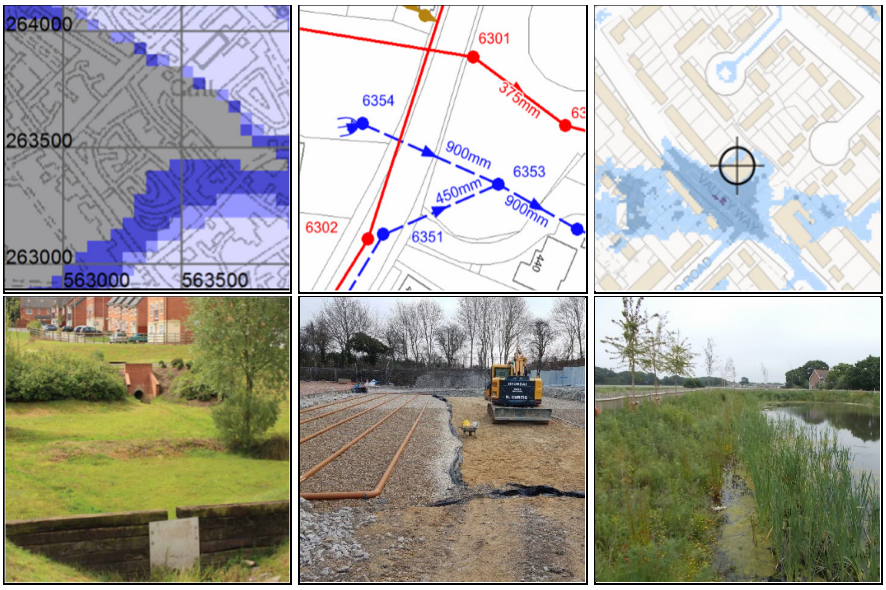


Flood Risk Assessment

Church Lane
Barnham, West Sussex

Reference:	24190.2	
Issue:	**Date:**	
1	12/5/2025	
2	4/7/2025	*Additional P4 information added*

Table of Contents

Appendices

1. Introduction

1.1 Instructions were received from A Brazil to undertake a Flood Risk Assessment (FRA) for development of 4 gypsy/traveller plots at Church Lane, Barnham, West Sussex.

1.2 This assessment has been undertaken by A P Traves BSc CEng MIStructE MCIHT.

1.3 The client's attention is drawn to the conditions and limitations contained in Appendix D.

2. Development Description & Location

2.1 The site comprises some 0.255 Ha of land forming the eastern part of two paddocks to the west side of Church Lane, Barnham, West Sussex (grid ref 495725 103800). The site location is indicated on the annotated aerial photograph in Appendix A and P Stubbington survey plan 1581-01 contained in Appendix A of this report.

2.2 The application includes land raising on some 660m^2 of the southern paddock and development of 4 gypsy/travel plots. Some 1,060m^2 of land in the northern paddock, also in the applicant's control, but immediately west of the proposed plots area would be lowered to ensure no net loss of floodplain storage at any stage and providing a beneficial increase of 301m^3 net storage gain at +105% climate change flood level. The proposed plan is indicated on site plan 633-101 and is contained in Appendix A of this report.

3. Local Development Documents & Strategic Flood Risk Assessment

3.1 The Strategic Flood Risk Assessment (SFRA) for Arun DC has been reviewed and this indicates the following:

3.2 SFRA Tile B22 indicates an Barnham Rife running east to west on the west of the site.

3.3 SFRA Appendix C indicates part of the southern paddock lies in FZ1

3.4 SFRA Tile D22 indicates the site does not lie within FZ3 climate change 2111.

3.5 SFRA Tile E22 has now been superseded by the new EA surface water flood model published January 2025. Refer to 3.10

3.6 SFRA Tile F22 indicates groundwater susceptibility. The mapping comprises a coarse grind of 1km tiles. The generic classification for the site is medium groundwater susceptibility 25-50%. Susceptibility is not however the same as risk. Refer to 3.12.

3.7 SFRA Tile H22 indicates the site lies within an historic flood outline.

3.8 Flood mapping data has been reviewed from the Environment Agency (EA) website. (refer to Appendix B). This indicates the following:

3.9 The EA mapping indicates the existing stable yard is located in FZ3

3.10 The new (2025) EA mapping indicates the site is at very low risk of surface water flooding:

3.11 The EA output for long term flood risk indicates reservoir flooding at the site is unlikely.

3.12 The EA output for long term flood risk indicates groundwater flooding at the site is unlikely.

4. Catchment Flood Management & Shoreline Management Plans

4.1 Although several miles from the coast the site lies close to Barnham Rife which is at low elevation (approx. 2.5m AOD) and would be susceptible to tidal flood risk in the absence of maintained coastal defences. The gypsy/traveller plots will be above 2125 design flood level both defended and undefended scenarios.

4.2 The Arun and Western streams Catchment Flood Management Plan summary – December 2009 (CFMP) indicates the site falls within sub-area 6 Coastal Plains. The CFMP states that policy 4 is the preferred policy approach:

"Areas of low, moderate or high flood risk where we are already managing existing flood risk effectively but where we may need to take further actions to keep pace with climate change."

4.3 Overall the CFMP does not present any issues that would prohibit the development of this site with respect to flood issues provided the surface water drainage is based on SuDS principles.

5. Catchment Data

5.1 The BGS geological mapping indicates the soils at the site comprise London Clay bedrock of Clay Silt and Sand. Raised Beach Deposits of Sand and Gravel superficial soils are indicated to the area of the plots in the northern paddock. No superficial soils are indicated to the southern paddock

6. Sewage Authority Data

6.1 The site is not currently connected to the public foul sewer. There is a 175mm DN public foul water sewer to Church Lane t the front of the site.

6.2 The proposed development will make connection to the 175mm DN public foul sewer running north to south in Church Lane to the front of the site. The change in network foul water load is considered *de minimis*, but notwithstanding this the standing wastewater Infrastructure Charge (IC), which came into force from 1st April 2018, will be paid. Should any downstream reinforcement be required Southern Water will deliver this from the development ICs they will collect, this is however considered unlikely.

7. Site Particulars

7.1 The proposed development plots is some 0.255 Ha and comprises grazing paddocks. The site falls east to west from some 4.5-5.5m at the front to some 3.0(*$_1$)-4.4m AOD at the rear.

$*_1$ 3.0m AOD at present but raised to 4.4m AOD as part of the proposed development

7.2 Barnham Rife is located some 25m west of the location of the proposed gypsy/traveller plots.

7.3 The surrounding land use is residential along Church Lane and Highground Lane with agricultural fields to the north

8. Source-Pathway-Receptor Assessments

8.1 2/7/2025 EA Table 3 point #1-4 average (refer to Appendix B) confirms the following 2025 fluvial and tidal flood levels:

Fluvial (undefended) 1%AEP	N/A	
Fluvial (undefended) 0.1%AEP	N/A	
Fluvial (defended) 1%AEP	N/A	2025 design flood
Fluvial (defended) 0.1%AEP	N/A	

The 2025 design flood would be fluvial spread from Barnham Rife but would not reach the site. (see also climate change in section 10)

8.2 The site is indicated to be at very low risk of surface water flooding (<0.1%AEP) <0.1% AEP.

8.3 The EA long term flood risk confirms that reservoir flooding at the stable yard is unlikely.

8.4 The EA long term flood risk confirms that groundwater flooding at the stable yard is unlikely.

8.5 The critical flood source is fluvial/tidal flooding from Barnham Rife some 25m west of the site. (see also climate change in section 10)

8.6 The flood receptors of the development are:

- Residential dwellings

8.7 The proposed development and existing site classifications to NPPF Annex 3 are as follows:

• Land used for agriculture	less vulnerable
• Residential dwellings	more compatible

9. Flood Probability

9.1 The EA flood zones shown on the outputs and included in Appendix B represents current best estimates of zone 2 and zone 3 flooding. It does not take account of potential climate change impacts. The flood zone definitions to Table 1 (NPPG Reference ID: 7-078-20220825) are as follows:

Zone 1	Low probability of flooding (<0.1% AEP)
Zone 2	Medium probability of tidal flooding (0.1-0.5% AEP) Medium probability of fluvial flooding (0.1-1% AEP)
Zone 3a	High probability of tidal flooding (>0.5% AEP) High probability of fluvial flooding (>1% AEP)
Zone 3b	Functional floodplain (>3.3% AEP probability of flooding)

The flood map does not differentiate between zones 3a and 3b.
Zone 3b is only considered appropriate for water-compatible development.
Zone 3a is additionally considered appropriate for less vulnerable uses.

9.2 The proposed land raising on 660m^2 of the southern paddock would mean all land on which the gypsy/traveller plots are located would be at low fluvial/tidal risk (<0.1%AEP) for the lifespan of the development and at low risk of fluvial/tidal flooding (FZ1) and the risk of flooding from other sources is low.

10. Climate Change

10.1 The new climate change allowances for flood risk assessment GOV.UK 27 May 2022 update climate change values for the site are:

• Sea level rise 2125, Higher Central (design)	+1.2m
• Sea level rise 2125, Upper End (sensitivity)	+1.6m
• Peak flow 2125, Upper End	+64%
• Peak rainfall 1%AEP upper End	+45%

10.2 2/7/2025 EA Table 3 point #1-4 average (refer to Appendix B) confirms the following 2115 fluvial and tidal flood levels:

Fluvial (undefended) 1%AEP	4.38-N/A AOD *$_2$
Fluvial (defended) 1%AEP	4.38-N/A m AOD *$_2$

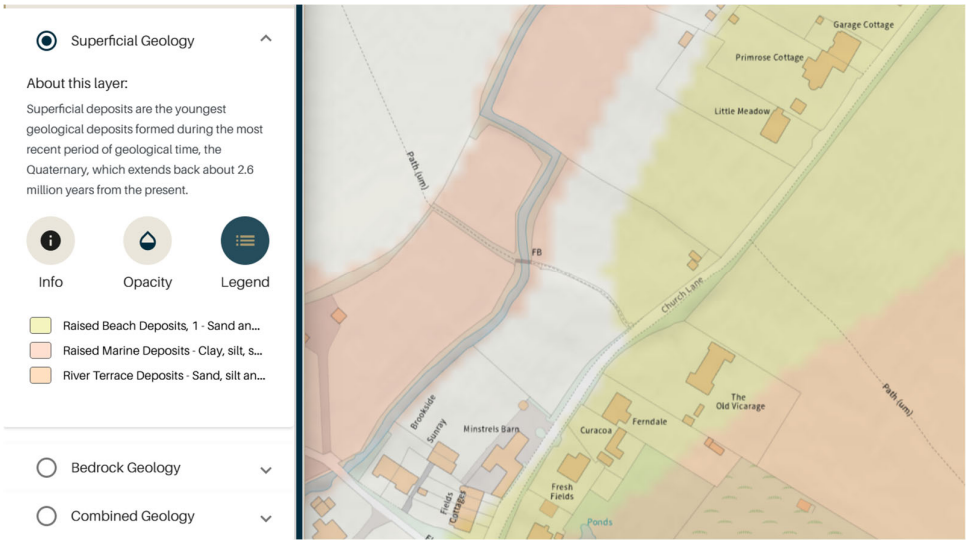
*$_2$ cited values are for +105%CC and +45%CC respectively actual CC applicable is +64%CC

The EA models do not provide output for the actual applicable peak flow climate change value of +64% and linear interpolation from the +45%CC and +105% CC; At point #3: 1%AEP +105%CC water depth 0.64m and at 1%AEP +45%CC the point does not flood ie flood level below 3.74m AOD. For actual design flood of 1%AEP +64% AEP actual flood level is deemed to be 3.92m AOD from the data supplied by the EA. A conservative approach has however been taken and has examined a flod level of 4.37m AOD ie =0.45m freeboard onto design flood level.

10.3 Surface water drainage strategy is discussed in Chapter 11. The volumes and flows for this strategy have been derived in accordance with CIRIA C753 and include for climate change effects.

11. Detailed Development Proposals & Surface Water Strategy

11.1 A site soils investigation has not yet been undertaken pending receipt of feedback from the initial application documents. The local geology is London Clay and other nearby developments have concluded that this does not have adequate permeability for an infiltration discharge. The northern paddock is indicated to at the fringe of Raised Beach Deposits (generically these are typically Sand and Gravel). The thickness of these Raised Beach deposits may however be thin as the site location is at the fringe of these where the deposit thickness would peter out.



11.2 The applicant proposes to form the site pavements of unbound gravel for which runoff would mimic the natural behaviour and not increase runoff rate or increase flood risk elsewhere.

11.3 If this application receives positive initial feedback the applicant will undertake permeability testing and groundwater level monitoring to establish the actual potential for infiltration drainage. If this testing can demonstrate an infiltration solution is viable then a detailed surface water drainage scheme for infiltration by permeable pavements will be submitted.

11.4 If this testing demonstrates infiltration discharge is not viable then the applicant will provide an attenuation storage scheme with regulated discharge rate to Barnham Rife. (the applicant controls the land at the rife and between the site and the rife so has the ability to deliver this).

11.5 There are two approaches to setting post development discharge rates. Either a variable rate discharge and provision of separate long-term storage which itself is limited to a discharge rate of 2 l/sec/Ha; or set a flat discharge of Q_{BAR} or 2 l/sec/Ha and provide

adequate storage to facilitate this. In both cases there is a pragmatic lower threshold to mitigate the potential blockage risk associated with small orifices for low flow rates. This is accepted to be 5 l/sec where discharging to open water bodies to allow for vegetation or 2 l/sec where discharging into sewers or piped systems which inherently have no vegetation.

With the pavement areas of unbound gravel construction mimicking natural runoff rates then for a 530m^2 overall roof catchment limited to 2 l/sec for 1%AEP + 45% climate change +10% urban creep 27.1m^3 storage would be required. Refer to calculation in Appendix C. This amount of storage could be delivered as 4 small linked attenuation tanks each 6 m x 3m x 0.4m deep outfalling through a shared vortex flow control at 2 l/sec to Barnham Rife. At this time the calculation is only to demonstrate that the applicant has the capability to deliver this should infiltration not be possible.

11.6 If this application receives positive initial feedback the applicant will in addition to permeability testing and ground water monitoring provide a detailed surface water drainage design. At this time Section 11 of this report serves only to show that in the circumstance of infiltration not being possible the applicant has the ability to provide attenuated discharge to Barnham Rife and so ensure both adequate drainage for the proposed development and that this will not increase flood risk elsewhere.

12. Sequential & Exceptions Tests

12.1 The proposed development will avoid flood risk as the part of the proposed gypsy/traveller plots which would be at risk of 2125 design flooding is to be raised. The proposed development will be at the lowest risk of flooding from all sources for the lifetime of the development and therefore meets the sequential test

12.2 Application of the Exceptions Test is not required.

13. Flood Risk Management Measures

13.1 The land raising of the proposed gypsy/traveller plots are in the southern paddock is identified on drawing ACC24190-01 contained in Appendix C. Flood compensation storage is proposed to land west of the gypsy traveller plots in part of the northern paddock area abutting the two gypsy traveller plots in the northern paddock.

As set out in paragraph 10.2:

The cited EA climate change flood level values are for +105%CC and +45%CC respectively whereas the actual CC applicable is +64%CC. The 2125 design flood would be at least 3.59m AOD. The EA models do not provide output for the actual applicable peak flow climate change value of +64% and linear interpolation from the +45%CC and +105% CC would give a value similar to 0.5% AEP 2115 tidal (undefended) value of 3.59m AOD. The proposed land raising is therefore considered unduly conservative by around 0.8m above that necessary to avoid the 2125 design flood.

Flood storage compensation ensures no net loss of floodplain storage at any stage and would provide a beneficial increase of 301m^3 net storage gain at 2125 flood level for +105%CC.

Stage	Net storage gain (m^3) at stage	
3.0 mAOD	0	
3.1	+99	
3.2	+186	
3.3	+262	
3.4	+327	
3.5	+380	
3.6	+421	Likely design flood (interpolating from limited EA outputs)

3.7	+448	
3.8	+463	
3.9	+465	
4.0	+454	
4.1	+430	
4.2	+393	
4.3	+344	
4.37	+301	(+105% CC ie 44% more than +64%CC applicable)

Compensation will ensure no increase in flood risk elsewhere and for flood levels above 3.0m AOD will actually deliver beneficial flood reduction.

13.2 The source pathway receptor assessment is contained in Chapter 8.

13.3 A minimum ground level of 4.37m AOD is proposed for the area of the gypsy/traveller plots

14. Off Site Impacts

14.1 The surface water strategy mimics the existing run-off regime. There will therefore be no adverse impact on flood risk.

15. Residual Risks

15.1 The proposed development provides for flood events up to 1:100 year 2025_{AD} + CC. The residual flood risk is therefore events in excess of 1:100 year 2025_{AD} + CC.

Appendix A

KEY:

bt	British Telecom
cb	Control Box
cl	Cover Level
ctv	Cable Television
dk	Drop Kerb
el	Electric
ep	Electricity Pole
fh	Fire Hydrant
gu	Gully
gsv	Gas Stop Valve
ht	Height
ic	Inspection Cover
il	Invert Level
lp	Lamp Post
mkr	Marker
o/h	Overhead
pb	Post Box
pxg	Pram Crossing
np	Name Plate
rs	Road Sign
sv	Stop Valve
tb	Telephone Box
tl	Traffic Light
tt	Top of Tree
th	Threshold
tw	Top of Wall
utl	Unable to Lift
vp	Vent pipe
wm	Water Meter
wsv	Water Stop Valve

CHURCH LANE

NOTES:
LEVELS RELATE TO O.S. DATUM
TREE SPECIES SHOULD BE VERIFIED WHERE OF CRITICAL IMPORTANCE
THE ARCHITECT SHOULD SATISFY THEMSELVES THAT ALL TREES LIKELY TO AFFECT HIS DESIGN HAVE BEEN SHOWN
INTER CONNECTION OF MANHOLES SHOULD BE VERIFIED WHERE OF CRITICAL IMPORTANCE USING CCTV
PIPE SIZES & INVERTS DETERMINED WITHOUT ENTRY INTO MANHOLE
ALL DIMENSIONS & LEVELS SHOWN IN METRES
ON SITE DIMENSION ACCURACY IS TAKEN RELATIVE TO THE PRINTED SCALE AND SHOULD BE CHECKED ON SITE WHERE OF CRITICAL IMPORTANCE

INDICATIVE

P STUBBINGTON
LAND SURVEYS LTD

NORTH WINDS
LOWER LANE
BISHOPS WALTHAM
SOUTHAMPTON
HAMPSHIRE
SO32 1AS

TEL : 023 8060 1876

MOBILE:- 07973 348165

EMAIL:- PAUL@PSLANDSURVEYS.COM

CONTRACT:-	CHURCH LANE BARNHAM
TITLE:-	TOPOGRAPHIC SURVEY
SCALE:-	1:250 @A1
DRAWING NO.	11588/02 OF 02
DATE:-	MARCH 2025
SURVEYOR:-	PS

SITE PLAN 1:500

KEY

1. Static Caravan
2. Day Room
3. Touring Caravan
4. Parking
5. Proposed Hedge Planting
6. Existing Access
7. Existing Hedge

N

REV	DESCRIPTION	DATE	AUTHOR	CHK'D
-	-	-	-	

NOTES

DRAFT

All dimensions are subject to site survey and site verification. Do not scale from this drawing.

0 25 50m

1:500 (at A2)

DATE
APRIL 2025

SCALE @ A2
1:500

AUTHOR
CW

CHECKED BY

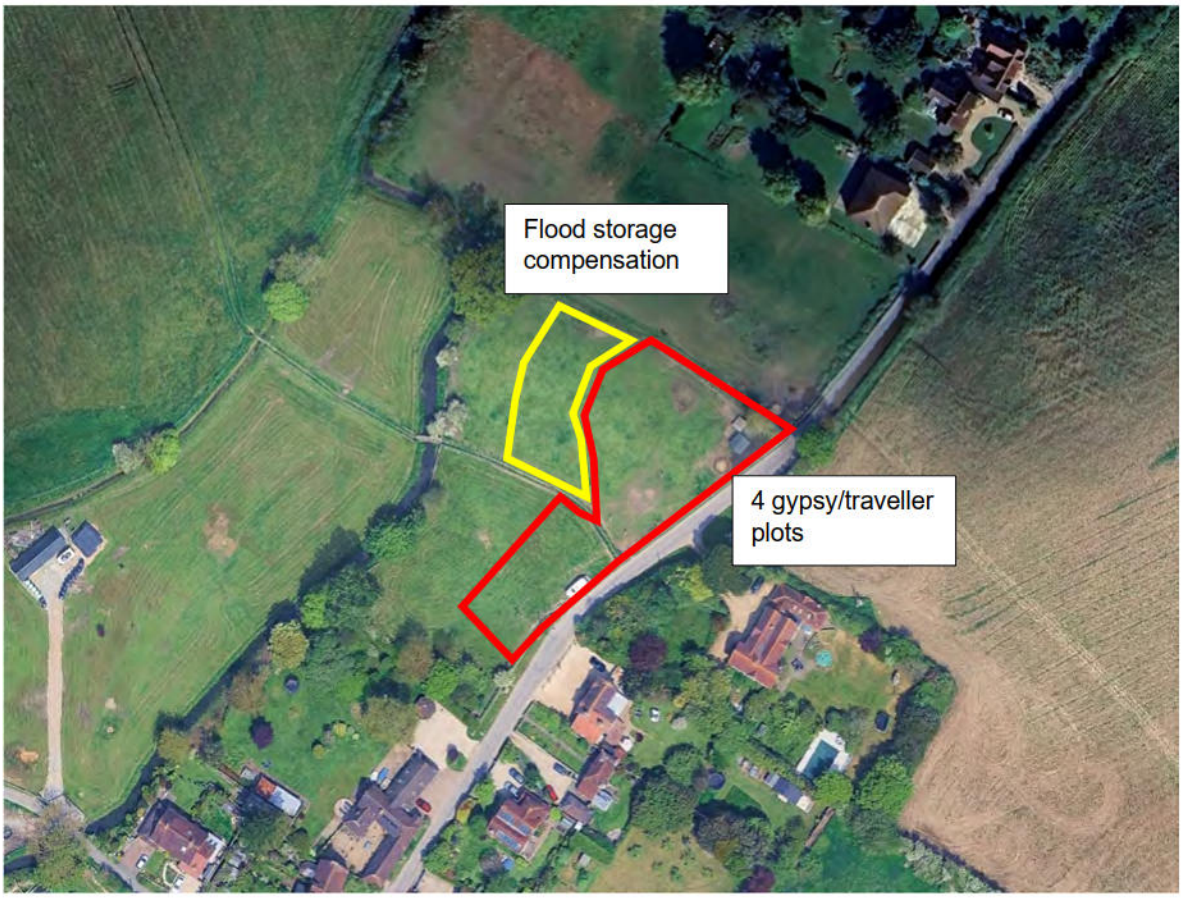
PROJECT
Proposed Chnage of Use to 4no. Gypsy/Traveller Plots on Land off Church Lane, Barnham

CLIENT
Mr A Brazil

STATUS
DRAFT

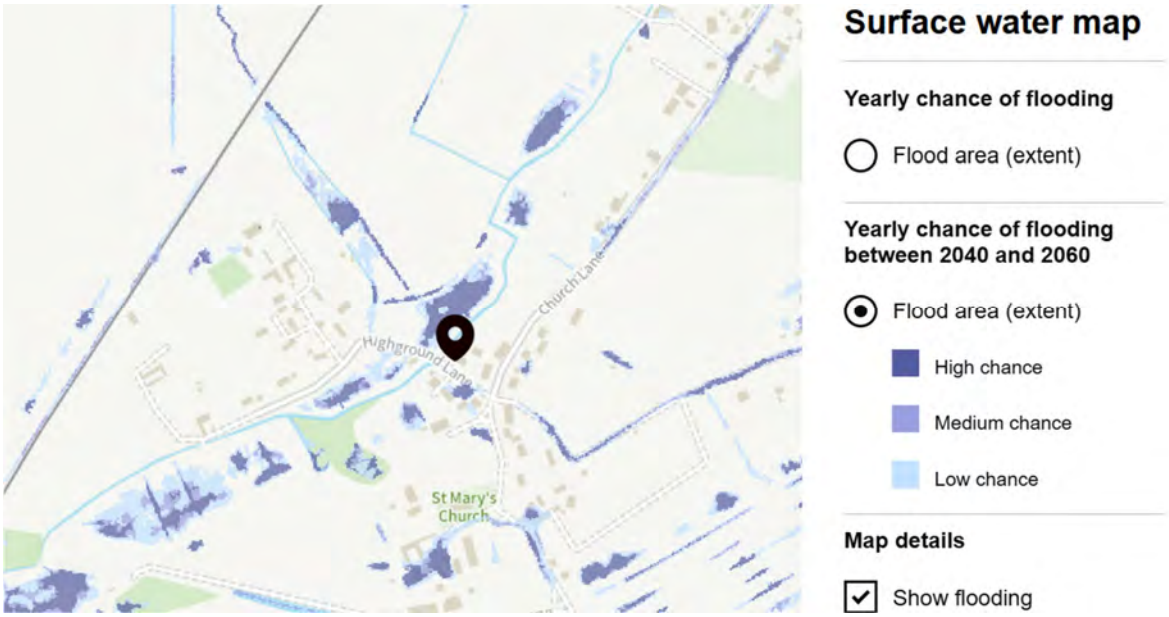
DRAWING
PROPOSED SITE PLAN

PROJECT NO.	DRAWING NO.	REV.-
633	101	



Site location

Appendix B



The EA no longer show reservoir flood risk on mapping output but set it out in writing for the relevant listed property at that post code, in this case this being:

Groundwater and reservoirs: understand your flood risk

Your selected location: Brookside, Highground Lane, Barnham, Bognor Regis, PO22 0BS

This information tells you the flood risk of the land around a building, not the building itself.

Groundwater

Flooding from groundwater is unlikely in this area.

What groundwater is

Groundwater is the water that is usually held in rocks and soil underground.

Groundwater flooding happens when this water rises and flows above the surface.

We use flood alert data to check the risk of flooding from groundwater.

Reservoirs

Flooding from reservoirs is unlikely in this area.

What a reservoir is and how we check an area's risk

A reservoir is a large natural or artificial lake that is designed to collect and store water.

We use predicted scenarios to understand the risk of flooding from reservoirs.

Flooding from reservoirs is extremely unlikely. An area is considered at risk if people's lives could be threatened in the event of a dam or reservoir failure.

Flood risk assessment data

Location of site: 495743 / 103827 (shown as easting and northing coordinates)
Document created on: 2 July 2025
This information was previously known as a product 4.
Customer reference number: E5Y3Y6P623TU / EIR202515348

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

How to use this information

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

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

Included in this document

In this document you'll find:

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

Surface water and other sources of flooding

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

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

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

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

Your Lead Local Flood Authority is West Sussex County.

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

About the models used

Model name: Aldingbourne Catchment Modelling
Scenario(s): Defended fluvial, Undefended fluvial
Date: 2015

Model name: Aldingbourne Climate Change Update
Scenario(s): Climate change defended fluvial, Climate change undefended fluvial
Date: 2016

Model name: River Arun to East Head Coastal Modelling
Scenario(s): Defended tidal, Undefended tidal
Date: 2016

These models contain the most relevant data for your area of interest.

Terminology used

Annual exceedance probability (AEP)

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

Metres above ordnance datum (mAOD)

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

Flood map for planning (rivers and the sea)

Your selected location is in flood zone 2.

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

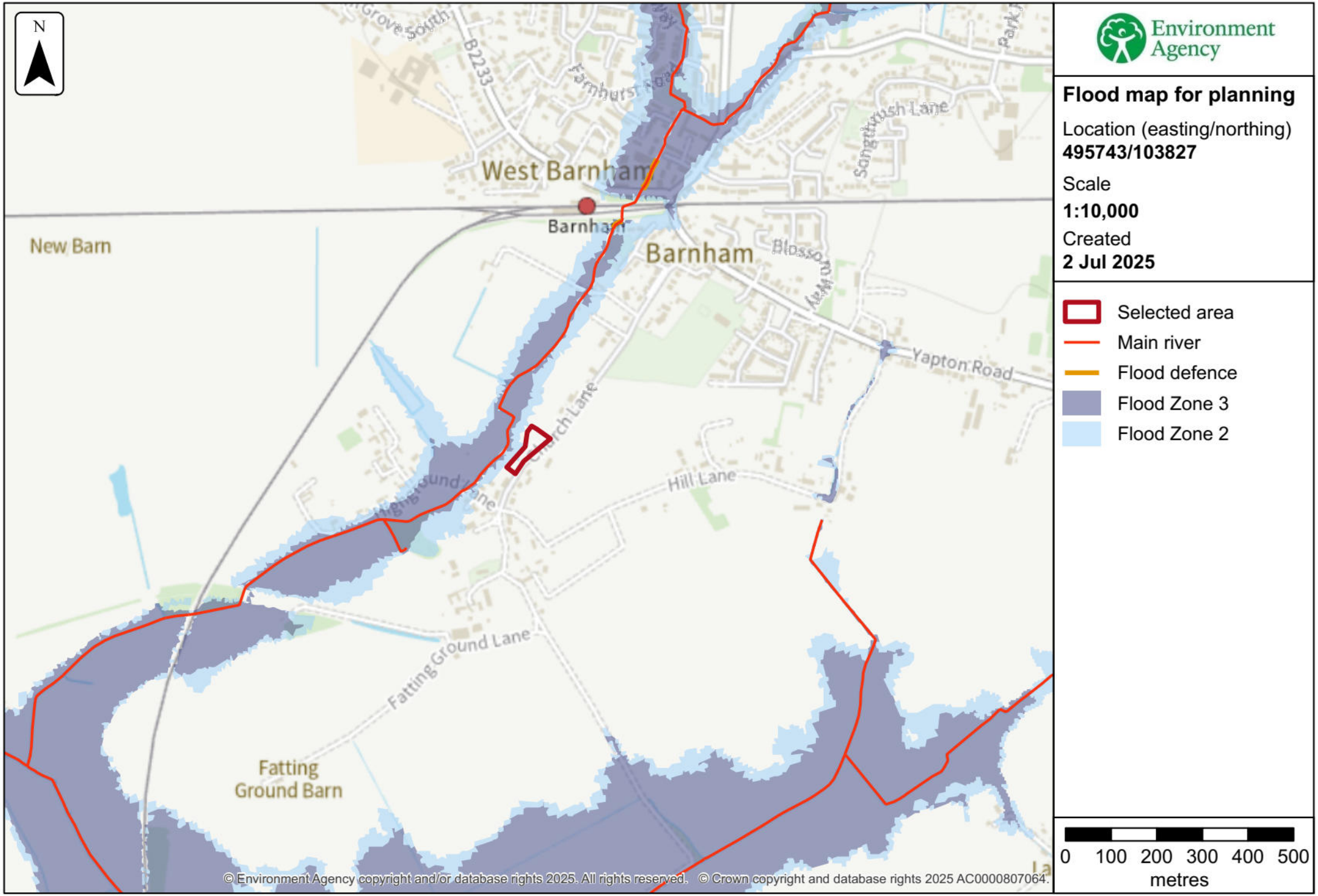
- 0.5% or greater probability of occurring in any year for flooding from the sea
- 1% or greater probability of occurring in any year for fluvial (river) flooding

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

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

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

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


N
West Barnham
Barnham
New Barn
Barnham
Blossom Way
Yapton Road
Hill Lane
Fatting Ground Lane
Fatting
Ground Barn
B2233
Songthrush Lane
Environment Agency
Flood map for planning
Location (easting/northing)
495743/103827
Scale
1:10,000
Created
2 Jul 2025
Selected area
Main river
Flood defence
Flood Zone 3
Flood Zone 2
0 100 200 300 400 500
metres
© Environment Agency copyright and/or database rights 2025. All rights reserved. © Crown copyright and database rights 2025 AC0000807064.

Past floods

Past flood events included in this document

The recorded flood outlines included in this document are for areas of land local to your site location that have been flooded by any of these sources:

- ephemeral water
- main rivers
- ordinary watercourses
- the sea
- unknown

Data limitations

The outlines do not include flooding from:

- drainage where rainfall has led to surface water ponding or overland runoff
- artificial, water-bearing sewer, water supply and wastewater treatment pipelines

Changes to flood defences

The defences (also known as assets) that were in place may also have changed. For example, assets may have been built more recently than the last recorded flood outline.

What the recorded flood outlines dataset is

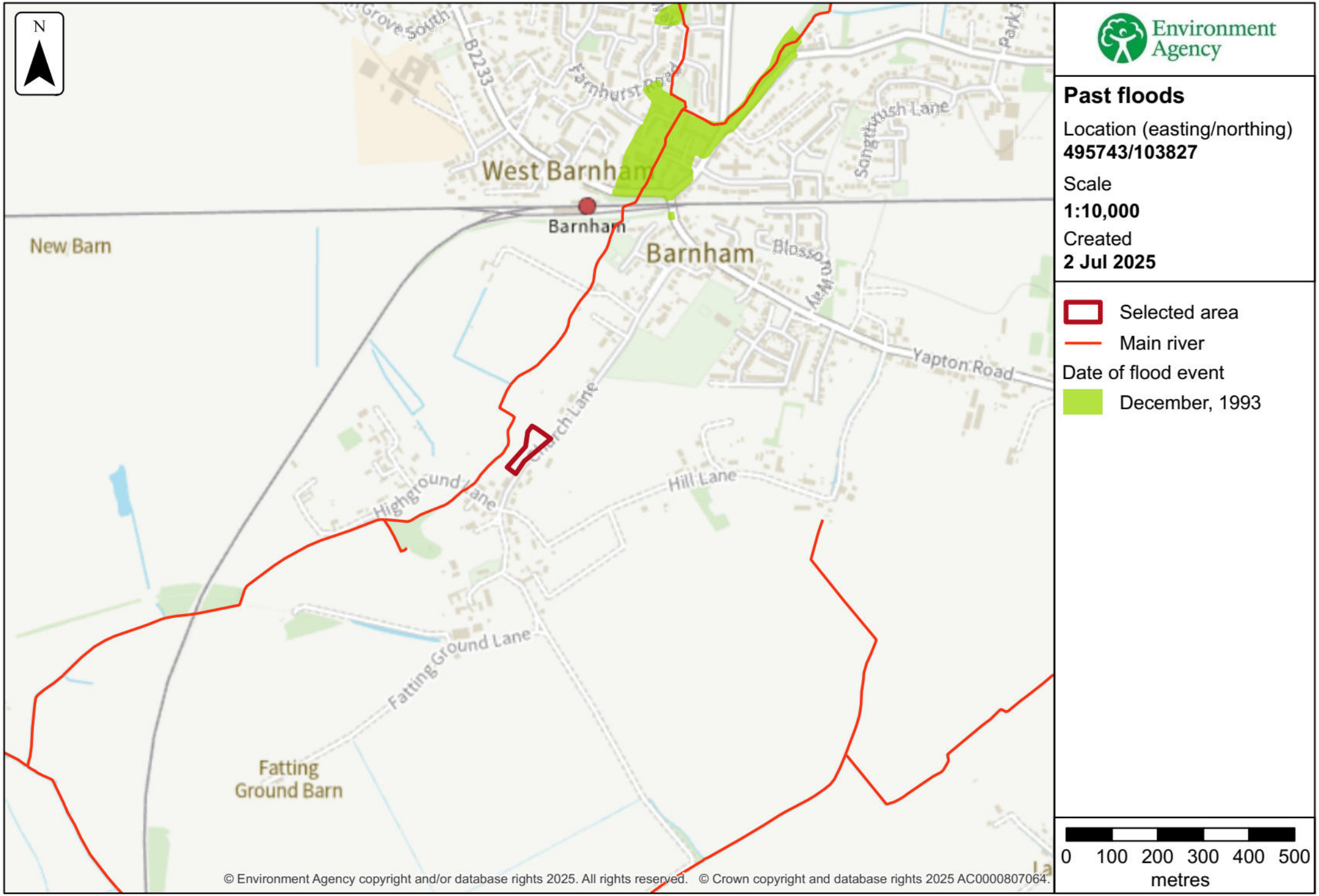
The recorded flood outlines are a geographical information system (GIS) data layer that show our verified records of areas that have flooded in the past from:

- rivers
- the sea
- groundwater
- surface water

Download the complete recorded flood outlines dataset, which includes data quality flags for outlines recorded after April 2020. This indicates the confidence we have in an outline.

Get flood information from other organisations

Contact West Sussex County Lead Local Flood Authority (LLFA) and your drainage board to get information about past flooding caused by surface water or drainage systems.


N
West Barnham
Barnham
New Barn
Barnham
Songthrush Lane
Blossom Way
Yapton Road
Church Lane
Highground Lane
Hill Lane
Fatting Ground Lane
Fatting
Ground Barn
B2233
Environment Agency
Past floods
Location (easting/northing)
495743/103827
Scale
1:10,000
Created
2 Jul 2025
Selected area
Main river
Date of flood event
December, 1993
0 100 200 300 400 500
metres
© Environment Agency copyright and/or database rights 2025. All rights reserved. © Crown copyright and database rights 2025 AC0000807064.

Data on past flood events

Start date	End date	Source of flood	Cause of flood	Affects location
30 December 1993	30 December 1993	main river	channel capacity exceeded (no raised defences)	No

Flood defences and attributes

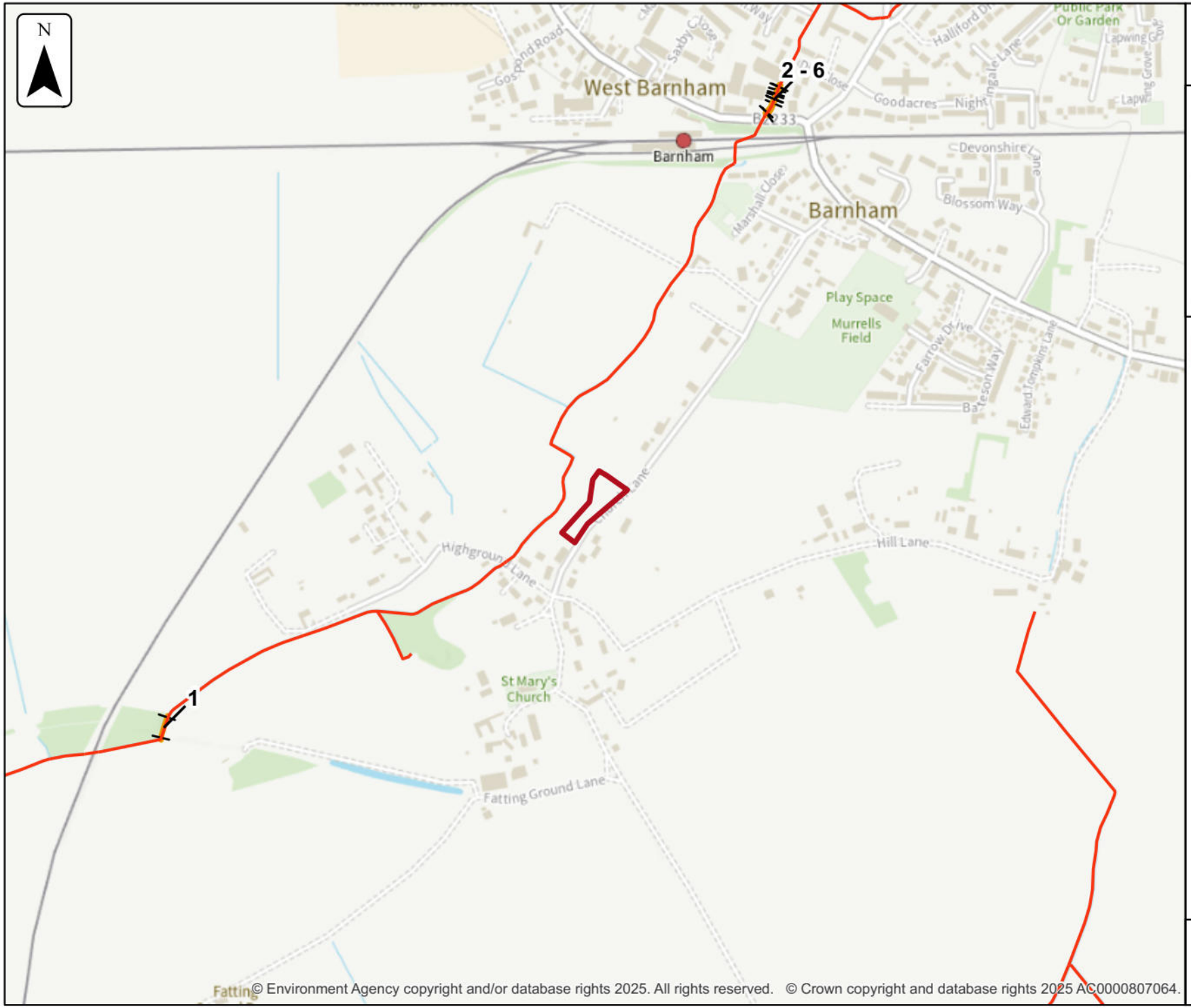
The flood defences map shows the location of the flood defences present.

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

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

Use this information:

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



Environment Agency

Flood defences

Location (easting/northing)
495743/103827

Scale
1:7,500

Created
2 Jul 2025

- Selected area
- Main river
- Flood defence

0 100 200 300
metres

Flood defences data

Label	Asset ID	Asset Type	Standard of protection (years)	Current condition	Downstream actual crest level (mAOD)	Upstream actual crest level (mAOD)	Effective crest level (mAOD)
1	19036	Engineered High Ground	5				
2	47952	Engineered High Ground	50				
3	19148	Engineered High Ground	50				
4	19153	Engineered High Ground	50				
5	19149	Engineered High Ground	10				
6	180627	Engineered High Ground					

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

Modelled data

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

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

Climate change

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

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

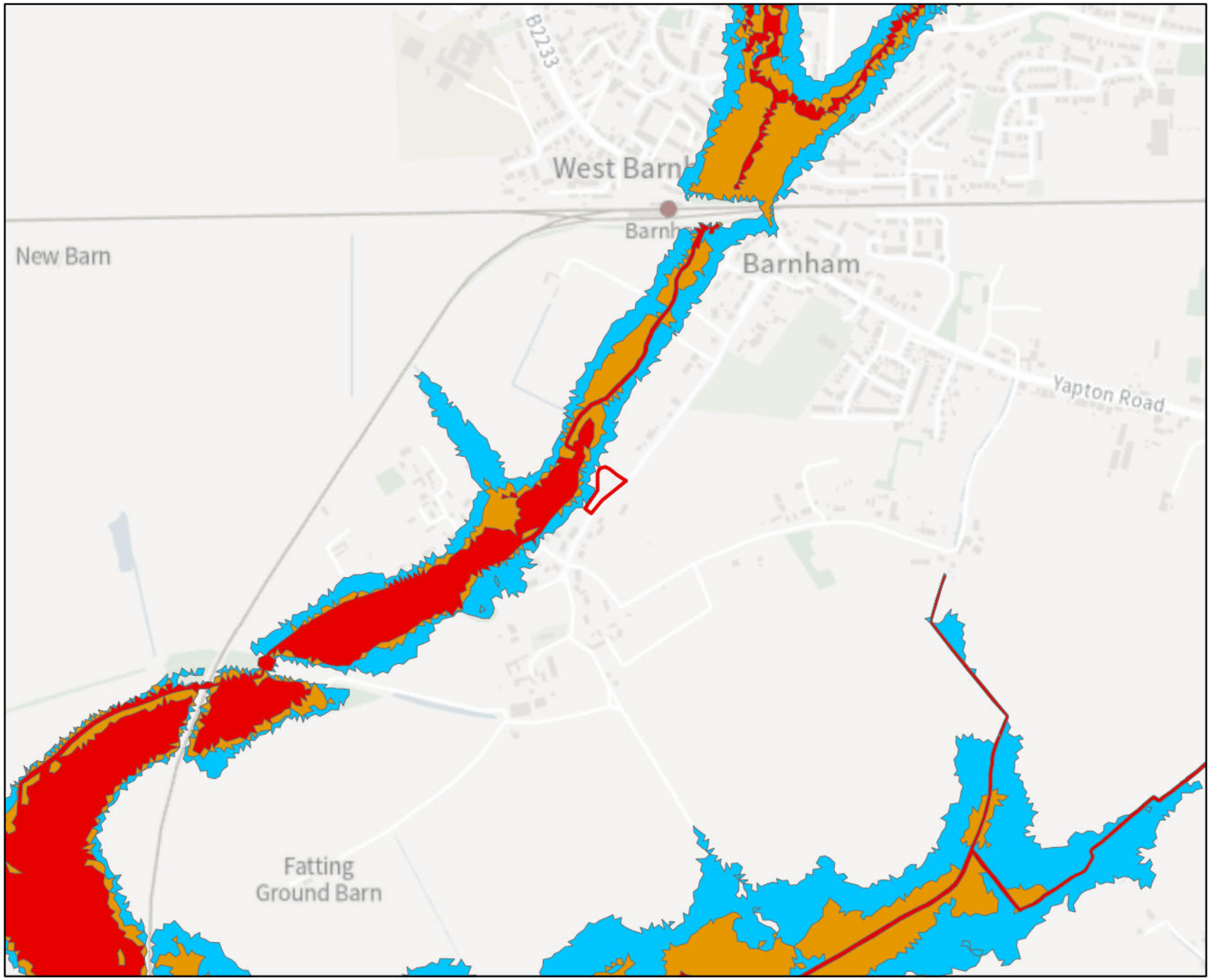
Modelled scenarios

The following scenarios are included:

Defended modelled fluvial: risk of flooding from rivers where there are flood defences

- Defences removed modelled fluvial: risk of flooding from rivers where flood defences have been removed
  Defended climate change modelled fluvial: risk of flooding from rivers where there
- are flood defences, including estimated impact of climate change
  Defences removed climate change modelled fluvial: risk of flooding from rivers
  where flood defences have been removed, including estimated impact of climate
  change
- Defended modelled tidal: risk of flooding from the sea where there are flood defences
  Defences removed modelled tidal: risk of flooding from the sea where flood defences have been removed

Modelled Flood Outlines (Defended Fluvial). Centred PO22 0DA. Created 02/07/2025.



Environment Agency

N

Legend

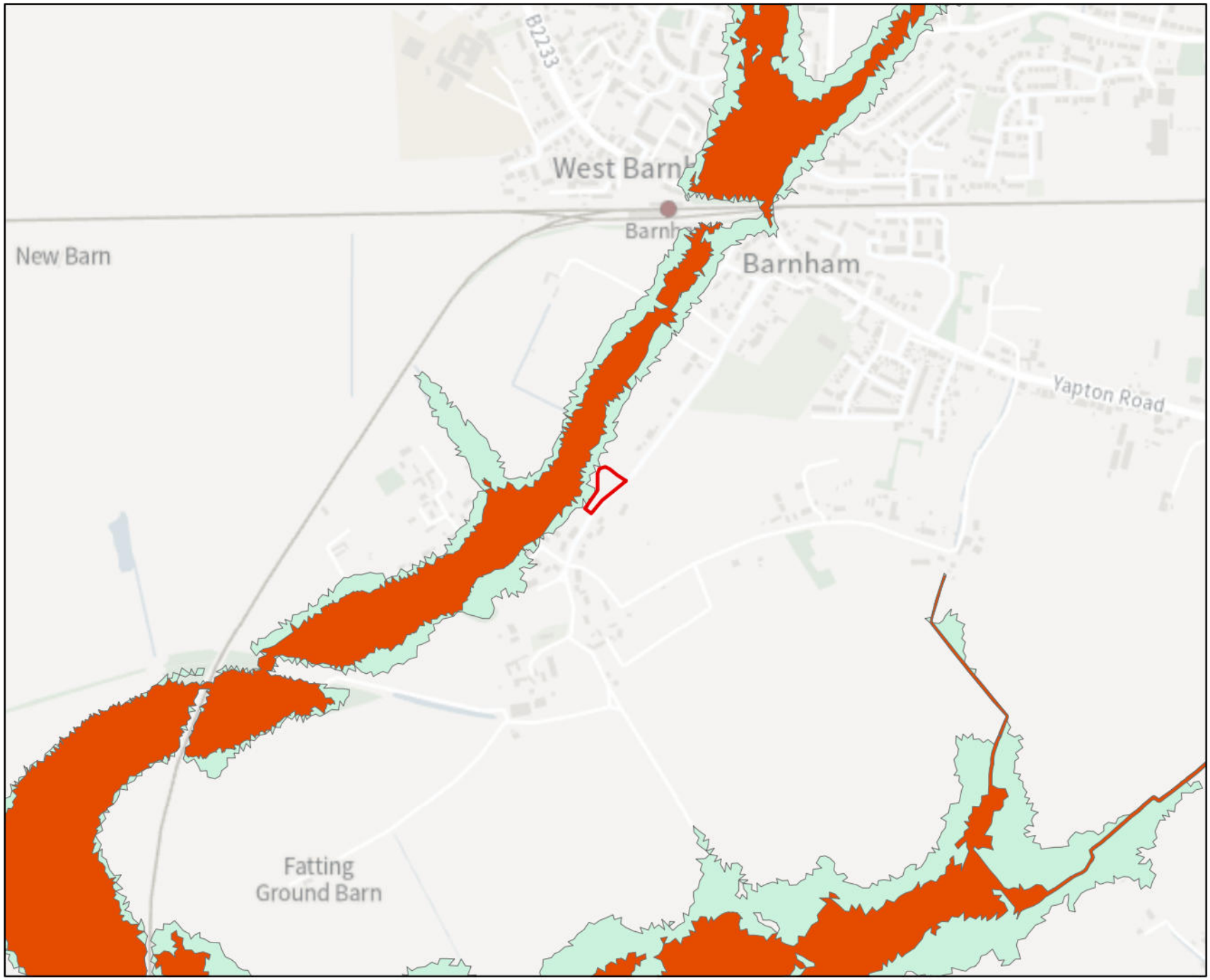
- Site Boundary
- 5% AEP (Defended Fluvial)
- 1% AEP (Defended Fluvial)
- 0.1% AEP (Defended Fluvial)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000

0 0.225 0.45
Kilometers

Modelled Flood Outlines (Undefended Fluvial). Centred PO22 0DA. Created 02/07/2025.



Environment Agency

N

Legend

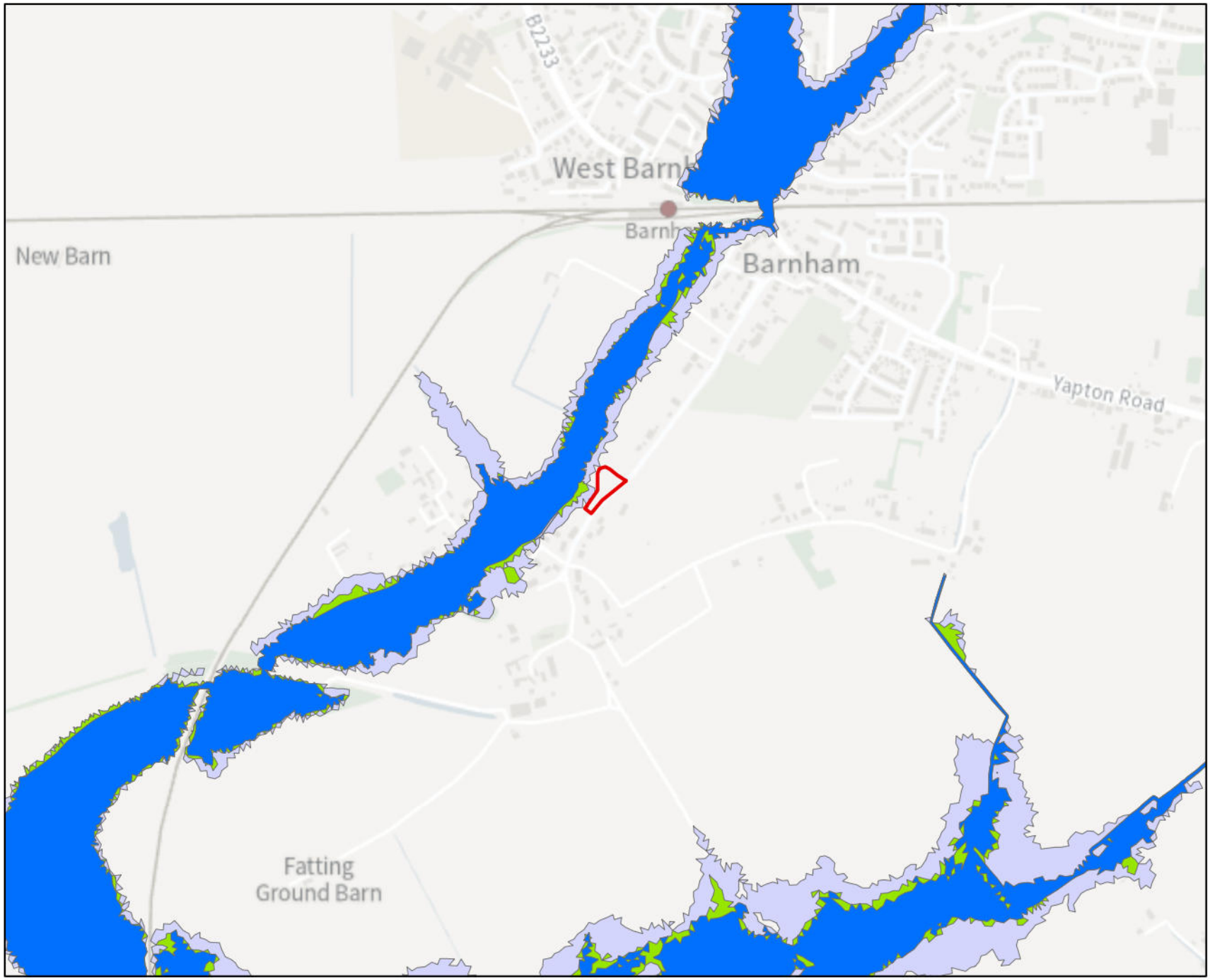
- Site Boundary
- 1% AEP (Undefended Fluvial)
- 0.1% AEP (Undefemded Fluvial)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000

0 0.225 0.45
Kilometers

Modelled Flood Outlines (Climate Change Defended). Centred PO22 0DA. Created 02/07/2025.



Environment Agency

N

Legend

- Site Boundary
- 1% AEP +CC 35% Defended Fluvial
- 1% AEP +CC 45% Defended Fluvial
- 1% AEP +CC 105% Defended Fluvial

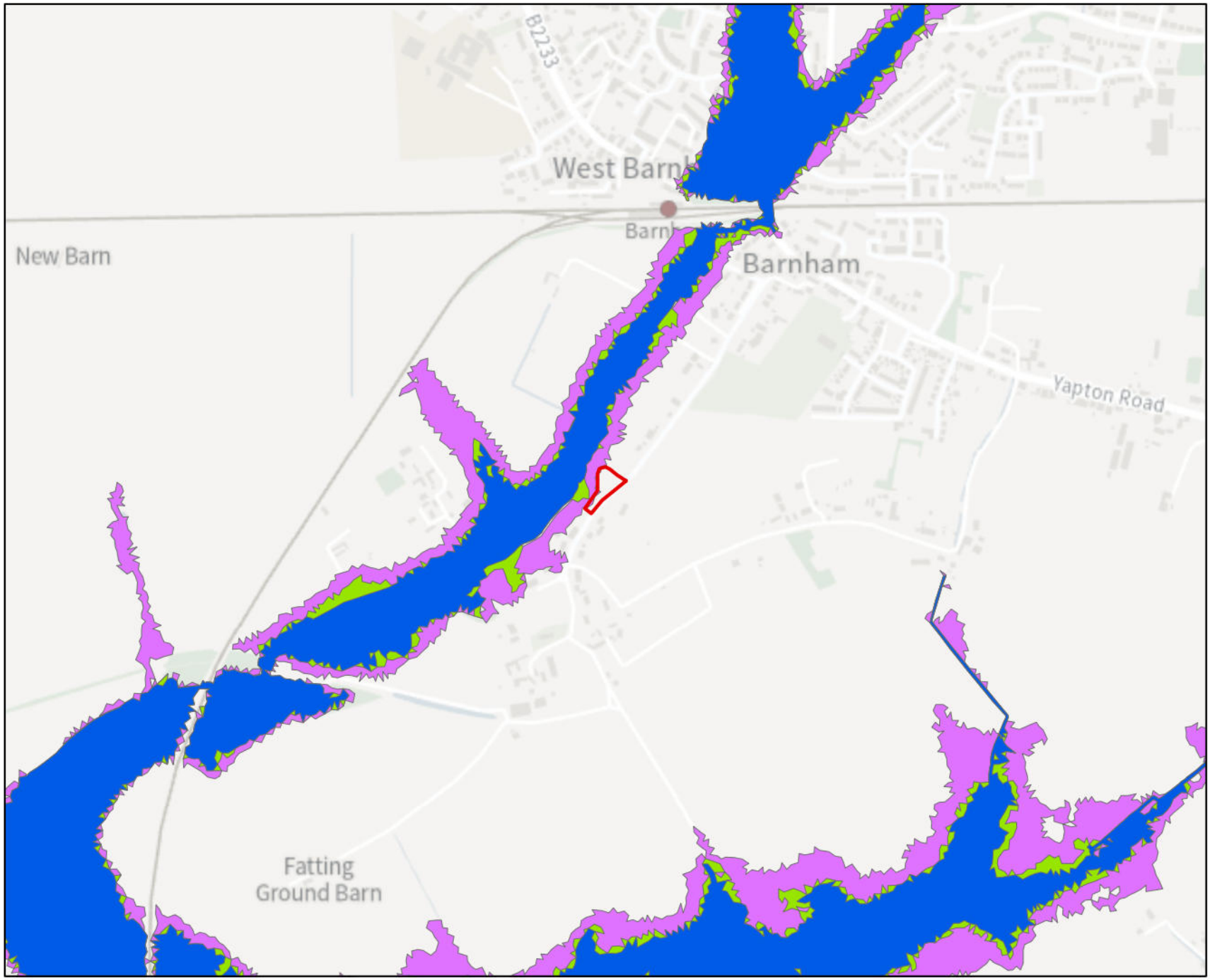
Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000

0 0.225 0.45
Kilometers

Contact us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506. Email:enquiries@environment-agency.gov.uk

Modelled Flood Outlines (Climate Change Undefended). Centred PO22 0DA. Created 02/07/2025.



Environment Agency

N

Legend

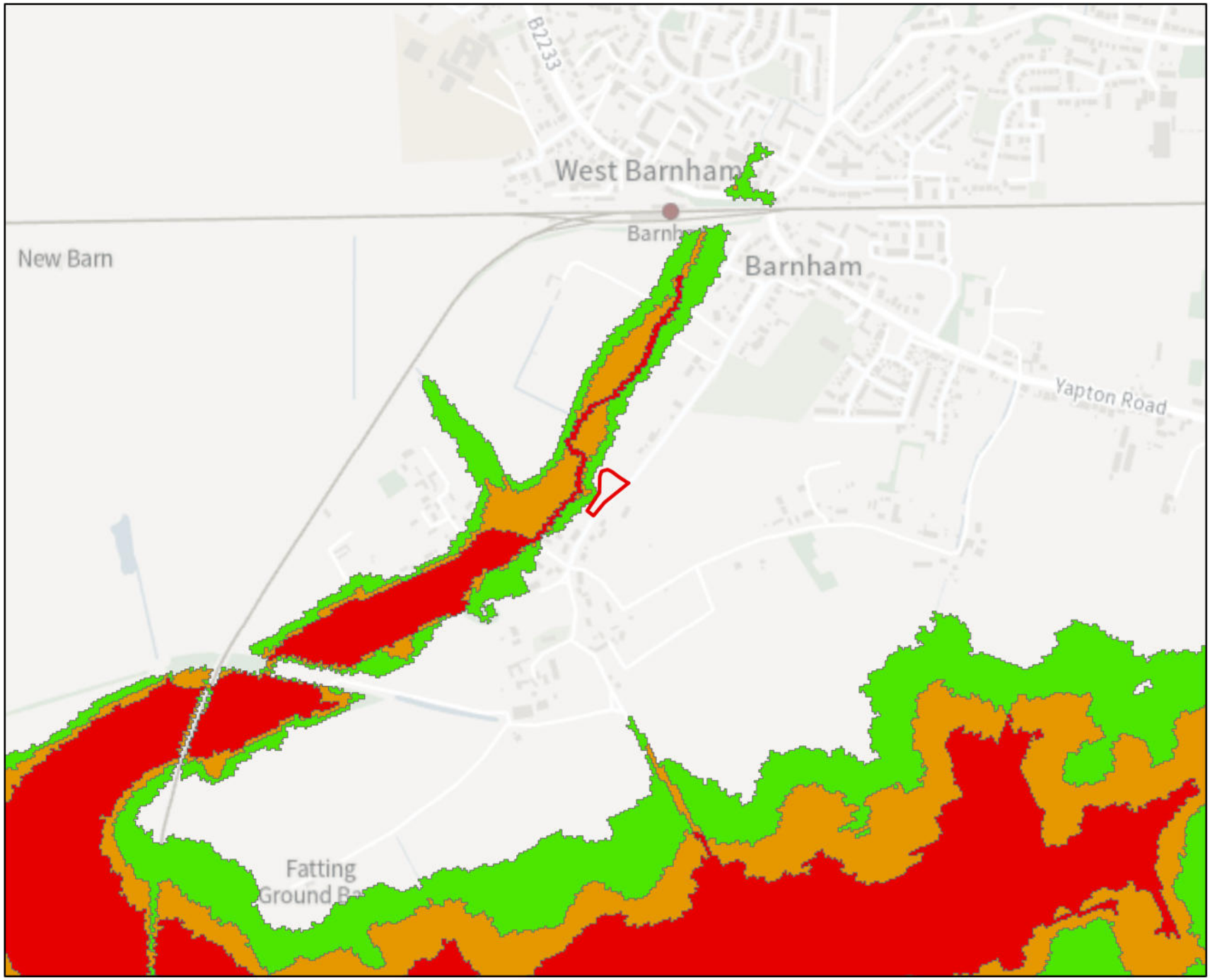
- Site Boundary
- 1% AEP +CC Undefended Fluvial
- 1% AEP +CC 45% Undefended Fluvial
- 1% AEP +CC 105% Undefended Fluvial

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000

0 0.225 0.45
Kilometers

Modelled Flood Outlines (Undefended Tidal). Centred PO22 0DA. Created 02/07/2025.



Environment Agency

N

Legend

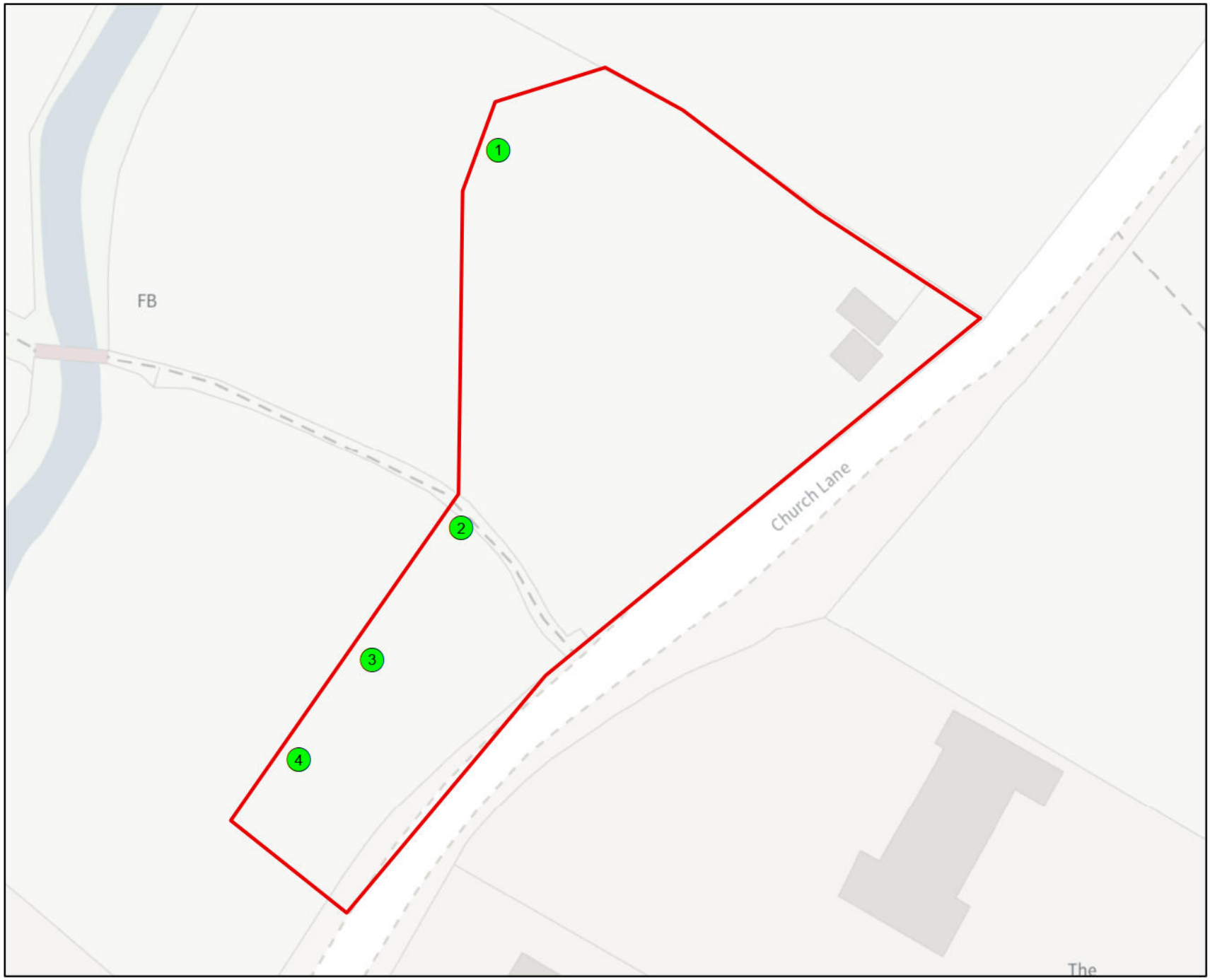
- Site Boundary
- 0.5% AEP (Undefended Tidal)
- 0.5% AEP (2070) NPPF (Undefended Tidal)
- 0.5% AEP (2115) NPPF (Undefended Tidal)
- 0.1% AEP (Undefended Tidal)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000

0 0.225 0.45
Kilometers

FRA Site Boundary and Node Points. Centred PO22 0DA. Created 02/07/2025.



Environment Agency

N

Legend

Site Boundary

Site Nodes

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:550

0 0.0125 0.025

Kilometers

Product 4 Flood Risk Data Requested by: Andy Traves

Site: land at Church Lane, Barnham, West Sussex

Table 1: Water Levels: Fluvial Undefended

	NGR		Modelled Flood Levels in Metres AOD Undefended Annual Exceedance Probability					
Node Ref	Eastings	Northings	5%	1%	1% +CC (35%)	1% +CC (45%)	1% +CC (105%)	0.1%
1	495741	103866	-	-	-	-	4.39	-
2	495737	103827	-	-	-	-	4.37	-
3	495728	103813	-	-	-	-	4.38	-
4	495721	103803	-	-	-	-	4.38	-

Table 2: Water Levels: Fluvial Defended

	NGR		Modelled Flood Levels in Metres AOD Defended Annual Exceedance Probability					
Node Ref	Eastings	Northings	5%	1%	1% +CC (35%)	1% +CC (45%)	1% +CC (105%)	0.1%
1	495741	103866	-	-	-	-	4.39	-
2	495737	103827	-	-	-	-	4.37	-
3	495728	103813	-	-	-	-	4.38	-
4	495721	103803	-	-	-	-	4.38	-

Table 3: Water Levels: Tidal Undefended

	NGR		Modelled Flood Levels in Metres AOD Undefended Annual Exceedance Probability			
Node Ref	Eastings	Northings	0.5%	0.5% (2070)**	0.5% (2115)**	0.1%
1	495741	103866	-	-	-	-
2	495737	103827	-	-	-	-
3	495728	103813	-	-	-	-
4	495721	103803	-	-	-	-

Office Address: Guildbourne House, Chatswor[redacted]
[redacted]ncy

Table 5: Water Depths: Fluvial Undefended

	NGR		Modelled Flood Depths in Metres					
			Undefended Annual Exceedance Probability					
Node Ref	Eastings	Northings	5%	1%	1% +CC (35%)	1% +CC (45%)	1% +CC (105%)	0.1%
1	495741	103866	-	-	-	-	0.19	-
2	495737	103827	-	-	-	-	0.50	-
3	495728	103813	-	-	-	-	0.64	-
4	495721	103803	-	-	-	-	0.48	0.22

Table 6: Water Depths: Fluvial Defended

	NGR		Modelled Flood Depths in Metres					
			Defended Annual Exceedance Probability					
Node Ref	Eastings	Northings	5%	1%	1% +CC (35%)	1% +CC (45%)	1% +CC (105%)	0.1%
1	495741	103866	-	-	-	-	0.19	-
2	495737	103827	-	-	-	-	0.50	-
3	495728	103813	-	-	-	-	0.64	-
4	495721	103803	-	-	-	-	0.48	0.21

Table 7: Water Depths: Tidal Undefended

	NGR		Modelled Flood Depths in Metres			
			Undefended Annual Exceedance Probability			
Node Ref	Eastings	Northings	0.5%	0.5% (2070)**	0.5% (2115)**	0.1%
1	495741	103866	-	-	-	-
2	495737	103827	-	-	-	-
3	495728	103813	-	-	-	-
4	495721	103803	-	-	-	-

All levels taken from:
Tidal: River Arun to East Head Model (2016), by JBA Consulting.
Fluvial: Aldingbourne Modelling Study (Defended Only) (2015) by JBA Consulting, plus updated climate change allowances (2016).
This site is unaffected by defended Tidal scenarios.

Produced on: 02/07/2025

*** The flood risk data provided is based on existing EA hydraulic models with an allowance for climate change. Please note the climate change allowances provided are not up to date. These were updated on 27 July 2021.**

You should refer to 'Flood risk assessments: climate change allowances' for the most up to date allowances. You will need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence.

[redacted]

There is no additional information or health warnings for these levels/depths or the model from which they have been produced.

Strategic flood risk assessments

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

This should give you information about:

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

Your Lead Local Flood Authority is West Sussex County.

About this data

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

Flood risk activity permits

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

Find out more about flood risk activity permits

Help and advice

Contact the Solent and South Downs Environment Agency team at [redacted]

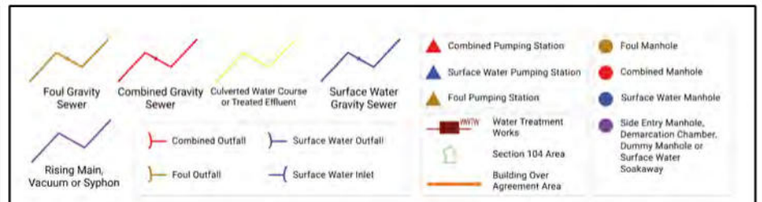
- more information about getting a product 5, 6, 7 or 8
- general help and advice about the site you're requesting data for

(c) Crown copyright and database rights 2025 Ordnance Survey AC0000808122 | Date: 12/05/25 | Scale: 1:1250 | Map Centre: 495725,103800 | Data updated: 20/03/25 | Our Ref: 1766445 - 1 | Wastewater Plan A3 Powered by digdat

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2025 Ordnance Survey AC0000808122 .This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.



andytraves247@gmail.com

24190

WATER for LIFE from Southern Water.

Appendix C

Rev.	Amendment	Date

Original Sheet Size A1 (841 x 594)

0 10 mm 50

Aqua Callidus CONSULTING

54 Common Lane
Titchfield
Hants
PO14 4BU

07717 759149

Project

Church lane
Barnham

Subject

Flood storage compensation

Scale	Project No.	Drawing No.	Sheet No.	Revision
1:250	###	ACC-DRAFT-01	na	-

Aqua Callidus Consulting Ltd
52 Common Lane
Titchfield, Hants,
[redacted]

Date: 12/05/2025

Project No.: 24190
Project Title: Church Lane

Detention Assessment to CIRIA C753

Site Location: Barnham
Catchment ID: gross roofs

r =	0.36	*(range 0.12 to 0.45)*	**C_v**	1.00
Drained Area =	530	m^2		
Design storm 1 in =	100	year		
Runoff volume uplift =	45	% for climate change		
Urban Creep =	10	% for climate change		

Technical Assessment

Base axis Length L_x =	24.00	m	**Base area =**	**72.0**	**m^2**
Base axis Length L_y =	3.00	m	**Storage volume =**	**27.4**	**m^3**
Discharge rate =	2.0	l/sec			
Storage depth =	0.40	m			
Stoarge porosity =	95	%			

M5-60 Rainfall = 20 mm

Storm Duration	**5 min**	**10 min**	**15 min**	**30 min**	**1 hr**	**2 hr**	**4 hr**	**6 hr**	**10 hr**	**24 hr**
(secs)	300	600	900	1800	3600	7200	14400	21600	36000	86400
r= 0.36 Value Z1	0.36	0.51	0.62	0.79	1.00	1.22	1.48	1.67	1.90	2.42
Rainfall M5 (mm)	7.2	10.2	12.4	15.8	20.0	24.4	29.6	33.4	38.0	48.4
M100/M5 gf Value Z2	1.84	1.91	1.95	2.00	2.03	2.01	1.97	1.94	1.91	1.82
Rainfall M100 (mm)	**13.3**	**19.5**	**24.2**	**31.5**	**40.6**	**49.1**	**58.4**	**64.9**	**72.4**	**88.2**
ith climate uplift (mm)	**19.2**	**28.3**	**35.0**	**45.7**	**58.9**	**71.2**	**84.7**	**94.1**	**105.0**	**127.9**
RUNOFF (m^3)	**11.2**	**16.5**	**20.4**	**26.7**	**34.3**	**41.5**	**49.4**	**54.9**	**61.2**	**74.6**
inflow rate(l/s)	37.4	27.5	22.7	14.8	9.5	5.8	3.4	2.5	1.7	0.9
stoarge rate (l/s)	35.4	25.5	20.7	12.8	7.5	3.8	1.4	0.5	0.0	0.0
Discharge (m3)	**0.6**	**1.2**	**1.8**	**3.6**	**7.2**	**14.4**	**28.8**	**43.2**	**61.2**	**74.6**
Req'd STORAGE (m^3)	**10.6**	**15.3**	**18.6**	**23.1**	**27.1**	**27.1**	**20.6**	**11.7**	**0.0**	**0.0**
Residual drain time (h)	**1.5**	**2.1**	**2.6**	**3.2**	**3.8**	**3.8**	**2.9**	**1.6**	**0.0**	**0.0**

Appendix D

[redacted]

CONDITIONS AND LIMITATIONS OF FLOOD RISK ASSESSMENT & DRAINAGE STRATEGIES October 2020

Aqua Callidus Consulting Ltd is constituted as a limited liability company in accordance with the Companies Act 1989 (with registered number 11390910 and with its registered office at Kintyre House, 70 High Street, Fareham, Hants, PO16 7BB).

1. The report is confidential to the clients stated in the report and has been prepared to their instructions for their own purposes and it is not permitted to disclose this report to other parties (except NHBC, Local Authority, the Client's own Solicitors and Professional Advisers) without the prior consent of Aqua Callidus Consulting Ltd.

2. This report has been prepared by Aqua Callidus Consulting Ltd, with all reasonable skill, care and diligence within the terms of contract with the Client incorporated in our Standard Terms of Business.

3. The copyright of this report remains the property of Aqua Callidus Consulting Ltd.

4. Aqua Callidus Consulting Ltd disclaims any responsibility to the Client and others in the respect of any matters outside the scope of this report.

5. No liability for the contents of this report is accepted to any parties other than the client stated in the report.

6. Where reference is made to third party information (for example topographic surveys, sewer plans, Environment Agency information, geotechnical investigations and reports, and proposed development layouts and drawings etc) the responsibility for the rights to use this information rests with the client where such information has been provided to us by the client or on behalf of the client by parties acting as their agent. No liability is accepted for the accuracy of third party information.

7. Unless stated otherwise reports are prepared as a desktop assessment and no site visit has been made.

8. Unless specifically stated otherwise in the report, any proposed strategies are in principle and sizings are illustrative only and are to be confirmed or modified as a appropriate at detailed design stage.