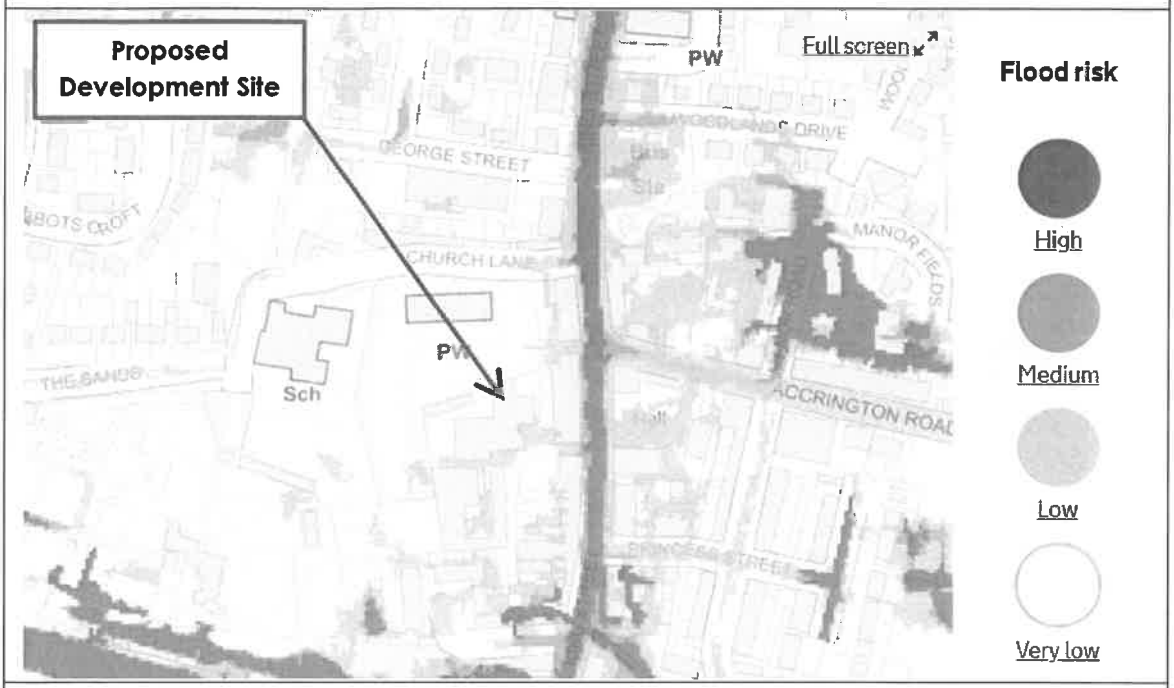
In conclusion groundwater emergence is a possibility however it is considered to be a low risk flooding mechanism, as finished floor levels are generally raised at least 150mm above existing ground levels.

Furthermore, the use of infiltration methods/soakaways is not recommended for inclusion within the surface water drainage strategy, as 1m freeboard cannot be achieved from the base of the soakaway.

Surface Water Flooding

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

Figure 5.2: Environment Agency Surface Water Flood Map



Source: www.gov.uk

- Very low risk means that each year this area has a chance of flooding of less than 0.1%. 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 the proposed development at The Stable off King Street has a very low risk of surface water flooding.

Flooding from Reservoirs

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

However, the risk of this actually happening is considered to be very low, in addition there has been no loss of life caused by reservoir flooding in the last 100 years.

Pluvial: Exceedance and Local System Failure (Sewer Flooding)

The following text has been extracted from CIRIA 2906 'Managing Extreme Events by Designing for Exceedance January 2013':

'Climate change and urbanisation is already contributing to increased surface water flooding, where the capacity of the existing drainage systems are overwhelmed (or exceeded).

The traditional approach to fixing the problem is to build bigger pipes or provide underground storage. Ofwat, the Environment Agency and others believe that this approach is unsustainable and unaffordable and are encouraging sewerage undertakers, Lead Local Flood Authorities and highway authorities to look at different approaches to managing sewer and surface water flooding.
One approach being promoted is "designing for exceedance".

Designing for exceedance is an approach to manage flood risk (particularly from extreme events) by planning, designing and retrofitting drainage schemes that can safely accommodate rainfall and flooding that exceeds their design capacity (normally a 1 in 30 rainfall event). This is often achieved by considering flood pathways

(such as managing runoff on highways) or providing additional storage (preferably on the surface through car parks, or multifunctional detention basins).

In England and Wales Sewers for Adoption and the National Planning Policy Framework encourage the consideration of drainage exceedance, it is a flexible approach to manage extreme events that can be used to reduce the need for more traditional, expensive underground approaches to manage surface water and often complement sustainable drainage and other local urban design initiatives.'

The impact of extreme rainfall events and/or local system failure will therefore need to be assessed as part of the overall surface water management strategy for the proposed development.

6.0 Quantitative Flood Risk Assessment

6.1 Fluvial: River Calder

6.1.1 General

The River Calder and the channalised section that splits from the main body of the watercourse are considered to be the primary fluvial flooding mechanisms at the site off King Street in Whalley, Clitheroe.

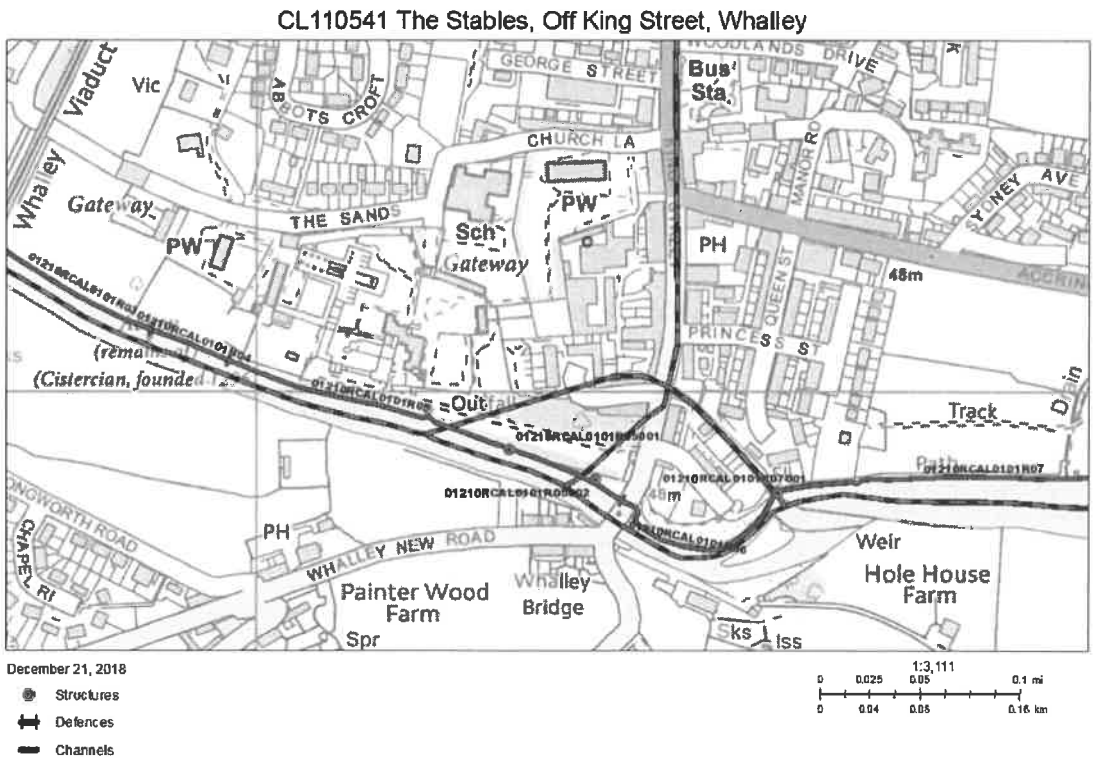
The River Calder is considered to be a 'Main River' therefore the Environment Agency have certain responsibilities in terms of management and maintenance.

The application site is located within Flood Zone 3, and therefore an evaluation to determine the depth associated with fluvial flooding at the proposed property has been undertaken.

6.1.2 Environment Agency Asset Information

The Environment Agency have provided Flood Data which includes information regarding flood defences associated with the River Calder, these are provided within the figures below:

Figure 6.1: EA Flood Defence Map



Source: EA

Figure 6.2: EA Flood Defence Table of Information

Site Location	The Stables, Off King Street, Whalley	CL110541

Fluvial Defences

Asset Ref.	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)			
01210RCAL0101R07	SD 73797 35944	High Ground	Fluvial	Poultry Houses to Weir	Unknown	5	3	-	-	-	384.9	-
01210RCAL0101R06	SD 73415 35918	High Ground	Fluvial	Weir to Whalley Bridge	Unknown	10	3	44.20	44.85	2	164.1	-
01210RCAL0101R05	SD 73292 35911	High Ground	Fluvial	Whalley Bridge to Upstream of Weir	Unknown	10	3	-	-	-	337.2	-
01210RCAL0101R04	SD 72978 36025	Embankment	Fluvial	Upstream of Weir to Weir at Rear of Catholic Church	Unknown	5	3	43.90	43.90	1	66.7	-
01210RCAL0101R03	SD 72916 36050	High Ground	Fluvial	Weir at Rear of Catholic Church to Milton Wood	Unknown	5	3	-	-	-	2683.7	-

Consent is REQUIRED for any works undertaken within 8 metres of these defences

Source: EA

The Flood Defence information provided by the Environment Agency has determined that none of the flood defences have a Design Standard of Protection in excess of the 10 year return period.

Taking the above into account the application site is not considered to benefit from flood defences during the more extreme return periods and for this reason the flood defences have not been used when assessing flood depths associated with the application site.

6.1.3 Environment Agency Modelled Flood Levels

The Environment Agency have provided flood plain levels associated with the River Calder reflecting the most recent modelling, approximately 100m south of the application site for a range of return periods.

The levels have been provided below for both the defended scenario and the undefended scenario.

Table 5: Flood Plain Levels

Return Period	Defended Scenario (m AOD)	Undefended Scenario (m AOD)
100 Year	45.02	45.02
100 Year + 20% Climate Change	45.35	45.36
*100 Year + 30% Climate Change	45.52	45.53
1000 Year	46.33	46.33

*New application of climate change has been estimated using interpolation

To provide a worst-case scenario Undefended levels have been used in order to evaluate the flood levels at the application site.

6.1.4 1 in 100-year Flood Event (Flood Zone 3)

The flood level associated with the 100-year event is identified to be 45.02m AOD.

The ground level on which the footprint of the proposed extension is to be located has been derived using LIDAR Data as approximately 45.86m AOD.

As such during the 100 year return period the application site is sufficiently elevated by 0.84m.

6.1.5 1 in 100-year Flood Event + 20% Climate Change Event

The flood level associated with the 100-year + 20% event is identified to be 45.36m AOD.

As such during the 100 year + 20% climate change return period the proposed extension is sufficiently elevated by 0.50m.

6.1.6 1 in 100-year Flood Event + 30% Climate Change Event

The EA have not provided flood levels for the 100 year event with the application of 30% climate change as required by current EA Guidance, therefore the flood level has been estimated using interpolation as 45.53m AOD.

During the 100 year + 30% climate change return period the proposed extension is sufficiently elevated by 0.33m.

6.1.7 1 in 1000-year Flood Event

The flood level associated with the 1000-year event is identified to be 46.33m AOD.

As such during the 1000 year return period the application site is expected to flood to a depth of approximately 0.47m.

6.1.8 Fluvial: Conclusion

Following a review of the Environment Agency's Flood Data the application site is located within Flood Zone 2 and will not be affected during the 100 year, 100 year + 20% climate change and the 100 year + 30% climate change event.

However the footprint of the proposed extension is expected to flood to a depth of 0.47m during the 1000 year event, which is considered to corelate well with the Environment Agency's Flood Map for Planning.

In conclusion it is considered that suitable mitigation measures can be incorporated into the proposed development to limit the damage caused in the event of a flood, as outlined within Section 7.0 of this report.

6.2 Surface Water Runoff

6.2.1 General

At present the site comprises of a single building located within the north east, court yard to the north and associated carparking area to the west.

- The total site area is approximately 0.13Ha (1300m^2)
- New extension roof area approximately 0.015Ha (150m^2)

6.2.2 Existing On-site Drainage Regime

At present a CCTV Survey has not been undertaken, however engineering judgement suggests that surface water flows from the existing building and associated car parking areas are positively drained, directing flows to the nearest public sewer.

At present the whole of the site comprises of roof area and hardstanding (100% impermeable), therefore the site is considered to have a total impermeable area of 0.13Ha.

6.2.3 Existing Sewers

At the time of writing no sewer records where available, however engineering judgment suggests that a public sewer is located within King Street to the east of the site.

6.2.4 Surface Water Drainage Hierarchy

The hierarchy for disposal of surface water from new developments is outlined within the Building Regulations Approved Document H and specifies the following methods in order of preference:

- Infiltration via soakaway or other suitable infiltration device
- Discharge to watercourse
- Discharge to public surface water sewer
- Discharge to public combined sewer

Infiltration

Following a non-intrusive desk top study infiltration at the site is not considered to be feasible, a review of Soilscape maps identifies the site to be located on land which is considered to be *'Loamy and clayey floodplain soils with naturally high groundwater'*.

A review of local borehole logs taken from the BGS online service identifies that water was struck 0.20m BGL with water rising to ground level.

Furthermore, the CIRIA SUDS Manual C753 states that Infiltration structures/soakaways should allow 1m freeboard from the base of the unit to groundwater table so that infiltration is not affected by saturated ground.

Taking the above into consideration the use of soakaways at the proposed development is not considered to be feasible.

Watercourse

The nearest watercourse to the proposed development is the River Calder located approximately 200m south of the application site.

If there is a culverted watercourse present under King Street it is likely that all surface water sewers within the vicinity discharge into it.

As such due to the lack of available watercourses within the vicinity of the site, disposal of surface water to watercourse is not viable.

Sewers

At the time of writing sewer records were unavailable, however engineering judgment suggests that the existing site is positively drained, ultimately connecting to the public sewer network, which is anticipated to be directed towards King Street east of the site.

As such it is recommended that flows from the proposed new extension should be connected onto the existing drainage network currently serving the site.

6.2.5 Sustainable Urban Drainage Systems (SUDS)

SUDS act to reduce the impact of surface water runoff from the development by limiting runoff volumes and rates from leaving the site.

The proposed development comprises of 'change of use' of an existing building and a minor extension of 150m^2 on a site which is currently 100% impermeable.

Due to the scale and nature of the development, excavation of the existing car parking area to provide SUDS is not considered appropriate, due to there being no increase in runoff compared to the existing situation.

However, to provide an element of source control the developer should consider the use of rainwater harvesting which will help slow down the time of concentration into the drainage network.

Rainwater Harvesting

Rainwater harvesting provides a source of non-potable water, for purposes such as car washing; and landscaped area irrigation etc... and can be used for some industrial processes to reduce consumption of water from conventional supplies.

This SUDS solution, like green roof technology, is also designed to provide interception storage i.e. acts to reduce the volume of surface water leaving the proposed development; thereby helping to alleviate the current pressures on the receiving watercourse.

Rainwater harvesting can be installed at relatively low costs dependant on the chosen structure providing that the development site has scope.

6.2.6 Restricted Discharge Rate

Restricting flows from a drained roof area of 150m^2 is not considered to be feasible, due to the size of the aperture required within a flow control device being less than 50mm. Doing so would result in blockage due to debris and siltation, ultimately increasing the flood risk at the application site.

6.2.7 Preliminary Drainage Strategy

At present the application site is considered to be 100% impermeable comprising of roof area and car parking space.

Development proposals comprise of the erection of the new extension on a court yard area that is currently positively drained and do not include for any alterations to the existing car parking area, therefore there will be no increase in impermeable area as a result of the development.

In the event that attenuation was to be imposed by the Statutory Authorities the use of soakaways would not be viable due to the presence of high groundwater. Furthermore, in order to restrict discharge from the proposed extension (150m^2) the flow control device would have to be less than 50mm, which would result in an increased flood risk due to blockage and siltation.

As such it is recommended that flows from the roof of the new extension should connect onto the existing drainage network currently serving the site unimpeded, mimicking the existing situation.

To reduce the time of concentration of surface water flows into the system it is recommended that the development incorporates rainwater harvesting, however ultimately this would be the decision of the developer/architect.

6.2.8 Maintenance

It is anticipated that the proposed drainage network will remain private and therefore the land/property owner will be responsible for maintaining all the drainage elements.

6.3 Foul

It is recommended that if there are any foul flows from the new extension theses should be connected to the existing foul drainage network currently serving the site

7.0 Mitigation Measures

7.1 Finished Development Levels

Due to the application comprising of an extension to an existing building, in order to provide level access for wheel chairs etc finished floor levels should be set in line with the existing building, which is approximately 150mm above existing ground levels i.e. 45.86 + 0.15 = **46.01m AOD** (with the addition of flood resilience/resistance measures as described within Section 7.2).

This is considered to be 0.48m above the 100 year + 30% climate change event of 45.53m 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 0.6m above the proposed finished floor level of the extension.

- Flood Resilience/Resistance = 46.01m OAD + 0.6 = **46.61m 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.**
- **Provide fitting for flood boards or other temporary barriers across openings in the walls.**
- **Avoid use of gypsum plaster and plasterboards; use more flood resistant linings (e.g. hydraulic lime, ceramic tiles), 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 0.6m above existing ground levels.
- Storage of any materials or possessions that may be susceptible to flood damage should be stored or raised at a level 0.6m 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.
- Locate electrical, gas and telephone equipment and systems above flood level
- Use mountable/demountable flood barriers for large opening such as doors and windows, alternatively use flood resistant doors which do not need installing prior to the onset of a flood.

7.3 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 2 and within close proximity of the River Calder, it is advised that staff sign up to receive flood warnings.

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 6: Environment Agency Flood Warning Codes

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

 SEVERE FLOOD WARNING	Severe flooding. Danger to life.	When flooding poses a significant threat to life.	• Stay in a safe place with means of escape • Be ready to evacuate • Co-operate with the emergency services • 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 • 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.

7.4 Emergency Evacuation Route

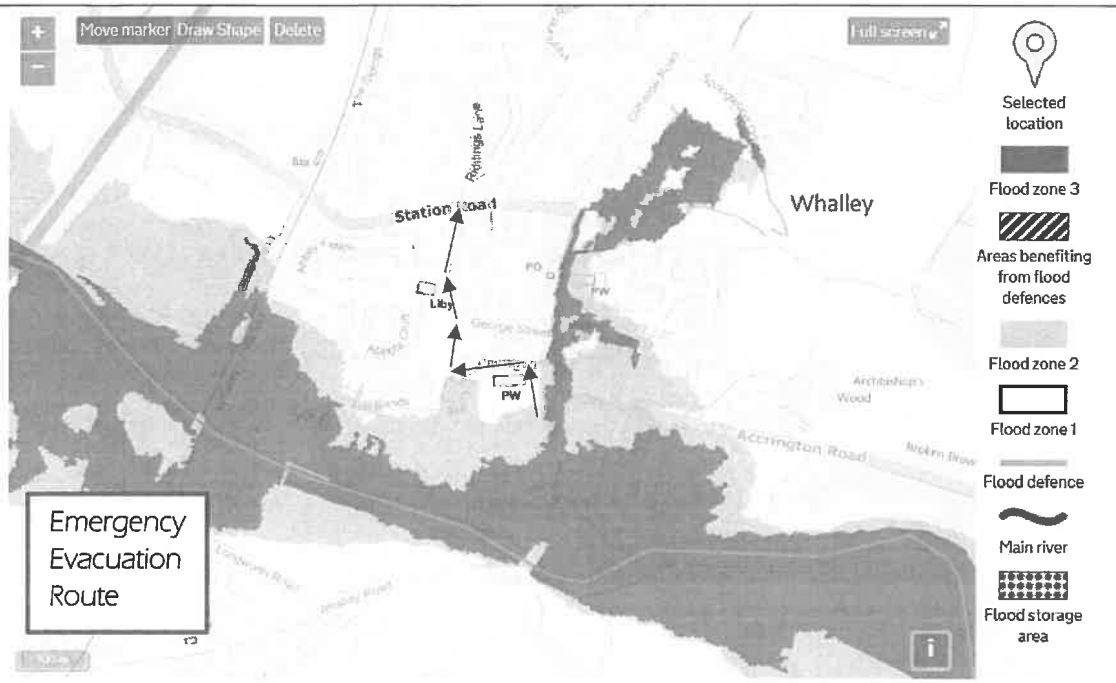
It is recommended that persons on site are prepared to evacuate away from the property, if advised to do so by the EA Flood Warning Service, the emergency services and/or local authority, in the advance of the onset of any flooding.

Evacuation away from the property during fluvial flood events should be directed out of the site north through Whalley Parish Church grounds and into Flood Zone 1. In addition if persons require access to the main highway network they should follow the route outlined below.

Persons can then continue along Church Lane, before heading north through public walkways past George Street, north along Abby Road, before exiting onto the main highway Station Road, which should allow access to all local road networks.

The Emergency Evacuation Route is depicted for reference within Figure 7.1.

Figure 7.1: Suggested Evacuation Route



Source: GOV.UK

7.5 Business Flood Plan

It is also recommended that staff create the business flood plan. This is a simple document that assists the staff/customers to prioritise actions required at the property before, during and following a flood event.

A copy of a business flood plan template has been provided within the appendices of this report.

8.0 Conclusions & Recommendations

The site is shown to be situated within Flood Zone 2 of the Environment Agency Flood Map and therefore has a medium risk of fluvial flooding.

An initial assessment indicates that the primary flood risk at the proposed development is from the fluvial source the River Calder.

The application site at present comprises of the old stable building, court yard to the north and associated car parking area to the west, vehicular access is provided from an access road from King Street to the east.

At the time of writing a topographical survey was not available, therefore LIDAR Data was used to estimate the levels onsite, which range from 45.40m AOD at the southern extent of the site, rising to 45.86m AOD at the north of the site.

The footprint on which the new extension will be located within the court yard area has a level of **45.86m AOD.**

The Environment Agency have provided Historic Flood Information in relation to historic flood events which shows that the application site was flooded during the floods of December 2015, but was not affected during the floods of June 2012.

Fluvial: River Calder

The Environment Agency have provided flood plain levels associated with the River Calder reflecting the most recent modelling, approximately 100m south of the application site for a range of return periods.

To provide a worst-case scenario Undefended levels have been used in order to evaluate the flood levels at the application site.

Following a review of the Environment Agency's Flood Data the application site is located within Flood Zone 2 and will not be affected during the 100 year, 100 year + 20% climate change and the 100 year + 30% climate change event.

However the footprint of the proposed extension is expected to flood to a depth of 0.47m during the 1000 year event, which is considered to corelate well with the Environment Agency's Flood Map for Planning.

In conclusion it is considered that suitable mitigation measures can be incorporated into the proposed development to limit the damage caused in the event of a flood, as outlined within Section 7.0 of this report.

Drainage

At present the application site is considered to be 100% impermeable comprising of roof area and car parking space.

The application comprises of 'change of use' of an existing building and a minor extension of 150m^2.

Due to the scale and nature of the development, excavation of the existing car parking area to provide SUDS is not considered appropriate, due to there being no increase in runoff compared to the existing situation

In the event that attenuation was to be imposed by the Statutory Authorities the use of soakaways would not be viable due to the presence of high groundwater. Furthermore, in order to restrict discharge from the proposed extension (150m^2) the flow control device would have to be less than 50mm, which would result in an increased flood risk due to blockage and siltation.

As such it is recommended that flows from the roof of the new extension should connect onto the existing drainage network currently serving the site unimpeded, mimicking the existing situation.

To reduce the time of concentration of surface water flows into the system it is recommended that the development incorporates rainwater harvesting, however ultimately this would be the decision of the developer/architect.

It is anticipated that the proposed drainage network will remain private and therefore the land/property owner will be responsible for maintaining all the drainage elements.

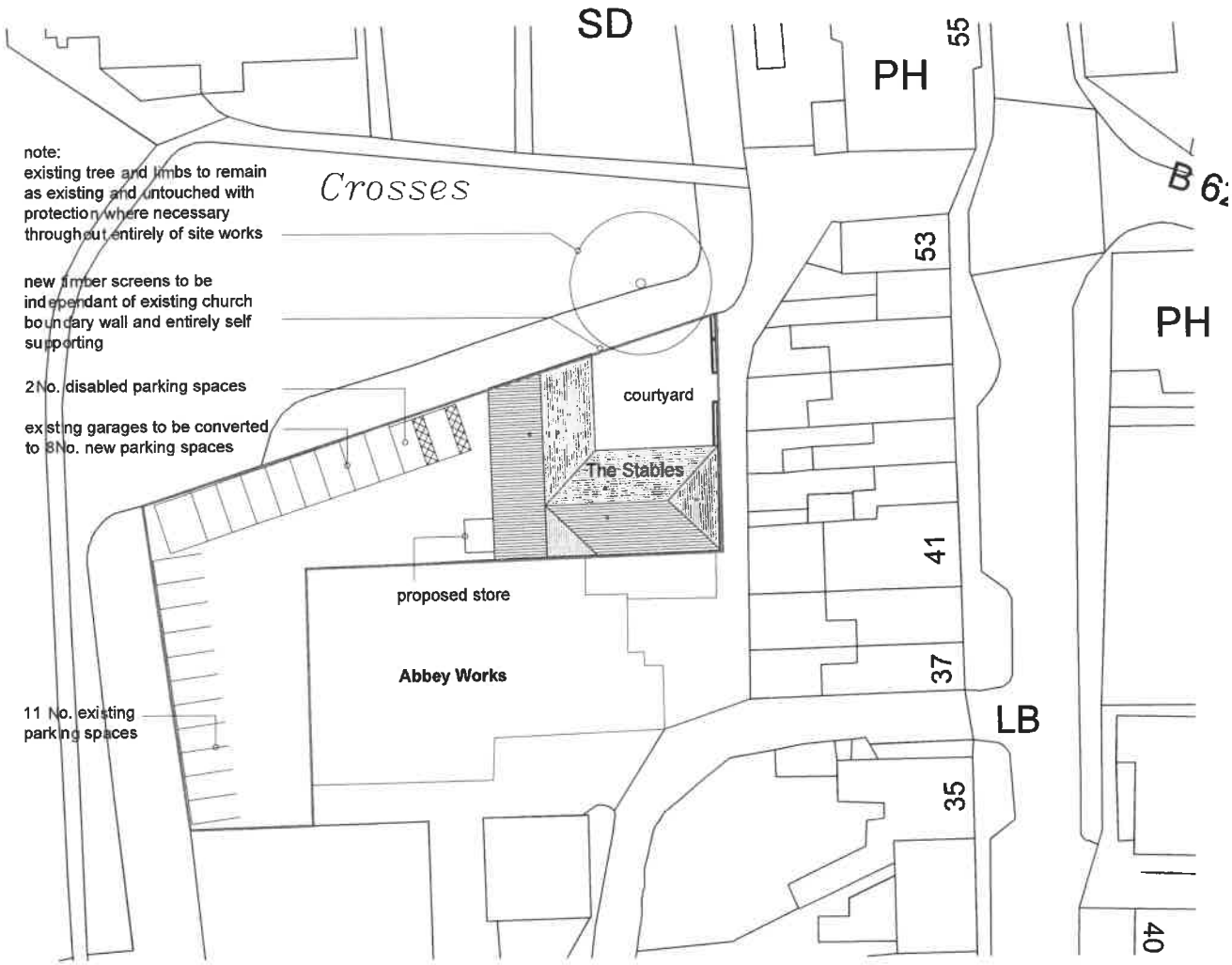
Are any foul flows from the new extension theses should be connected to the existing foul drainage network currently serving the site

Mitigation Measures

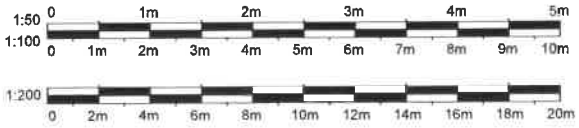
- Finished floor levels = 45.86 + 0.15 = **46.01m AOD** (in line with existing building)
- Flood Resilience/Resistance = 46.01m OAD + 0.6 = **46.61m AOD** (outlined within Section 7.2)
- Staff sign up to receive EA Flood Warning Service
- Emergency evacuation route is available north out of the site into Flood Zone 1
- Prepare and implement Business Flood Plan

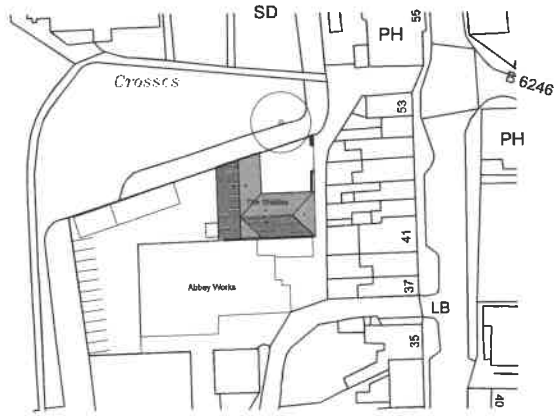
APPENDICES

Appendix A: - Development Proposals



Proposed Site Plan
Scale 1:500



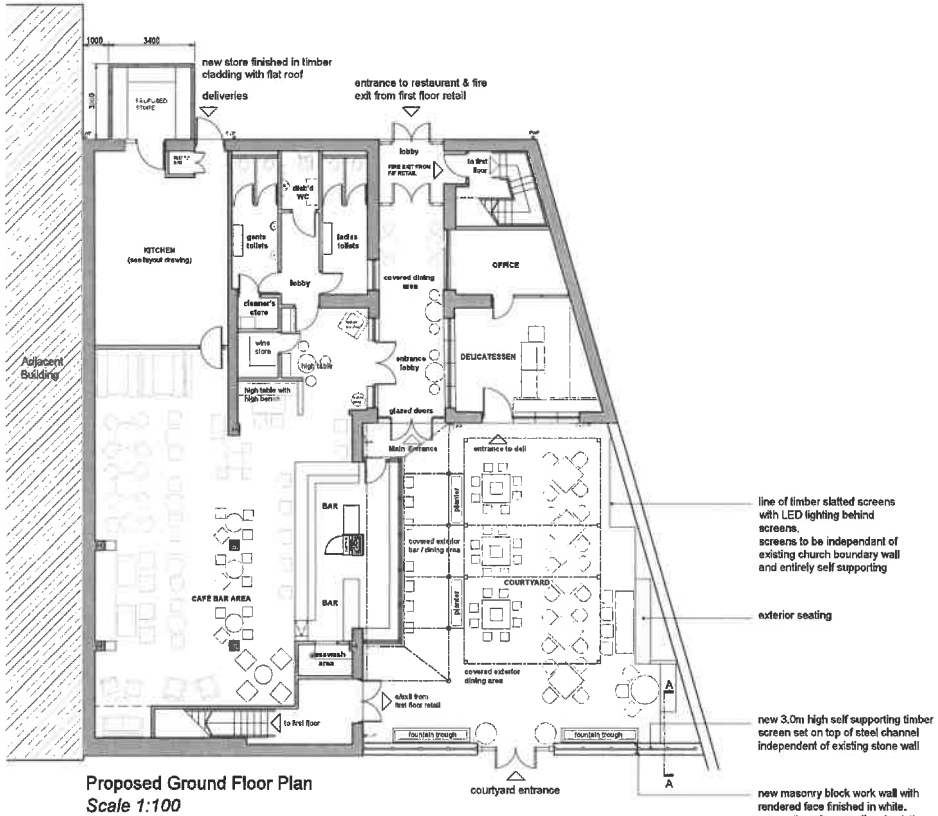


Location Plan
1:1250

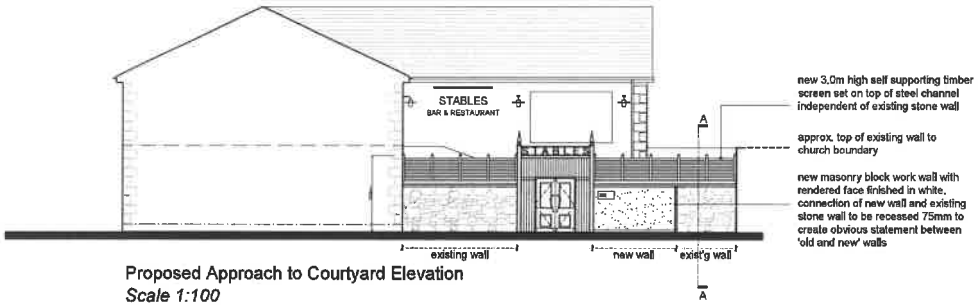
REVISIONS -

Whalley Leisure Ltd
PROPOSED SITE & LOCATION PLAN
THE STABLES, OFF KING STREET, WHALLEY
1:500 / 1250 @ A3
DRAWING NUMBER:- 3357 / P2
DRAWN BY: S.Bailey DATE: Dec 18

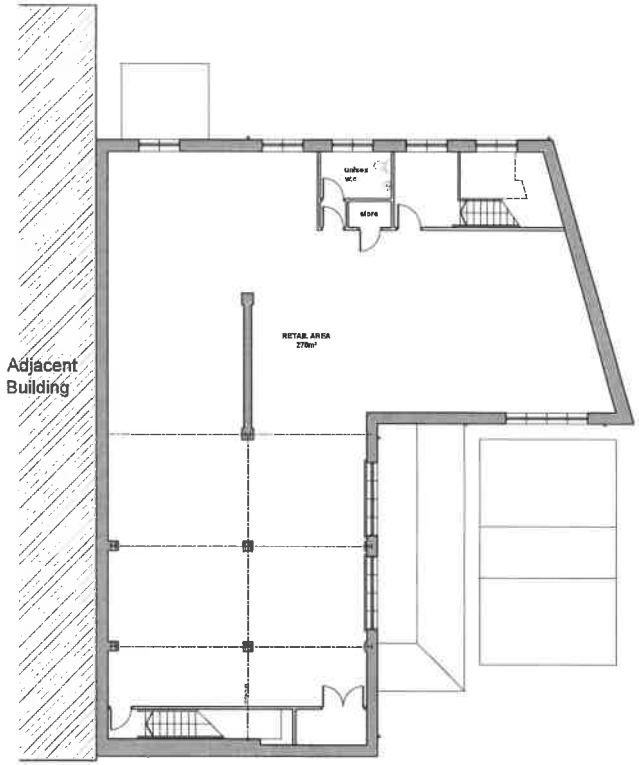
fletcher smith architects | 11 riversway business village, navigation way, preston. pr22yp | t: 01772 723626 | e: info@fletchersmith.net | w: www.fletchersmith.net |



Proposed Ground Floor Plan
Scale 1:100



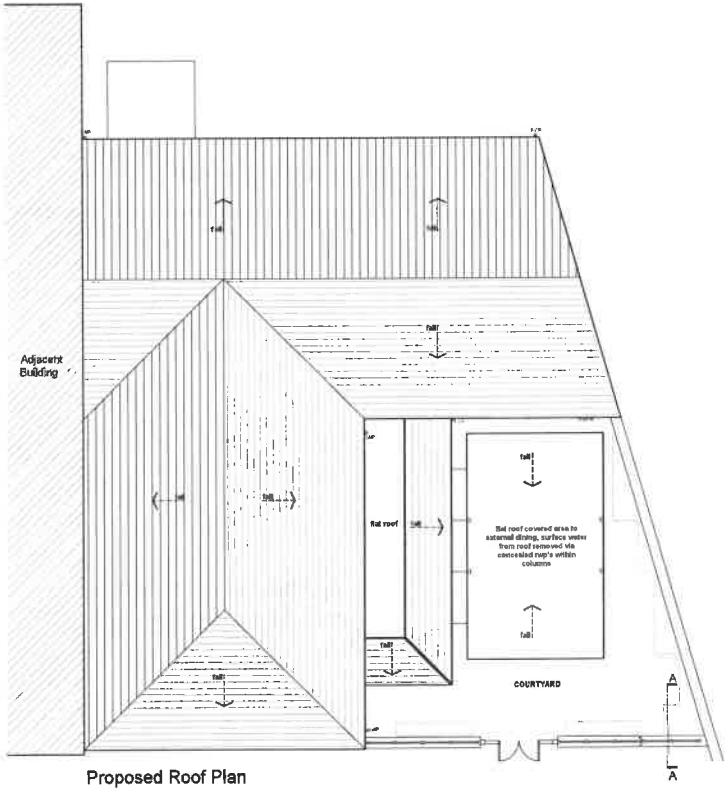
Proposed Approach to Courtyard Elevation
Scale 1:100



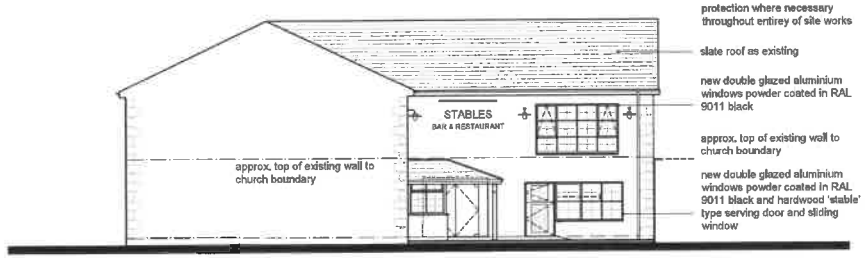
Proposed First Floor Plan
Scale 1:100

REVISIONS -

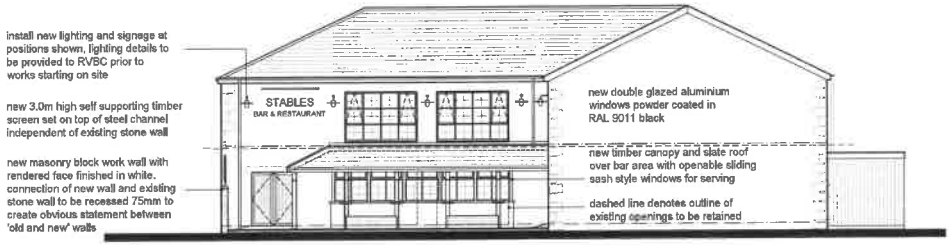
WHALLEY LEISURE LTD
PROPOSED PLANS & APPROACH ELEVATION
THE STABLES, OFF KING STREET, WHALLEY
1:100 @ A1
DRAWING NUMBER:- 3357 / 13
DRAWN BY: S.Bailey DATE: Dec 18



Proposed Roof Plan
Scale 1:100

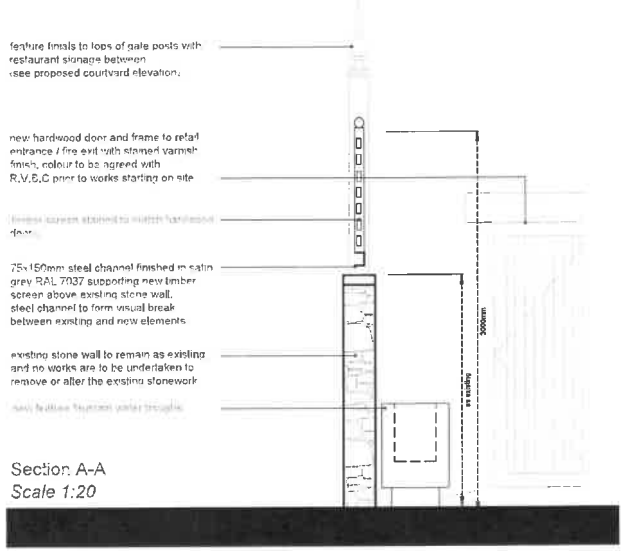


Proposed Courtyard Elevation
Scale 1:100



Proposed Courtyard Elevation
Scale 1:100

note:
existing tree and limbs to remain as existing and untouched with



Section A-A
Scale 1:20

Proposed Rear Elevation
Scale 1:100

REVISIONS -

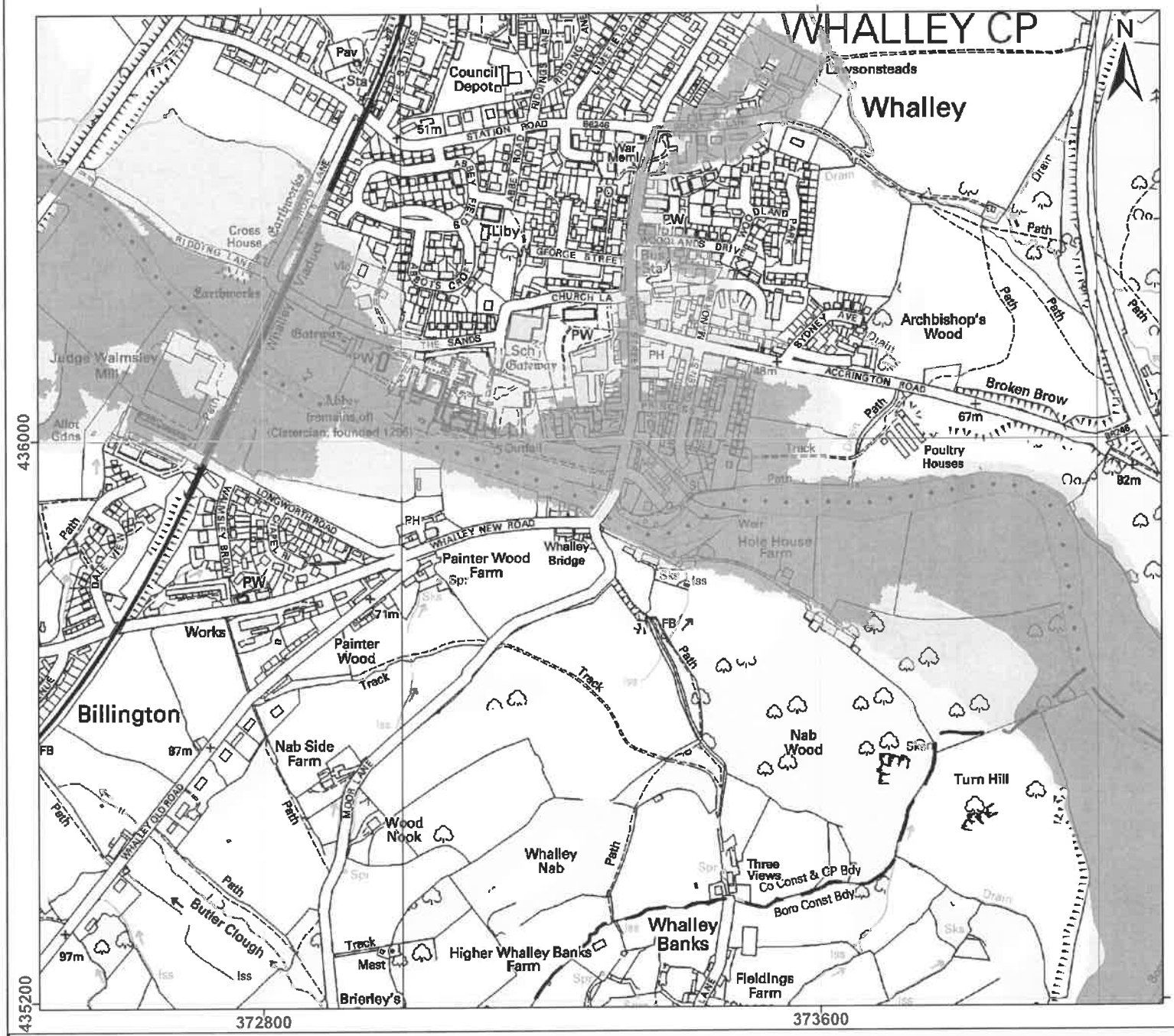
WHALLEY LEISURE LTD
PROPOSED PLANS, ROOF PLAN & ELEVATIONS
THE STABLES, OFF KING STREET, WHALLEY
1:100 @ A1
DRAWING NUMBER:- 3357 / 14
DRAWN BY: S.Bailey DATE: Dec 18

Appendix B: - LIDAR Data

X: 373665.862 Y: 435867.552 sd7336_DTM_1M.asc: Outside boundary

Node

Appendix C: - Environment Agency Flood Data



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 Zone Map:

Whalley

Produced: 10 January 2019
Our Ref: CL110541BL
NGR: 373,285 435,900

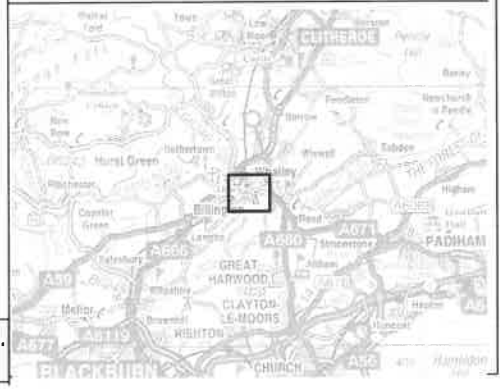
Key

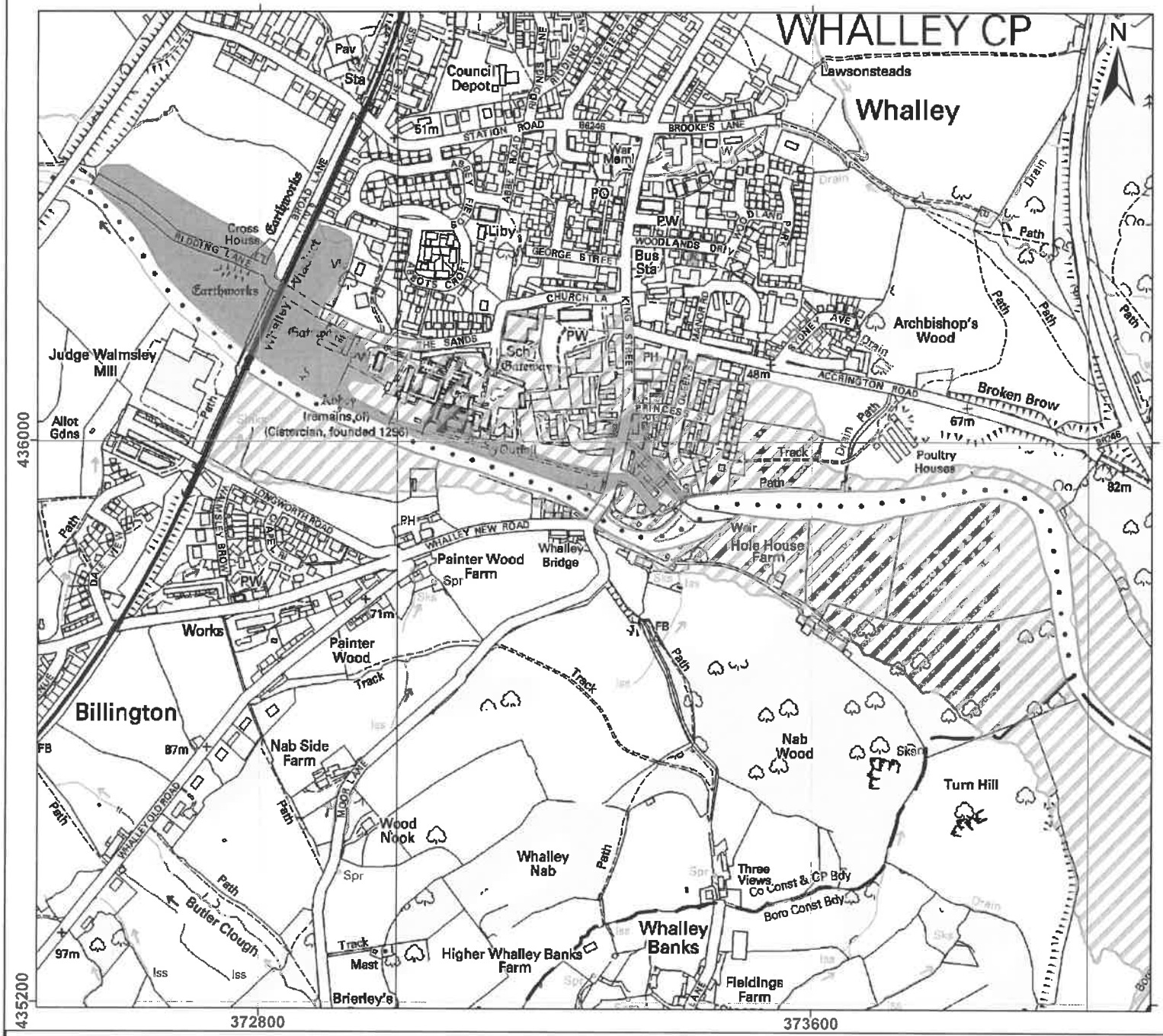
- Flood Zone 3
- Flood Zone 2

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 a 0.1% chance of occurring each year.





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

Historic Flood Map:

Whalley

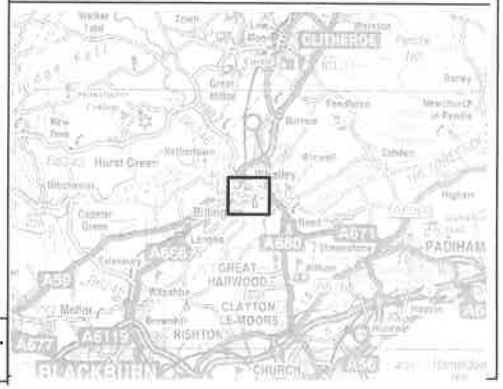
Produced: 10 January 2019
Our Ref: CL110541BL
NGR: 373,285 435,900

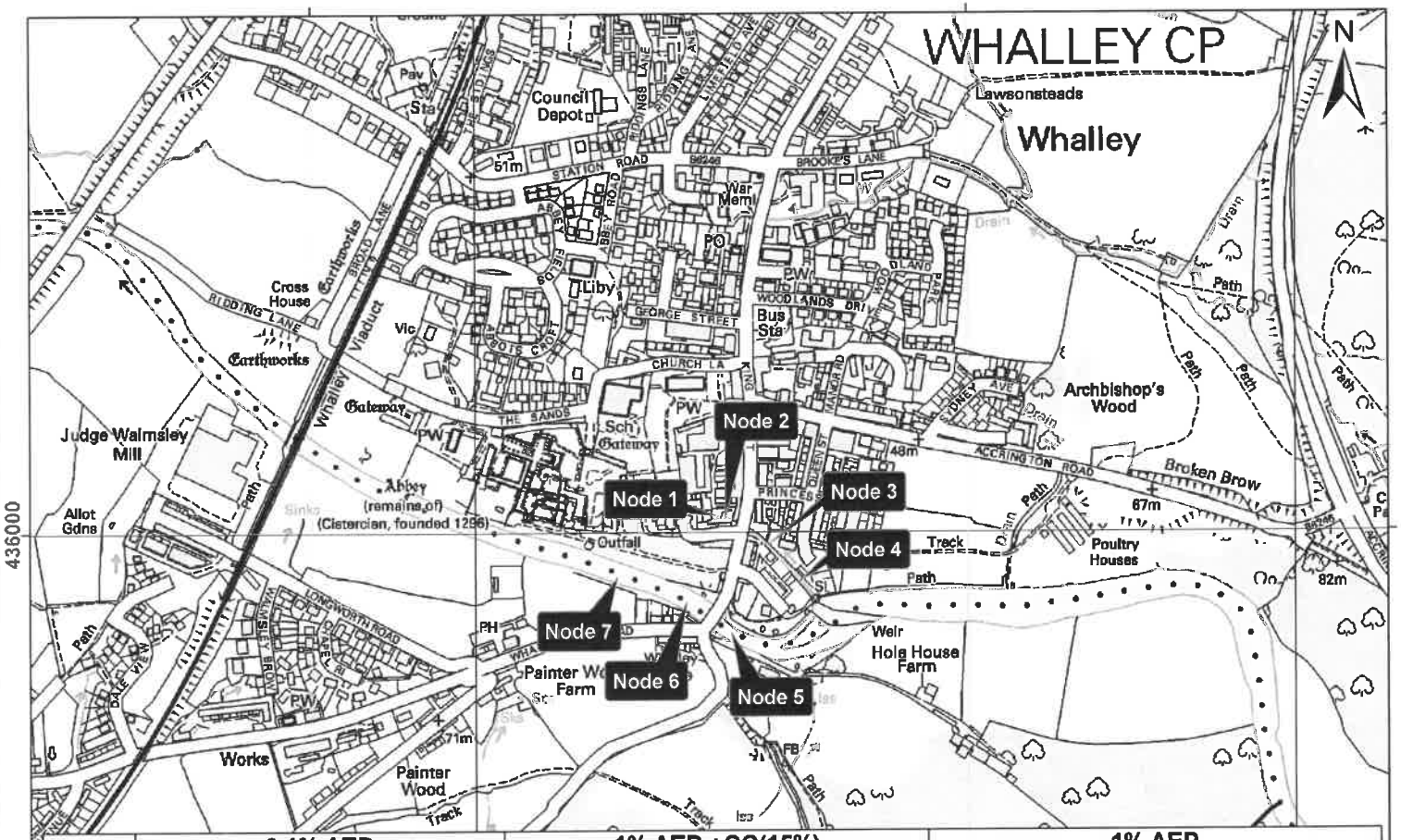
Key

Fluvial flooding

December 2015

June 2012





Node point	0.1% AEP				1% AEP +CC(15%)				1% AEP			
	Defended		Undefended		Defended		Undefended		Defended		Undefended	
	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow
Node 1	46.73	10.26	46.73	10.26	45.69	5.92	45.69	5.92	45.29	4.90	45.29	4.90
Node 2	46.77	3.75	46.77	3.75	45.71	3.73	45.71	3.73	45.31	3.72	45.31	3.72
Node 3	46.63	40.49	46.63	40.49	45.67	19.88	45.68	19.90	45.31	14.64	45.31	14.65
Node 4	47.13	27.15	47.13	27.14	46.05	14.20	46.05	14.21	45.69	11.56	45.69	11.56
Node 5	46.95	408.23	46.95	408.21	45.76	326.97	45.77	326.74	45.39	312.59	45.39	312.49
Node 6	46.30	408.24	46.30	408.22	45.29	343.55	45.29	343.28	44.96	324.19	44.96	324.13
Node 7	46.13	446.01	46.13	446.05	45.16	362.85	45.17	362.62	44.87	334.52	44.87	334.47

Level data in mAOD (metres above ordnance datum); Flow data in m^3/s

Data taken from Wider Calder 2017

Environment Agency

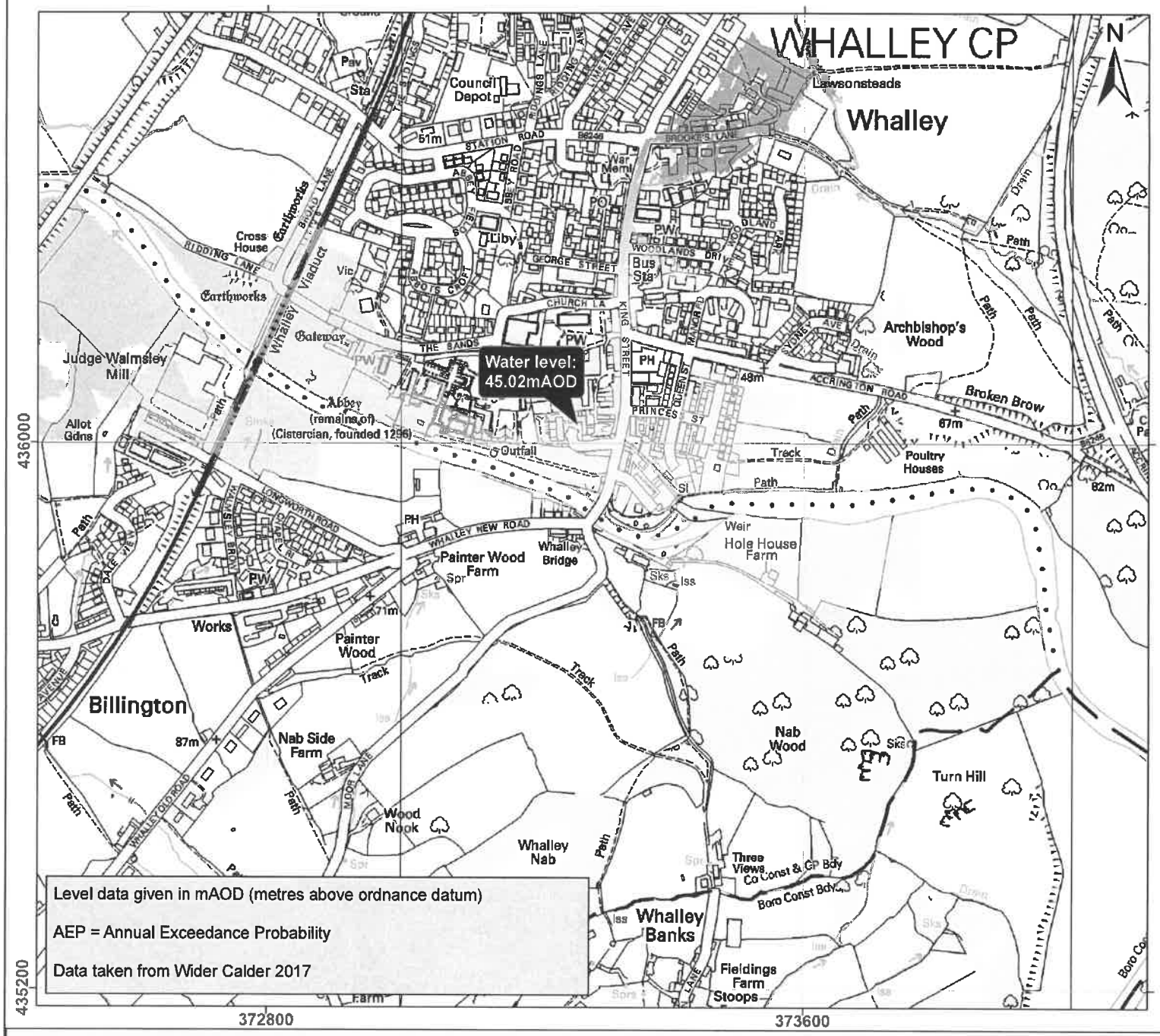
Fluvial Flood Level Map:

Whalley

Produced: 10 January 2019
Our Ref: CL110541BL
NGR: 373,285 435,900

Key

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 Level Map:

Whalley

Produced: 10 January 2019
Our Ref: CL110541BL
NGR: 373,285 435,900

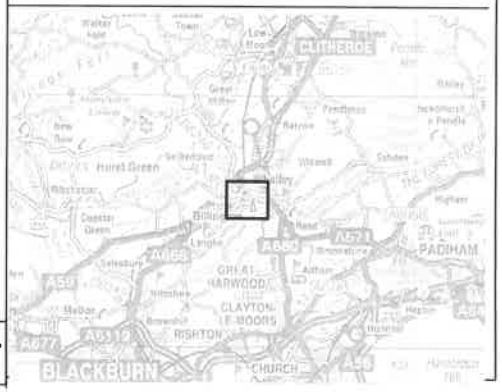
Key

1% AEP Defended

High : 50

mAOD

Low : 40



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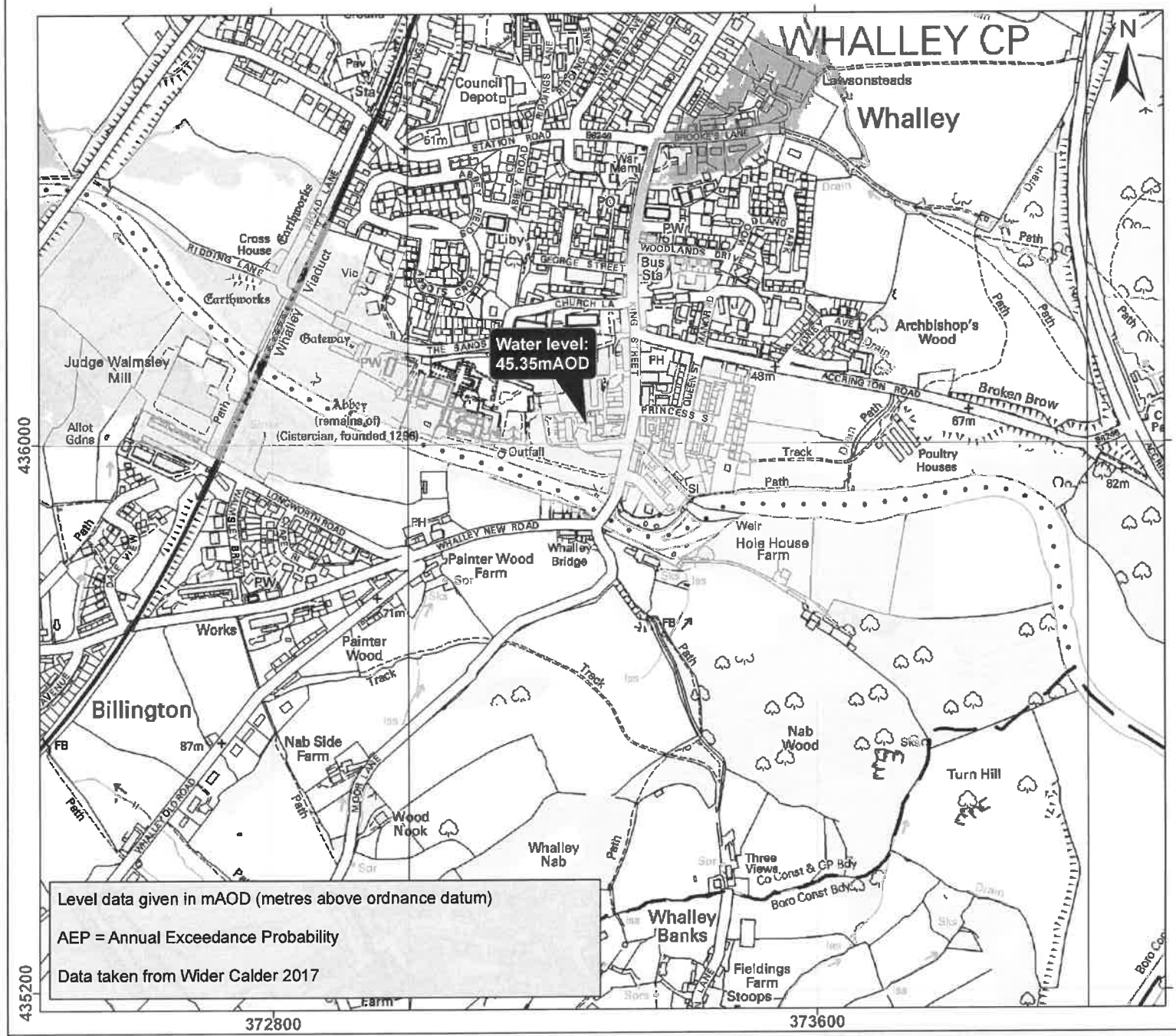


Environment Agency

Fluvial Flood Level Map:

Whalley

Produced: 10 January 2019
Our Ref: CL110541BL
NGR: 373,285 435,900

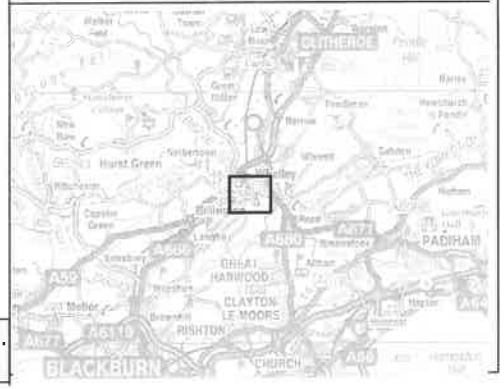
Key

1% AEP +CC(15%) Defended

High : 50

mAOD

Low : 40



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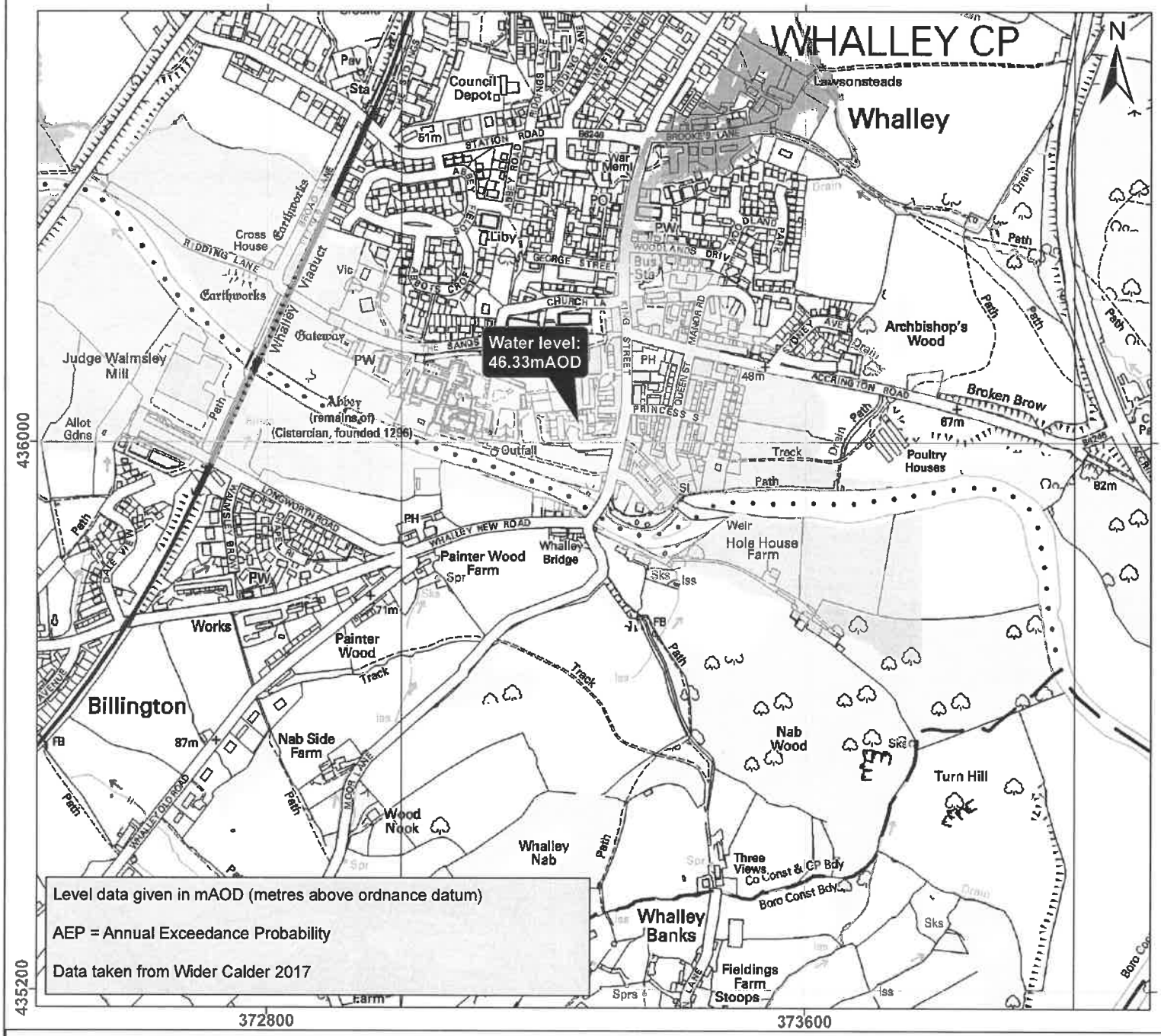


Environment Agency

Fluvial Flood Level Map:

Whalley

Produced: 10 January 2019
Our Ref: CL110541BL
NGR: 373,285 435,900

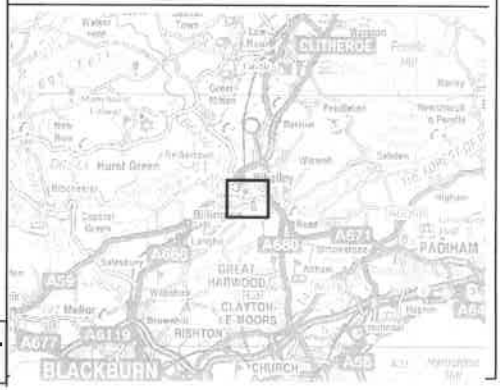
Key

0.1% AEP Defended

High : 50

mAOD

Low : 40



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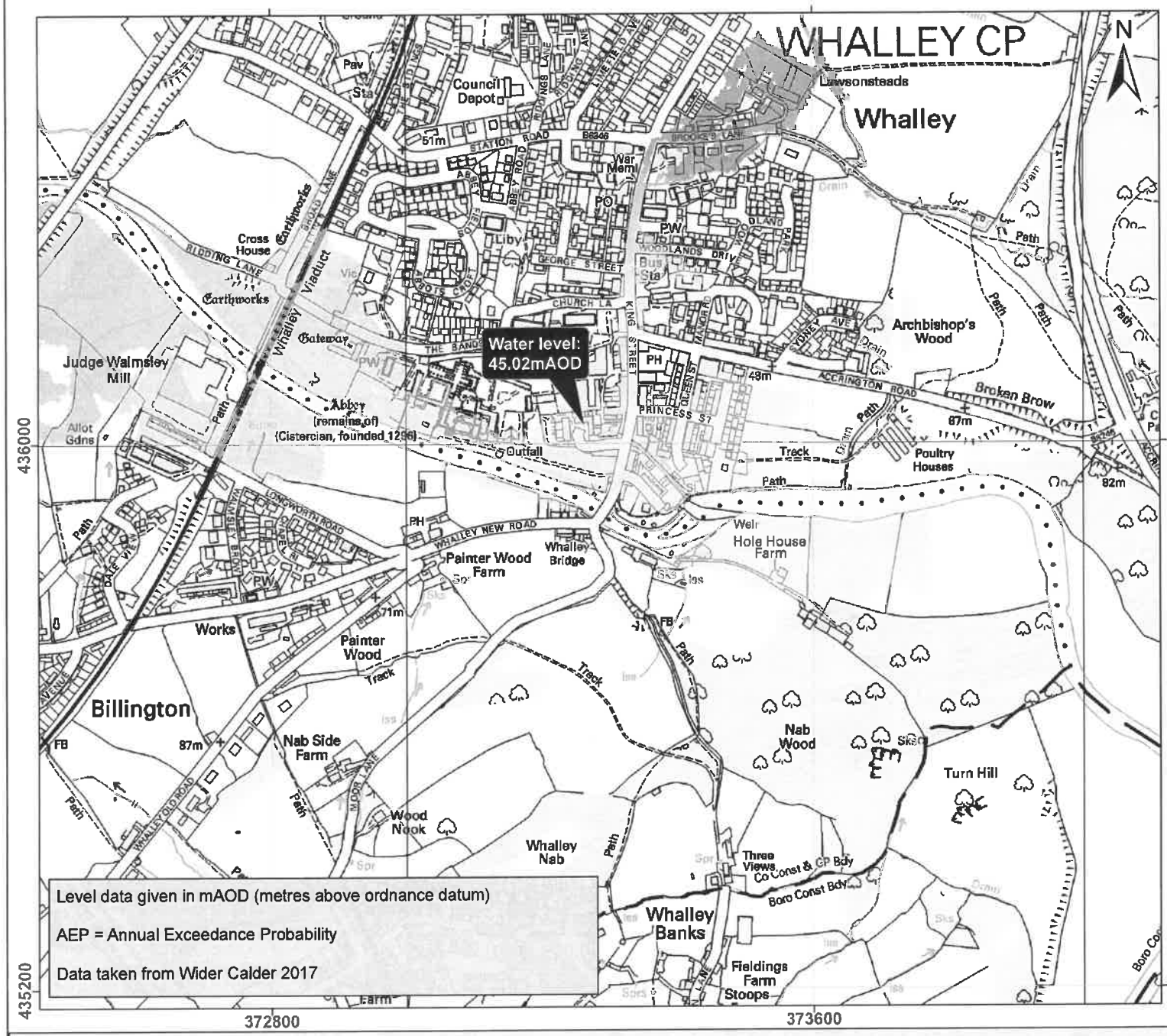


Environment Agency

Fluvial Flood Level Map:

Whalley

Produced: 10 January 2019
Our Ref: CL110541BL
NGR: 373,285 435,900

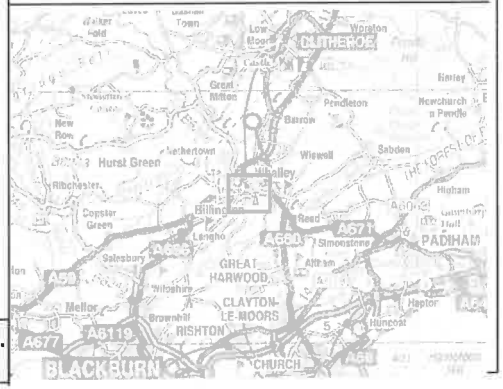
Key

1% AEP Undefended

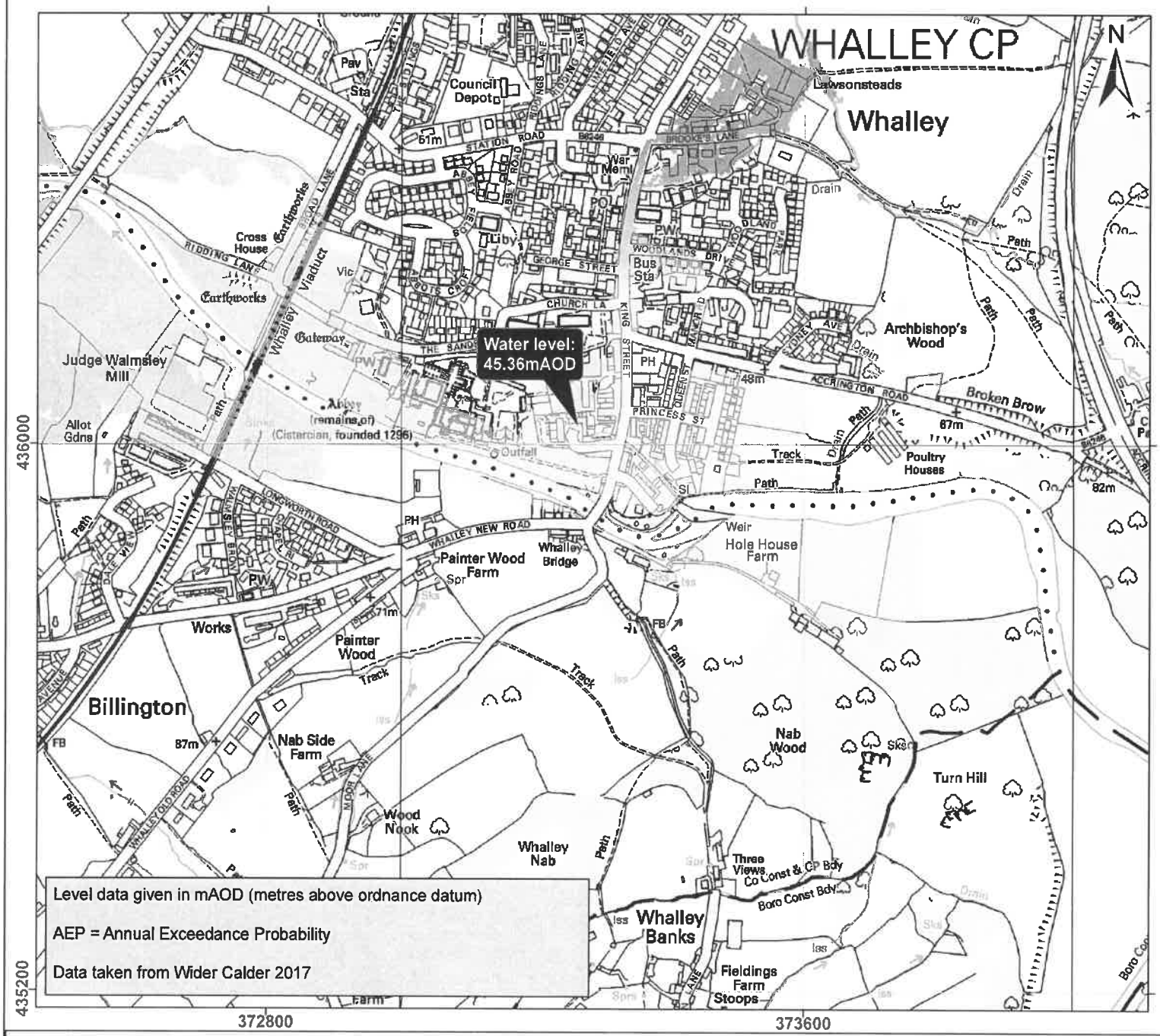
High : 50

mAOD

Low : 40



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 Level Map:

Whalley

Produced: 10 January 2019
Our Ref: CL110541BL
NGR: 373,285 435,900

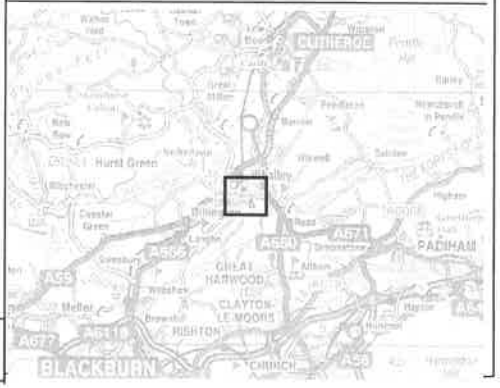
Key

1% AEP +CC(15%) Undefended

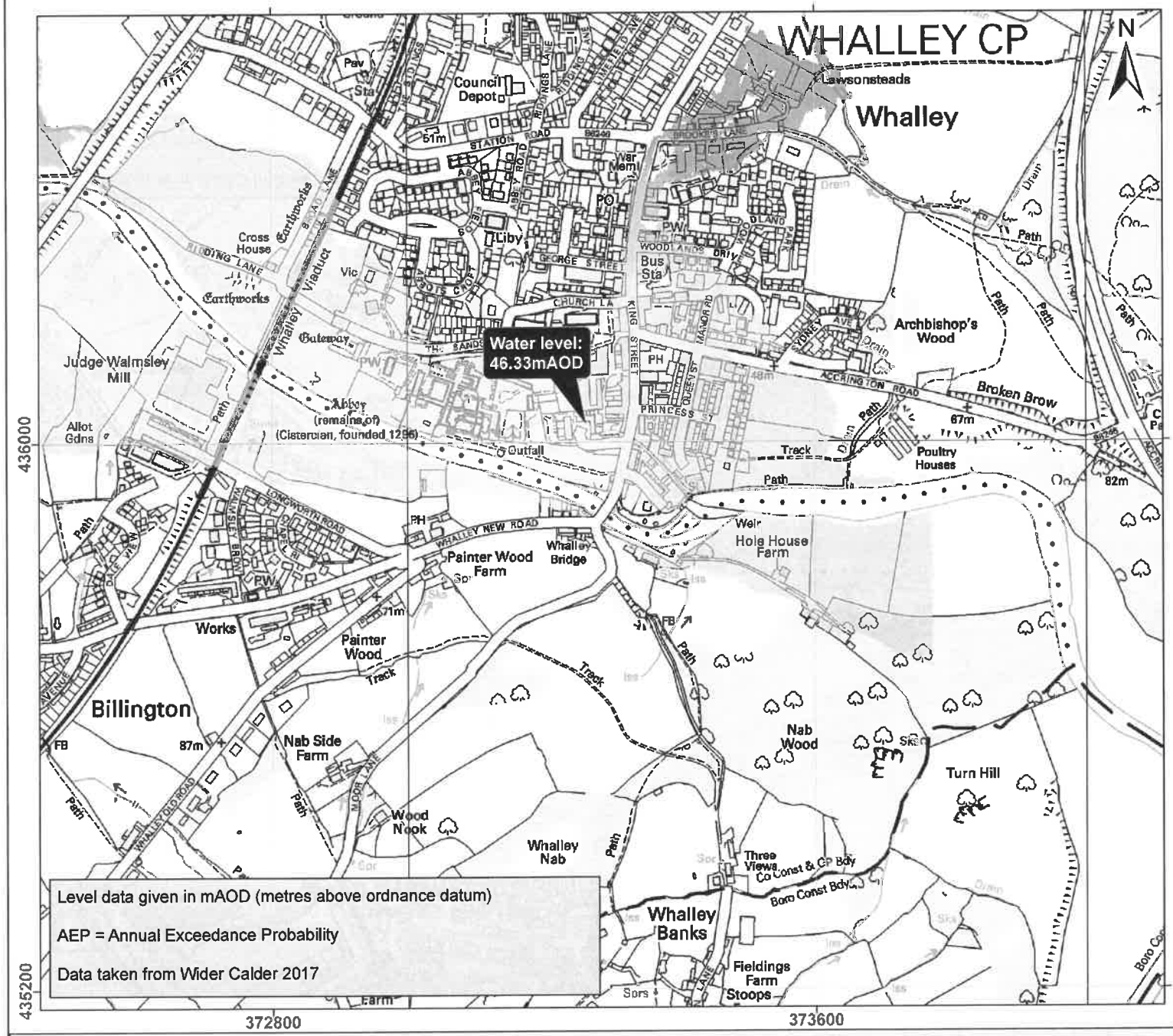
High : 50

mAOD

Low : 40



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



Level data given in mAOD (metres above ordnance datum)

AEP = Annual Exceedance Probability

Data taken from Wider Calder 2017

Environment Agency

Fluvial Flood Level Map:

Whalley

Produced: 10 January 2019
Our Ref: CL110541BL
NGR: 373,285 435,900

Key

0.1% AEP Undefended

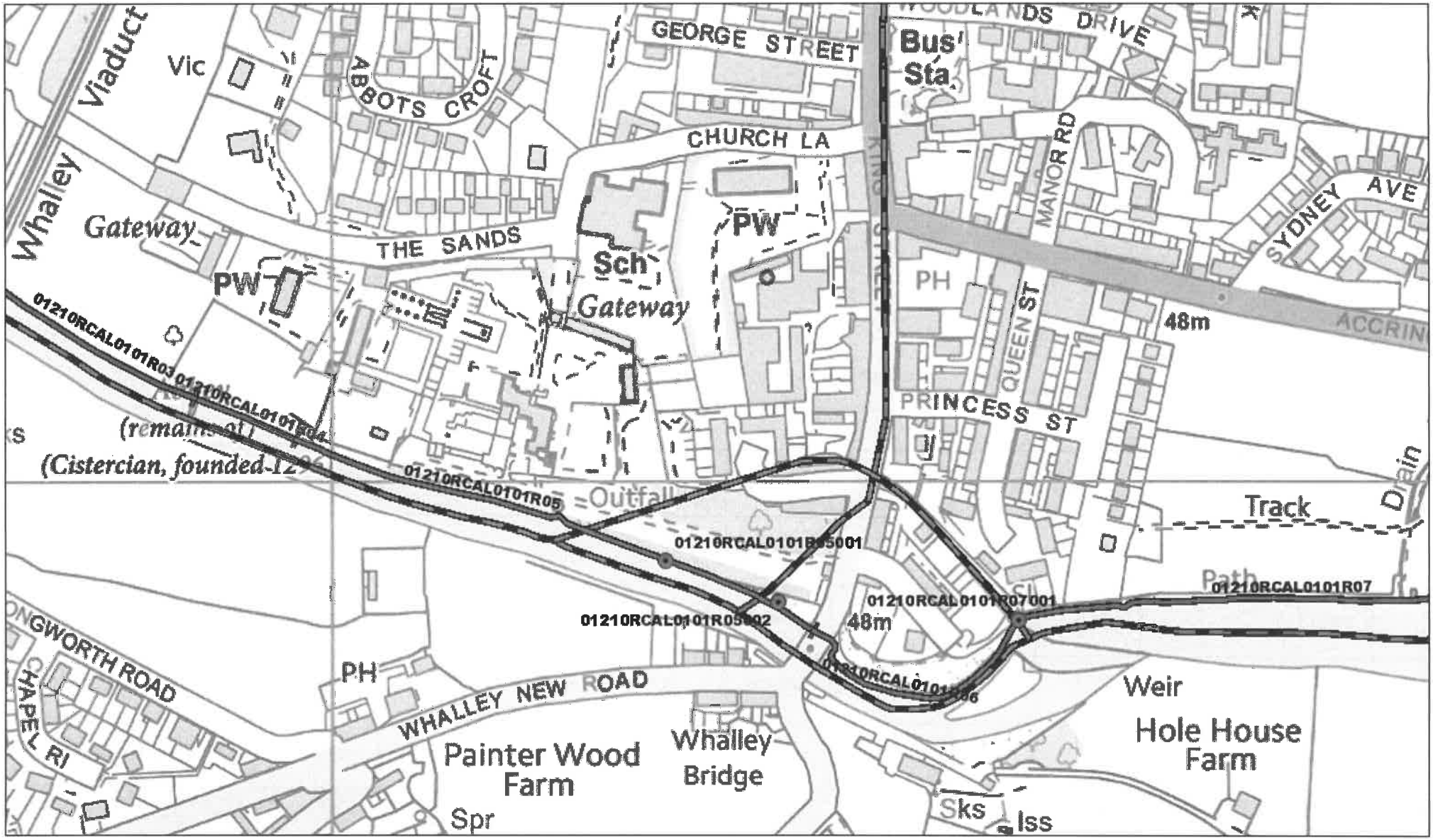
High : 50

mAOD

Low : 40

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

CL110541 The Stables, Off King Street, Whalley



December 21, 2018

- Structures
- Defences
- Channels

1:3,111

0 0.025 0.05 0.1 mi

0 0.04 0.08 0.16 km

Site Location	The Stables, Off King Street, Whalley	CL110541

Fluvial Defences

Asset Ref.	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)			
01210RCAL0101R07	SD 73797 35944	High Ground	Fluvial	Poultry Houses to Weir	Unknown	5	3	-	-	-	384.9	-
01210RCAL0101R06	SD 73415 35918	High Ground	Fluvial	Weir to Whalley Bridge	Unknown	10	3	44.20	44.85	2	164.1	-
01210RCAL0101R05	SD 73292 35911	High Ground	Fluvial	Whalley Bridge to Upstream of Weir	Unknown	10	3	-	-	-	337.2	-
01210RCAL0101R04	SD 72978 36025	Embankment	Fluvial	Upstream of Weir to Weir at Rear of Catholic Church	Unknown	5	3	43.90	43.90	1	66.7	-
01210RCAL0101R03	SD 72916 36050	High Ground	Fluvial	Weir at Rear of Catholic Church to Mitton Wood	Unknown	5	3	-	-	-	2683.7	-

Consent is REQUIRED for any works undertaken within 8 metres of these defences

Site Location	The Stables, Off King Street, Whalley	CL110541

Fluvial Structures

Asset Ref.	National Grid Reference	Asset Type	Protection Type	Location	Maintained By	Design Standard (Return Period)	Overall Condition Grade (Excellent 1- 5 Very Poor)	Length (m)	Height (m)
01210RCAL0101R07001	SD 73415 35918	Outfall	Fluvial	Adjacent to Weir	Private	-	3	-	-
01210RCAL0101R05002	SD 73271 35929	Outfall	Fluvial	Downstream of Whalley Bridge	Private	-	2	-	-
01210RCAL0101R05001	SD 73202 35953	Outfall	Fluvial	Downstream of Whalley Bridge	Private	-	3	-	-

Appendix D: - Borehole Logs and Soilscape Map

Norwest Holst Soil Engineering Ltd.

Borehole No. **2**

BOREHOLE LOG

Contract No. P5087
Location Whalley, South View.
Client Old Chapel House Developments
Method of Boring Percussion
Diameter of Borehole 150 mm

SD73NW 102
735 362

Sheet 1 of 2
Chainage
Ground Level 100.4 m A.O.D.
Date 31/5/84

Description of Strata	Legend	Depth Below O.L. (m)	O.D. Level (m)	Casing Depth in Sampling	Sampling and Coring	"N" / R.Q.D.%	Daily Progress
Soft brown PEAT.					1.00	0	
		2.00	98.4		2.00	1	
Very loose grey organic clayey SAND.		3.50	96.9		3.50	0	
Loose brown SAND and GRAVEL.		4.10	96.3		4.50	0	
Loose grey silty SAND with soft clay partings.					6.00	10	
					7.50	9	
		8.50	91.9				
Firm to stiff grey silty sandy CLAY with occasional gravel.					8.00 (50)		

Type of Sample

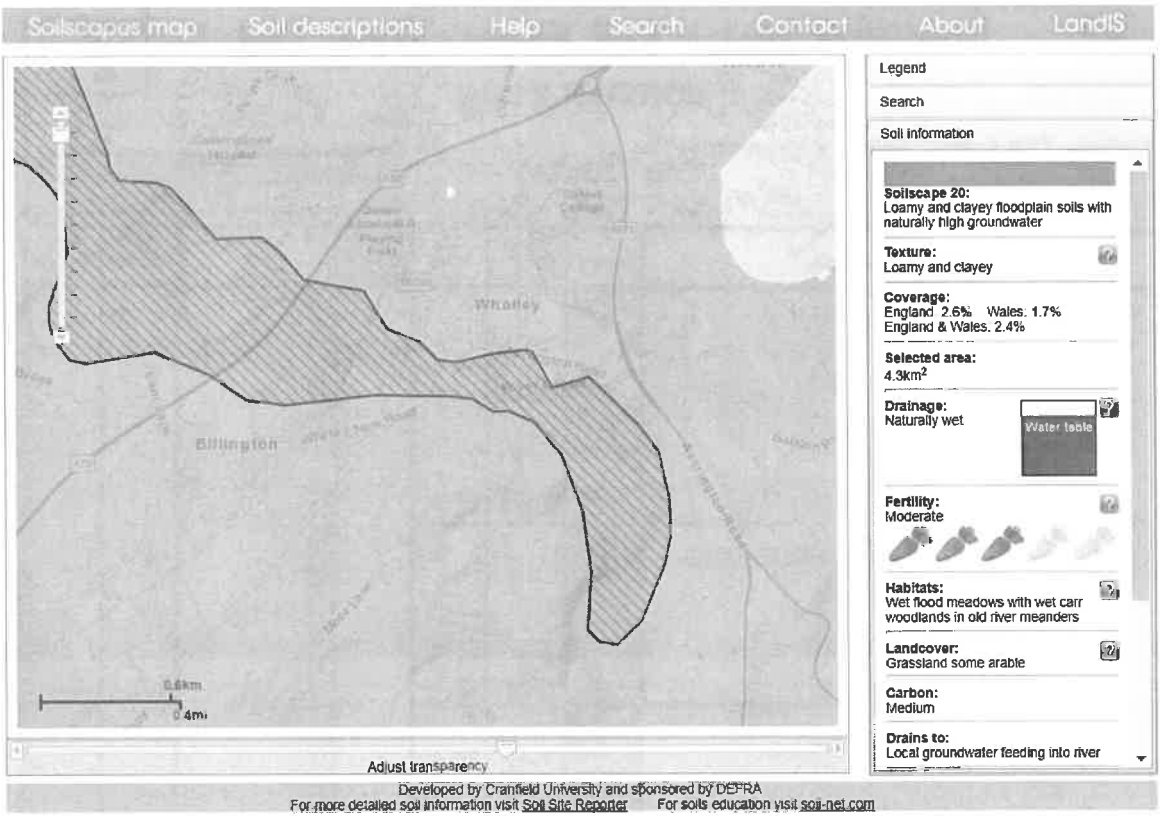
- S.P.T.
- Undisturbed
- C.P.T.
- Vane
- Jar
- Water
- Bulk
- Piezometer

Remarks (Observations of Ground Water etc.)

(50) U100 blows.

Water struck at 0.20 m.
Standing level at ground level.

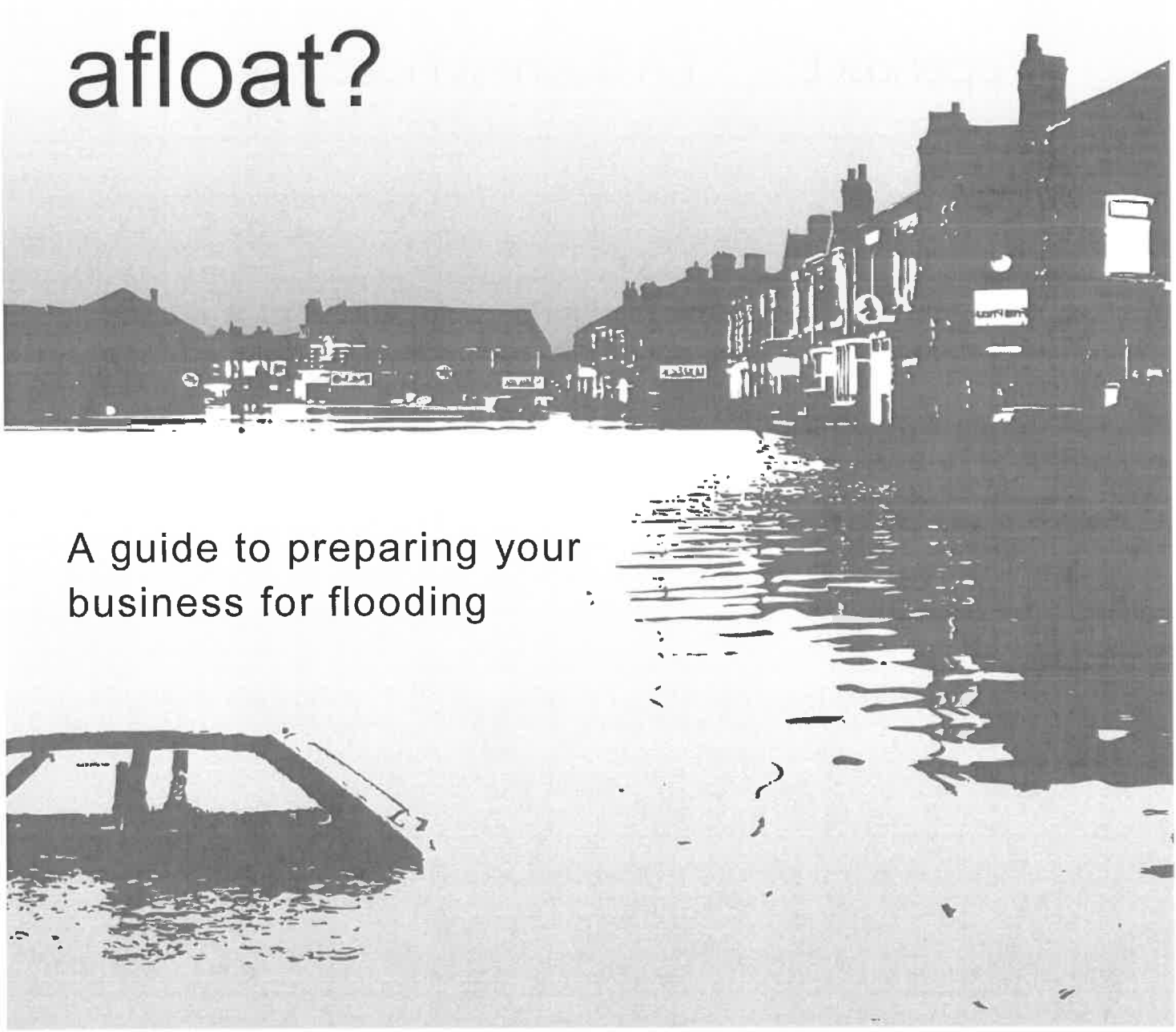
Water levels are subject to seasonal or tidal variations and should not be taken as constant.


Soilscapes map
Soil descriptions
Help
Search
Contact
About
LandIS
Whatley
Billington
0.6km
0.4mi
Adjust transparency
Legend
Search
Soil information
Soilscape 20:
Loamy and clayey floodplain soils with naturally high groundwater
Texture:
Loamy and clayey
Coverage:
England 2.6% Wales. 1.7%
England & Wales. 2.4%
Selected area:
4.3km2
Drainage:
Naturally wet
Water table
Fertility:
Moderate
Habitats:
Wet flood meadows with wet carr woodlands in old river meanders
Landcover:
Grassland some arable
Carbon:
Medium
Drains to:
Local groundwater feeding into river
Developed by Cranfield University and sponsored by DEFRA
For more detailed soil information visit Soil Site Reporter
For soils education visit soil-net.com

Appendix E: - EA 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.

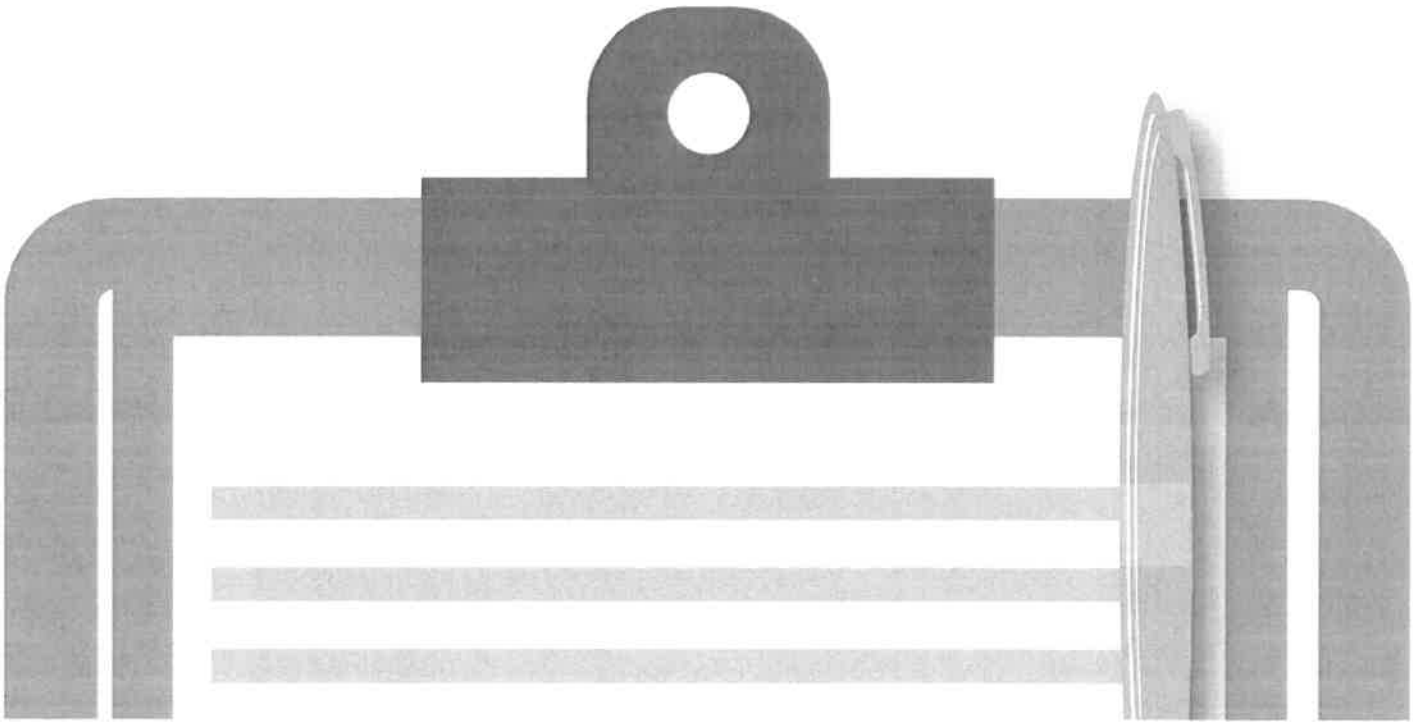
All members of the team should also keep a copy of important flood contacts at home for easy access.

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.

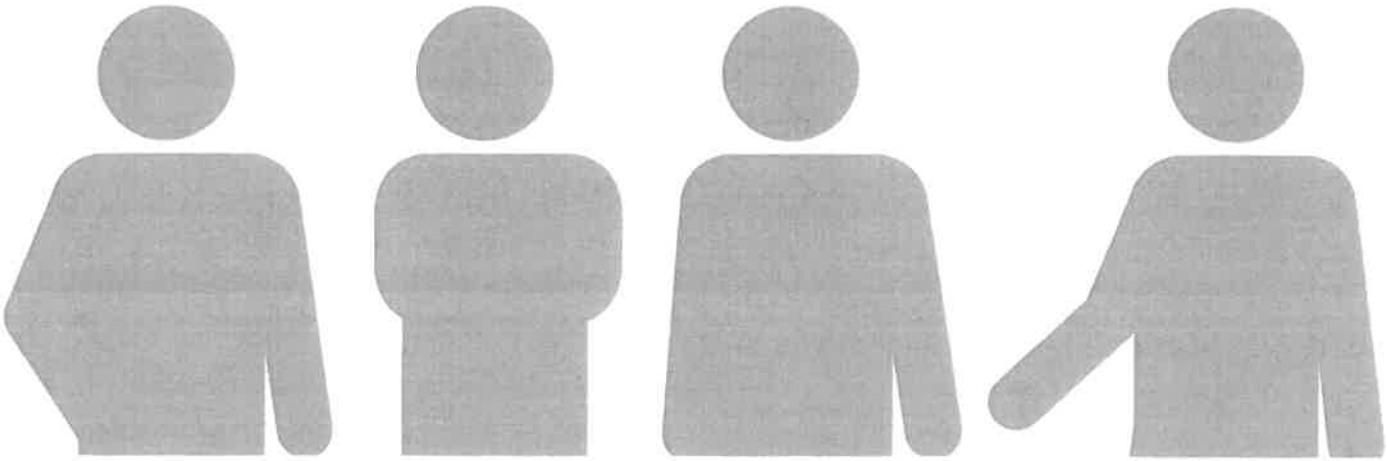
Name	Address	Telephone day	Telephone evening	Mobile

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

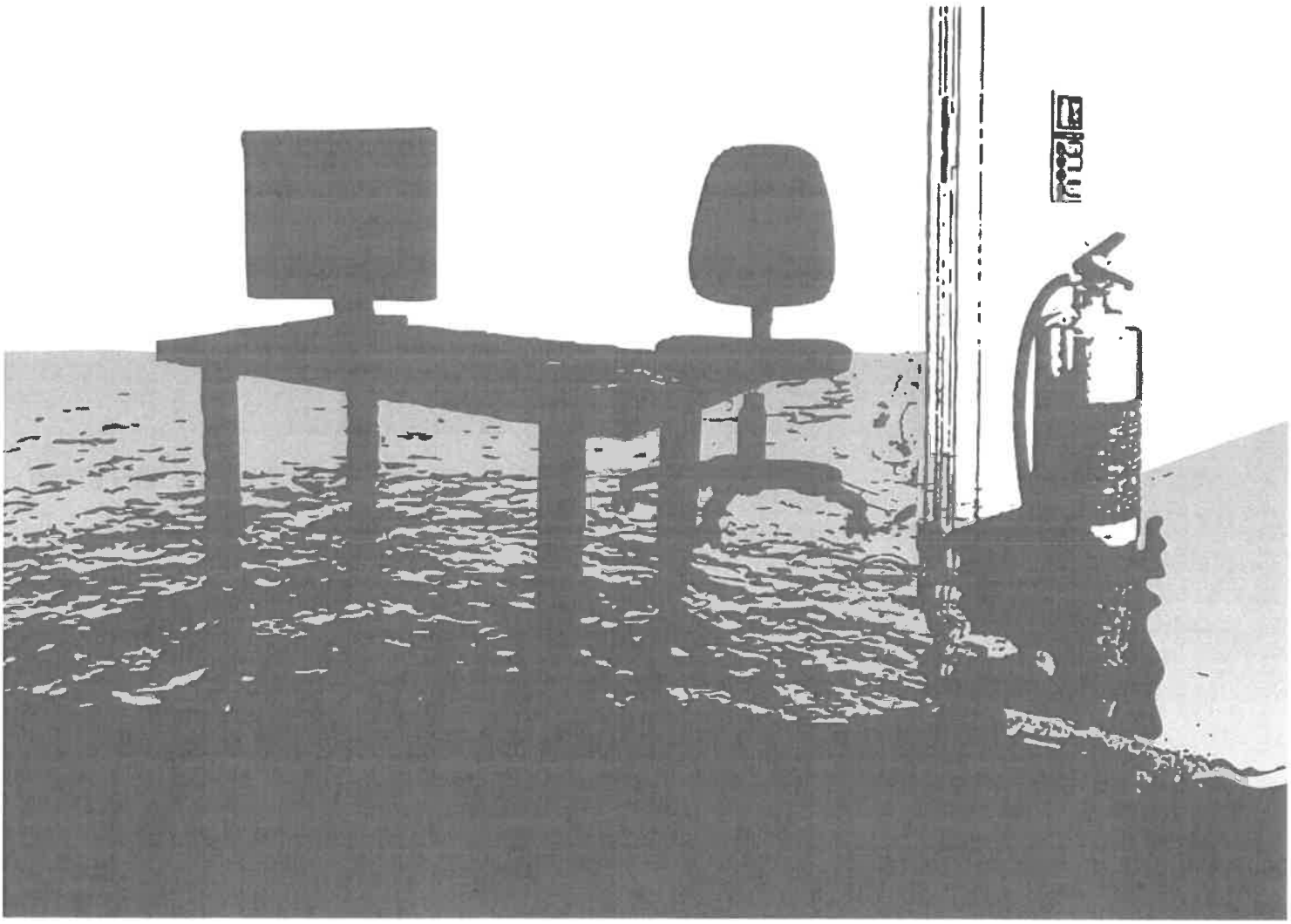
- Identify products and services you won't need in the event of a flood, or which suppliers may not be able to provide. **Make back-up plans** or arrangements for short-notice cancellation of deliveries;
- Consider contracting in advance with companies whose help you may need after a flood.

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.**

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