Flood Risk Assessment

LAND ADJACENT TO 7 HALIFAX ROAD
MILLBRIDGE
LIVERSEDGE

for

Javad Mahmood/Tux Auto

Report Number 4472

May 2025

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Flood Risk Assessment

LAND ADJACENT TO 7 HALIFAX ROAD, MILLBRIDGE, LIVERSEDGE

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1 INTRODUCTION

1.1 At the request of J.A. Oldroyd and Sons Limited, acting on behalf of Javad Mahmood and Tux Auto, a Flood Risk Assessment has been carried out of land adjacent to 7 Halifax Road in Millbridge. It is proposed to construct a detached warehouse on the site.

1.2 The Flood Risk Assessment has been prepared in accordance with The National Planning Policy Framework (NPPF), which is the official document that regulates the assessment of flood risks and their appropriate mitigation measures in the planning process. To accompany the NPPF there is the "Technical Guidance to the National Planning Framework" document of March 2012. This replaces PPS25: Development and Flood Risk.

1.3 The National Planning Policy Framework sets strict tests to protect people and property from flooding which all local planning authorities are expected to follow. Where these tests are not met, national policy is clear that new development should not be allowed. The mains steps to be followed are set out below which, in summary, are designed to ensure that if there are better sites in terms of flood risk, or a proposed development cannot be made safe, it should not be permitted.

2 THE SITE

2.1 The site presently comprises an unused car park. The site is entirely tarmac hardstading. It is located to the south side of Halifax Road, approximately 1km west of the centre of Heckmondwike. The Ordnance Survey National Grid Reference is E420676, N423696.

2.2 Maps of the British Geological Survey record the site to be possibly underlain by Alluvial Deposits of predominantly clay, silty sand and gravel. Bedrock is recorded as Undifferentiated mudstones, siltstones and sandstones of the Carboniferous Pennine Lower Coal Measures.

3 SITE SPECIFIC FLOOD RISK ASSESSMENT

3.1 The assessment is based on the Environment Agency's maps of flood risk zones. These cover all of England and Wales and map areas prone to flooding in terms of the following:

Zone 1 - Low Probability (Little or No Risk)

This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year. There are no development constraints.

Zone 2 - Medium Probability (Low to Medium Risk)

This zone comprises land assessed as having between a 1 in 100 (1%) and 1 in 1000 (0.1%) annual probability of river flooding or between a 1 in 200 and 1 in 1000 annual probability of sea flooding in any year.

Zone 3a - High Probability (High Risk)

This zone and the site itself comprises land assessed as having a 1 in 100 or greater annual probability of river flooding or a 1 in 200 or greater annual probability of flooding from sea in any year.

Zone 3b - Functional Floodplain

This zone comprises land where water has to flow or be stored in times of flood. The annual probability that such land will flood will be 1 in 20 or greater.

3.2 A search has been made of the Environment Agency's on-line Flood Map for Planning and the report is attached in Appendix 1. Virtually the whole of the site lies within Flood Zone 3.

Surface Water Flooding

3.3 The car park area is shown to have a low risk in respect of surface water flooding. No flood depth is shown in respect of surface water flooding, suggesting it is minimal. Any surface water affecting the car park is likely to run off the gulley located in the road.

3.4 The lifetime of the 'development' is estimated to be 100 years. In terms of vulnerability to flooding appropriate developments for each flood zone are given. The proposed use of the site and the car park falls under the "less vulnerable" category, i.e. car park and building used for "assembly and leisure". As such, for flood zones 1 to 3a, the development is considered to be appropriate.

Flood Vulnerability Zone	Essential Infrastructure	Water Compatible Development	Highly Vulnerable	More Vulnerable	Less Vulnerable
1	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate
2	Appropriate	Appropriate	Exception test required	Appropriate	Appropriate
3a	Exception test required	Appropriate	Inappropriate	Exception Test required	Appropriate
3b	Exception test required	Appropriate	Inappropriate	Inappropriate	Inappropriate

3.5 The Environment Agency has been contacted and has provided predicted flood level data expressed as the Annual Exceedance Probability (AEP). As such, a flood event with a return period of 100 years (a '1 in 100 year' event) would have a 1% chance of occurring each year. An allowance of + 20% has also been included to allow for climate change (1% AEP + 20% CC).

3.6 The Environment Agency data provided is on a grid basis as a series of points (labels) over the site area and for the scenario of "defences removed." The points directly applicable to the site are 9, 10, 11, 14, 15, 16, 17 and 20.

3.7 In respect of "defences removed", this assumes that any local flood defences 'fail' and flooding occurs. Based on the points (labels) at the site, the flood levels recorded range from 0.41m (410mm) to 1.02m (1020mm). The greatest depth occurs at the low point on the site, namely in the northern half of the site.

Point	Depth (m)
9	0.41
10	0.94
11	0.81
14	0.67
15	0.96
16	1.02
17	0.97
20	1.01

3.8 It is normal practice to assume that the defences may potentially 'fail', and as such, this should be considered the worse-case scenario. In this scenario, the maximum flood depth would be 1020mm (1.02m) above present ground level in the middle of the site.

4 CONCLUSIONS

4.1 The site lies within Flood Zone 3, and is therefore at risk of flooding. It is also not at risk of surface water flooding.

4.2 The proposed change of use will be classed as a "less vulnerable" land use under the Flood Risk Vulnerability Classification of the National Planning Policy Framework. As such, the proposed use is in Flood Zone 3 and is considered "appropriate".

4.3 Based upon a worse-case scenario where the present flood defences fail, and incorporating an allowance for climate change, there is the potential for a maximum flood depth of 1020mm over the 100 year lifespan of the development and allowing for climate change.

4.4 The finished floor level of the building has yet to be determined, and could be set such that there would be no theoretical flooding. Nevertheless, the Flood Risk Assessment shows that the proposed change of use is appropriate.

A D Joyce

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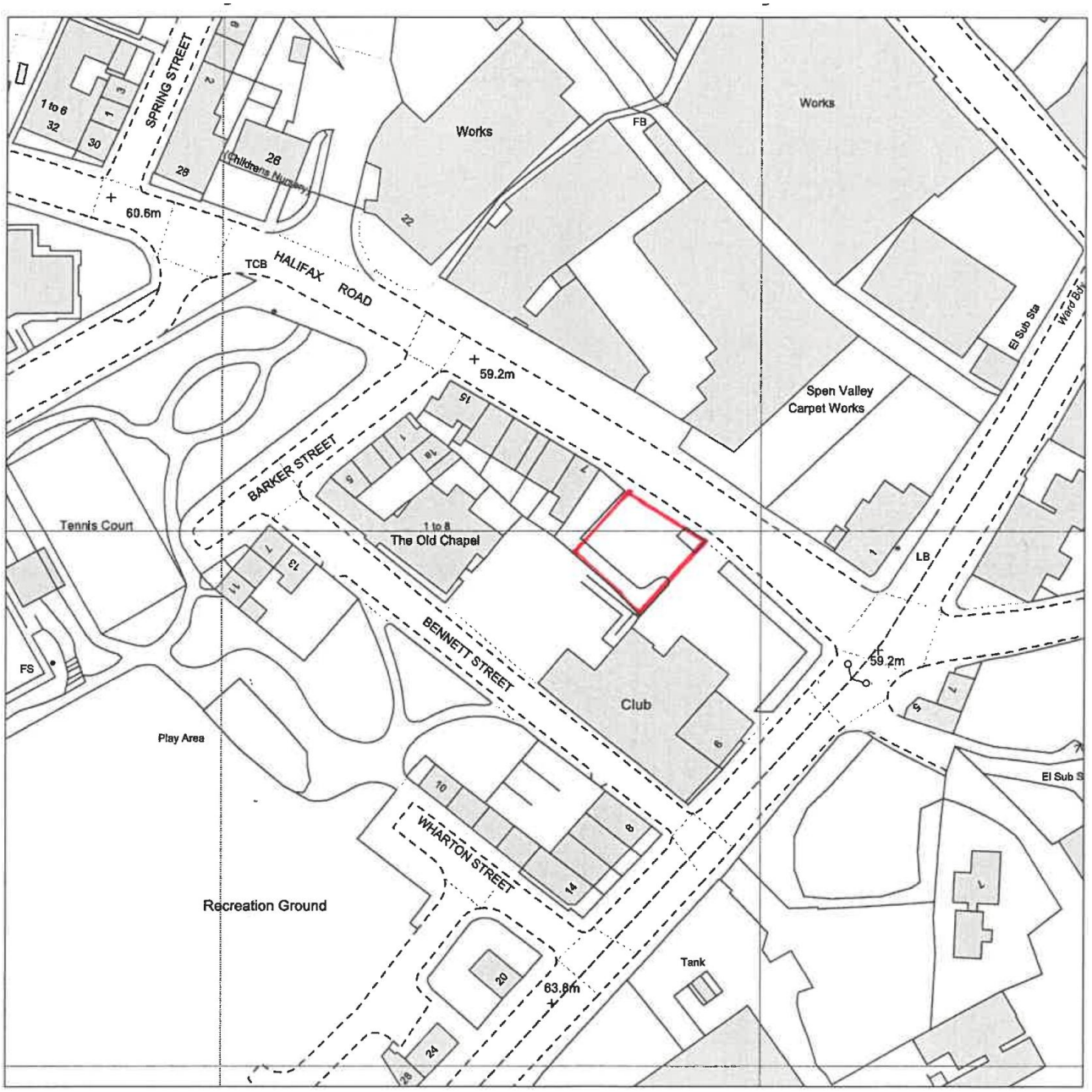
May 2025



7 Halifax Road, Mill Bridge, Liversedge

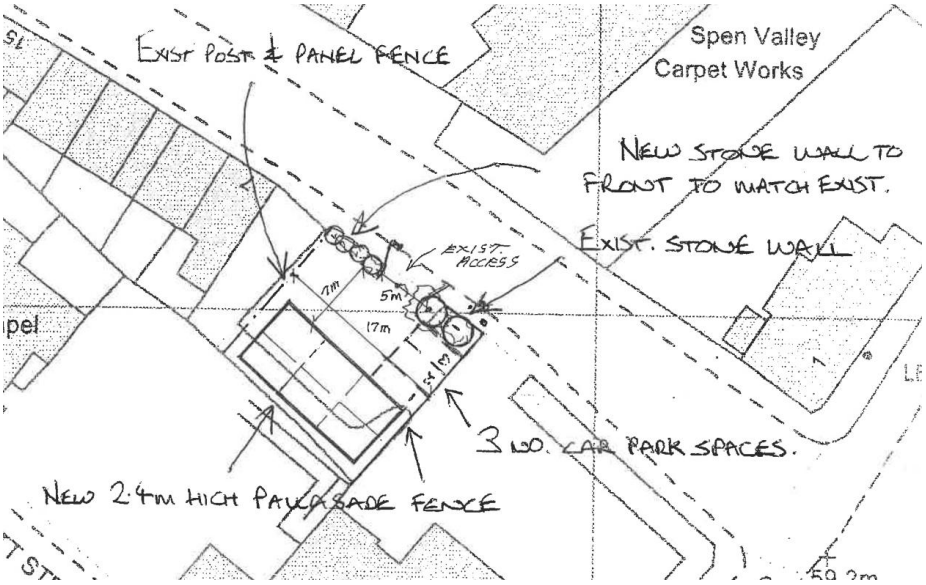
Site Location

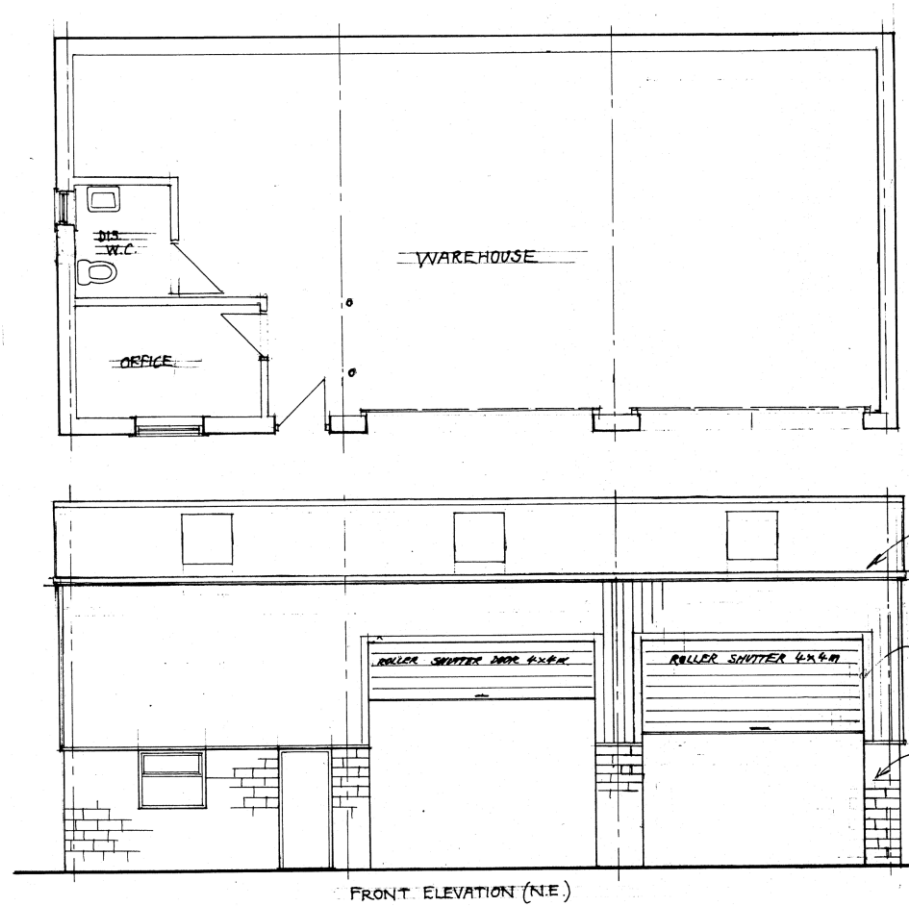
Michael D Joyce Associates LLP

Geotechnical and Geoenvironmental Consultants

Scale: NTS

Figure: 1





7 Halifax Road, Mill Bridge, Liversedge

Development Proposals

Michael D Joyce Associates LLP

Geotechnical and Geoenvironmental Consultants

Scale: NTS

Figure: 2

APPENDIX 1

Environment Agency Flood Map for Planning

Flood map for planning

Your reference	Location (easting/northing)	Created
Unspecified	**420677/423695**	**9 April 2025 10:19**

Your selected location is in flood zone 3, an area with a high probability of flooding.

This means:

- you must complete a flood risk assessment for development in this area
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (see https://www.gov.uk/guidance/flood-risk-assessment-standing-advice)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Environment Agency

Flood map for planning

Your reference
Unspecified

Location (easting/northing)
420677/423695

Scale
1:2,500

Created
9 Apr 2025 10:19

- Selected area
- Flood zone 3
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Water storage area

0 20 40 60 m

APPENDIX 2

Correspondence from the Environment Agency

Flood risk assessment data

Location of site: 420676 / 423696 (shown as easting and northing coordinates)
Document created on: 9 April 2025
This information was previously known as a product 4.
Customer reference number: 7GD87UGYGPXW

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 Kirklees District.

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

About the models used

Model name: 2009 FIM River Spen
Scenario(s): Defended fluvial, defences removed fluvial, defences removed climate change fluvial
Date: 1 March 2009

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

Terminology used

Annual exceedance probability (AEP)

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

Metres above ordnance datum (mAOD)

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

Flood map for planning (rivers and the sea)

Your selected location is in flood zone 3.

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

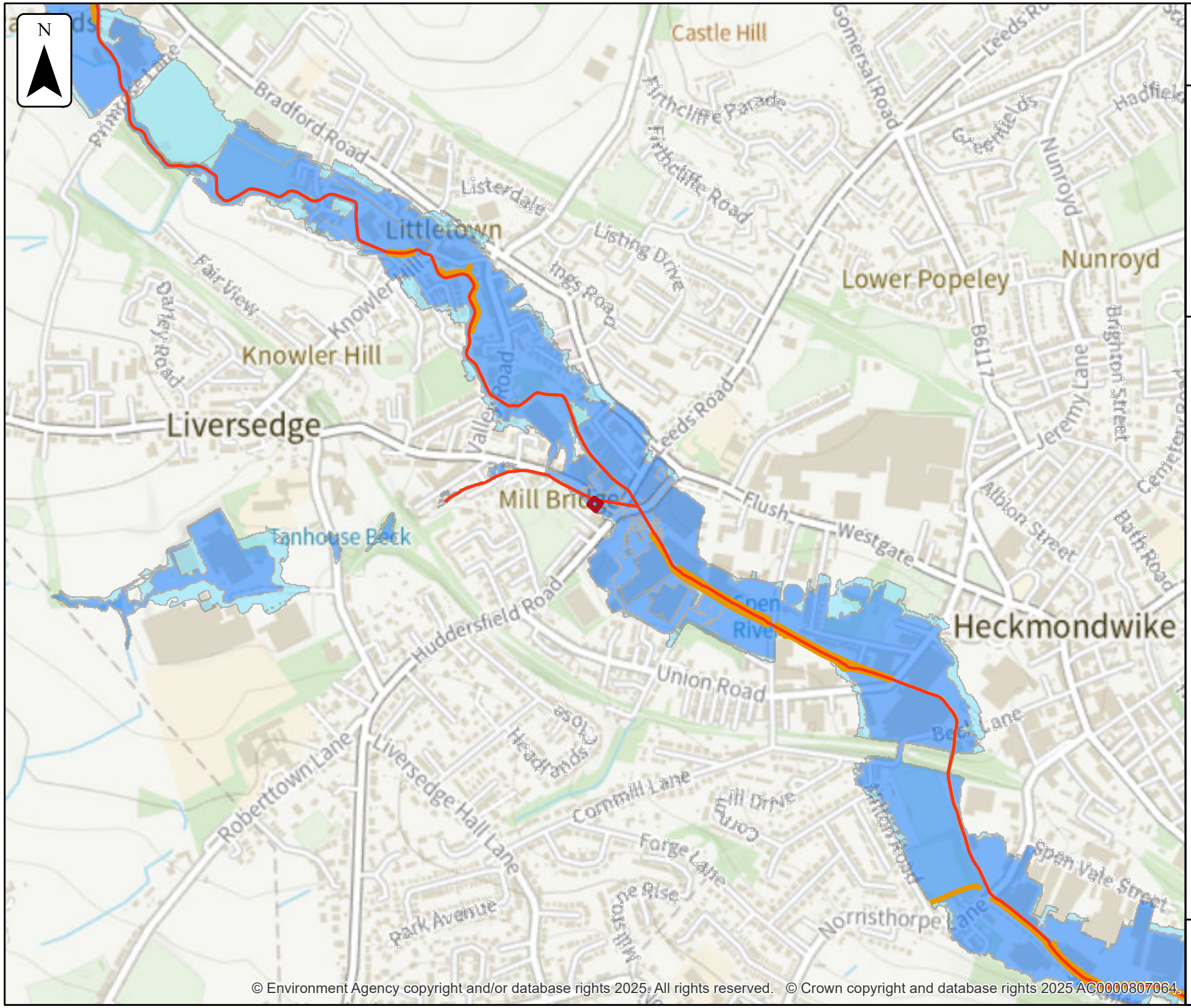
- 0.5% or greater probability of occurring in any year for flooding from the sea
- 1% or greater probability of occurring in any year for fluvial (river) flooding

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



Environment Agency

Flood map for planning

Location (easting/northing)
420676/423696

Scale
1:10,000

Created
9 Apr 2025

- Selected area
- Main river
- Flood defence
- Water storage area

Flood Zones 2 and 3
Rivers and Sea

- Flood Zone 2
- Flood Zone 3

0 100 200 300 400 500
metres

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

Environment Agency

Past floods

Location (easting/northing)
420676/423696

Scale
1:10,000

Created
9 Apr 2025

Selected area
Main river
Date of flood event
February, 2020
November, 2019
June, 2007

0 100 200 300 400 500
metres

Data on past flood events

Start date	End date	Source of flood	Cause of flood	Affects location
8 February 2020	19 March 2020	main river	channel capacity exceeded (no raised defences)	No
7 November 2019	8 November 2019	main river	channel capacity exceeded (no raised defences)	No
25 June 2007	26 June 2007	main river	unknown	No

Flood defences and attributes

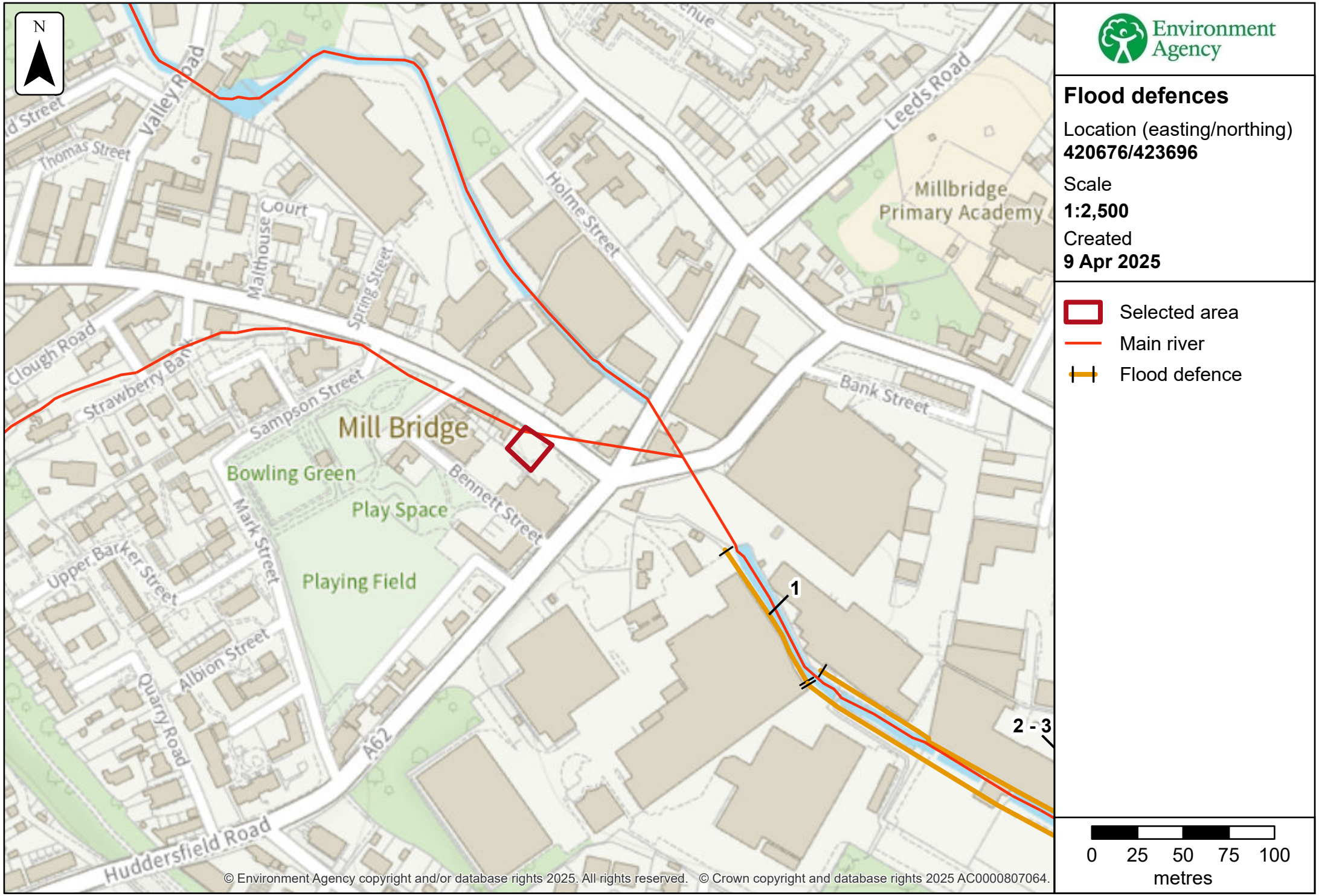
The flood defences map shows the location of the flood defences present.

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)
420676/423696

Scale
1:2,500

Created
9 Apr 2025

- Selected area
- Main river
- Flood defence

0 25 50 75 100
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	27840	Wall	50		58.56	58.43	
2	52204	Wall	50	Fair	57.08	58.56	
3	50692	Wall	50	Good	57.07	57.60	

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

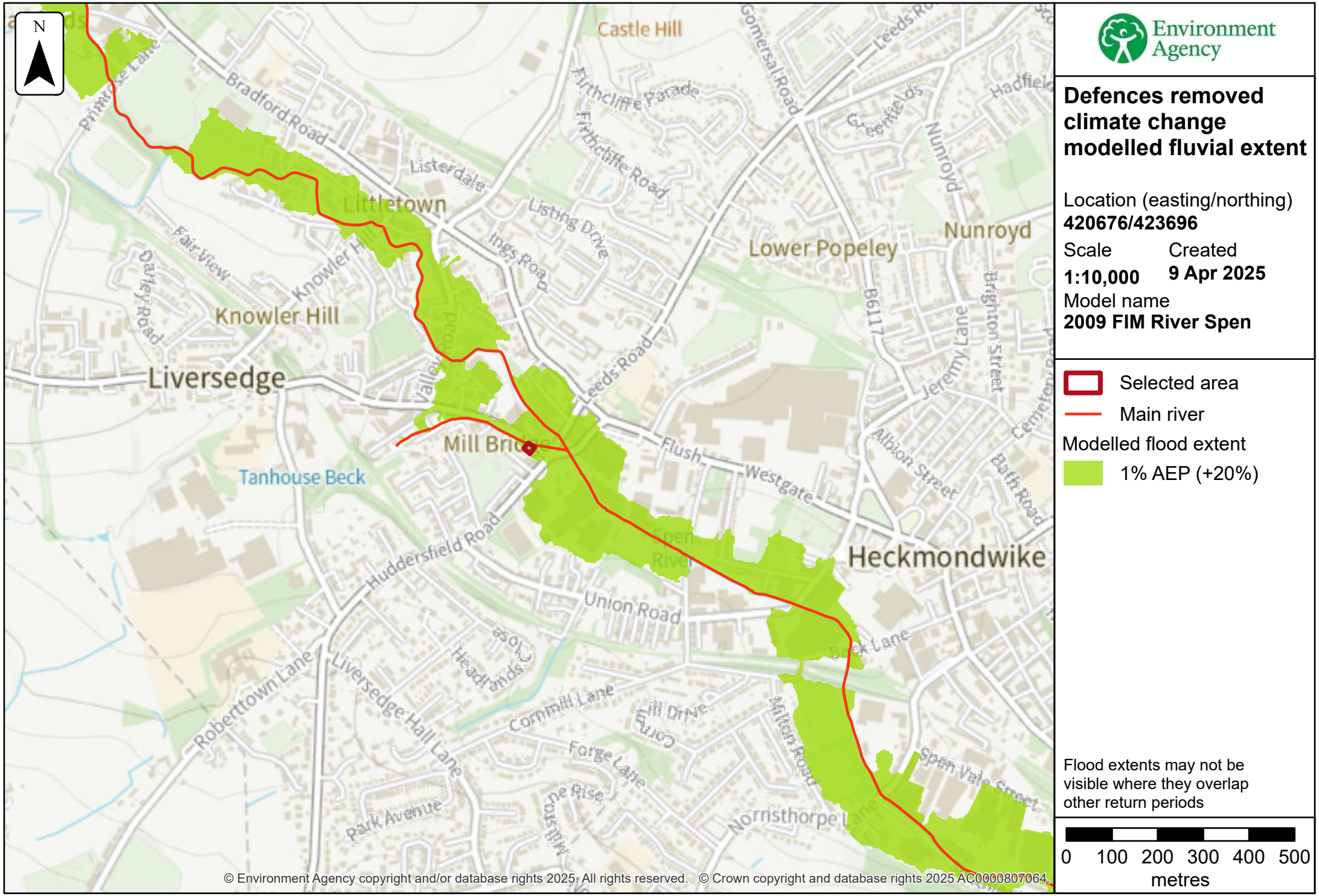
The climate change data included in the models may not include the latest flood risk assessment climate change allowances. Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

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
- Defences removed climate change modelled fluvial: risk of flooding from rivers where flood defences have been removed, including estimated impact of climate change



Environment Agency

Defences removed climate change modelled fluvial extent

Location (easting/northing)
420676/423696

Scale
1:10,000

Created
9 Apr 2025

Model name
2009 FIM River Spen

Selected area

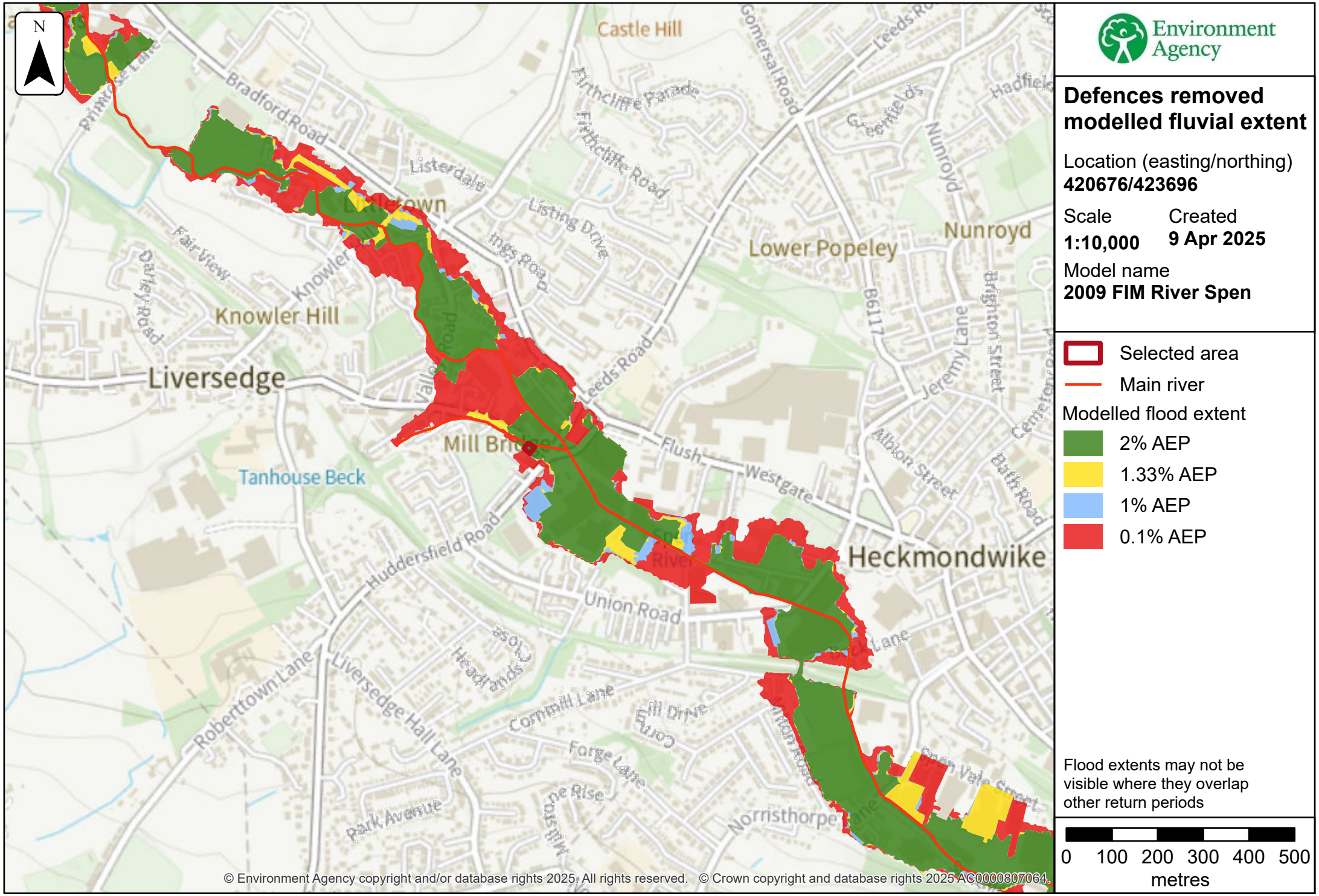
Main river

Modelled flood extent

1% AEP (+20%)

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

0 100 200 300 400 500
metres



Environment Agency

Defences removed modelled fluvial extent

Location (easting/northing)
420676/423696

Scale
1:10,000

Created
9 Apr 2025

Model name
2009 FIM River Spen

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

Environment Agency

Defended modelled fluvial extent

Location (easting/northing)
420676/423696

Scale
1:10,000

Created
9 Apr 2025

Model name
2009 FIM River Spen

Selected area

Main river

Modelled flood extent

1% AEP

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

0 100 200 300 400 500
metres

Environment Agency

Defences removed climate change modelled fluvial node locations

Location (easting/northing)
420676/423696

Scale
1:2,500

Created
9 Apr 2025

Model name
2009 FIM River Spen

Selected area
Modelled location
Main river

0 25 50 75 100
metres

Modelled node locations data

Defences removed climate change

Label	Modelled location ID	Easting	Northing	1% AEP (+20%)	1% AEP (+20%)
				Level	Flow
1	307820	420417	423721	64.48	4.63
2	348269	420461	423737	64.37	4.26
3	341109	420502	423893	60.86	21.81
4	53958	420516	423760	61.87	4.26
5	301230	420518	423888	60.86	22.77
6	64923	420543	423761	61.71	3.57
7	252318	420589	423910	60.59	28.07
8	59656	420631	423869	60.09	31.54
9	164986	420740	423723	59.84	16.07
10	98373	420791	423643	58.99	17.48

Data in this table comes from the 2009 FIM River Spen 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

Defences removed modelled fluvial node locations

Location (easting/northing)
420676/423696

Scale
1:2,500

Created
9 Apr 2025

Model name
2009 FIM River Spen

Selected area
Modelled location
Main river

0 25 50 75 100
metres

Modelled node locations data

Defences removed

Label	Modelled location ID	Easting	Northing	20% AEP	10% AEP	4% AEP	2% AEP	1.33% AEP	1% AEP	0.1% AEP
				Level	Level	Level	Level	Level	Level	Level
1	307820	420417	423721	64.07	64.12	64.19	64.23	64.26	64.27	64.74
2	348269	420461	423737	62.26	62.36	62.63	63.25	63.61	63.82	64.63
3	341109	420502	423893	60.09	60.22	60.41	60.54	60.61	60.56	61.44
4	53958	420516	423760	60.74	60.88	61.23	61.61	61.73	61.77	62.08
5	301230	420518	423888	60.08	60.21	60.40	60.53	60.60	60.55	61.44
6	64923	420543	423761	60.14	60.26	60.88	61.40	61.55	61.59	61.91
7	252318	420589	423910	59.83	59.97	60.14	60.27	60.33	60.38	61.36
8	59656	420631	423869	59.50	59.67	59.81	59.90	59.95	59.92	60.46
9	164986	420740	423723	59.10	59.32	59.52	59.63	59.68	59.65	60.24
10	98373	420791	423643	57.82	58.04	58.39	58.62	58.71	58.66	59.64

Data in this table comes from the 2009 FIM River Spen 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.

Defences removed

Label	Modelled location ID	Easting	Northing	20% AEP	10% AEP	4% AEP	2% AEP	1.33% AEP	1% AEP	0.1% AEP
				Flow	Flow	Flow	Flow	Flow	Flow	Flow
1	307820	420417	423721	2.14	2.53	3.05	3.45	3.69	3.86	7.91
2	348269	420461	423737	2.14	2.53	3.05	3.43	3.67	3.83	4.33
3	341109	420502	423893	16.28	18.42	20.63	21.49	21.61	21.74	22.09
4	53958	420516	423760	2.14	2.53	3.05	3.43	3.67	3.83	4.33
5	301230	420518	423888	16.22	18.42	20.71	21.87	22.18	22.21	25.39
6	64923	420543	423761	2.14	2.53	3.04	3.42	3.54	3.56	3.50
7	252318	420589	423910	16.48	18.08	20.99	23.08	24.11	24.81	30.59
8	59656	420631	423869	16.11	18.01	21.13	23.73	25.19	24.10	49.03
9	164986	420740	423723	14.78	15.16	15.44	15.60	15.71	15.78	16.51
10	98373	420791	423643	16.83	17.12	17.33	17.39	17.40	17.97	17.65

Data in this table comes from the 2009 FIM River Spen 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

Defended modelled fluvial node locations

Location (easting/northing)
420676/423696

Scale
1:2,500

Created
9 Apr 2025

Model name
2009 FIM River Spen

Selected area
Modelled location
Main river

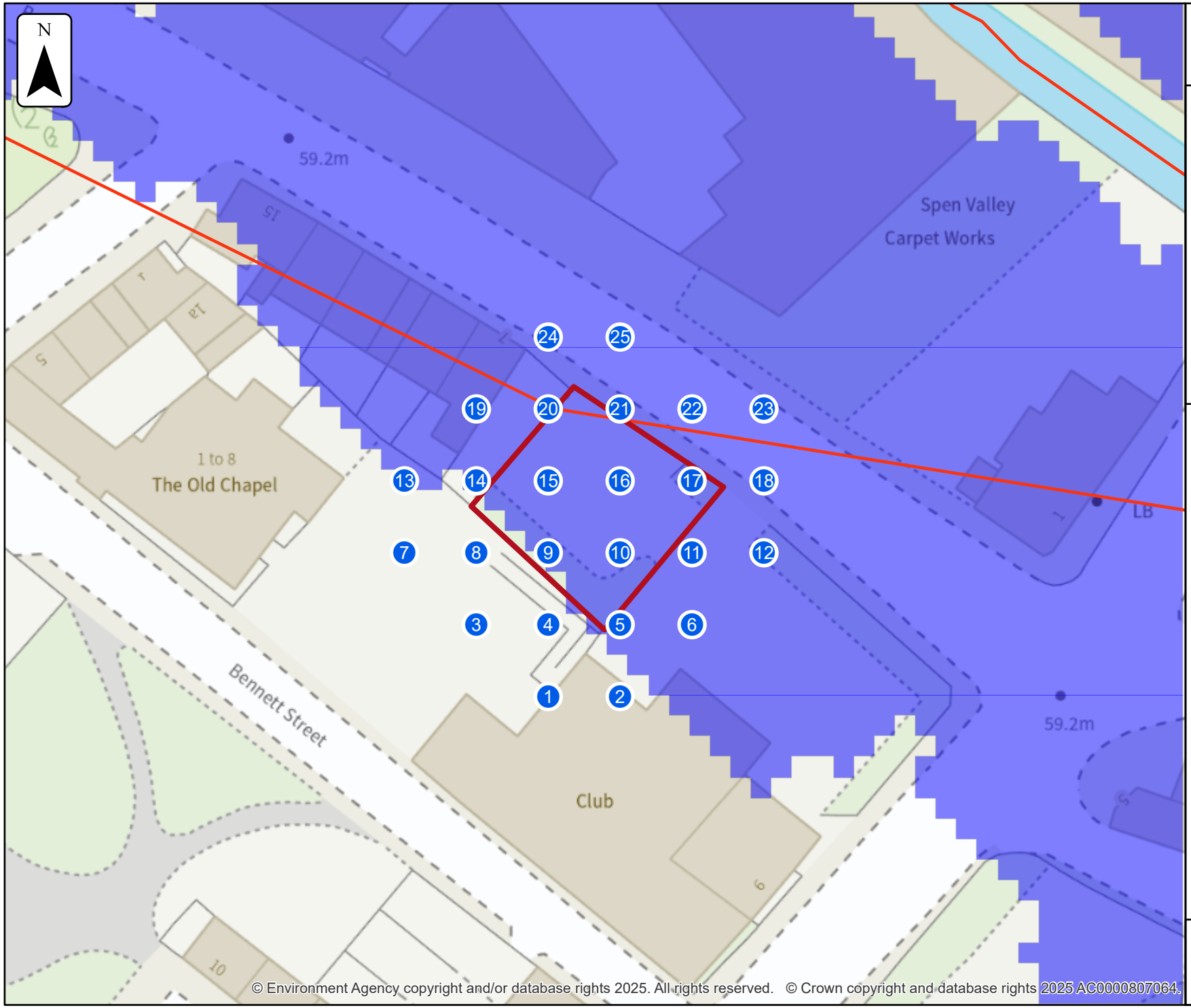
0 25 50 75 100
metres

Modelled node locations data

Defended

Label	Modelled location ID	Easting	Northing	1% AEP	1% AEP
				Level	Flow
1	307820	420417	423721	64.27	3.86
2	348269	420461	423737	63.81	3.83
3	341109	420502	423893	60.56	21.74
4	53958	420516	423760	61.76	3.83
5	301230	420518	423888	60.55	22.21
6	64923	420543	423761	61.58	3.60
7	252318	420589	423910	60.28	23.44
8	59656	420631	423869	59.92	24.10
9	164986	420740	423723	59.65	15.78
10	98373	420791	423643	58.66	17.97

Data in this table comes from the 2009 FIM River Spen 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

Defended modelled fluvial extent and depth

Location (easting/northing)
420676/423696

Scale
1:500

Created
9 Apr 2025

Model name
2009 FIM River Spen

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 31
- 31 - 31.5
- 31.5 - 32
- 32 - 32.5
- 32.5 - 33
- 33 - 33.5
- 33.5 - 34
- 34 - 34.5
- 34.5 - 35

This map shows the 1% AEP depth data

0 5 10 15 20
metres

Sample point data

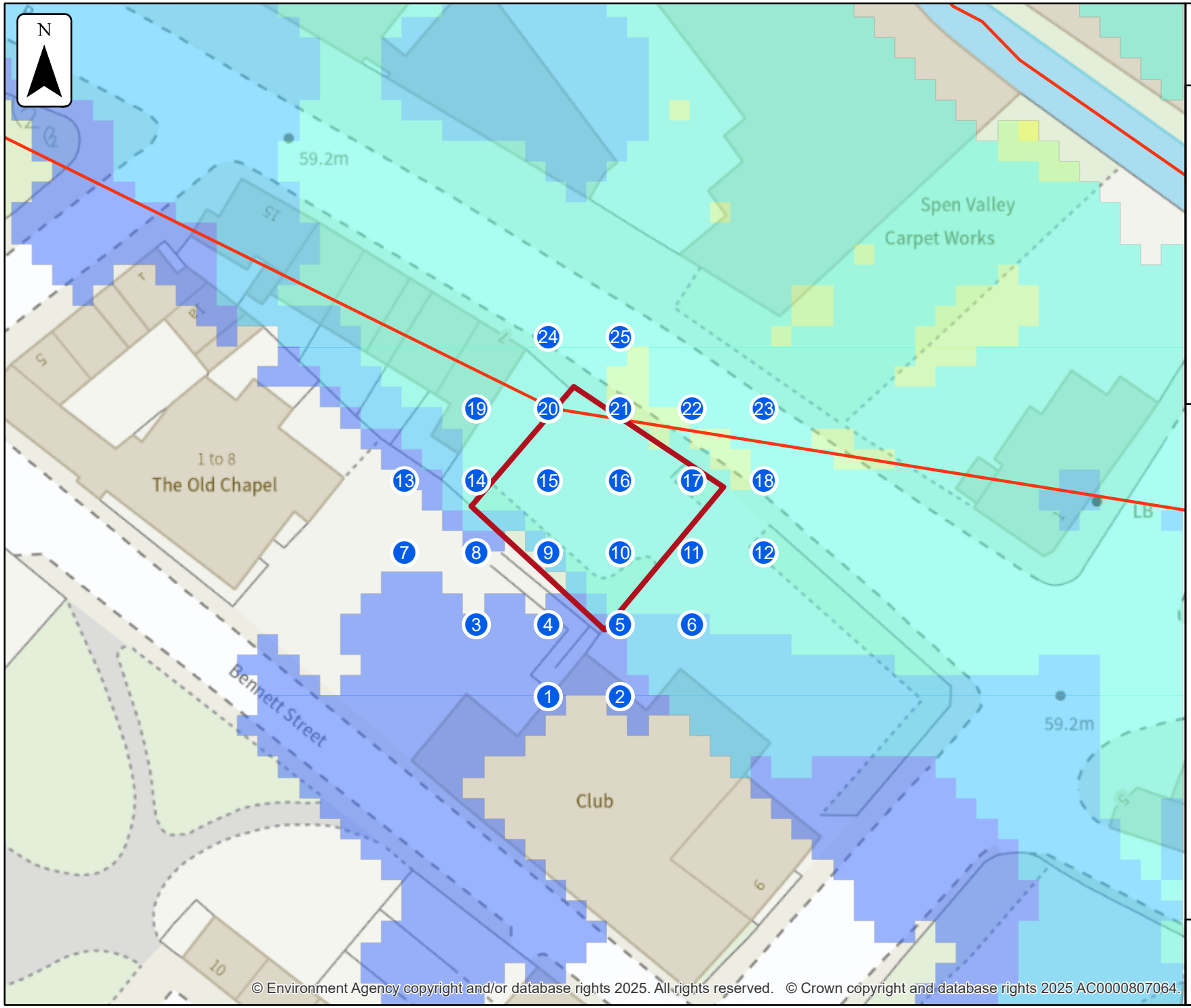
Defended

Label	Easting	Northing	1% AEP
			Depth
1	420672	423677	NoData
2	420679	423677	NoData
3	420665	423684	NoData
4	420672	423684	NoData
5	420679	423684	0.21
6	420686	423684	0.40
7	420658	423691	NoData
8	420665	423691	NoData
9	420672	423691	0.26
10	420679	423691	0.76
11	420686	423691	0.63
12	420693	423691	0.61

Label	Easting	Northing	1% AEP
			Depth
13	420658	423698	0.03
14	420665	423698	0.49
15	420672	423698	0.78
16	420679	423698	0.84
17	420686	423698	0.79
18	420693	423698	0.90
19	420665	423705	0.58
20	420672	423705	0.82
21	420679	423705	0.91
22	420686	423705	0.91
23	420693	423705	0.89
24	420672	423712	0.86

Label	Easting	Northing	1% AEP
			Depth
25	420679	423712	0.89
Max value in selected area:			0.91

Data in this table comes from the 2009 FIM River Spen model. Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.
'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.



Environment Agency

Defences removed modelled fluvial extent and depth

Location (easting/northing)
420676/423696

Scale
1:500

Created
9 Apr 2025

Model name
2009 FIM River Spen

Selected area

Main river

Modelled 2D grid
Water level in mAOD

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

This map shows the 0.1% AEP depth data

0 5 10 15 20
metres

Sample point data

Defences removed

Label	Easting	Northing	20% AEP	10% AEP	4% AEP	2% AEP	1.33% AEP	1% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth
1	420672	423677	NoData	NoData	NoData	NoData	NoData	NoData	0.01
2	420679	423677	NoData	NoData	NoData	NoData	NoData	0.00	0.02
3	420665	423684	NoData	NoData	NoData	NoData	NoData	NoData	0.03
4	420672	423684	NoData	NoData	NoData	NoData	NoData	NoData	0.20
5	420679	423684	NoData	NoData	NoData	0.20	0.22	0.23	0.69
6	420686	423684	NoData	0.13	0.13	0.39	0.43	0.47	0.98
7	420658	423691	NoData	NoData	NoData	NoData	NoData	NoData	NoData
8	420665	423691	NoData	NoData	NoData	NoData	NoData	NoData	NoData
9	420672	423691	0.12	0.17	0.17	0.26	0.27	0.29	0.81
10	420679	423691	0.31	0.48	0.48	0.74	0.79	0.82	1.34
11	420686	423691	0.19	0.35	0.35	0.62	0.66	0.70	1.21
12	420693	423691	0.17	0.33	0.33	0.59	0.64	0.67	1.19

Label	Easting	Northing	20% AEP	10% AEP	4% AEP	2% AEP	1.33% AEP	1% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth
13	420658	423698	NoData	NoData	NoData	0.03	0.03	0.04	0.14
14	420665	423698	0.11	0.22	0.22	0.47	0.52	0.55	1.07
15	420672	423698	0.34	0.50	0.51	0.77	0.82	0.85	1.37
16	420679	423698	0.39	0.56	0.56	0.82	0.87	0.90	1.42
17	420686	423698	0.35	0.51	0.51	0.78	0.83	0.86	1.38
18	420693	423698	0.46	0.62	0.63	0.89	0.94	0.97	1.49
19	420665	423705	0.14	0.30	0.30	0.56	0.61	0.65	1.17
20	420672	423705	0.38	0.54	0.55	0.81	0.86	0.89	1.41
21	420679	423705	0.47	0.63	0.64	0.90	0.95	0.98	1.50
22	420686	423705	0.47	0.63	0.63	0.90	0.95	0.98	1.50
23	420693	423705	0.44	0.61	0.61	0.87	0.92	0.95	1.47
24	420672	423712	0.41	0.57	0.58	0.84	0.89	0.92	1.44

Label	Easting	Northing	20% AEP	10% AEP	4% AEP	2% AEP	1.33% AEP	1% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth
25	420679	423712	0.45	0.61	0.61	0.88	0.92	0.96	1.48
Max value in selected area:			0.47	0.63	0.64	0.90	0.95	0.98	1.50

Data in this table comes from the 2009 FIM River Spen model. Height values are shown in mAOD, and depth values are shown in metres.
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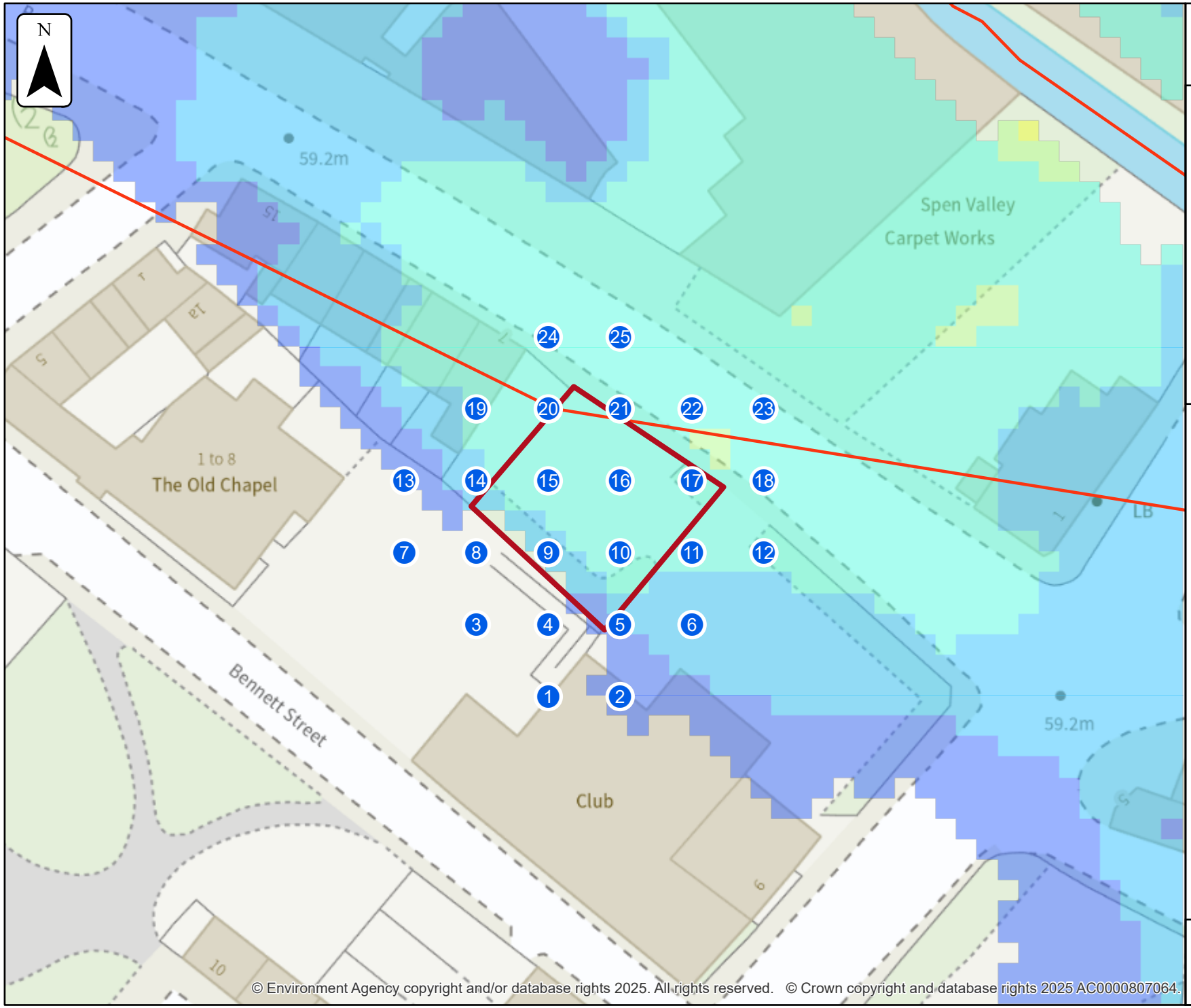

Environment Agency

Defences removed climate change modelled fluvial extent and depth

Location (easting/northing)
420676/423696

Scale
1:500

Created
9 Apr 2025

Model name
2009 FIM River Spen

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 0.0
- 0.0 - 0.375
- 0.375 - 0.75
- 0.75 - 1.125
- 1.125 - 1.5
- 1.5 - 1.875
- 1.875 - 2.25
- 2.25 - 2.625
- 2.625 - 3.0

This map shows the
1% AEP +20% depth data

0 5 10 15 20
metres

Sample point data

Defences removed climate change

Label	Easting	Northing	1% AEP (+20%)
			Depth
1	420672	423677	NoData
2	420679	423677	0.00
3	420665	423684	NoData
4	420672	423684	NoData
5	420679	423684	0.30
6	420686	423684	0.58
7	420658	423691	NoData
8	420665	423691	NoData
9	420672	423691	0.41
10	420679	423691	0.94
11	420686	423691	0.81
12	420693	423691	0.79

Label	Easting	Northing	1% AEP (+20%)
			Depth
13	420658	423698	0.05
14	420665	423698	0.67
15	420672	423698	0.96
16	420679	423698	1.02
17	420686	423698	0.97
18	420693	423698	1.08
19	420665	423705	0.76
20	420672	423705	1.01
21	420679	423705	1.10
22	420686	423705	1.09
23	420693	423705	1.07
24	420672	423712	1.04

Label	Easting	Northing	1% AEP (+20%)
			Depth
25	420679	423712	1.07
Max value in selected area:			1.10

Data in this table comes from the 2009 FIM River Spen model. Height values are shown in mAOD, and depth values are shown in metres.
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Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.
'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.

Strategic flood risk assessments

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

This should give you information about:

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

Your Lead Local Flood Authority is Kirklees District.

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