Flood Risk Assessment

Proposed Extension
15 The Hawthorns, Sutton in Craven

Report Ref:
1271-100

Prepared For:
Mr & Mrs Shaw

November 2022

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1.0 Introduction

This flood risk has been prepared by LARK Architects on behalf of Mr & Mrs Shaw to accompany the planning application for a proposed extensions & detached garage. The potential flood risks will also be analyzed as part of this report.

Proposals for the site comprise of a ground floor extension to the existing bungalow. This includes a living space and a bedroom.

The nearest watercourse to the development site is Holme Beck which is located approximately 100m south of the site. This is a main river.

The development site covers an area of approximately 0.031(ha) and is located entirely within flood zone 3, High probability of flooding according to the Environment Agency Flood Risk Map. (Refer to figure 1 below).

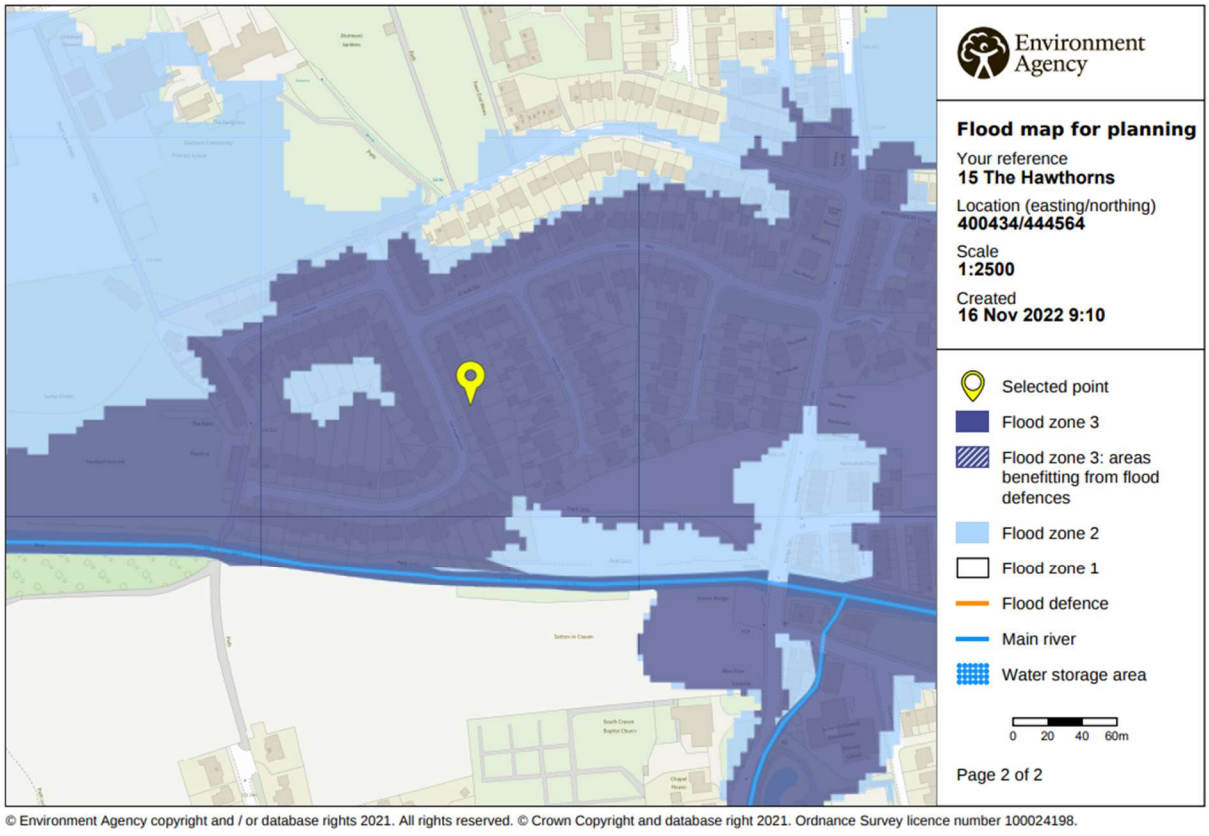

Figure 1: Environment Agency – Flood Zone Plan

Source: https://flood-map-for-planning.service.gov.uk

By definition, Flood Zone 3 comprising Land assessed as having a less than 1 in 100 annual probability of river or sea flooding.

2.0 Approach to Flood Risk Assessment

The requirements for flood risk assessments are generally as set out in the 'Technical Guidance to the National Planning Policy Framework', published in March 2014; and in more detail from the Government website 'Planning Applications: assessing flood risk' available from https://www.gov.uk/planning-applications-assessing-flood-risk. This methodology has been adopted to evaluate flood risk at the development site.

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2.1 Application of the Sequential and Exceptions Test

The risk based sequential test should be applied at all stages of planning. Its aim is to steer new development to areas at the lowest probability of flooding, within Zone 1. The flood zones are the starting point for the sequential approach.
The development of a proposed extension (minor development) to the existing property, on a brownfield site and as such Table 2 of the Technical Guidance to the National Planning Policy Framework (March 2014) indicates that the development is classified as 'more vulnerable. The proposed residential development area is shown to be entirely within Flood Zone 3. This development sits within zone 3a.

Table 1: Flood Risk Vulnerability and Flood Zone 'Compatibility'

Flood Risk Vulnerability Classification		Essential Infrastructure	Water compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	X	Exception Test required	✓
	Zone 3b*	Exception Test	✓	X	X	X

✓ Development is appropriate

X Development should not be permitted

In accordance with the vulnerability table above the type of development proposed is not appropriate and does require an exception test.

3.0 Site Details

3.1 Location

Site Co-ordinates:
OS X (Eastings): 400431
OS Y (Northings): 444574
National Grid Reference: SE 00431 44574

Figure 2: Site Location Plan (1:1250)

Source: Lark Architects AutoCAD drawing

3.2 Former/Current Use

The existing bungalow that is to be developed is currently used for residential use.

3.3 Development Proposals

Proposals for the development comprise of a proposed ground floor extension.

3.4 Boundaries

Table 2: Boundaries

Boundary	Adjoining Feature
North	13 The Hawthorns
East	The Hawthorns Highway
South	17 The Hawthorns
West	4 Meadow Lea

4.0 Flooding Mechanisms

4.1 Fluvial & Tidal Flooding

An extract of the Environment Agencies Indicative Flood map is shown below (Refer to Figure 3). The map shows the indicative extents of Fluvial flooding within the site boundary and surrounding areas. Fluvial flooding occurs when watercourse such as rivers, streams and becks flood because of high or intense rainfall flowing into them. As depicted by the extract below of the Environment Agency Flood Map, the development is situated within an area to be subject to Fluvial flooding.

The site is located in flood zone 3a, which comprises of land assessed as having greater than a 1 in 100-year annual probability of river flooding from Holme Beck.

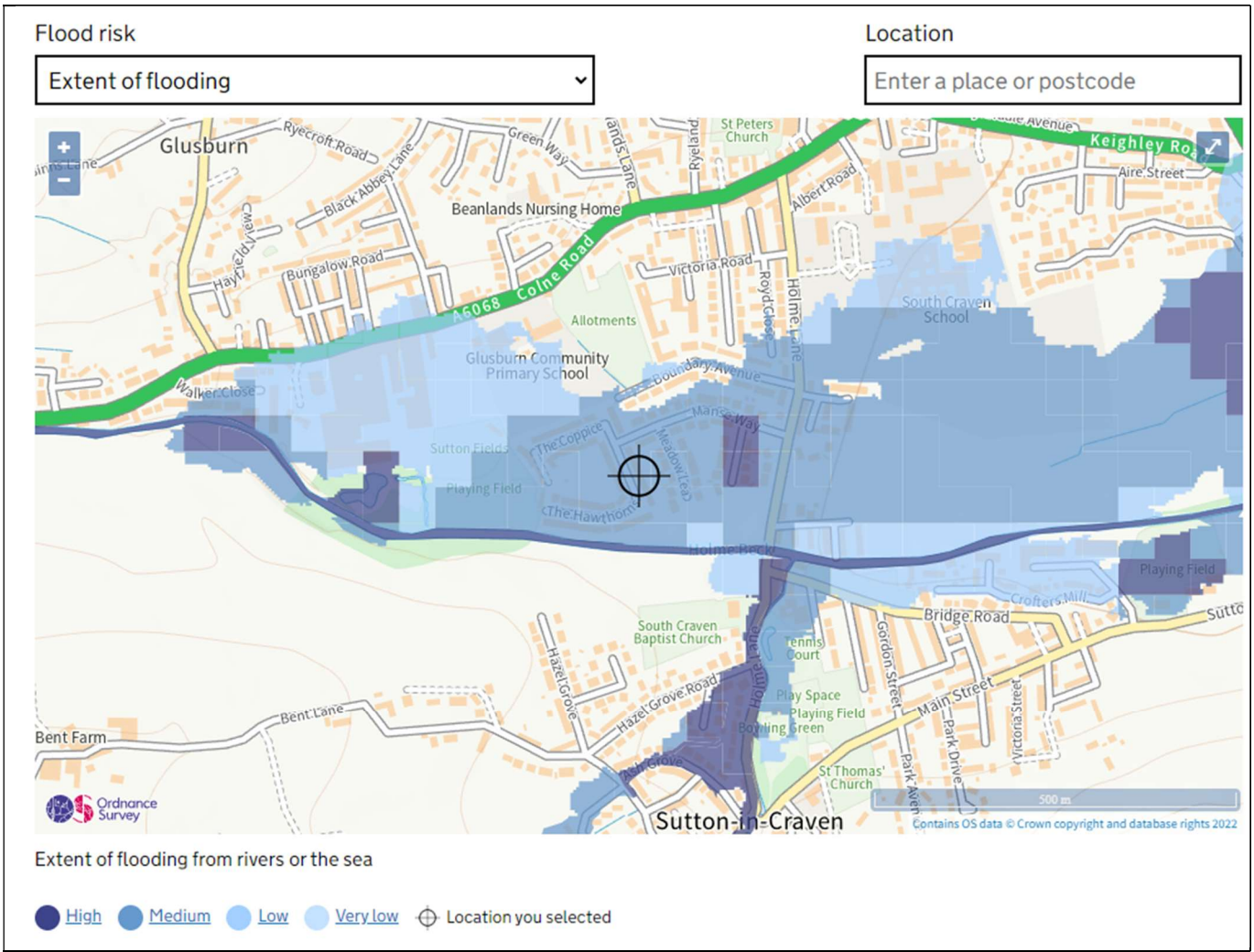


Figure 3: Extents of Flooding from Rivers or Sea

Source: https://flood-warning-information.service.gov.uk

The effects of river flooding will be analysed from Holme Beck for this report.

The development site is medium risk of flooding from river or the sea.

4.2 Pluvial Flooding

Pluvial flooding occurs when extreme rainfall events saturate drainage systems and excess water cannot be accommodated within drainage systems leading to surcharging and flooding. This could also include the surcharge of watercourses and sewer systems as a result of blockages. Although it is usually the result of high rainfall intensities it can occur from lower rainfall intensities and/or melting snow when the ground is already saturated or frozen.

The EA, working with the Lead Local Flood Authorities (LLFA's) have produced a series of updated Flood Maps for Surface Water (uFMfSW). These updated flood maps are based upon the latest modelling techniques and flood data and supersede the previous nationally produced surface water mapping Products. The extract below (Refer to Figure 4) indicated the location of this predicted surface water flooding for both depth and velocities. The flooding falls into four categories as shown below:

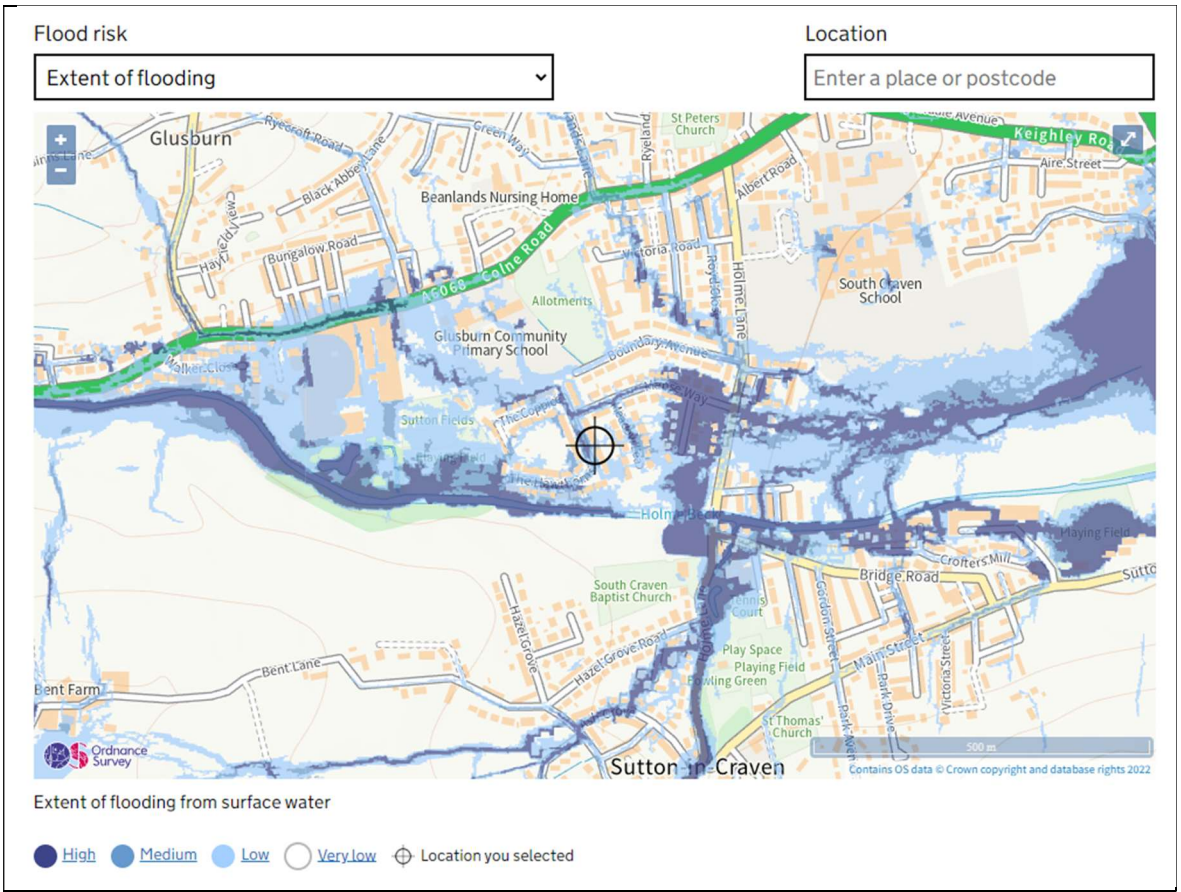


Figure 4: Extents of Flooding from Surface Water

Source: https://flood-warning-information.service.gov.uk

The map indicates a high risk to the access road with some ponding of surface water (noted as high risk) due the existing road levels. This area has a chance of flooding is greater than 3.3%. The overland flow path will be accommodated and maintained in the proposed layout.

The levels slope away from the house, with the levels dropping 150mm into The Hawthorns Road from our FFL of 103.850. This acts as a flood exceedance route.

The finished floor levels of the new extension unit will match existing house levels.

The development is seen to be at medium risk from pluvial sources.

4.3 Reservoir Flooding

The Environment Agency Flood maps have been reviewed to determine the risk of flooding from artificial sources such as reservoirs, canals and flood defences etc. These maps will show any areas of potential risk of flooding due to failure of such structures. 'Risk of Flooding from Reservoirs' map (Refer to Figure 5 below) indicates that the site is not at risk of flooding from this source.

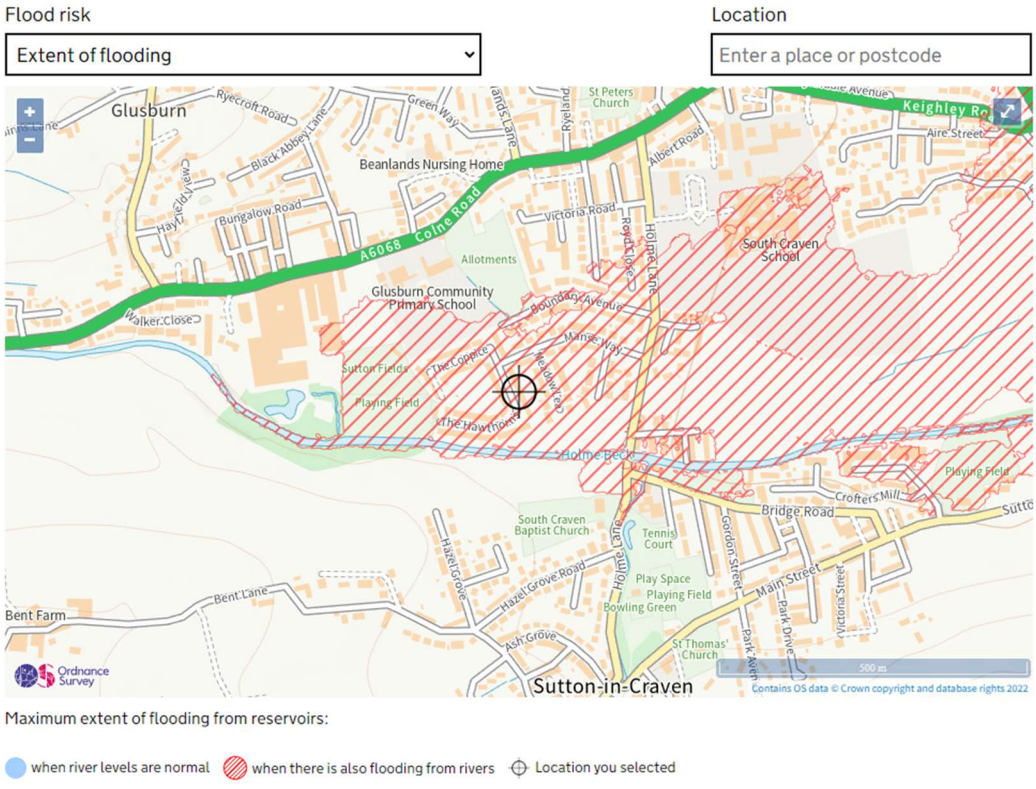


Figure 5: Environment Agency Risk of Flooding from Reservoirs Map

Source: https://flood-warning-information.service.gov.uk

4.4 Groundwater Flooding

Ground water flooding occurs when water levels in the ground rise above the surface levels and are more likely to occur in low lying areas.

The finished floor levels for the proposed extension will be set at the existing ground levels and the levels will fall away from the proposed building.

Groundwater levels in the area reflect that of Holme Beck. Therefore, the risk from groundwater is no greater than that from the Holme Beck.

Flooding from ground water independently of the river is considered low risk.

4.5 Sewer Capacity Flood Risk

A Further possible source of flooding is because of artificial drainage systems and the public sewers, there are no records of the public sewer systems surrounding the site as having flooded.

All existing sewer connections are to remain the same. Flooding from sewers is therefore considered a low risk. The existing drive and bungalow are drained by gullies connecting into the existing combined drainage. The proposed minor extension will have rainwater pipes picking up the proposed roof water and discharging into the combined sewer system. The extension Is replacing existing decking; therefore, the impermeable area will remain the same.

4.6 Flood Mitigation Measures

Flood Level Data
Flood data has been obtained from the Environment Agency's records for areas surrounding the site, refer to appendix B for details.

The data indicates critical modelled flood water levels for the different flood events. This model data suggests a critical flood level of 103.450 AOD for the 1 in 100 year flood event + 30% climate change. This information is based off node 13 at modelled location 400431/444569.

Proposed development
The site is situated wholly within Flood Zone 3a of the Environment Agency's Flood Map.

It is concluded that there is a high risk of fluvial flooding at the site.

The finished floor levels of the extension will be set to suit the existing floor levels on site at 103.850 AOD. This is 0.40m above the designated flood level. Due to the risk & location of the development in floodzone 3a, flood resilient/resistant materials must be utilised to protect the properties in the event of a flood.

Overland flows will replicate the existing scenario with surface water falling away from the 15 The Hawthorns and then down along the exceedance route to the north-east of the site.

The predicted flood depths during an extreme flood event are 103.840 AOD. Safe access /egress from the site is onto to Manse Way which leads to Holme Lane which is above the predicted Extreme flood level (1 in 1000-year event + 20% climate change) for the property.

Flood Resistance and Resilience

In the extreme event of a flood the proposed/existing shall allow water ingress and as such no compensation volume shall be provided. It is reiterated that flood resilient/resistant materials must be utilised to protect the properties in the event of
a flood. It is stressed that all attempts should be made to reduce the risk of flood water ingress and minimise potential damage to the interior of the residential units.

Flood resilience measures are to include the following;

- Construct all new external walling from good quality facing bricks and concrete blocks or profiled metal cladding. Internal walling constructed from concrete blocks. External renders should not be used.
- Floor and wall insulation should be of the closed-cell type to minimise the impact of flood water.
- Install gas meters, electric boxes and sockets 0.6m above the proposed new floor level.
- Ensure all communication wiring is in sealed ducts to prevent damage.
- Use durable fixtures and fittings that are not significantly affected by water and can be easily cleaned.

Flood Alerts can be accessed online via the following:

- Three day flood risk forecast
- River and sea levels
- Floodline Warnings Direct - FREE flood warning service
- Flood warnings on Facebook
- Live Flood Warning map

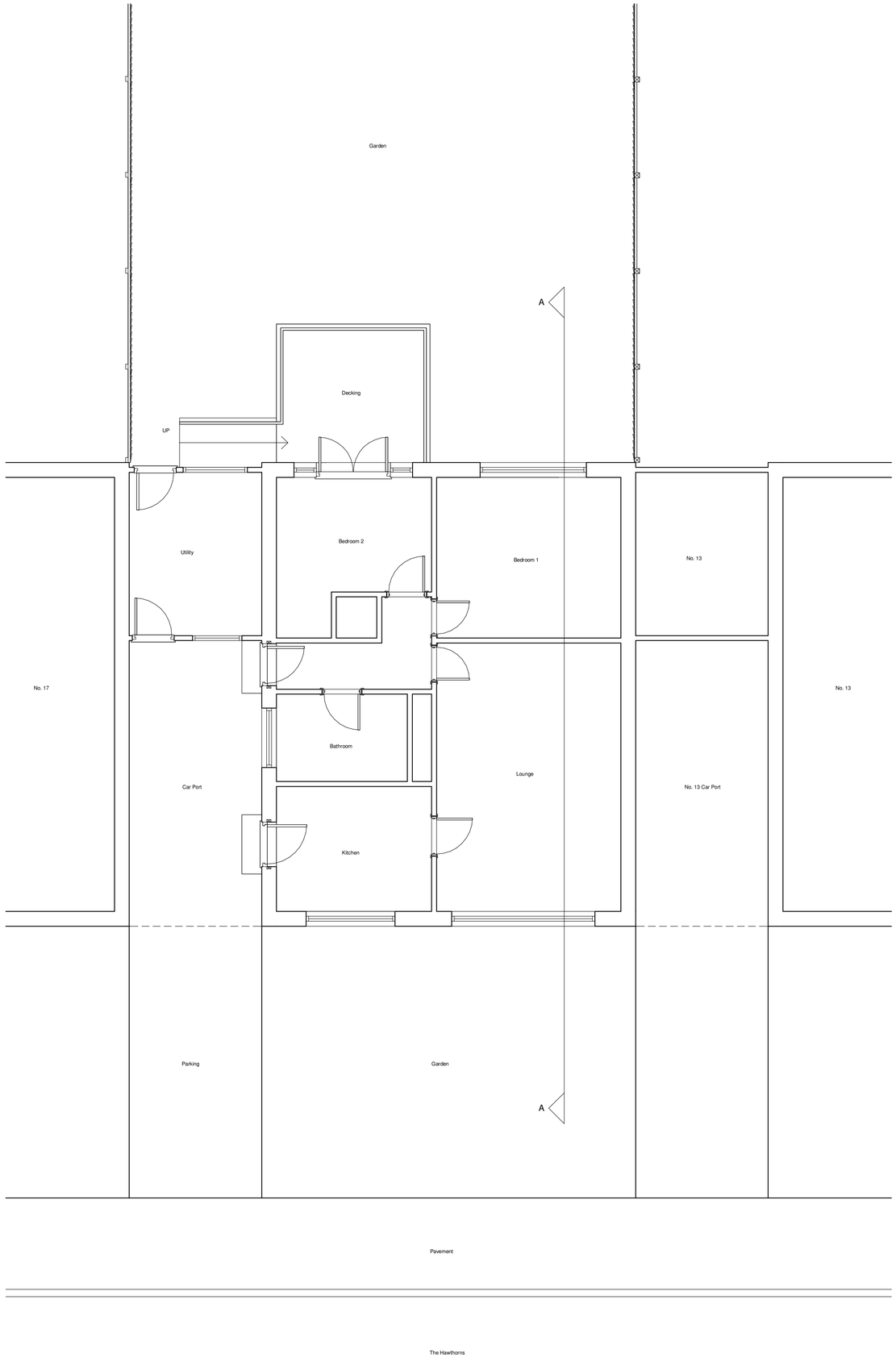
It is typical that the Environment Agency provides up to 2 days warning of potential flood events wherever possible, however this can vary from location to location and on the nature of the weather event.

Flood Warning Code	What it means	When its used	What to do
	Flooding is possible. Be Prepared	2 hours – 2 days in advance of flooding.	• Be prepared to act • Prepare a flood kit • Monitor local water levels and the flood forecast of the EA website
	Flooding is expected. Immediate action is required.	½ hour – 1 day in advance of flooding.	Move people to a safe place • Turn off gas, electricity and water supplies if safe to do so • Put flood protection equipment in place
	Severe flooding. Danger to life.	When flooding poses a significant threat to life.	Stay in a safe place with means of escape • 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

Evacuation Plan

It is recommended that residents of new development develop a personal flood evacuation plan. As the access road is located within a Flood Zone 3 area, they are advised to use the Environment Agency's Flood Warning system to alert them to potential flooding and evacuate prior to a flood event. During times of flooding residents should exit left onto Holme Lane to quickly enter a flood zone 1 area.

Appendix A
Existing & Proposed Site Layout



North

GENERAL NOTES

ALL WORK TO BE CARRIED OUT IN STRICT ACCORDANCE WITH THE BUILDING REGULATIONS AND TO THE SATISFACTION OF THE LOCAL AUTHORITY TOWN / COUNTRY PLANNING, BUILDING CONTROL AND DRAINAGE DEPARTMENTS.

APPOINTED CONTRACTOR RESPONSIBLE FOR NOTIFYING LOCAL AUTHORITY BUILDING CONTROL DEPARTMENT UPON COMMENCEMENT OF BUILDING WORKS ON SITE.

DIMENSIONS ALL TO SITE CHECK. DISCREPANCIES (IF ANY) TO BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE DESIGNER.

THESE PLANS HAVE BEEN PREPARED FOR SUBMISSION TO THE LOCAL AUTHORITY FOR TOWN & COUNTRY PLANNING AND / OR BUILDING REGULATION PURPOSES ONLY AND DO NOT CONSTITUTE FULL WORKING DRAWINGS. INFORMATION NOTED ON THE PLANS OR ACCOMPANYING DOCUMENTS / DETAILS IS NOT EXHAUSTIVE, AND CONTRACTOR TO CHECK WITH CLIENT AS TO ANY ADDITIONAL WORK NOT SPECIFICALLY NOTED OR IMPLIED.

ALL MATERIALS ARE TO BE USED IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS OF THE MANUFACTURES

ANY WORK COMMENCING ON SITE PRIOR TO BUILDING REGULATIONS APPROVAL IS NOT RECOMMENDED AND IS ENTIRELY THE RESPONSIBILITY OF THE CLIENT.

Rev	Date	Notes

LARK architects

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info@larkarchitects.co.uk www.larkarchitects.co.uk

client: Mr & Mrs Shaw

project: 15 The Hawthorns, Sutton-in-Craven, BD20 8BP, Proposed Extension

drawing: Existing Floor Plan

status: PLANNING

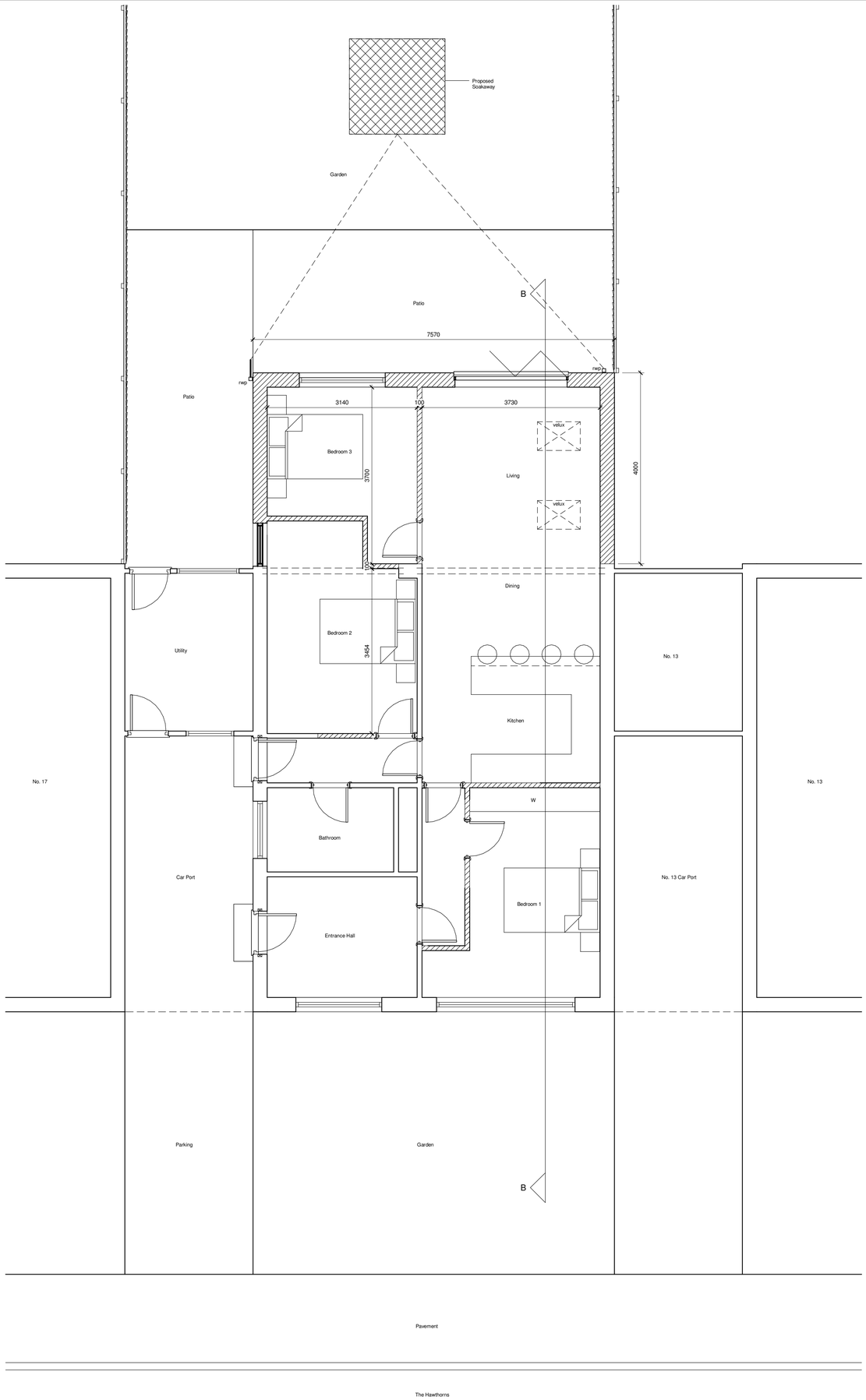
job no:	dwg no:	rev:
1271	02	

scale: 1:50 @ A1 drawn: F.D.F check: R.A.K

date: November 2022

LARK Architects Ltd
Unit 10, The Crossings, Riparian Court
Riparian Way, Cross Hills
Keighley, West Yorkshire, BD20 7BW.

RIBA Chartered Practice



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Proposed Extension

drawing: Proposed Floor Plan

status: PLANNING

job no:	dwg no:	rev:
1271	05	

scale: 1:50 @ A1 drawn: F.D.F check: R.A.K

date: November 2022

LARK Architects Ltd
Unit 10, The Crossings, Riparian Court
Riparian Way, Cross Hills
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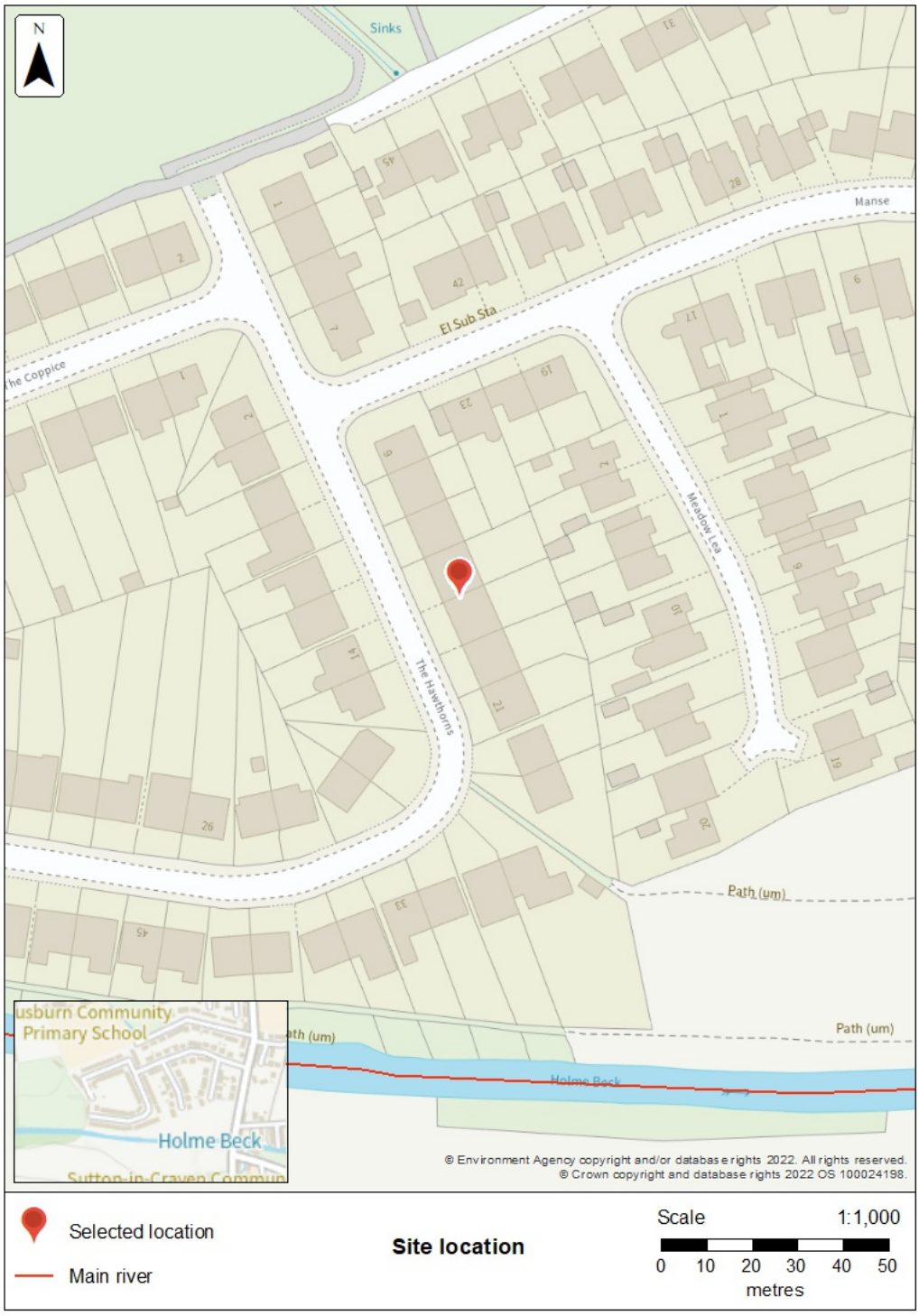
RIBA Chartered Practice

Appendix B
EA Supporting Information

Flood risk assessment data

Location of site: 400431 / 444569 (shown as easting and northing coordinates)
Document created on: 25 October 2022
This information was previously known as a product 4.
Customer reference number: KREYGW53DX8H

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)
- historic flooding
- flood defences and attributes
- modelled data
- climate change 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

Use the long term flood risk service to find out about the risk of flooding from:

- surface water
- ordinary watercourses
- reservoirs

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

About the models used

Model name: 2021 Upper Aire tribs - Glusburn Beck
Scenario(s): No defences exist fluvial, no defences exist climate change fluvial
Date: 23 April 2021

Model name: Aire CFMP Lumb Mill Beck and Lane House Beck catch
Scenario(s): No defences exist fluvial, no defences exist climate change fluvial
Date: 31 December 2008

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 3.

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

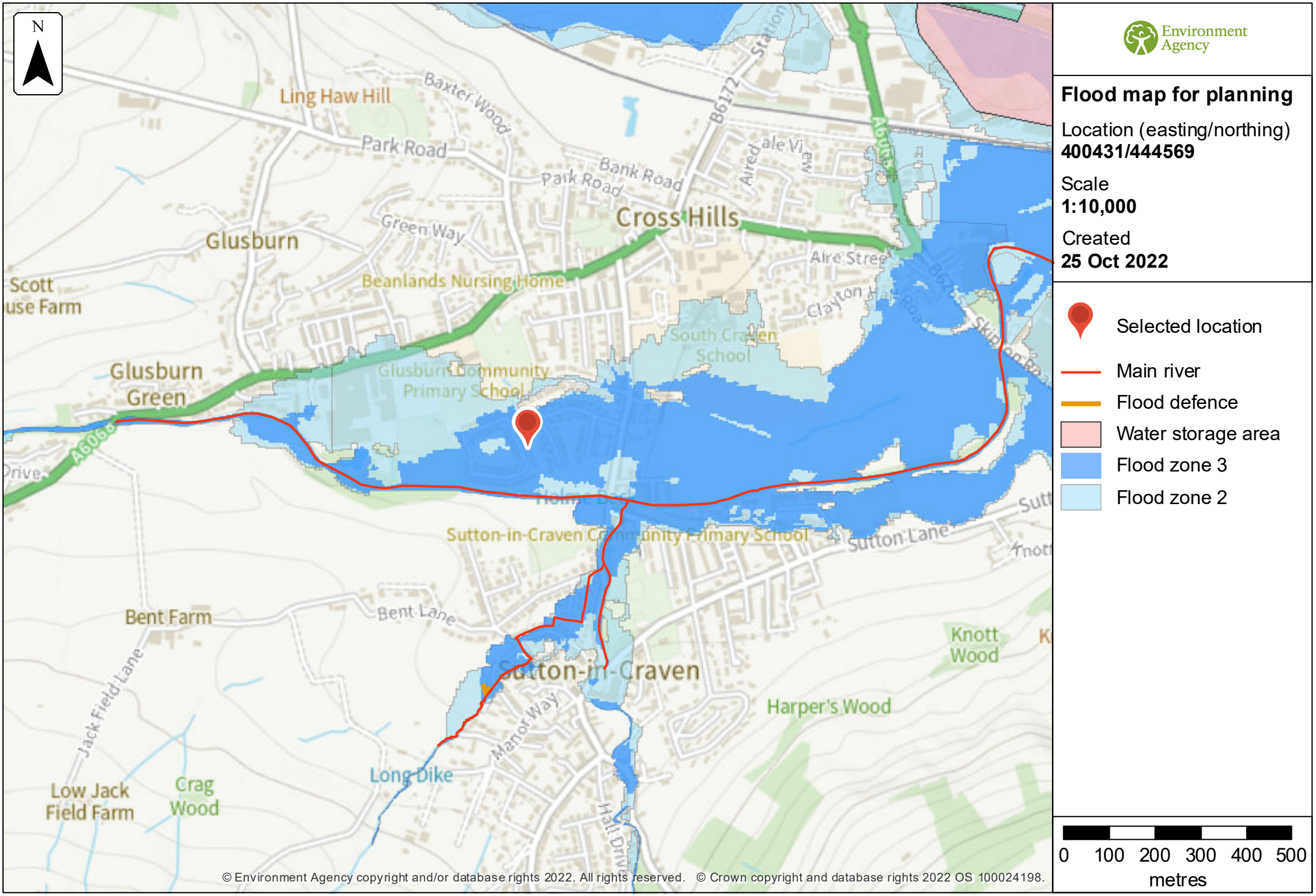
Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- 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

This data is updated on a quarterly basis as better data becomes available.


N
Ling Haw Hill
Baxter Wood
Park Road
Bank Road
Park Road
B6172
Station
Aire Street
Cross Hills
Green Way
Glusburn
Beanlands Nursing Home
Scott
use Farm
Glusburn
Green
A6068
Glusburn Community
Primary School
South Craven
School
Clayton
Skipton Road
Sutton-in-Craven Community Primary School
Sutton Lane
Bent Farm
Bent Lane
Knott
Wood
Sutton-in-Craven
Harper's Wood
Jack Field Lane
Manor Way
Long Dike
Low Jack
Field Farm
Crag
Wood
Hall Drive
© Environment Agency copyright and/or database rights 2022. All rights reserved. © Crown copyright and database rights 2022 OS 100024198.
Environment Agency
Flood map for planning
Location (easting/northing)
400431/444569
Scale
1:10,000
Created
25 Oct 2022
Selected location
Main river
Flood defence
Water storage area
Flood zone 3
Flood zone 2
0 100 200 300 400 500
metres

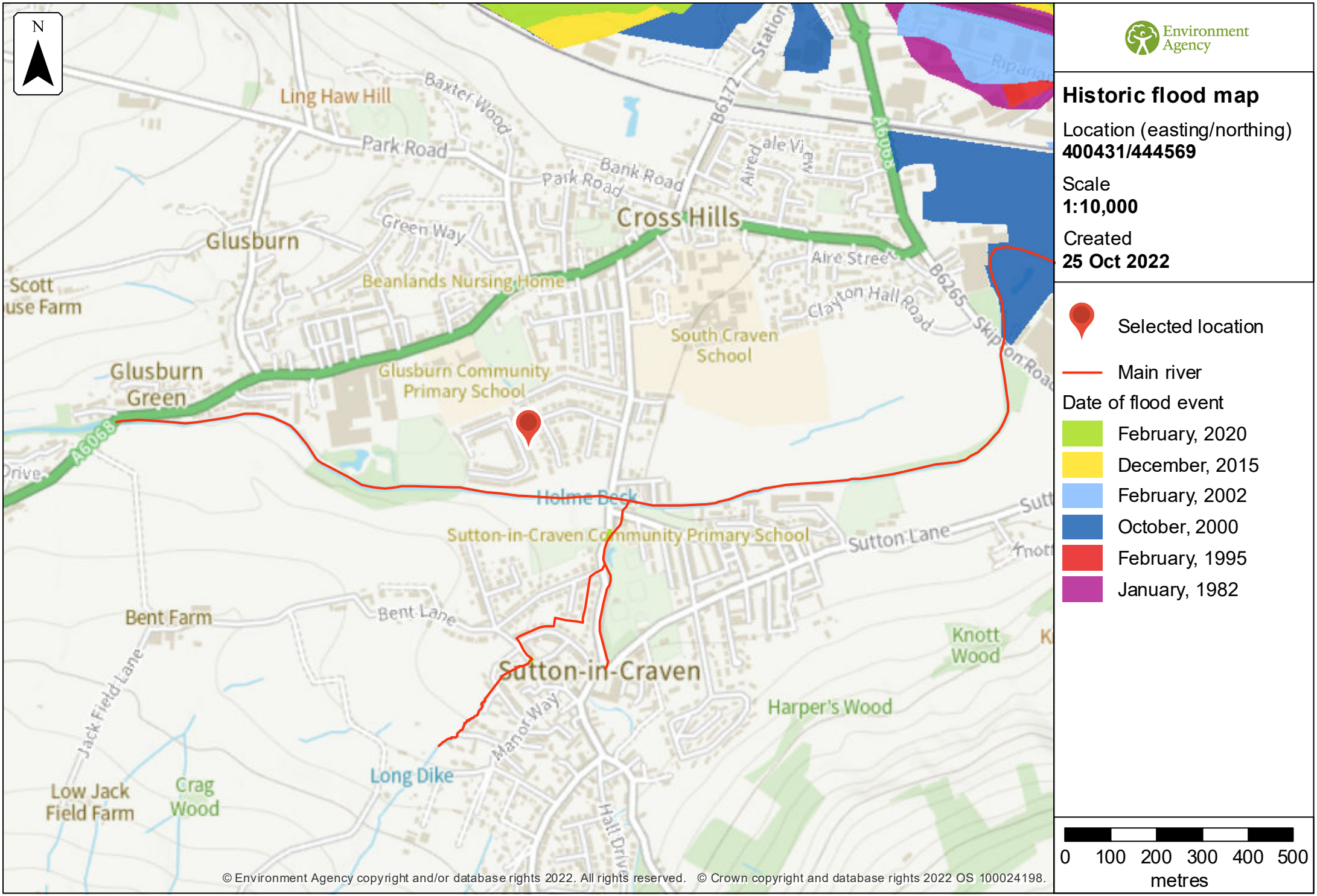
Historic flooding

This map is an indicative outline of areas that have previously flooded. Remember that:

- our records are incomplete, so the information here is based on the best available data
- it is possible not all properties within this area will have flooded
- other flooding may have occurred that we do not have records for
- flooding can come from a range of different sources - we can only supply flood risk data relating to flooding from rivers or the sea

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

Download recorded flood outlines in GIS format



Environment Agency

Historic flood map

Location (easting/northing)
400431/444569

Scale
1:10,000

Created
25 Oct 2022

Selected location

Main river

Date of flood event

- February, 2020
- December, 2015
- February, 2002
- October, 2000
- February, 1995
- January, 1982

0 100 200 300 400 500
metres

Historic flood event data

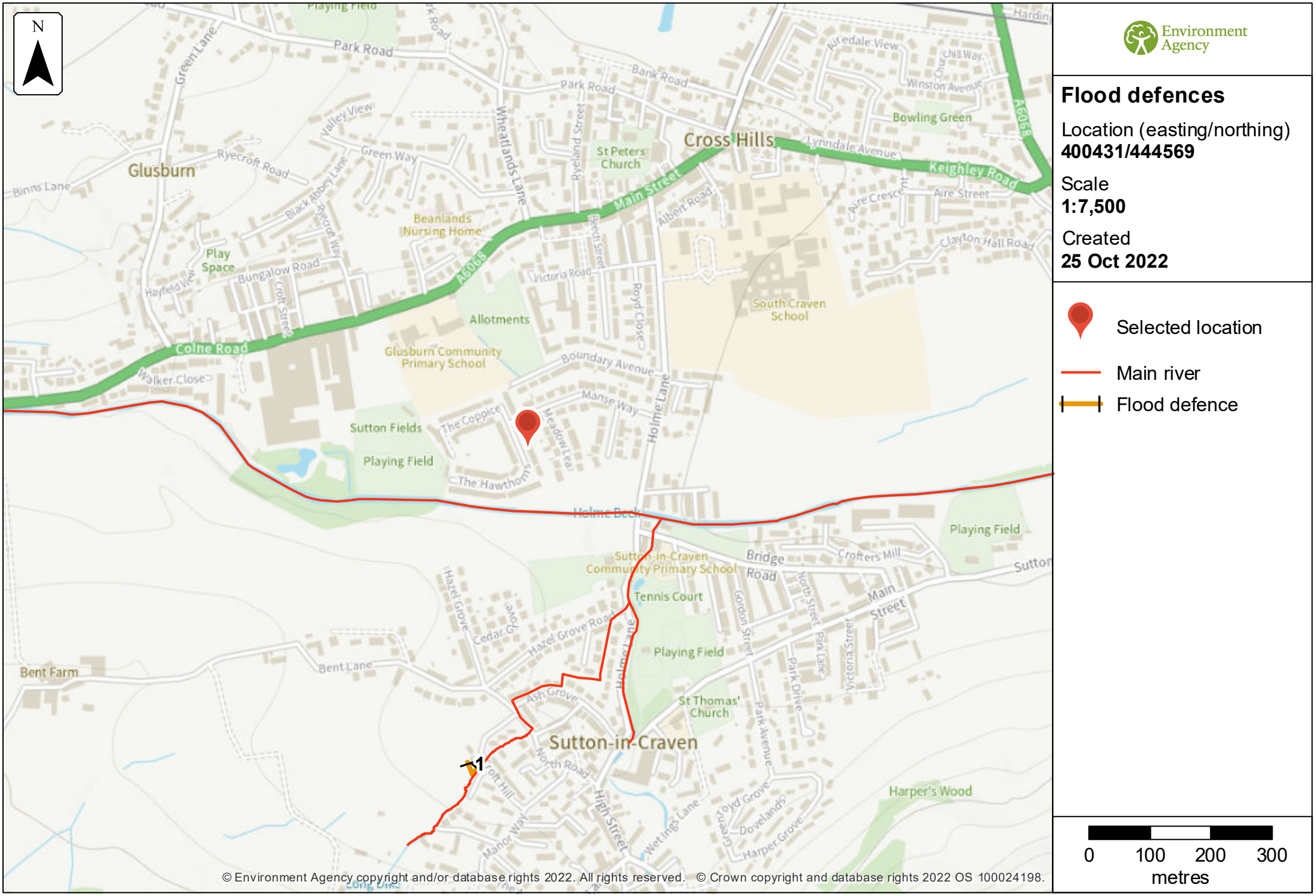
Start date	End date	Source of flood	Cause of flood	Affects location
15 February 2020	19 March 2020	main river	channel capacity exceeded (no raised defences)	No
8 February 2020	14 February 2020	ordinary watercourse	channel capacity exceeded (no raised defences)	No
25 December 2015	29 December 2015	main river	channel capacity exceeded (no raised defences)	No
10 February 2002	13 February 2002	main river	other	No
30 October 2000	4 December 2000	main river	other	No
February 1995	February 1995	main river	other	No
3 January 1982	31 January 1982	main river	other	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.


N
Environment Agency
Flood defences
Location (easting/northing)
400431/444569
Scale
1:7,500
Created
25 Oct 2022
Selected location
Main river
Flood defence
0
100
200
300
metres
Cross Hills
Glusburn
Sutton-in-Craven
Main Street
Keighley Road
A6068
Colne Road
Park Road
Bank Road
Bowling Green
St Peters Church
Beanlands Nursing Home
Play Space
Allotments
Glusburn Community Primary School
South Craven School
Sutton Fields
Playing Field
Holme Beck
Sutton-in-Craven Community Primary School
Tennis Court
St Thomas' Church
Bent Farm
Harper's Wood
Bridge Road
Crofters Mill
Clayton Hall Road
Aire Street
Albert Road
Victoria Road
Boundary Avenue
Manse Way
Holme Lane
Bent Lane
Hazel Grove
Ash Grove
North Road
High Street
Park Avenue
Park Drive
Park Lane
Gordon Street
North Street
Victoria Street
Lyndale Avenue
Winston Avenue
Airedale View
Valley View
Green Way
Ryecroft Road
Binns Lane
Black Abbey Lane
Wheatlands Lane
Ryeland Street
Beech Street
Croft Street
Bungalow Road
Hayfield View
Walker Close
Royd Close
The Coppice
Meadow Lea
The Hawthorns
Aire Crescent
Dovelands
Harper Grove
Greenroyd Grove
Wetings Lane
Manor Way
Croft Hill
1
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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	147708	Wall			116.20	116.32	

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

Modelled data

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

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

Climate change

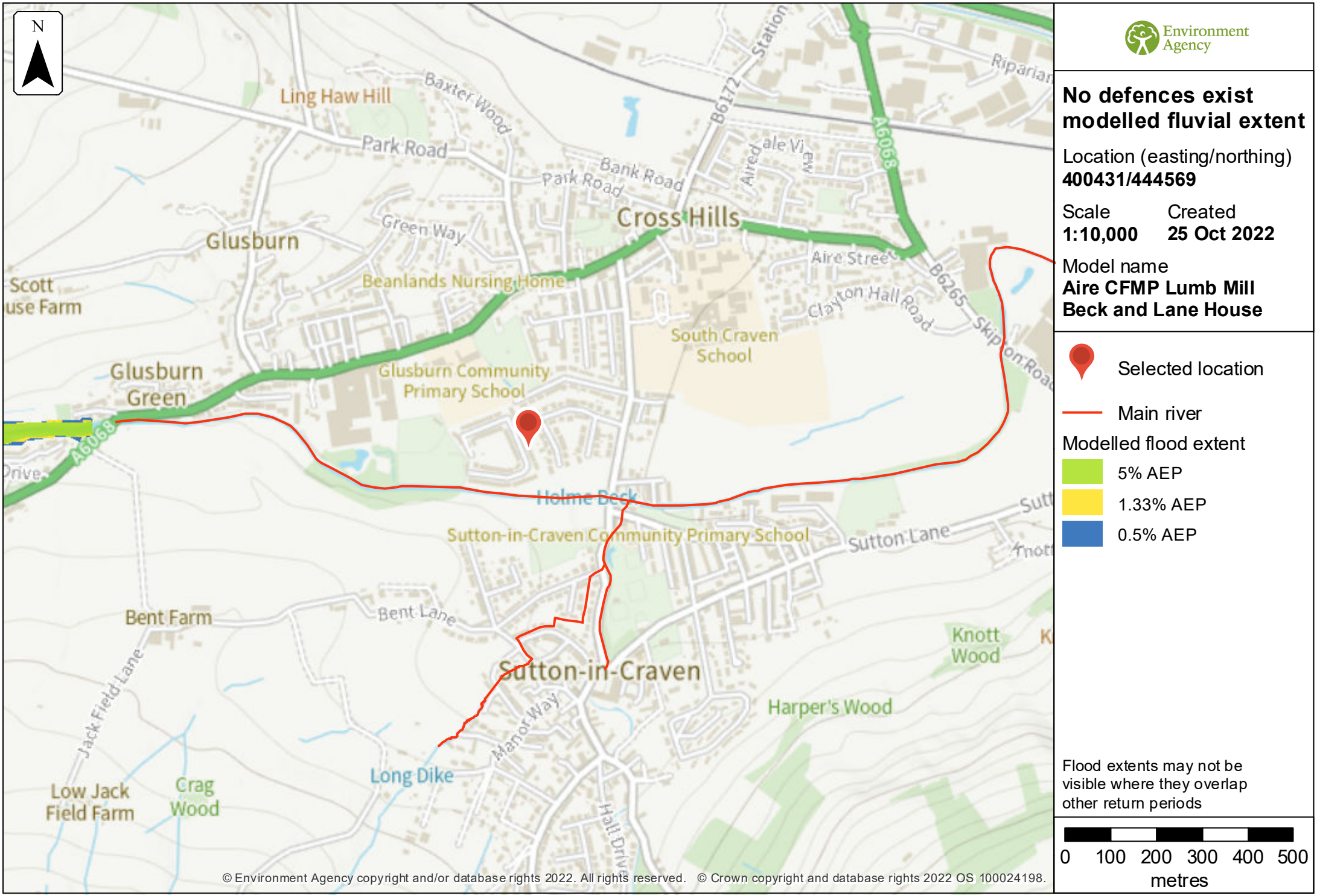
The climate change data included in the models may not include the latest flood risk assessment climate change allowances. Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

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

Modelled scenarios

The following scenarios are included:

- No defences exist modelled fluvial: risk of flooding from rivers where there are no flood defences
- No defences exist climate change modelled fluvial: risk of flooding from rivers where there are no flood defences, including estimated impact of climate change



Environment Agency

No defences exist modelled fluvial extent

Location (easting/northing)
400431/444569

Scale
1:10,000

Created
25 Oct 2022

Model name
Aire CFMP Lumb Mill Beck and Lane House

Selected location

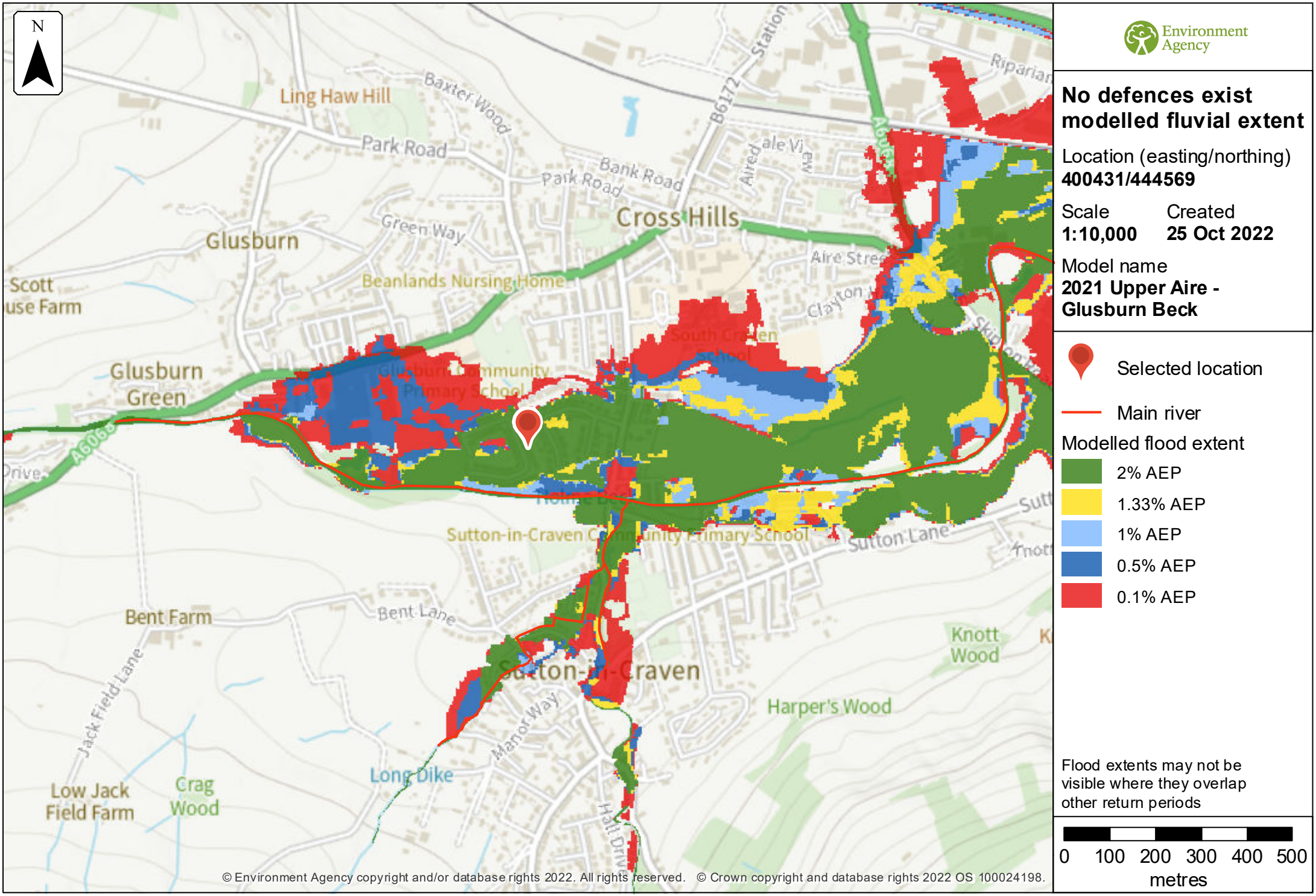
Main river

Modelled flood extent

- 5% AEP
- 1.33% AEP
- 0.5% AEP

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

0 100 200 300 400 500
metres



Environment Agency

No defences exist modelled fluvial extent

Location (easting/northing)
400431/444569

Scale
1:10,000

Created
25 Oct 2022

Model name
2021 Upper Aire - Glusburn Beck

Selected location

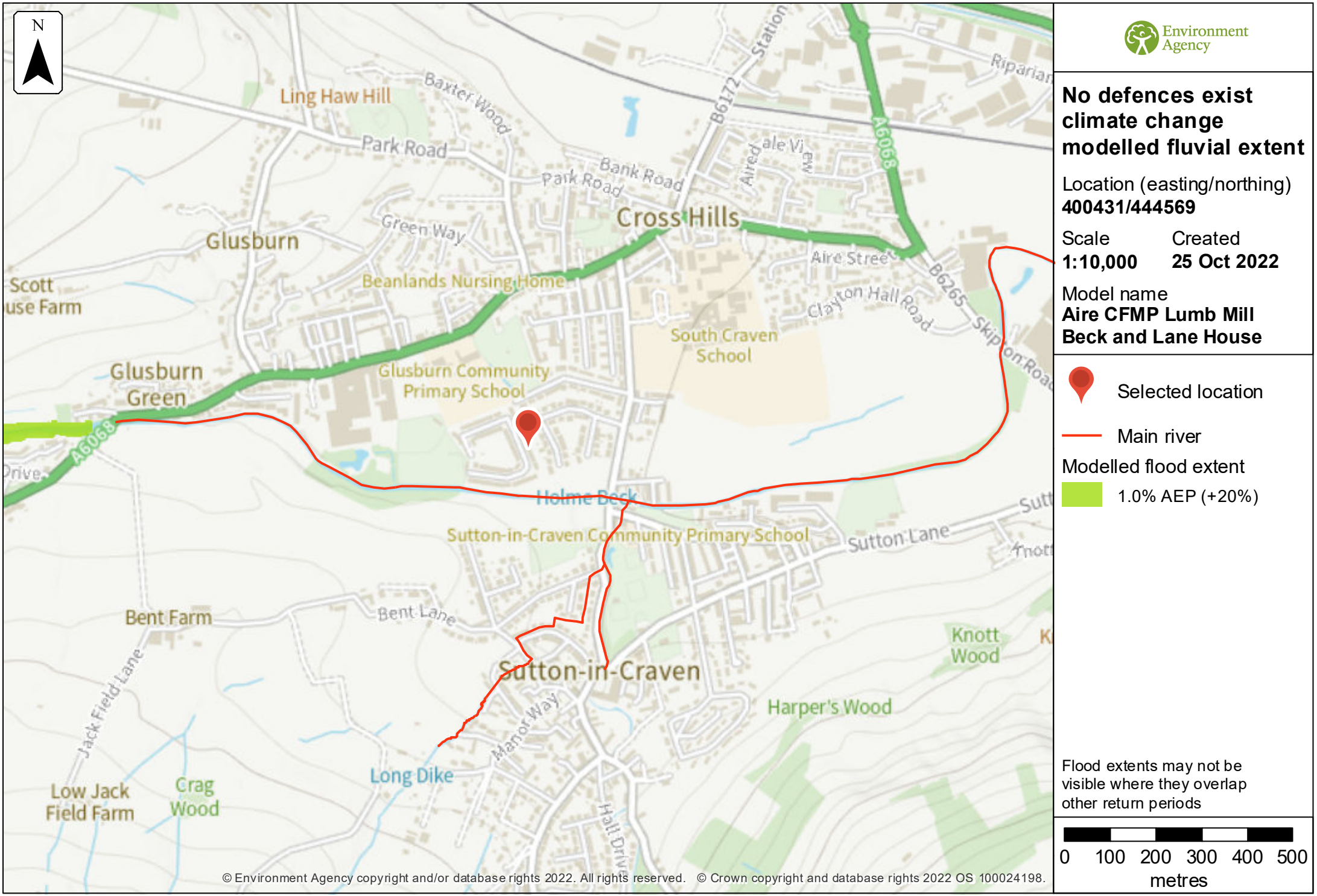
Main river

Modelled flood extent

- 2% AEP
- 1.33% AEP
- 1% AEP
- 0.5% AEP
- 0.1% AEP

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

0 100 200 300 400 500
metres



Environment Agency

No defences exist climate change modelled fluvial extent

Location (easting/northing)
400431/444569

Scale
1:10,000

Created
25 Oct 2022

Model name
Aire CFMP Lumb Mill Beck and Lane House

Selected location

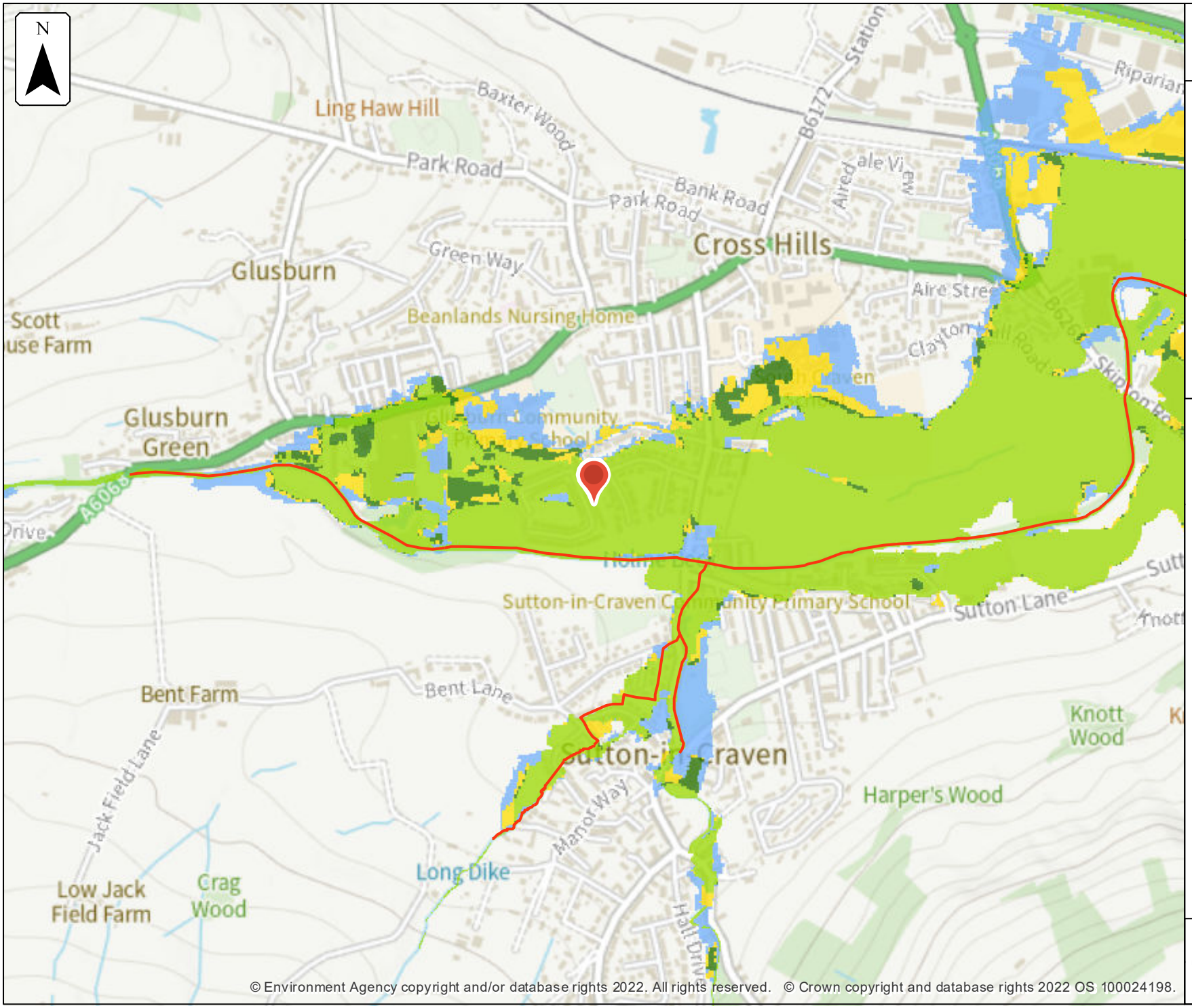
Main river

Modelled flood extent

1.0% AEP (+20%)

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

0 100 200 300 400 500
metres



Environment Agency

No defences exist climate change modelled fluvial extent

Location (easting/northing)
400431/444569

Scale
1:10,000

Created
25 Oct 2022

Model name
2021 Upper Aire - Glusburn Beck

Selected location

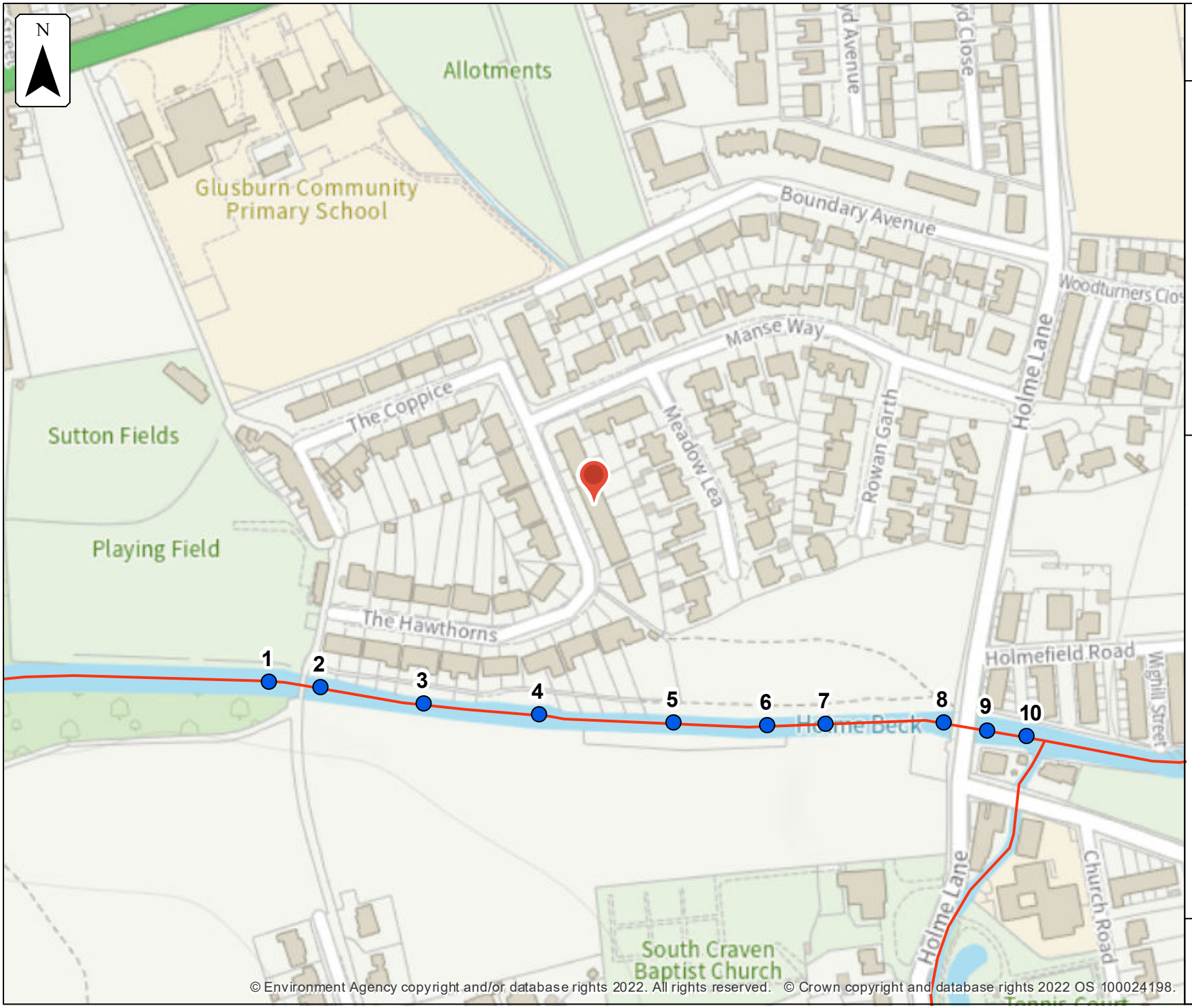
Main river

Modelled flood extent

- 1.0% AEP (+20%)
- 1.0% AEP (+30%)
- 1.0% AEP (+50%)
- 0.1% AEP (+20%)

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

0 100 200 300 400 500
metres



Environment Agency

No defences exist modelled fluvial node locations

Location (easting/northing)
400431/444569

Scale
1:2,500

Created
25 Oct 2022

Model name
2021 Upper Aire - Glusburn Beck

Selected location

Modelled location

Main river

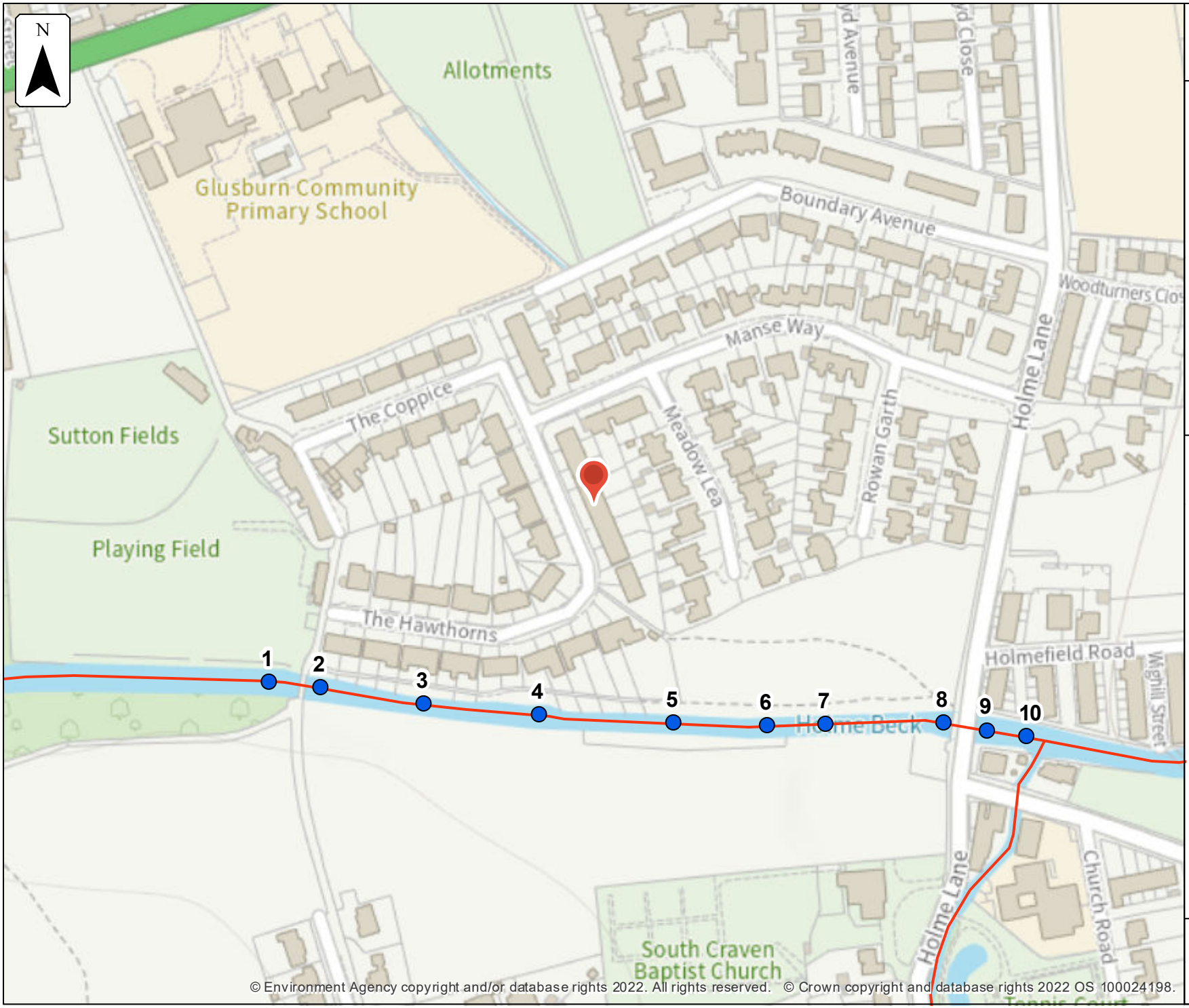
0 25 50 75 100
metres

Modelled node locations data

No defences exist

Label	Modelled location ID	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
				Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow
1	1195695	400272	444481			104.79	56.54	104.86	59.59	104.90	61.39	105.0	66.83	105.23	79.87
2	1195672	400297	444479			104.79	56.54	104.86	59.59	104.90	61.39	105.0	66.83	105.23	79.87
3	1195707	400348	444471			104.33	56.53	104.42	59.58	104.47	61.39	104.57	66.83	104.72	79.89
4	1195582	400404	444465			104.14	56.53	104.23	59.57	104.28	61.36	104.36	66.19	104.47	78.30
5	1195653	400469	444462			103.84	56.52	103.92	59.56	103.96	61.35	104.06	65.38	104.22	73.01
6	1195555	400515	444460			103.41	56.52	103.47	59.56	103.51	61.35	103.59	65.38	103.73	72.44
7	1195661	400544	444461			103.11	56.52	103.16	59.56	103.19	61.35	103.23	65.38	103.30	72.44
8	1195662	400601	444462			103.05	54.53	103.14	56.06	103.20	56.78	103.29	58.82	103.48	61.39
9	1195590	400622	444458			102.56	54.53	102.62	56.06	102.67	56.78	102.73	58.82	102.88	61.39
10	1195713	400641	444455			102.26	57.98	102.30	60.61	102.33	62.20	102.37	64.90	102.43	70.16

Data in this table comes from the 2021 Upper Aire tribs - Glusburn Beck model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.



Environment Agency

No defences exist climate change modelled fluvial node locations

Location (easting/northing)
400431/444569

Scale
1:2,500

Created
25 Oct 2022

Model name
2021 Upper Aire - Glusburn Beck

Selected location

Modelled location

Main river

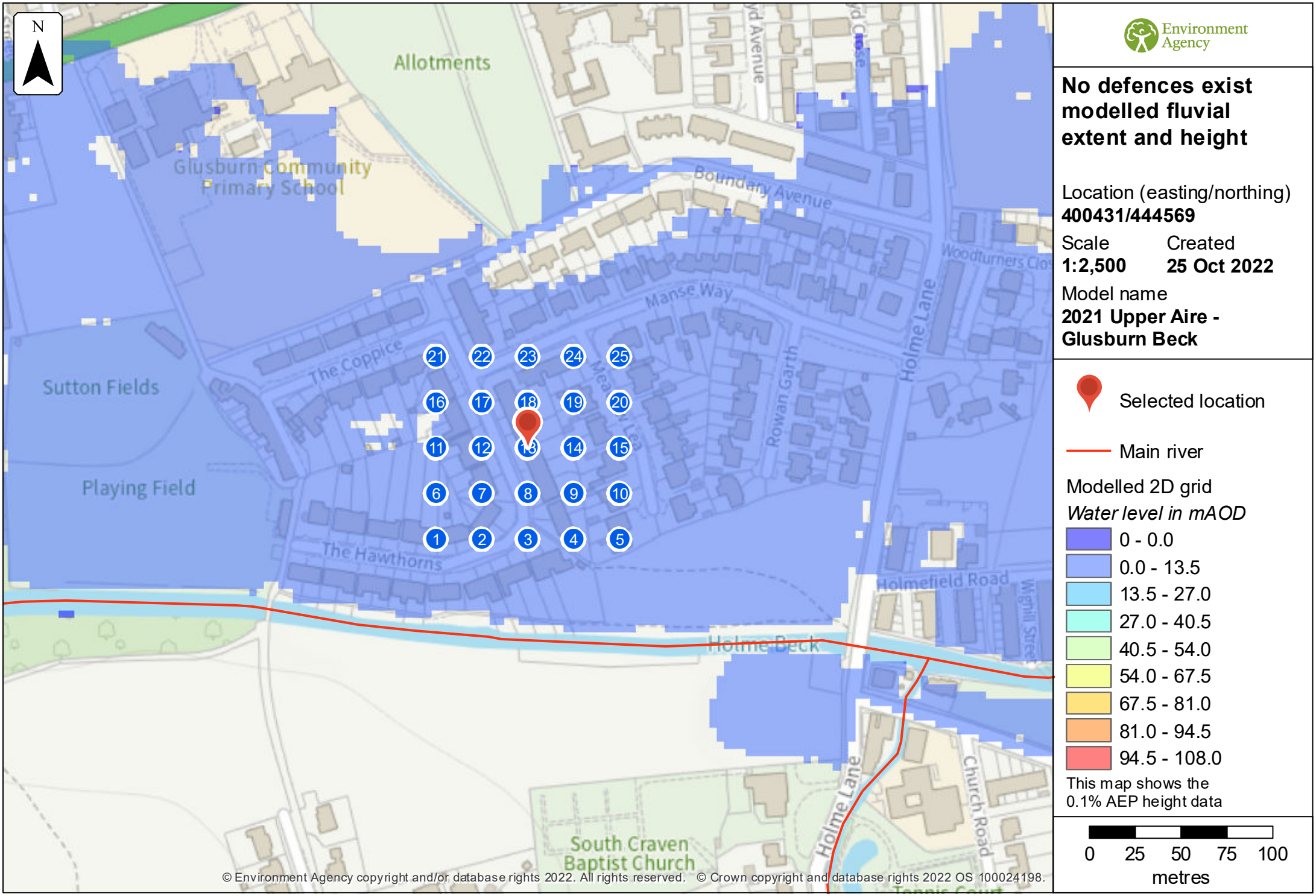
0 25 50 75 100
metres

Modelled node locations data

No defences exist climate change

Label	Modelled location ID	Easting	Northing	1.0% AEP (+20%)		1.0% AEP (+30%)		1.0% AEP (+50%)		0.1% AEP (+20%)	
				Level	Flow	Level	Flow	Level	Flow	Level	Flow
1	1195695	400272	444481	105.02	67.35	105.06	70.07	105.13	74.25	105.31	84.34
2	1195672	400297	444479	105.01	67.35	105.06	70.07	105.13	74.25	105.31	84.34
3	1195707	400348	444471	104.58	67.35	104.61	70.06	104.66	74.14	104.79	85.02
4	1195582	400404	444465	104.37	66.64	104.40	69.03	104.43	72.79	104.50	83.53
5	1195653	400469	444462	104.07	65.69	104.10	67.26	104.15	69.65	104.27	76.17
6	1195555	400515	444460	103.60	65.69	103.63	67.21	103.68	69.40	103.78	75.25
7	1195661	400544	444461	103.24	65.69	103.26	67.21	103.30	69.40	103.33	75.25
8	1195662	400601	444462	103.32	58.47	103.37	58.97	103.43	59.72	103.55	62.05
9	1195590	400622	444458	102.77	58.47	102.81	58.97	102.88	59.72	102.96	62.05
10	1195713	400641	444455	102.39	65.58	102.40	66.83	102.44	68.74	102.46	72.35

Data in this table comes from the 2021 Upper Aire tribs - Glusburn Beck model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.



Environment Agency

No defences exist modelled fluvial extent and height

Location (easting/northing)
400431/444569

Scale
1:2,500

Created
25 Oct 2022

Model name
2021 Upper Aire - Glusburn Beck

Selected location

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 0.0
- 0.0 - 13.5
- 13.5 - 27.0
- 27.0 - 40.5
- 40.5 - 54.0
- 54.0 - 67.5
- 67.5 - 81.0
- 81.0 - 94.5
- 94.5 - 108.0

This map shows the 0.1% AEP height data

0 25 50 75 100
metres

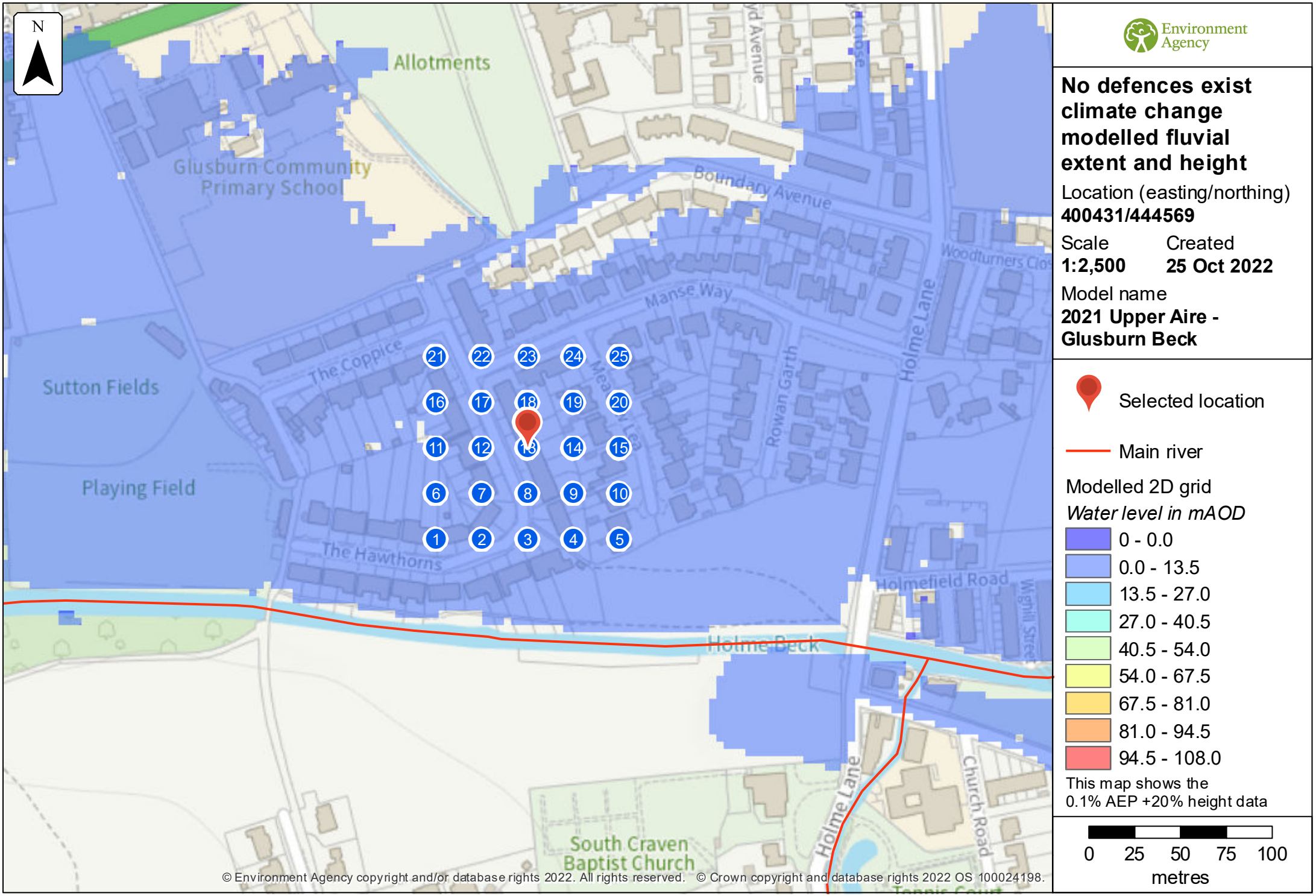
Sample point data

No defences exist

Label	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height
1	400381	444519			0.17	103.74	0.23	103.80	0.26	103.83	0.36	103.93	0.55	104.12
2	400406	444519			NoData	NoData	0.15	103.59	0.18	103.62	0.26	103.70	0.48	103.92
3	400431	444519			0.02	103.27	0.06	103.31	0.09	103.34	0.18	103.43	0.54	103.79
4	400456	444519			0.14	102.88	0.26	103.00	0.31	103.05	0.43	103.18	0.72	103.47
5	400481	444519			0.28	102.79	0.35	102.87	0.39	102.91	0.49	103.01	0.80	103.31
6	400381	444544			0.17	103.85	0.21	103.89	0.23	103.91	0.26	103.94	0.48	104.16
7	400406	444544			0.30	103.55	0.39	103.63	0.43	103.68	0.55	103.79	0.78	104.02
8	400431	444544			0.23	103.25	0.29	103.32	0.33	103.36	0.45	103.48	0.81	103.84
9	400456	444544			0.12	102.93	0.18	102.98	0.21	103.02	0.32	103.12	0.55	103.35
10	400481	444544			0.05	102.63	0.07	102.65	0.07	102.65	0.09	102.67	0.16	102.74
11	400381	444569			NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.16	104.15
12	400406	444569			0.07	103.32	0.11	103.36	0.13	103.39	0.19	103.44	0.51	103.76
13	400431	444569			0.34	103.21	0.40	103.26	0.43	103.30	0.52	103.39	0.83	103.70
14	400456	444569			0.13	102.73	0.17	102.78	0.19	102.80	0.29	102.90	0.61	103.22
15	400481	444569			0.02	102.47	0.03	102.48	0.03	102.48	0.08	102.53	0.18	102.63
16	400381	444594			0.12	103.63	0.17	103.67	0.20	103.70	0.29	103.80	0.60	104.10

Label	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height
17	400406	444594			0.17	103.25	0.23	103.32	0.27	103.35	0.37	103.45	0.72	103.81
18	400431	444594			0.08	103.09	0.10	103.11	0.11	103.13	0.13	103.14	0.27	103.28
19	400456	444594			0.25	102.73	0.29	102.78	0.32	102.81	0.42	102.90	0.78	103.27
20	400481	444594			0.26	102.41	0.33	102.49	0.37	102.53	0.48	102.64	0.81	102.96
21	400381	444619			NoData	NoData	NoData	NoData	NoData	NoData	0.01	103.75	0.20	103.94
22	400406	444619			0.04	103.24	0.07	103.27	0.10	103.30	0.17	103.37	0.47	103.67
23	400431	444619			0.05	102.97	0.09	103.02	0.12	103.05	0.21	103.13	0.53	103.45
24	400456	444619			0.00	102.72	0.00	102.72	0.00	102.72	0.03	102.75	0.21	102.96
25	400481	444619			NoData	NoData	NoData	NoData	NoData	NoData	0.13	102.62	0.47	102.96

Data in this table comes from the 2021 Upper Aire tribs - Glusburn Beck model.
Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.



Environment Agency

No defences exist climate change modelled fluvial extent and height

Location (easting/northing)
400431/444569

Scale
1:2,500

Created
25 Oct 2022

Model name
2021 Upper Aire - Glusburn Beck

Selected location

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 0.0
- 0.0 - 13.5
- 13.5 - 27.0
- 27.0 - 40.5
- 40.5 - 54.0
- 54.0 - 67.5
- 67.5 - 81.0
- 81.0 - 94.5
- 94.5 - 108.0

This map shows the 0.1% AEP +20% height data

0 25 50 75 100
metres

Sample point data

No defences exist climate change

Label	Easting	Northing	1% AEP (+20%)		1% AEP (+30%)		1% AEP (+50%)		0.1% AEP (+20%)	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height
1	400381	444519	0.37	103.94	0.40	103.97	0.46	104.03	0.63	104.20
2	400406	444519	0.27	103.71	0.32	103.75	0.38	103.82	0.59	104.03
3	400431	444519	0.19	103.44	0.25	103.50	0.36	103.61	0.70	103.95
4	400456	444519	0.45	103.19	0.50	103.25	0.59	103.34	0.82	103.57
5	400481	444519	0.50	103.02	0.55	103.07	0.63	103.15	0.91	103.42
6	400381	444544	0.26	103.94	0.30	103.98	0.37	104.05	0.59	104.27
7	400406	444544	0.56	103.80	0.61	103.85	0.68	103.92	0.87	104.12
8	400431	444544	0.46	103.49	0.52	103.55	0.63	103.66	0.97	104
9	400456	444544	0.32	103.13	0.37	103.17	0.44	103.25	0.64	103.44
10	400481	444544	0.09	102.67	0.10	102.68	0.12	102.70	0.19	102.77
11	400381	444569	NoData	NoData	0.02	104.01	0.06	104.05	0.27	104.26
12	400406	444569	0.20	103.45	0.24	103.49	0.34	103.59	0.67	103.92
13	400431	444569	0.53	103.40	0.58	103.45	0.68	103.54	0.97	103.84
14	400456	444569	0.30	102.91	0.35	102.96	0.45	103.06	0.75	103.35
15	400481	444569	0.08	102.53	0.09	102.55	0.13	102.58	0.23	102.68
16	400381	444594	0.30	103.81	0.34	103.84	0.44	103.94	0.75	104.25

Label	Easting	Northing	1% AEP (+20%)		1% AEP (+30%)		1% AEP (+50%)		0.1% AEP (+20%)	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height
17	400406	444594	0.38	103.46	0.43	103.51	0.54	103.62	0.89	103.97
18	400431	444594	0.13	103.15	0.14	103.16	0.17	103.18	0.37	103.39
19	400456	444594	0.43	102.91	0.49	102.97	0.60	103.08	0.92	103.40
20	400481	444594	0.49	102.65	0.54	102.70	0.64	102.80	0.95	103.10
21	400381	444619	0.01	103.75	0.03	103.77	0.09	103.83	0.34	104.08
22	400406	444619	0.18	103.38	0.23	103.43	0.32	103.52	0.60	103.80
23	400431	444619	0.22	103.14	0.26	103.18	0.36	103.28	0.68	103.60
24	400456	444619	0.03	102.75	0.05	102.78	0.09	102.84	0.30	103.05
25	400481	444619	0.14	102.63	0.20	102.68	0.30	102.79	0.62	103.10

Data in this table comes from the 2021 Upper Aire tribs - Glusburn Beck model.
Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.

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

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 Yorkshire Environment Agency team at neyorkshire@environment-agency.gov.uk for:

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

Appendix C
Personal Flood Plan

Personal flood plan

Name

Environment Agency

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

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

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

Key locations

Service cut-off	Description of location
Electricity	
Gas	
Water	

Who can help/who can you help?

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

Be prepared for flooding. Act now

Personal flood plan

What can I do NOW?

Environment Agency

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

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

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

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

Be prepared for flooding. Act now

GEHO0709BQPU-E-E

Report No: 1271_100_Flood Risk Assessment
Project Details: 15 The Hawthorns, Sutton in Craven
Date: November 2022