October 2024

Flood Risk Assessment

Headfield mills, Unit 19-20, Savile Road, Dewsbury, WF12 9LQ

DMA Design Management Ltd

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Executive Summary

FPS Environmental ("FPS") on behalf of DMA Design Management Ltd ("the client"), have undertaken a Flood Risk Assessment ("FRA") to support a planning application for a proposed single storey extension, external alterations to shop front including change of use of part vacant area to class E café site at Headfield Mills, Unit 19-20, Savile Road, Dewsbury, WF12 9LQ ("the site").

The River Calder, designated as an Environment Agency (EA) Main River, flows in a northernly direction and is located adjacent to the western boundary of the site.

The EA Flood Map for Planning (Drawing 04) shows that the western boundary of the site is located within Flood Zone 3. Flood Zone 3 is land assessed as having a greater than 1 in 100 year (1% AEP) probability of flooding each year. However, the proposed external alterations and extension area are located within Flood Zone 1. Flood Zone 1 is land assessed as having less than a 1 in 1000 year (0.1% AEP) probability of flooding each year.

In accordance with Annex 3 of the NPPF: Flood Risk and Coastal Change, the proposed change of use is considered to be a 'Less Vulnerable' development. The NPPF indicates that less vulnerable developments are appropriate in Flood Zone 1 and 2.

An Exception Test is not required for less vulnerable developments within Flood Zone 1, which is where the proposals are located.

The site has been assessed for a variety of flood sources, and based upon detailed analysis, this FRA has identified that flood risk from groundwater and artificial sources is considered medium. Fluvial and surface water flooding are considered low, while reservoir and tidal flooding are deemed as negligible.

The proposals are set to maintain the existing areas of hard surfacing across the site, and therefore surface water run-off rates are expected to remain the same. The car park area is set to implement a permeable resin finish.

Therefore, this FRA demonstrates that the proposed development is:

- Suitable in the location proposed;
- Unlikely to place additional persons at risk of flooding; and,
- Unlikely to increase flood risk elsewhere through the loss of floodplain storage, impedance of flood flows or increase in surface water run-off.

1. Introduction

1.1 Authorisation & Context

FPS Environmental ("FPS") on behalf of DMA Design Management Ltd ("the client"), have undertaken a Flood Risk Assessment ("FRA") to support a planning application for a proposed single storey extension, external alterations to shop front including change of use of part vacant area to class E café site at Headfield Mills, Unit 19-20, Savile Road, Dewsbury, WF12 9LQ ("the site").

1.2 Aims and Objectives

The overall aim is to demonstrate that the proposed development at the site is appropriate in the context of flood risk. The proposed site plan and existing and proposed site layout and elevations are included within Appendix A for reference. FPS has undertaken this FRA in accordance with the most up to date local and national policies on development and flood risk by:

- Assessing whether the site is likely to be affected by flooding from different sources;
- Providing an assessment of the vulnerability of the proposed development and its suitability in relation to the identified flood risk;
- Providing an opinion in relation to the likely impacts of the proposed development on flooding and elsewhere; and,
- Where required, presenting flood risk mitigation measures necessary to ensure that the proposed development and occupants will be safe, whilst ensuring flood risk is not increased elsewhere.

1.3 Information Sources Used

To prepare this report, the following information sources and general guidance documents have been used:

- National Planning Policy Framework (NPPF), Flood Risk and Coastal Change Planning Practice Guidance;
- Environment Agency (EA) correspondence and Product 4 dataset – October 2024;
- Calder Catchment (CC) Strategic Flood Risk Assessment (SFRA) – JBA Consulting, April 2016;
- Kirklees Council (KC) Preliminary Flood Risk Assessment (PFRA) – KC, June 2011;
- KC Local Flood Risk Management Strategy (LFRMS) – KC, 2024;
- KC Surface Water Management Plan (SWMP) – KC, 2011;
- Site Location Plan & Existing Block Plan – Drawing no. EX-01 – Tractus: DMA Architectural Design, 02/24;

- Existing Site/ Roof Plan – Drawing no. EX-02 – Tractus: DMA Architectural Design, 02/24;
- Proposed Site/ Roof Plan – Drawing no. PL-01 – Tractus: DMA Architectural Design, 02/24;
- EA Interactive Online Flood Mapping – Accessed October 2024;
- EA Surface Water Dataset – Accessed October 2024;
- 1m Resolution Light Detection and Ranging (LiDAR) Data – Downloaded October 2024; and,
- British Geological Survey Drift & Geology Maps – Accessed October 2024.

1.4 Report Limitations

This assessment of flood risk has looked to use the most accurate and up to date flood mapping for the location. The site boundary has been supplied by the client and the assessment of risk is based on this.

This report has been prepared with due care and diligence in accordance with industry best practice and guidance. The conclusions in this report are valid only to the extent that the information provided to FPS was accurate and complete at time of receipt.

1.5 Site Setting

The site is located at National Grid Reference (NGR): SE241205 / SE2417120567.

The site covers an area of approximately 0.067 hectares (ha) and currently comprises of an existing commercial unit and adjacent parking area. The site is bordered by other commercial properties to the north, Savile Road to the east, a small section of vegetated land to the south, while the western sections of the site are bordered by the River Calder.

The site location can be seen in Appendix A and Drawings 01 and 02 for reference.

1.6 Topographic Mapping & Levels

In the absence of a topographical survey, freely available 1m resolution Light Detection and Ranging (LiDAR) data has been downloaded for the site and local area to provide wider context to the ground levels within the vicinity of the site. An extract of the LiDAR data is provided on Drawing 03. The corresponding Ordnance Datum level has been estimated using LiDAR Data:

- Within the site ground levels fall gradually in a westerly direction from a level of approximately 46.4m AOD at the north-eastern site boundary, to a level of approximately 37.38 AOD at the western site boundary adjacent to the River Calder.
- Ground levels at the southeastern section of the site are approximately 45.7m AOD.

- Ground levels in the mid-section of the site where the proposed single storey extension area is to be located is approximately 41m AOD.
- Ground levels adjacent to the banks of the River Calder are approximately 34.05m AOD.

1.7 Local Hydrology

The River Calder, designated as an EA Main River flows in a northernly direction and is located adjacent to the western boundary of the site.

From a review of the Flood Estimation Handbook (FEH) web portal, the upstream catchment area of the River Calder to the site is approximately 714.5km^2. The upstream catchment primarily comprises the urbanised and rural areas of West Yorkshire.

1.8 Existing Drainage

Details of the existing drainage at the site are not known.

It is considered likely that surface water run-off drains to the adjacent River Calder through a piped outfall or surface water drainage system. Given the urban location it is expected that the site is served by the public foul sewer system.

Yorkshire Water sewer asset plans have not been obtained as part of this FRA.

2. Flood Risk Evaluation

The following sections provide an evaluation of the risk posed by the key flood sources in relation to the site location. Consideration is given to the severity of flood risk to the site as a whole, making use of existing flood mapping, high-level local strategic studies and available topographic information.

2.1 Fluvial Flood Risk

Fluvial flood risk originates from a watercourse of any size that may affect a site when the channel capacity is exceeded. This type of flooding often occurs following an extreme rainstorm event or a prolonged period of wet weather.

The western boundary of the site is located within Flood Zone 3. Flood Zone 3 is land assessed as having a greater than 1 in 100 year (1% AEP) probability of flooding. However, the proposed external alterations and extension area are located within Flood Zone 1. Flood Zone 1 is land assessed as having less than a 1 in 1000 year (0.1% AEP) probability of flooding.

The EA Flood Map for Planning can be seen on Drawing 04.

The CC SFRA 2016 states:

"The River Calder rises on the Pennine Moors west of Todmorden. It is predominantly an urban river, flowing through the West Yorkshire towns of Hebden Bridge, Brighouse, Dewsbury and Wakefield, before it joins the River Aire at Castleford. The upper reaches of the Calder and many of its tributaries flow through steep and relatively narrow valleys, which means they react quickly to rainfall. Heavy rainfall causes rapid rises in water level, which contributes to the flood risk in many of the communities. Downstream of Dewsbury the floodplains of the Calder broaden and include large areas of washland. These washlands act as flood storage areas attenuating peak flows. Consequently water levels rise and fall more slowly and peak flows are often lower than upstream of Dewsbury."

EA Data

The EA have provided flood levels for the River Calder. These levels have been taken from the 2015 Calder and Canals – Downstream of Sowerby Bridge modelling study which contains the most relevant data for the site. The two model nodes closest to the site are Node 9 (ID 1129626) and Node 8 (ID 1130123). The modelled flood levels at these model nodes are summarised in the below table:

Table 1 – Potential flood levels at the site from 2015 Calder & Canals modelling study

2015 Calder & Canals – Downstream of Sowerby Bridge modelling study				
Modelled Flood Event	Flood Level at Model Node 8 (ID 1130123) (m AOD)		Flood Level at Model Node 9 (ID 1129626) (m AOD)	
	D*	U**	D*	U**
1 in 25 year (4% AEP)	37.86	37.62	38.04	37.82
1 in 50 year (2% AEP)	38.15	37.89	38.32	38.10
1 in 75 year (1.33% AEP)	38.26	38.04	38.43	38.25
1 in 100 year (1% AEP)	38.33	38.28	38.51	38.45
1 in 100 year + 20% CC (1% + 20% CC AEP)	38.84	No Data	38.99	No Data
1 in 200 year (0.5% AEP)	38.65	38.31	38.80	38.53
1 in 1000 year (0.1% AEP)	39.81	39.82	39.96	39.98

*D – Defended Scenario

**U – Undefended/ Defences Removed

The potential flood depths at the site have been estimated assuming a ground level of 37.38m AOD, as derived from the LiDAR data (Section 1.6). This is the approximate ground level located at the western section of the site adjacent to the River Calder. The potential flood depths calculated are therefore considered to represent a worst-case scenario of flood impacts on the dwelling based on the hydraulic model results provided by the EA.

The modelling indicates that the site will be affected by fluvial flooding in all modelled scenarios.

Potential flood depths of up to 0.44m could occur at the site during the 1 in 25 year (4% AEP) event. These depths are indicated to rise with progressively more extreme scenarios. Flood depths of up to 1.07m could occur at the site during the 1 in 100 year (1% AEP) scenario.

However, if the fluvial risk is based on a LiDAR level of 40m AOD, which is the approximate ground level in the mid-section of the site where the proposed single storey extension area is to be located. Then this area of the site is indicated to remain unaffected from fluvial flooding during all modelled scenarios. Due to the topography of the site, potential fluvial accumulations are indicated to be contained to the western sections of the site.

The EA have also provided modelled 2D grid reference points for the site which have been taken from the 2015 Batley Beck Mapping Study. However, the corresponding table contained within the EA Product 4 data set appears to have no 2D flood depths data for the site.

The flood extent maps for the 2015 Calder and Canals – Downstream of Sowerby Bridge indicate the western boundary of the site to be located within the 1 in 50 year (2% AEP) fluvial extent. However, all other areas of the site are shown to be located outside of all modelled fluvial extents up until the 1 in 1000 year (0.1% AEP) event.

Since completion of the 2015 Calder and Canals – Downstream of Sowerby Bridge Modelling, the Environment Agency have produced updated guidance relating to projected increases in peak river flows that may arise due to climate change. The site is located within the Aire & Calder Management Catchment area and the peak increases to river flows are summarised as follows:

Table 2 – Peak river flow allowances for the Aire & Calder Management Catchment

Year	Aire & Calder Management Catchment Peak River Flow Allowances		
	Central	Higher	Upper
2020's	11%	15%	24%
2050's	13%	18%	31%
2080's	23%	31%	51%

The range of allowances is based on percentiles. A percentile describes the proportion of possible scenarios that fall below an allowance level. The 50th percentile is the point at which half of the possible scenarios for peak flow fall below it, and half fall above it.

The Central allowance is based on the 50th percentile; the Higher allowance is based on the 70th percentile; and the Upper End allowance is based on the 95th percentile.

Historic Flooding

The historic flood map (Drawing 5), the EA data set and recorded flood outline within open-source GIS datasets show the site to be located within an area that has historically flooded. However, this area appears to be confined to the western site boundary.

The EA data set indicates that the western section of the site previously flooded during the 08/02/2020 and 25/12/2015 flood events, which were both deemed to be as a result of the channel capacity of the River Calder being exceeded.

The KC PFRA and CC SFRA hold no mapping of recorded historical flooding incidents at the site and states:

"Council records of past flood events are poor. Recording of customer reported flooding through the councils call centre over the last 10 years has facilitated GIS recording of the incidents and there is now a sound basis on which to build a comprehensive record of previous floods. However, the current record of past floods with significant consequences is limited in both number and detail."

Fluvial flood risk is considered to be **low.**

The western boundary of the site is located within Flood Zone 3. Flood Zone 3 is land assessed as having a greater than 1 in 100 year (1% AEP) probability of flooding each year. However, the proposed external alterations and extension area are located within Flood Zone 1. Flood Zone 1 is land assessed as having less than a 1 in 1000 year (0.1% AEP) probability of flooding each year.

The proposed location of the extension area and adjacent car parking area of the site is indicated to remain unaffected from fluvial flooding during all modelled scenarios. Due to the topography of the site, potential fluvial accumulations are indicated to be contained to the western sections of the site.

Further considerations are made within Section 3 of this FRA to ensure that the risk remains at or below this level for the lifetime of the development.

2.2 Tidal Flood Risk

Tidal flood risk can affect the coastline as well as estuaries and rivers that are tidally influenced. Flood events often coincide with the tidal regime, high rainfall events or other natural phenomena, which can lead to water levels covering low-lying land or exceeding natural or man-made defences.

The site has an approximate elevation of >37m AOD and is located approximately 60km from the closest area at risk from tidal flooding. The watercourses within the vicinity of the site are not tidally influenced.

Tidal flood risk is considered to be **negligible** and no further consideration from this risk source is deemed necessary as part of this FRA.

2.3 Surface Water Flooding

Surface water flooding occurs when local drainage networks are overwhelmed during an extreme rainfall event, causing water to flow over the surface and follow gravity to the lowest point where it often pools. This flood source is increasingly becoming one of the major contributors of flood risk, due to changing weather patterns and increased extreme rainfall events occurring across the UK. This places

more pressure than ever on drainage systems, which are often overwhelmed during flash flood events, normally only designed to take between a 1 in 20 and a 1 in 30 return period event.

EA Risk of Flooding from Surface Water mapping can be seen on Drawings 06, 07 and 08, showing the flood extents and potential flood depths for the high risk, medium risk and low risk events. These are defined as follows:

- High risk: annual chance of flooding of greater than 3.3%;
- Medium risk: annual chance of flooding of between 1% and 3.3%;
- Low risk: annual chance of flooding of between 0.1% and 1%;
- Very Low risk: annual chance of flooding of less than 0.1%.

The EA Risk of Flooding from Surface Water map indicates that the site will remain unaffected from surface water flooding in all modelled scenarios.

In the low-risk scenario, surface water flooding is indicated to accumulate and be contained within the channel banks of the River Calder. Surface water flood depths of over 1200mm are indicated but these are indicated to be contained within the river channel and do not encroach onto the site. Surface water flood depths of up to 150mm are shown to accumulate along the eastern site boundary along Savile Road. However, these accumulations are indicated to be confined to the public highway and are not shown to impact the site.

The KC SWMP states:

"During extreme rainfall events, it will often be the case that both fluvial and surface water flooding occur during the same event. It is extremely difficult to quantify the individual effect of each type of flooding but this is largely irrelevant to those people suffering flooding, who are interested in the impact rather than the cause."

Surface water flood risk is considered to be l**ow.**

The site remains unaffected in all modelled scenarios.

Surface water flood depths of over 1200mm are indicated but these are shown to be contained within the river channel and do not encroach onto the site. Surface water flood depths of up to 150mm are shown to accumulate along the eastern site boundary along Savile Road. However, these accumulations are indicated to be confined to the public highway and are not shown to impact the site.

It is worth noting that the EA Risk of Flooding from Surface Water maps were produced back in 2013, and therefore the surface water risk to the property should only be considered as indicative.

Further considerations are made within Section 3 of this FRA to ensure that the risk remains at or below this level for the lifetime of the development.

2.4 Reservoir Failure

Assessment of risk of a reservoir failure may be interpreted as the extent of flooding that would occur, should any reservoir that has a capacity larger than 25,000m^3, suffer a catastrophic failure. Mapping of this nature is described by EA as a worst-case scenario, with a flood event of this type being extremely unlikely to occur.

Online EA mapping showing the Flood Risk from Reservoirs shows that the site is located outside of any areas potentially at risk of flooding in the event of a reservoir failure.

It should be noted that the EA risk of flooding from reservoir maps only consider the flood risk associated with designated reservoirs (typically >25,000m^3). Small and/or non-designated reservoirs may not be represented on the flood maps.

Current legislation ensures that reservoirs are inspected regularly, and essential safety work is carried out as required. The likelihood of a failure event occurring is therefore considered to be very low.

The risk of flooding from reservoir failure is considered to be **negligible**, and no further consideration from this risk source is deemed necessary as part of this FRA.

2.5 Groundwater Flooding

Flooding from a groundwater source often occurs during or following a period of prolonged wet weather within areas that are low lying underlain by permeable rocks (aquifers). When aquifers are at their maximum holding potential, flooding at surface level can occur from beneath the ground.

Groundwater as a sole flooding mechanism is often regarded as low risk, as it often relies on a coinciding rainfall, or flood event from an additional source to become a risk. The main contributory factor that will enhance the risk of groundwater flooding is prolonged periods of high rainfall, which result in the groundwater saturation level rising to the point where it reaches the surface.

Online BGS mapping shows the bedrock geology beneath the site comprises the *Pennine Lower Coal Measures Formation – Mudstone, Siltstone and Sandstone.* This is defined as a Secondary A Aquifer. Secondary A aquifers comprise permeable layers that can support local water supplies, and may form an important source of base flow to rivers.

The Hydrogeological Map of the UK defines the bedrock as a *moderately productive aquifer.*

The Cranfield University online "Soilscapes" map identifies the soils below the site comprise *loamy and clayey floodplain soils with naturally high groundwater,* which are indicated to drain to local groundwater feeding rivers.

Groundwater flooding susceptibility data does not typically identify flood risk or likelihood of occurrence but that the susceptibility rating is based on geological and hydrogeological conditions within an area.

The property is not located within a Groundwater Source Protection Zone (SPZ).

There is no evidence to suggest the site has previously been affected by groundwater flooding. The CC SFRA indicates no records of pervious groundwater flooding at the vicinity of the site.

The KC LFRMS states:

"Warmer, wetter winters and hotter, drier summers due to climate change are likely to have significant impacts on groundwater levels within Kirklees. Increased periods of rainfall within the district are likely to increase the susceptibility of groundwater flooding in areas currently at risk. It is considered unusual to see groundwater breaking through the surface of the ground but the high number of basements in older properties, means that groundwater flooding to "below ground" rooms is increasingly common.

Recorded incidents of groundwater flooding in Kirklees are rare. However, we will continue to raise awareness in local communities of the risks associated with groundwater flooding and how such risks can be mitigated."

Overall, the risk of flooding from groundwater is considered to be **medium.**

There is no evidence to suggest the site has previously been affected by groundwater flooding. However, given the proximity to the adjacent River Calder, moderately productive aquifer and underlying soil composition which indicates a naturally high groundwater; there remains an elevated risk to the site.

Further considerations are made within Section 3 of this FRA to ensure that the risk remains at or below this level for the lifetime of the proposed development.

2.6 Artificial Flood Sources

Flood risk from artificial sources would include the failure of man-made drainage or the water supply network. Although the likelihood of such an occurrence is highly unpredictable, it is recommended that any potential future development at the site takes into account the location of any existing below

ground services, in order to avoid any inadvertent flooding taking place during the construction phase and in the future.

Historical incidents of flooding are detailed by Yorkshire Water through their DG5 register. This database records flooding incidents relating to public foul, combined or surface water sewers. The DG5 gives no indication as to the severity of the flood events that occurred. The Yorkshire Water DG5 database data contained within the CC SFRA indicates no historic flooding attributed to sewer flooding within the vicinity of the site.

The KC SWMP states:

"Yorkshire Water owns much of the combined and surface water sewers in the region. Sewer systems are currently designed not to flood in a 1:30 year return period design storm. This does not include accommodating flows from exceptional and high magnitude rainfall events. During extremely wet weather, the rainfall may exceed current design criteria. Such events can result in exceedance of the hydraulic capacity of the sewer thus increasing the risk of flooding. One of the most recent occurrences of this type of event was the flooding experienced in June 2007.

There are some known sewer related flooding issues within the Kirklees catchment. However, overall sewer performance is satisfactory. Yorkshire Water is working with Kirklees Council, the Environment Agency and other parties to better understand the interaction of the networks and provide improvements that will help further reduce the risk of flooding."

Yorkshire Water have not been contacted for records of historic sewer flooding as part of this FRA.

It is not known whether the existing building is served by any existing public or private foul drainage systems. Given the urban site location it is considered very likely that there are public sewer systems located within the immediate vicinity of the site. Surface water run-off is expected to flow into the local drainage network and watercourses within the vicinity of the site.

As the site is believed to be served by public drainage systems, the risk of flooding from sewers and artificial sources is considered to be **medium.**

Further considerations are made within Section 3 of this FRA to ensure that the risk remains at or below this level for the lifetime of the proposed development.

2.7 Summary

Table 3 provides a summary of the classification of risk to the site from all flood sources and indicates where further considerations are required in the context of the proposed development.

Table 3 – Flood Risk Summary

Risk Source	Overall Risk Classification	Additional Considerations
Fluvial	Low	See Section 3
Tidal	Negligible	None
Surface Water	Low	See Section 3
Reservoir Failure	Negligible	None
Groundwater	Medium	See Section 3
Artificial Flood Sources	Medium	See Section 3

3. Flood Risk in Planning Context

This report has so far evaluated all potential flood sources that may affect the site. The following sections describe the identified flood risks in the context of the proposed development and provide recommendations where required, for the mitigation or reduction of those risks to enable safe development.

3.1 Flood Risk Status and Development Viability

The EA Flood Map for Planning (Drawing 04) shows that the western boundary of the site is located within Flood Zone 3. Flood Zone 3 is land assessed as having a greater than 1 in 100 year (1% AEP) probability of flooding each year. However, the proposed external alterations and extension area are located within Flood Zone 1. Flood Zone 1 is land assessed as having less than a 1 in 1000 year (0.1% AEP) probability of flooding each year.

The proposals comprise a single storey extension, external alterations to shop front including change of use of part vacant area to class E café. The building footprint of the proposed extension area is approximately 8m² and is therefore considered a minor development.

In accordance with Annex 3 of the NPPF: Flood Risk and Coastal Change, the proposed change of use is considered to be a 'Less Vulnerable' development.

Table 2 of the PPG shows the Flood Risk Vulnerability and Flood Zone 'Incompatibility'. Table 2 indicates that less vulnerable development is considered acceptable in areas of Flood Zone 1 and 2.

An Exception Test is not required for less vulnerable developments within Flood Zone 1, which is where the proposals are located. The proposed works are acceptable within Flood Zone 1.

3.2 Design Principles for Development

It is recommended that, based on the current design proposals, the following design principles should be incorporated to demonstrate its long-term resistance to flooding:

Development Levels

EA Standing Advice for more vulnerable development states:

Ground floor levels should be a minimum of whichever is higher of:

- *300 millimetres (mm) above the general ground level of the site.*

- *600mm above the estimated river or sea flood level.*

Where possible, the internal finished floor levels should be raised a minimum of 300mm above the immediate surrounding external ground levels. This will minimise the likelihood of water ingress from any external fluvial and surface water accumulations.

Access/Egress

Access and Egress to the site is via Savile Road to the east of the site.

Access and Egress to the site may be restricted during a flood event should the road flood during a surface water flood event.

Should the public highway ever flood, the occupants should remain either within the site until floodwater has receded so that safe access and egress can be achieved.

The occupants should not drive through flood water.

Flood Resistance

Flood resistance measures could be considered at the site as part of the design proposals to mitigate against the risk of floodwater ingress to the main building, and should the occupier wish to mitigate against extreme flooding scenarios at the site as a whole.

Flood resistance measures that could be considered include:

- Masonry & Render: All external walls should be kept in good condition in order to minimise the potential for flood water to ingress through this point. Basic maintenance includes keeping masonry pointing and render in good order. Any damaged masonry and mortar should be repaired. The lower portion of the wall could be treated with a waterproofing cream to help reduce ingress and repointed with a waterproof additive. (Repointing £40-£70 +VAT per m2. Wall sealant £12-£20 +VAT per m2)

- Flood Doors or Barriers: Doorways present one of the greatest risks of flood water ingress to a property. Doors can be replaced with watertight flood doors, or demountable barrier systems could be installed across doorway openings to prevent water ingress. (Flood doors from £2,000 + VAT for single doors, and flood barriers from £1,000 + VAT per doorway opening).

- Aperture Protection: Any gaps or holes that penetrate the external walls for both existing and historic pipes or cables should be sealed with mortar or silicone. (Seal hole with mortar £24-£36 +VAT. Seal cable entry point with silicone £6-£12).

- Non-Return Valves: To mitigate against sewer surcharging, surcharge protection would be achievable through the use of non-return valves within the drainage system, or pan seals with

backflow valves on sink outlets. (£80-£150 +VAT per NRV). A drainage survey would need to be undertaken to confirm the locations and connections of all drains at the property, to ascertain the correct location of any NRVs.

Flood recoverability measures could be considered at the site to mitigate against potential floodwater ingress at ground level.

Flood Recoverability

Flood recoverability is where emphasis is placed upon making a site recoverable from a flooding event as quickly and economically as possible. Flood resilient buildings are designed and constructed to reduce the impact of flood water entering the building so that no permanent damage is caused, structural integrity is maintained and drying and cleaning is easier.

Flood recoverability measures that could be adopted include:

- Internal Walls: Promoting the use of water-resistant plaster and plasterboard (horizontal application where possible). The anticipated costs of utilising these building methods are between £72 - £120 +VAT per m2;
- Skirting boards: There are various options available for skirting boards. Wooden skirting boards can be treated with sealants such as Yacht Varnish to improve their flood resistance, or alternative materials can be used such as Tricoya or Plastic. It is also possible to use a tiled upstand. Industry quoted costs for skirting boards with Tricoya are £60-£90 per metre.
- Wiring: Raising of electrical sockets as far up the wall as reasonably practicable and avoiding low level junction boxes or fuse boards will reduce any water damage to these items.
- Raise Internal / External Apparatus: Where possible, any internal apparatus that is not designed to resist water ingress should be raised (e.g., boilers and white goods). It is noted that the electric and gas meter boxes are located externally adjacent to the front door, at the lower ground floor level. Where feasible, these could benefit from being raised and/or relocated to reduce the risk of being affected or damaged should external areas flood here; and,
- Puddle Pump/Wet Vac: To enable the efficient dewatering of the property in the event of water ingress, the provision of such items should be kept internally (£280 - £350 +VAT per unit).

Surface Water Drainage

As part of the development, it should be ensured that the proposals do not increase flooding elsewhere. The proposed extension area is understood to be built on existing impermeable surfacing.

The nature of the surface water drainage system serving the existing development at the site is to be confirmed during the site works and retained as part of the proposed development.

The proposed extension area of the building is to be extended on an already hardstanding impermeable surface. There will be no increase in the hardstanding or impermeable footprint within the site as a result of the single storey extension, and the existing drainage system is to be retained.

3.3 Flood Awareness & Maintenance

It is important that all site occupiers have an awareness of flood risk at a local level, and that any necessary actions can be taken prior to flooding.

- **Flood Warnings & Alerts:** The site is located within an EA Flood Alert Area and an EA Flood Warning Area:

  Flood Alert Area – Lower River Calder Catchment *(123WAF964).*

  Flood Warning Area – River Calder at Dewsbury *(123FWF333).*

  The extent of the EA Flood Alert and EA Flood Warning Areas are shown on Drawing 09. It is recommended that all occupants of the site are subscribed to the EA Flood Warning service through the following website: https://www.gov.uk/sign-up-for-flood-warnings

- **Flood Action Plan:** In order to efficiently prepare for a potential future flood event, the occupants could prepare an all-encompassing Flood Action Plan. The action plan should consider how to respond in the event of a flood. The Environment Agency provide template flood plan documents, copies of which are provided can be downloaded from the following webpages:

  https://www.gov.uk/government/publications/preparing-your-business-for-flooding

- **Weather Alerts:** The Met Office provide weather warnings when extreme weather is forecast. Their service includes warnings for rain and thunderstorms. Surface water flooding typically occurs during and following torrential and/or high intensity rainfall and therefore these warnings may provide an indication of when flooding could happen. The occupants can check the local weather forecast and register to receive weather warnings from the Met Office via their website:

  https://www.metoffice.gov.uk/weather/warnings-and-advice

- **Drainage:** The site occupants should regularly inspect guttering and downpipes and clear any debris that exists. This will reduce the likelihood of any blockages and subsequent increase in surface water risk during heavy rainfall events.

Conclusion

The site has been assessed for a variety of flood sources, and based upon detailed analysis, this FRA has identified that flood risk from groundwater and artificial flood sources are considered medium. Fluvial and surface water flood risk are considered low, while flood risk from reservoir failure and tidal flooding are deemed as negligible.

The client's development aspirations can manage/mitigate any residual flood risk as part of the design. Flood resilience measures could be implemented within the main building.

This FRA has therefore demonstrated that the proposed development can be undertaken in-line with NPPF guidance, and that it is:

- Suitable in the location proposed;
- Unlikely to place additional persons at risk of flooding; and,
- Unlikely to increase flood risk elsewhere through the loss of floodplain storage, impedance of flood flows, or increase in surface water run-off.

Limitations of the report

This report has been prepared by FPS Environmental Limited (FPS) solely for the benefit of DMA Design Management Ltd ("the Client") and has not been assigned to any other third parties. If reliance on this report was required by a third party, this could be arranged for an agreed fee. This report should not be used by the client in relation to any other matters not covered specifically by the scope of the report. If this report does not contain a signature in the Document Control window, then this is an uncontrolled electronic copy and should not be relied upon by the client or any other recipient, as FPS cannot give assurance on the source or content of the document. FPS has used all reasonable skill, care and diligence in the preparation of this report.

The Flood Risk Assessment report has been designed to satisfy planning requirements, as outlined in Section 1. It is a desktop review of information provided by the client and from selected private and public databases. It only includes a site investigation where specifically referenced. This report does not make a detailed site-specific assessment of the suitability of the existing drainage on the Site. If this is required, then a site survey should be considered. FPS accepts no responsibility for the accuracy or completeness of third-party data reviewed within this assessment.

This report is provided under Flood Protection Solutions Limited Standard Terms and Conditions.

Drawings

Legend

- Site Boundary
- Main River

Google Satellite

Scale @ A4: **1:1,000**

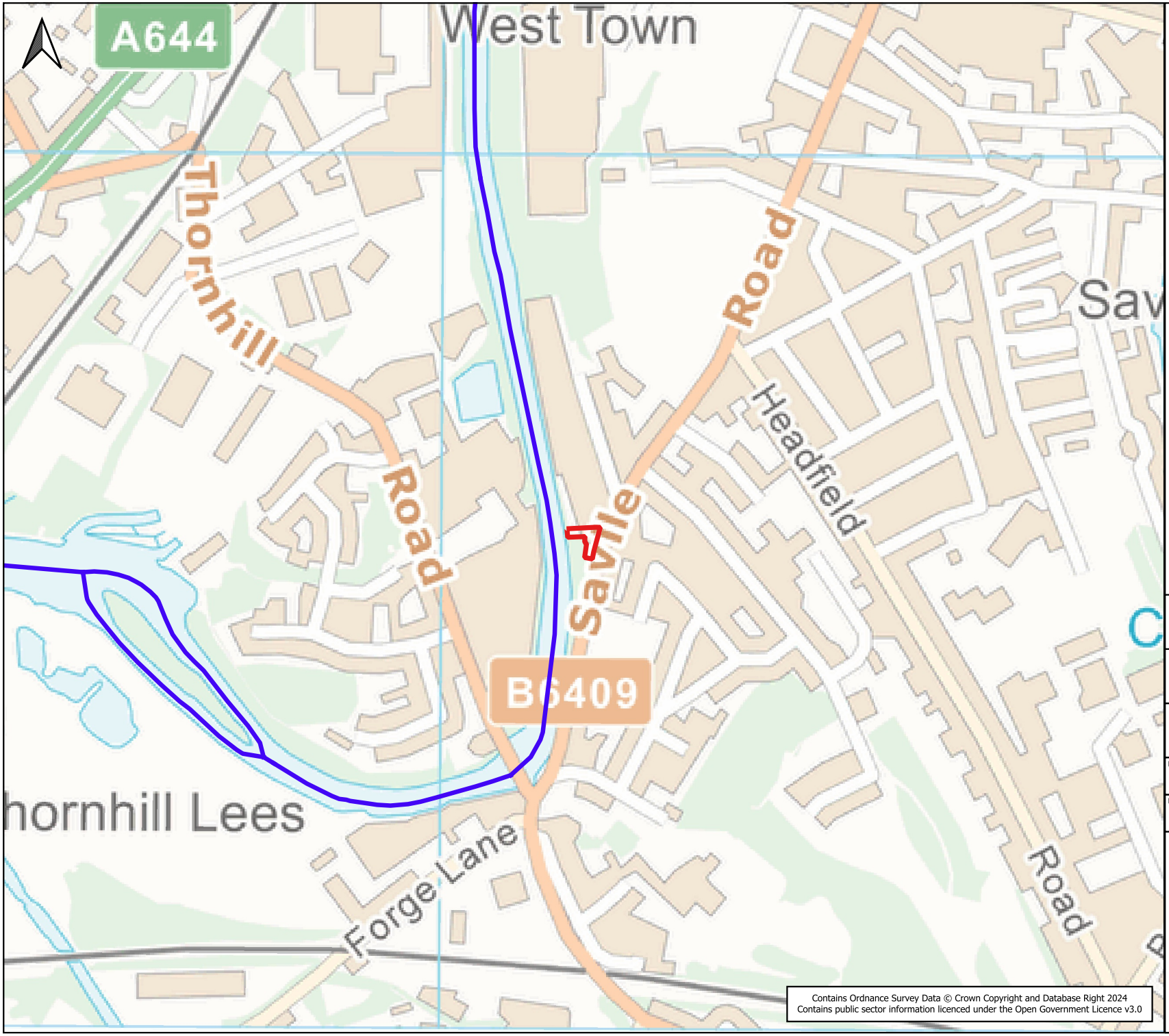
Drawing Title
Site Location Plan

Project
Headfield Mills - Unit 19-20 Dewsbury

Client
DMA Design Managment Ltd

Drawing No. & Revision	Date
01	28/10/2014
Drawn By	**Approved By**
RH	LB

FPS environmental
www.fpsenvironmental.co.uk



Legend

- Site Boundary
- Main River

Scale @ A4: **1:10,000**

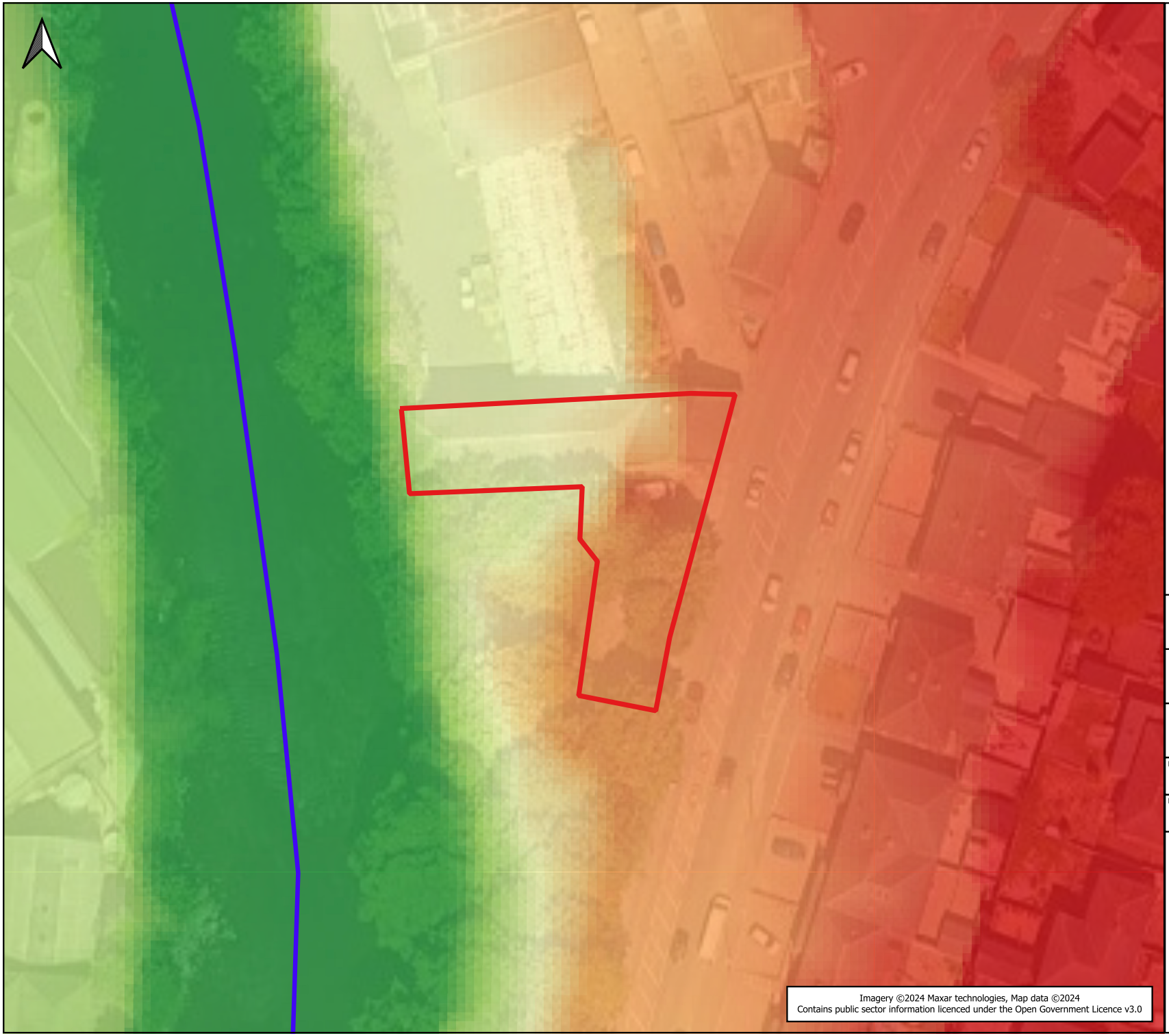
Drawing Title
Site Location Plan

Project
Headfield Mills - Unit 19-20 Dewsbury

Client
DMA Design Managment Ltd

Drawing No. & Revision	Date
02	28/10/2014
Drawn By	**Approved By**
RH	LB

FPS environmental
www.fpsenvironmental.co.uk



Legend

- Site Boundary
- Main River

LiDAR Data
(Metres above Ordnance Datum)

- 33.00
- 37.00
- 41.00
- 45.00
- 49.00

Google Satellite

Scale @ A4: **1:1,000**

Drawing Title
LiDAR Data

Project
Headfield Mills - Unit 19-20 Dewsbury

Client
DMA Design Managment Ltd

Drawing No. & Revision	Date
03	28/10/2014
Drawn By	**Approved By**
RH	LB

FPS environmental
www.fpsenvironmental.co.uk

Legend

- Site Boundary
- Main River
- Flood Zone 3
- Flood Zone 2

Google Satellite

Scale @ A4: **1:1,000**

Drawing Title
EA Flood Map for Planning

Project
Headfield Mills - Unit 19-20 Dewsbury

Client
DMA Design Managment Ltd

Drawing No. & Revision	Date
04	28/10/2014
Drawn By	**Approved By**
RH	LB

FPS environmental
www.fpsenvironmental.co.uk

Legend

- Site Boundary
- Main River
- EA Historic Flood Map

Google Satellite

Scale @ A4: **1:1,000**

Drawing Title
EA Historic Flood Map

Project
Headfield Mills - Unit 19-20 Dewsbury

Client
DMA Design Managment Ltd

Drawing No. & Revision	Date
05	28/10/2014
Drawn By	**Approved By**
RH	LB

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Legend

- Site Boundary
- Main River

Risk of Flooding from Surface Water
1 in 30 year depth (m)

- > 1.20
- 0.90 - 1.20
- 0.60 - 0.90
- 0.30 - 0.60
- 0.15 - 0.30
- 0.00 - 0.15

Google Satellite

Scale @ A4: **1:1,000**

Drawing Title
Risk of Flooding from Surface Water
1 in 30 year (3.3%) Flood Depth

Project
Headfield Mills - Unit 19-20 Dewsbury

Client
DMA Design Managment Ltd

Drawing No. & Revision	Date
06	28/10/2014
Drawn By	**Approved By**
RH	LB

FPS environmental
www.fpsenvironmental.co.uk

Legend

- Site Boundary
- Main River

Risk of Flooding from Surface Water
1 in 100 year depth (m)

- > 1.20
- 0.90 - 1.20
- 0.60 - 0.90
- 0.30 - 0.60
- 0.15 - 0.30
- 0.00 - 0.15

Google Satellite

Scale @ A4: **1:1,000**

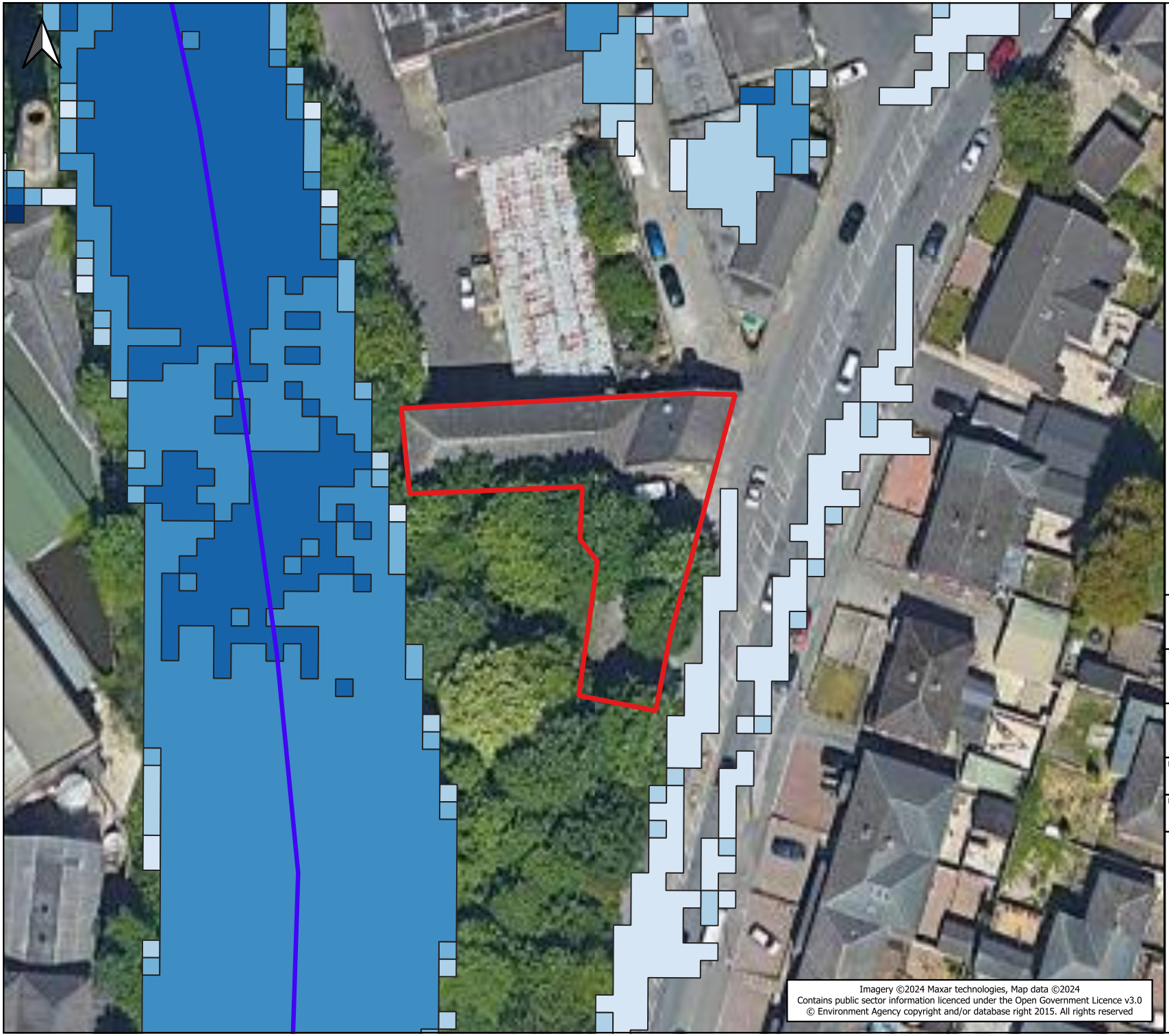
Drawing Title
Risk of Flooding from Surface Water
1 in 100 year (1%) Flood Depth

Project
Headfield Mills - Unit 19-20 Dewsbury

Client
DMA Design Managment Ltd

Drawing No. & Revision	Date
07	28/10/2014
Drawn By	**Approved By**
RH	LB

FPS environmental
www.fpsenvironmental.co.uk



Legend

- Site Boundary
- Main River

Risk of Flooding from Surface Water
1 in 1000 year depth (m)

- > 1.20
- 0.90 - 1.20
- 0.60 - 0.90
- 0.30 - 0.60
- 0.15 - 0.30
- 0.00 - 0.15

Google Satellite

Scale @ A4: **1:1,000**

Drawing Title
Risk of Flooding from Surface Water
1 in 1000 year (0.1%) Flood Depth

Project
Headfield Mills - Unit 19-20 Dewsbury

Client
DMA Design Managment Ltd

Drawing No. & Revision	Date
08	28/10/2014
Drawn By	**Approved By**
RH	LB

FPS environmental
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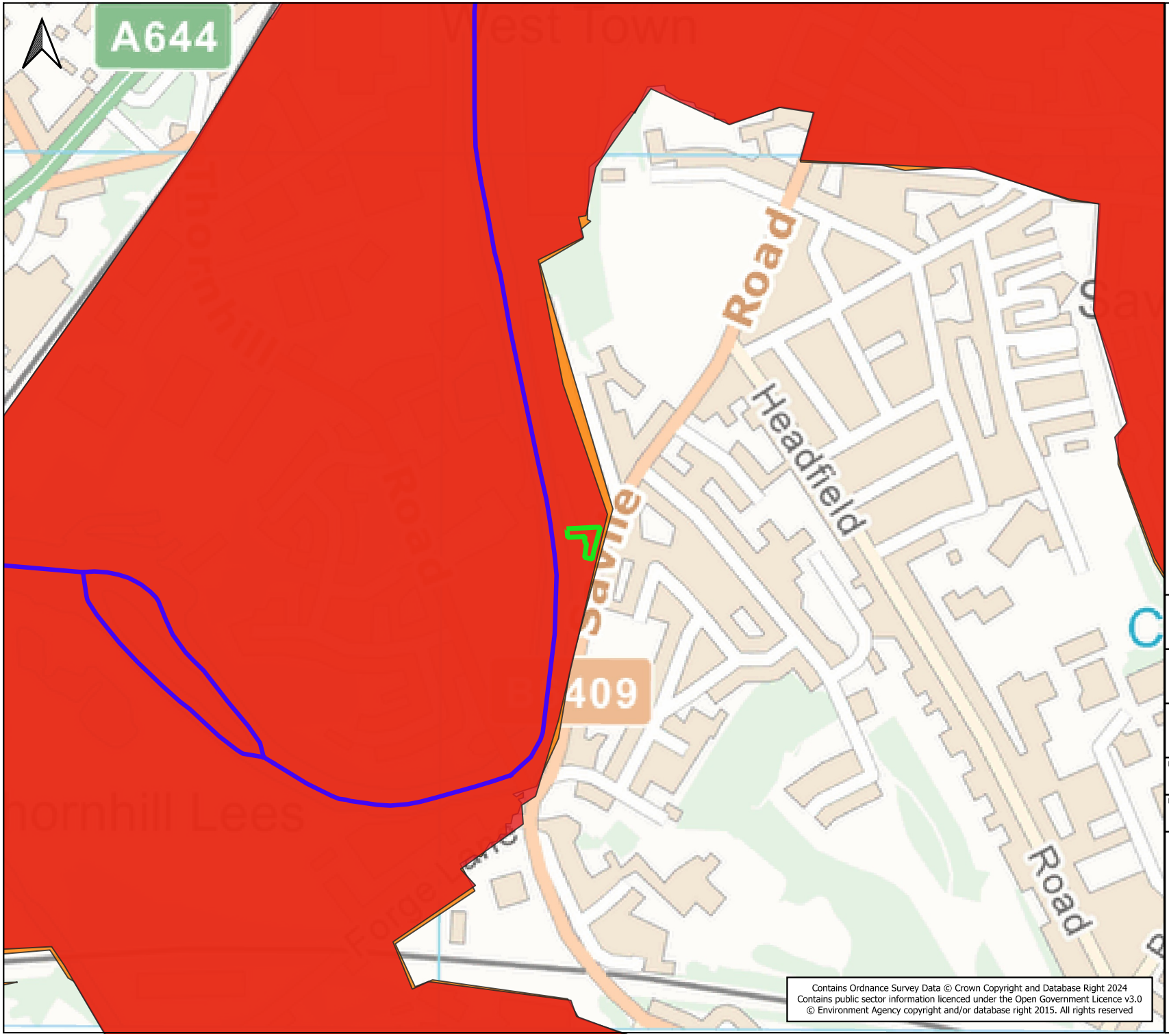


Legend

- Site Boundary
- Main River
- EA Flood Warning Area
- EA Flood Alert Area

Scale @ A4: **1:10,000**

Drawing Title
EA Flood Alert & Warning Areas

Project
Headfield Mills - Unit 19-20 Dewsbury

Client
DMA Design Managment Ltd

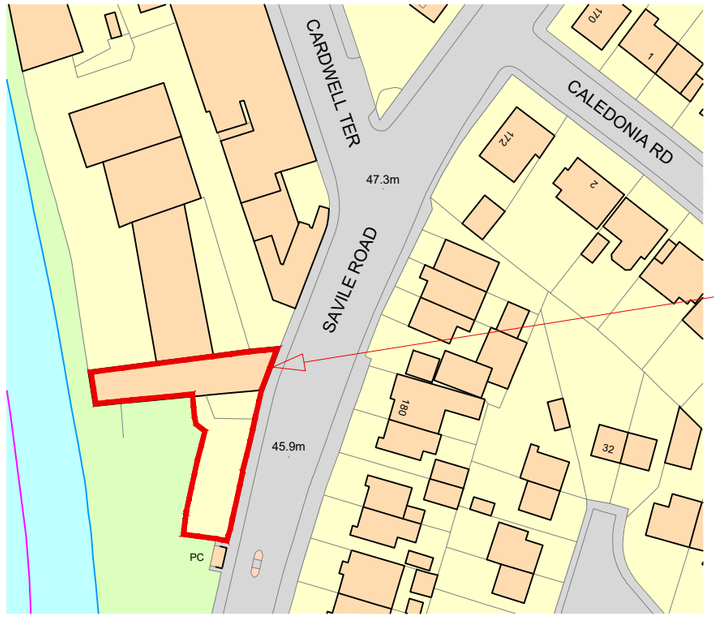
Drawing No. & Revision	Date
09	28/10/2014
Drawn By	**Approved By**
RH	LB

FPS environmental
www.fpsenvironmental.co.uk

Appendices

Appendix A

Site Plans



NORTH

SITE

Headfield Mills, Unit 19-20
Savile Road
Dewsbury
West Yorkshire
WF12 9LQ

1:1250 0 10 20 30m
Scale

SITE LOCATION PLAN
SCALE - 1:1250

Materials As Existing -

Walls - Stonework finish to outerleaf with aluminium wall cladding panels to front elevation.

Doors - Green powder coated aluminium framed doorsets to shopfront(s) with roller shutters.

Windows - Green powder coated aluminium framed glazed units to shopfront(s) with roller shutters.

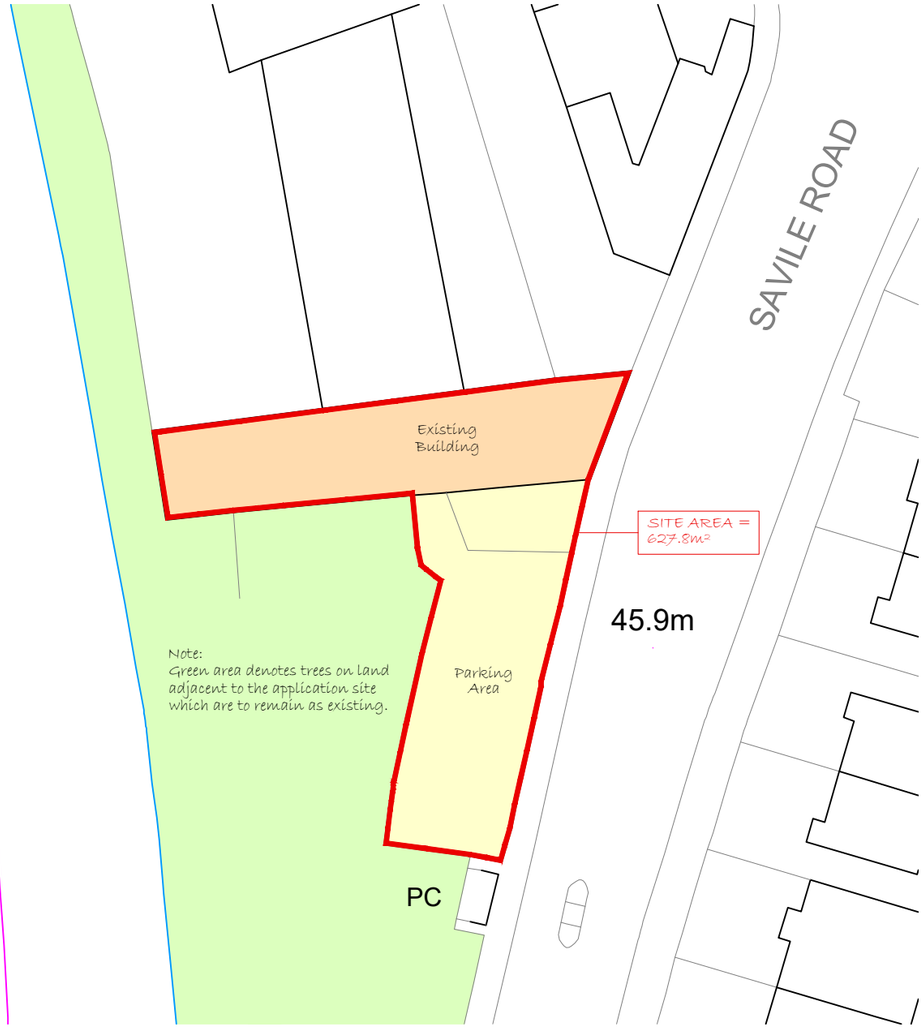
Roof - Slate finish to pitch roof.

Fascia/Guttering - Stone corbels/gutter course with black guttering & down pipes to suit.

CDM 2015

RISKS

1. RESTRICTED ACCESS TO SITE.
2. SITE WELFARE REQUIREMENTS.
3. SITE CLEARANCE.
4. WORKING AT HEIGHT.
5. INSTALLATION OF TEMPORARY AND RE-ROUTED SERVICES.
6. HANDLING LOADS.



NORTH

EXISTING BLOCK PLAN
SCALE - 1:500

1:500 0 10 20 30m
Scale

NOTES

All efforts have been made in measuring existing site.
However the contractor / builder is responsible, for checking & confirming all given dimensions on site prior to pricing & works.

Extent of boundary ownership confirmed by applicant.

Proposal -

Application for the planning permission for the Proposed Single-Storey extension and external alterations to shopfront to front and side elevation including change of use of part vacant area into class E Restaurant/Cafe to meet end user requirements and as shown on the application plans.

1) GENERAL BUILDING NOTES

a) All works to be in accordance with Building Regulations, current editions and amendments and to the satisfaction of the Building Control Authority.
b) All works within the contract and by the contractor must be carried out in such a way that all requirements under the Health and Safety at Work Act are satisfied and maintained.
c) All works by the Contractor must be carried out in compliance with the requirements of all British Standards, Codes of Practice etc. and with the requirements of all relevant and current Statutory Authority regulations.
d) All structural calculations if required to be submitted by client appointed Structural Engineers and upgraded as necessary as works proceed to suit any clients requirements.
e) The contractor must ensure and will be held responsible for the stability of the building structure at all stages of the contract.

2) APPROVED DOCUMENT A STRUCTURE

a) All structural details and calculations if required to be submitted for approval to Building Control Authority by client appointed Structural Engineer.

PLANNING ISSUE

Rev	Description	Date	By	App'd

tractus:dma
architectural design
Headfield Business Centre, Headfield Mills
Savile Road, Dewsbury, West Yorkshire, WF12 9LQ
t: 01924 462 550 m: 07791 717 404
e: asif@tractusad.co.uk

Client
Nafees Bakers Limited

Project
Headfield Mills, Unit 19-20
Savile Rd, Dewsbury

Drawing title
Site Location Plan and Existing Block Plan

Drawn by		Date	App'd
AM		02/24	-
Drawing no	Project no	Scale @ A3	Rev
EX-01	23-918	A.S.	-

NOTES

All efforts have been made in measuring existing site.
However the contractor / builder is responsible, for checking & confirming all given dimensions on site prior to pricing & works.

Extent of boundary ownership confirmed by applicant.

Proposal -

Application for the planning permission for the Proposed Single-Storey extension and external alterations to shopfront to front and side elevation including change of use of part vacant area into class E Restaurant/Cafe to meet end user requirements and as shown on the application plans.

1) GENERAL BUILDING NOTES

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e) The contractor must ensure and will be held responsible for the stability of the building structure at all stages of the contract.

2) APPROVED DOCUMENT A STRUCTURE

a) All structural details and calculations if required to be submitted for approval to Building Control Authority by client appointed Structural Engineer.

Materials As Existing -

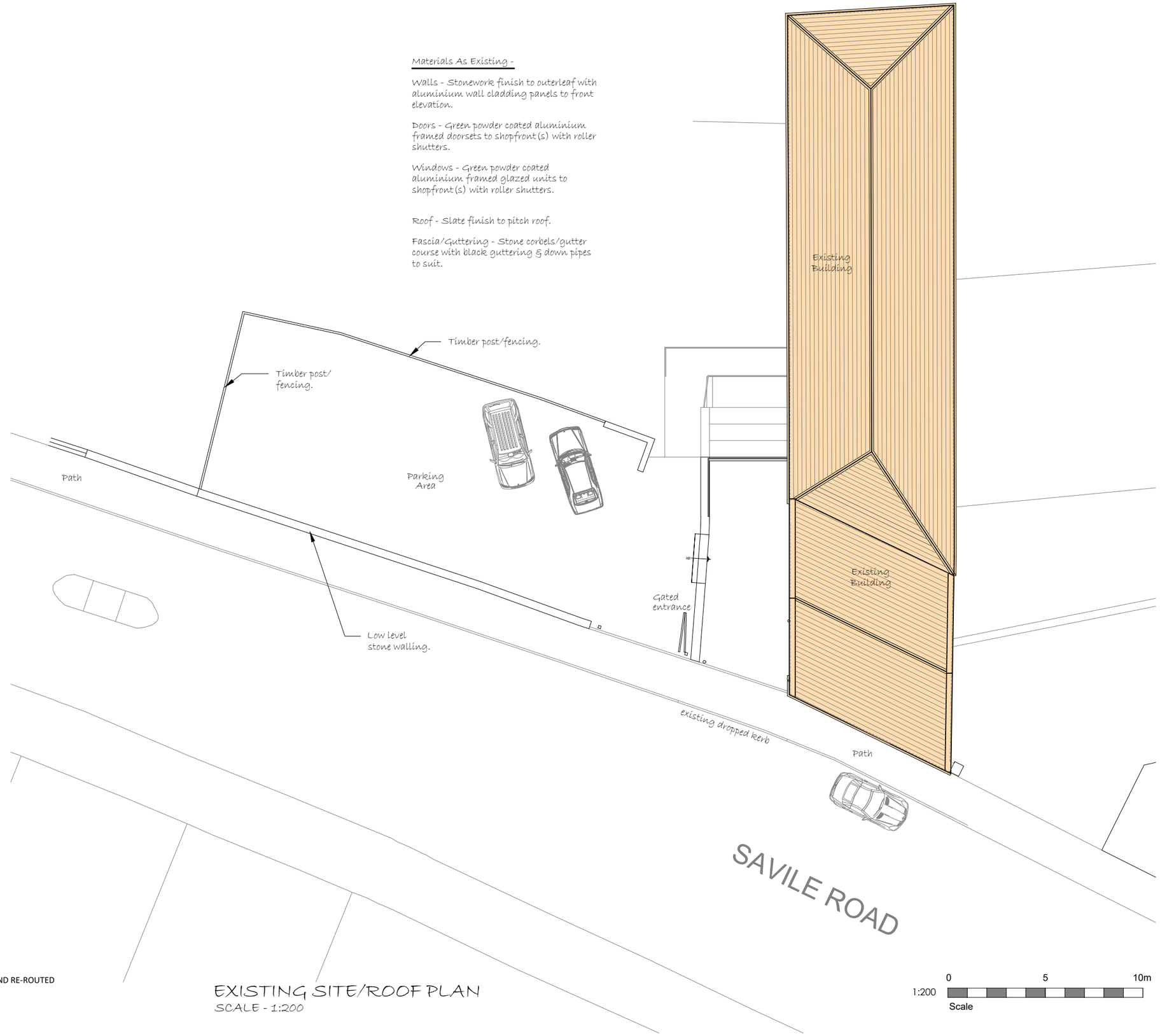
Walls - Stonework finish to outerleaf with aluminium wall cladding panels to front elevation.

Doors - Green powder coated aluminium framed doorsets to shopfront(s) with roller shutters.

Windows - Green powder coated aluminium framed glazed units to shopfront(s) with roller shutters.

Roof - Slate finish to pitch roof.

Fascia/Guttering - Stone corbels/gutter course with black guttering & down pipes to suit.



CDM 2015

RISKS

1. RESTRICTED ACCESS TO SITE.
2. SITE WELFARE REQUIREMENTS.
3. SITE CLEARANCE.
4. WORKING AT HEIGHT.
5. INSTALLATION OF TEMPORARY AND RE-ROUTED SERVICES.
6. HANDLING LOADS.

EXISTING SITE/ROOF PLAN
SCALE - 1:200

1:200 Scale 0 5 10m

PLANNING ISSUE

Rev	Description	Date	By	App'd

tractus:dma
architectural design
Headfield Business Centre, Headfield Mills
Savile Road, Dewsbury, West Yorkshire, WF12 9LQ
t: 01924 462 550 m: 07791 717 404
e: asif@tractusad.co.uk

Client: Nafees Bakers Limited

Project: Headfield Mills, Unit 19-20 Savile Rd, Dewsbury

Drawing title: Existing Site/Roof Plan

Drawn by		Date	App'd
AM		02/24	-
Drawing no	Project no	Scale @ A3	Rev
EX-02	23-918	1:200	-

NOTES

All efforts have been made in measuring existing site.
However the contractor / builder is responsible, for checking & confirming all given dimensions on site prior to pricing & works.

Extent of boundary ownership confirmed by applicant.

Proposal -

Application for the planning permission for the Proposed Single-Storey extension and external alterations to shopfront to front and side elevation including change of use of part vacant area into class E Restaurant/Cafe to meet end user requirements and as shown on the application plans.

1) GENERAL BUILDING NOTES

a) All works to be in accordance with Building Regulations, current editions and amendments and to the satisfaction of the Building Control Authority.
b) All works within the contract and by the contractor must be carried out in such a way that all requirements under the Health and Safety at Work Act are satisfied and maintained.
c) All works by the Contractor must be carried out in compliance with the requirements of all British Standards, Codes of Practice etc. and with the requirements of all relevant and current Statutory Authority regulations.
d) All structural calculations if required to be submitted by client appointed Structural Engineers and upgraded as necessary as works proceed to suit any clients requirements.
e) The contractor must ensure and will be held responsible for the stability of the building structure at all stages of the contract.

2) APPROVED DOCUMENT A STRUCTURE

a) All structural details and calculations if required to be submitted for approval to Building Control Authority by client appointed Structural Engineer.

Materials As Proposed -

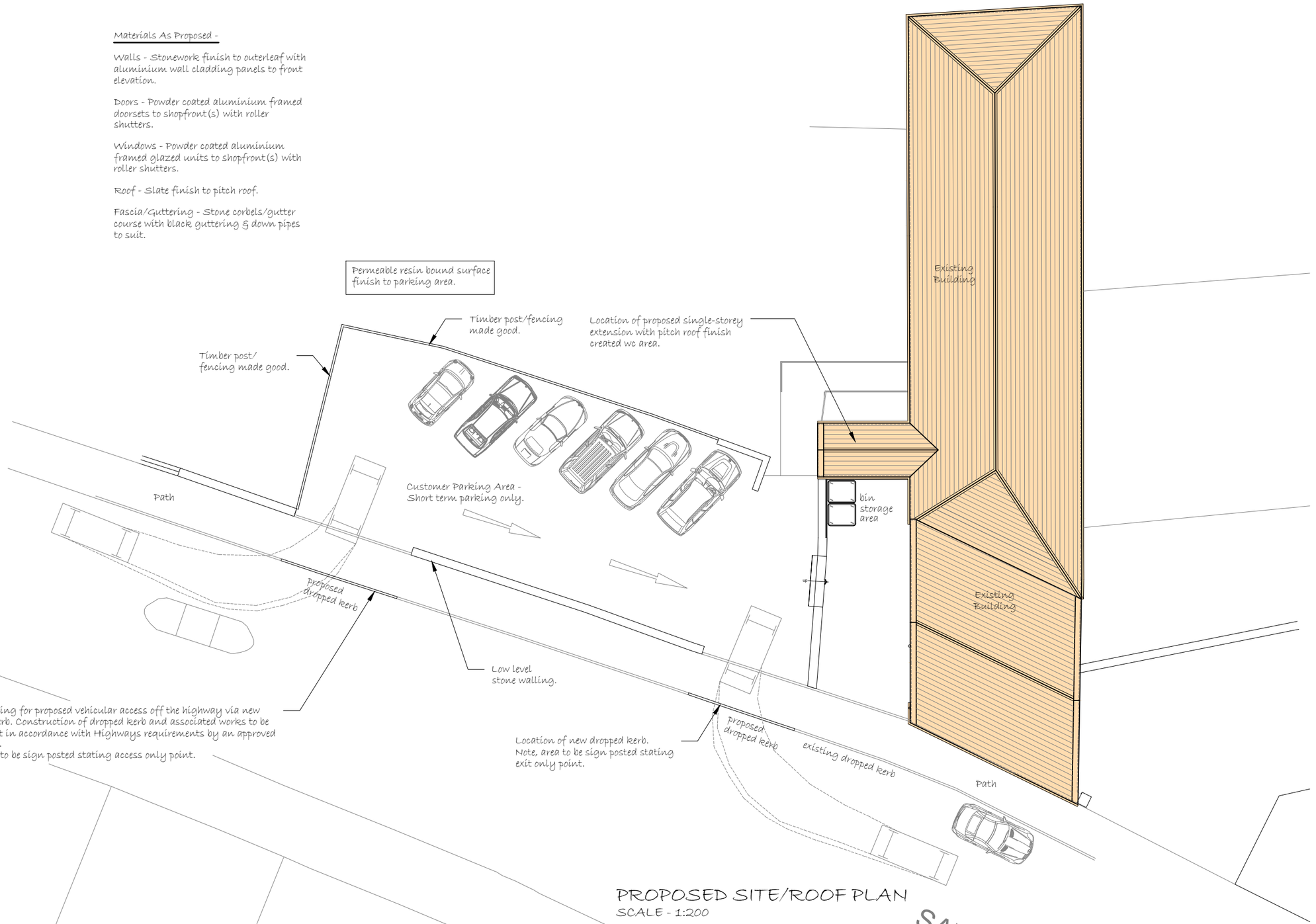
Walls - Stonework finish to outerleaf with aluminium wall cladding panels to front elevation.

Doors - Powder coated aluminium framed doorsets to shopfront(s) with roller shutters.

Windows - Powder coated aluminium framed glazed units to shopfront(s) with roller shutters.

Roof - Slate finish to pitch roof.

Fascia/Guttering - Stone corbels/gutter course with black guttering & down pipes to suit.



PROPOSED SITE/ROOF PLAN
SCALE - 1:200

CDM 2015

RISKS

1. RESTRICTED ACCESS TO SITE.
2. SITE WELFARE REQUIREMENTS.
3. SITE CLEARANCE.
4. WORKING AT HEIGHT.
5. INSTALLATION OF TEMPORARY AND RE-ROUTED SERVICES.
6. HANDLING LOADS.

PLANNING ISSUE

Rev	Description	Date	By	App'd

tractus:dma
architectural design
Headfield Business Centre, Headfield Mills
Savile Road, Dewsbury, West Yorkshire, WF12 9LQ
t: 01924 462 550 m: 07791 717 404
e: asif@tractusad.co.uk

Client
Nafees Bakers Limited

Project
Headfield Mills, Unit 19-20 Savile Rd, Dewsbury

Drawing title
Proposed Site/Roof Plan

Drawn by		Date	App'd
AM		02/24	-
Drawing no	Project no	Scale @ A3	Rev
PL-01	23-918	1:200	-

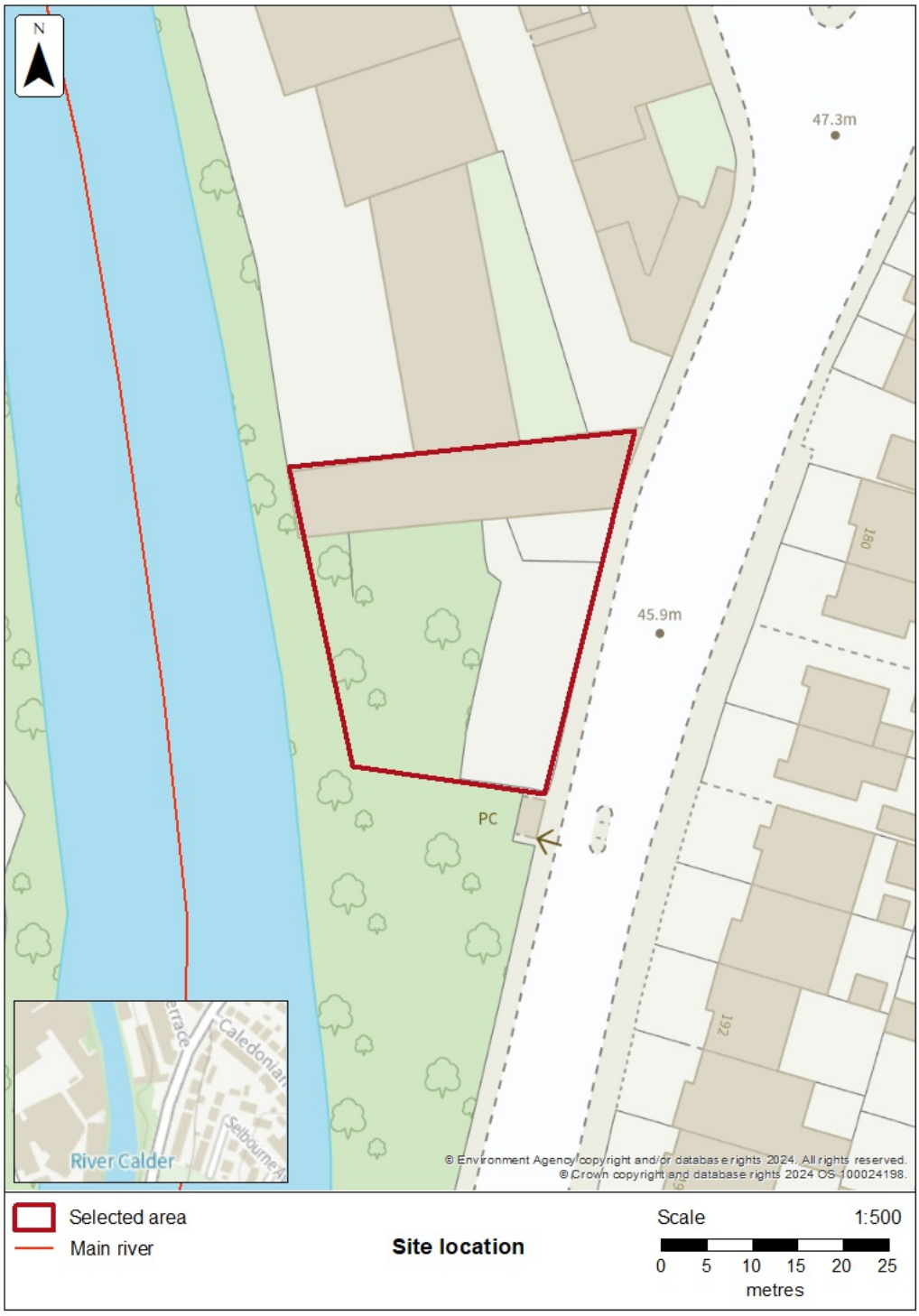
Appendix B

Stakeholder Correspondence

Flood risk assessment data

Location of site: 424163 / 420557 (shown as easting and northing coordinates)
Document created on: 29 July 2024
This information was previously known as a product 4.
Customer reference number: ARMKGXKA9DKK

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
- information to help you assess if there is a reduced flood risk from rivers and the sea because of defences
- 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

Or you can contact your Lead Local Flood Authority for further information.

Your Lead Local Flood Authority is Kirklees.

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

Model name: 2011 River Calder - Calder
Scenario(s): Defences removed fluvial, defences removed climate change fluvial
Date: 31 March 2011

Model name: 2015 Batley Beck Mapping Study
Scenario(s): Defended fluvial, defences removed fluvial, defended climate change fluvial, defences removed climate change fluvial
Date: 30 November 2015

Model name: 2015 Calder and Canals - downstream of Sowerby Bridge
Scenario(s): Defended fluvial, defences removed fluvial, defended climate change fluvial
Date: 31 March 2014

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

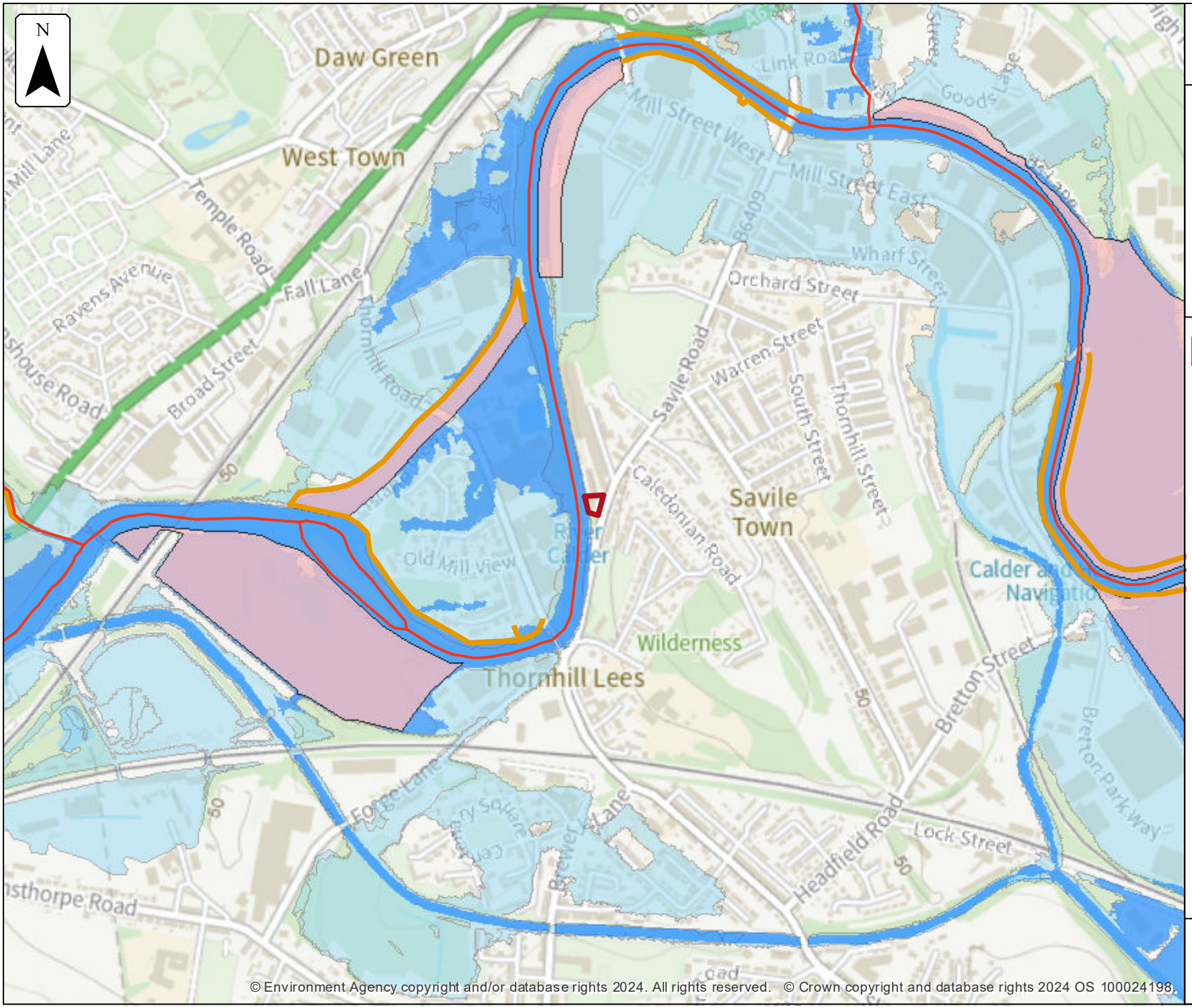
Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- 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

The flood zones are not currently being updated. The last update was in November 2023. Some of the flood zones may have changed, however all source data is included in the models below.



Environment Agency

Flood map for planning

Location (easting/northing)
424163/420557

Scale
1:10,000

Created
29 Jul 2024

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

0 100 200 300 400 500
metres

Historic flooding

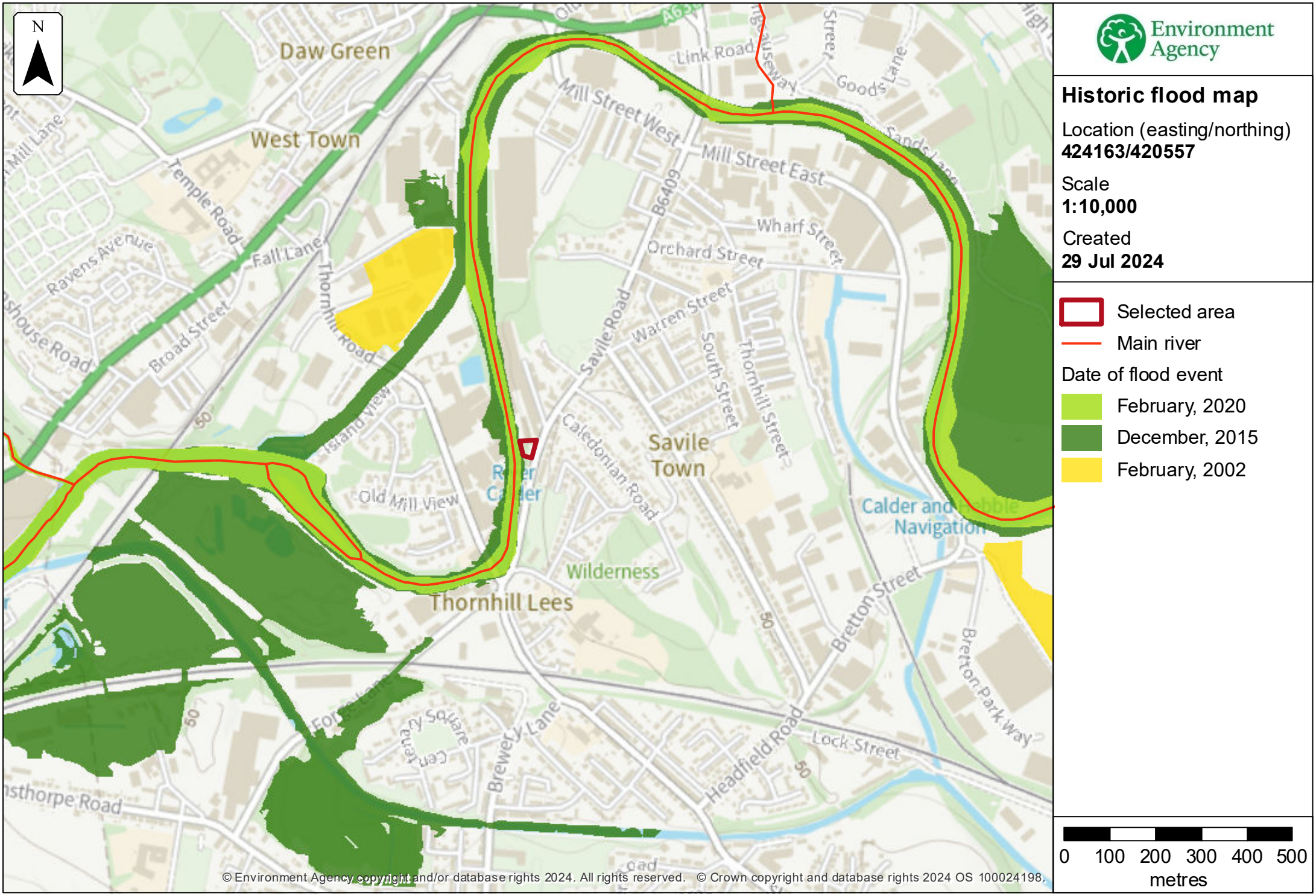
This map is an indicative outline of areas that have previously flooded. Remember that:

- 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.

Your Lead Local Flood Authority is Kirklees.

Download recorded flood outlines in GIS format



Environment Agency

Historic flood map

Location (easting/northing)
424163/420557

Scale
1:10,000

Created
29 Jul 2024

- Selected area
- Main river

Date of flood event

- February, 2020
- December, 2015
- February, 2002

0 100 200 300 400 500
metres

Historic flood event data

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
25 December 2015	29 December 2015	main river	channel capacity exceeded (no raised defences)	Yes
10 February 2002	13 February 2002	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)
424163/420557

Scale
1:2,500

Created
29 Jul 2024

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	28241	Embankment	50		37.10	34.58	
2	390193	Embankment					
3	150301	Wall	50		39.72	39.88	
4	330913	Wall			39.75	39.75	

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

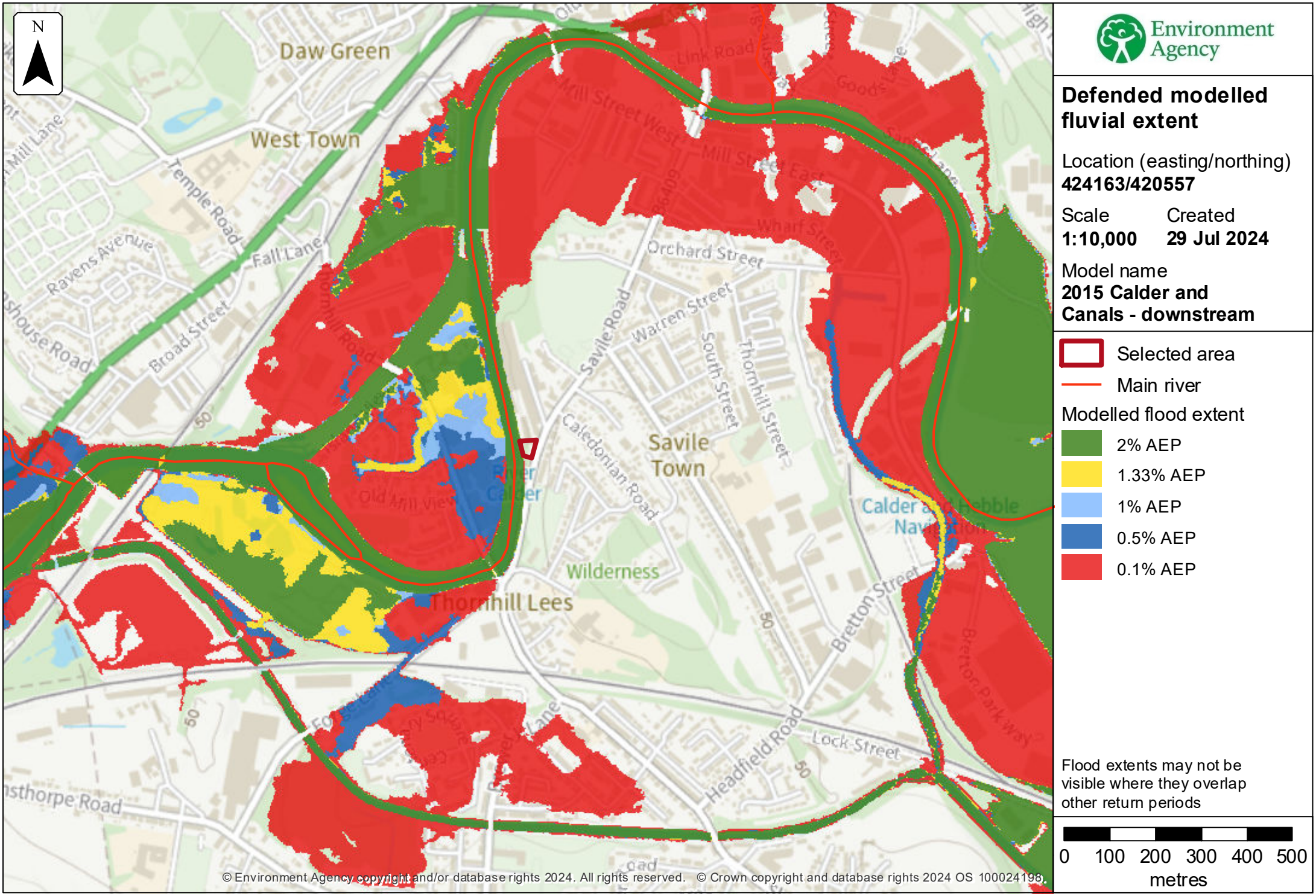
The climate change data included in the models may not include the latest flood risk assessment climate change allowances. Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

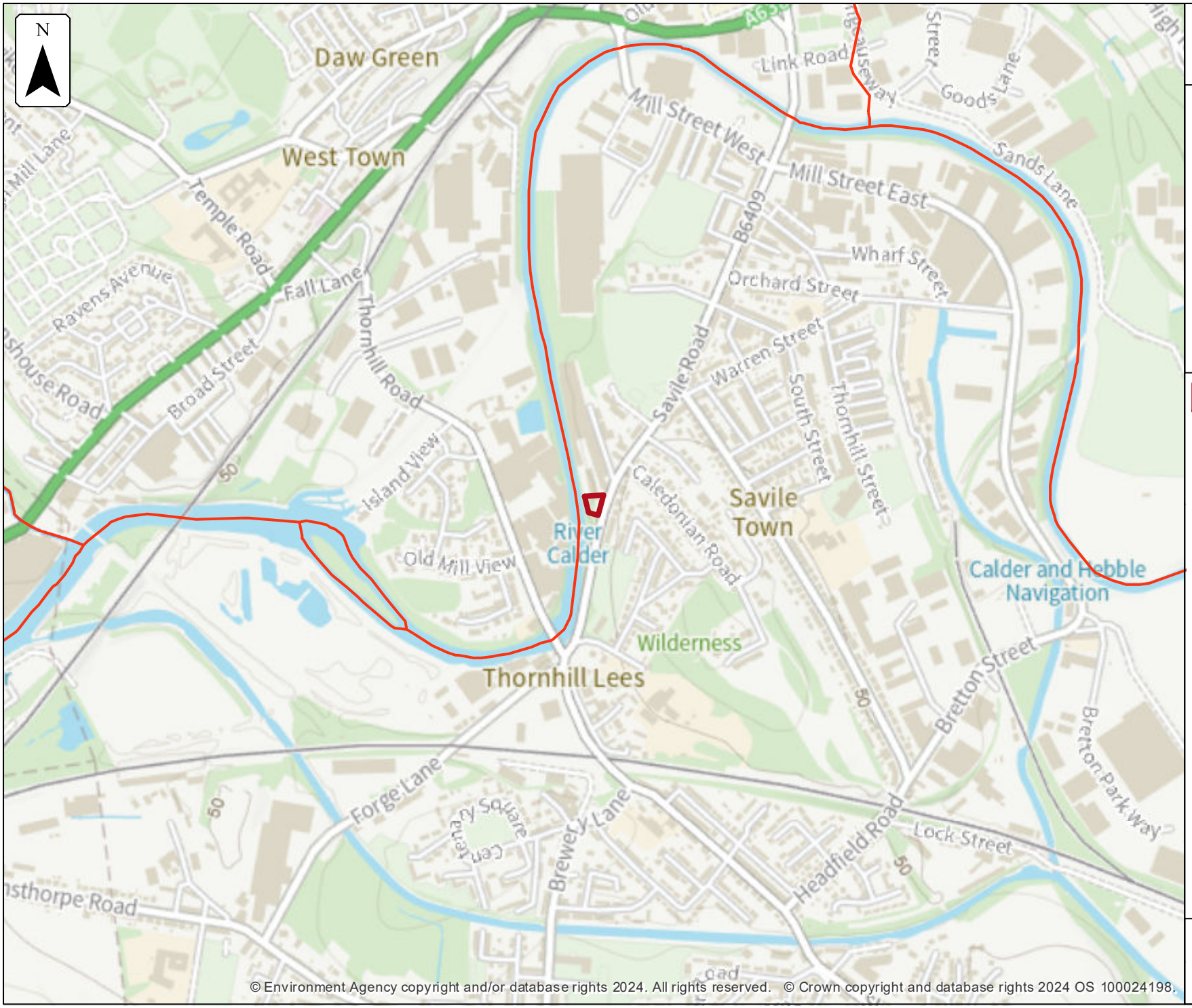
The Environment Agency will incorporate the new allowances into future modelling studies. For now, it's your responsibility to demonstrate that new developments will be safe in flood risk terms for their lifetime.

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


N
Daw Green
West Town
Temple Road
Fall Lane
Ravens Avenue
Broad Street
Mill Lane
Link Road
Mill Street West
Mill Street East
Wharf Street
Orchard Street
Savile Road
Warren Street
South Street
Thornhill Street
Caledonian Road
Savile Town
Wilderness
Thornhill Lees
Bretton Street
Lock Street
Headfield Road
Old Mill View
Thornhill Road
50
Environment Agency
Defended modelled fluvial extent
Location (easting/northing)
424163/420557
Scale
1:10,000
Created
29 Jul 2024
Model name
2015 Calder and Canals - downstream
Selected area
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 copyright and/or database rights 2024. All rights reserved. © Crown copyright and database rights 2024 OS 100024198.



Environment Agency

Defended modelled fluvial extent

Location (easting/northing)
424163/420557

Scale
1:10,000

Created
29 Jul 2024

Model name
2009 FIM River Spen

Selected area

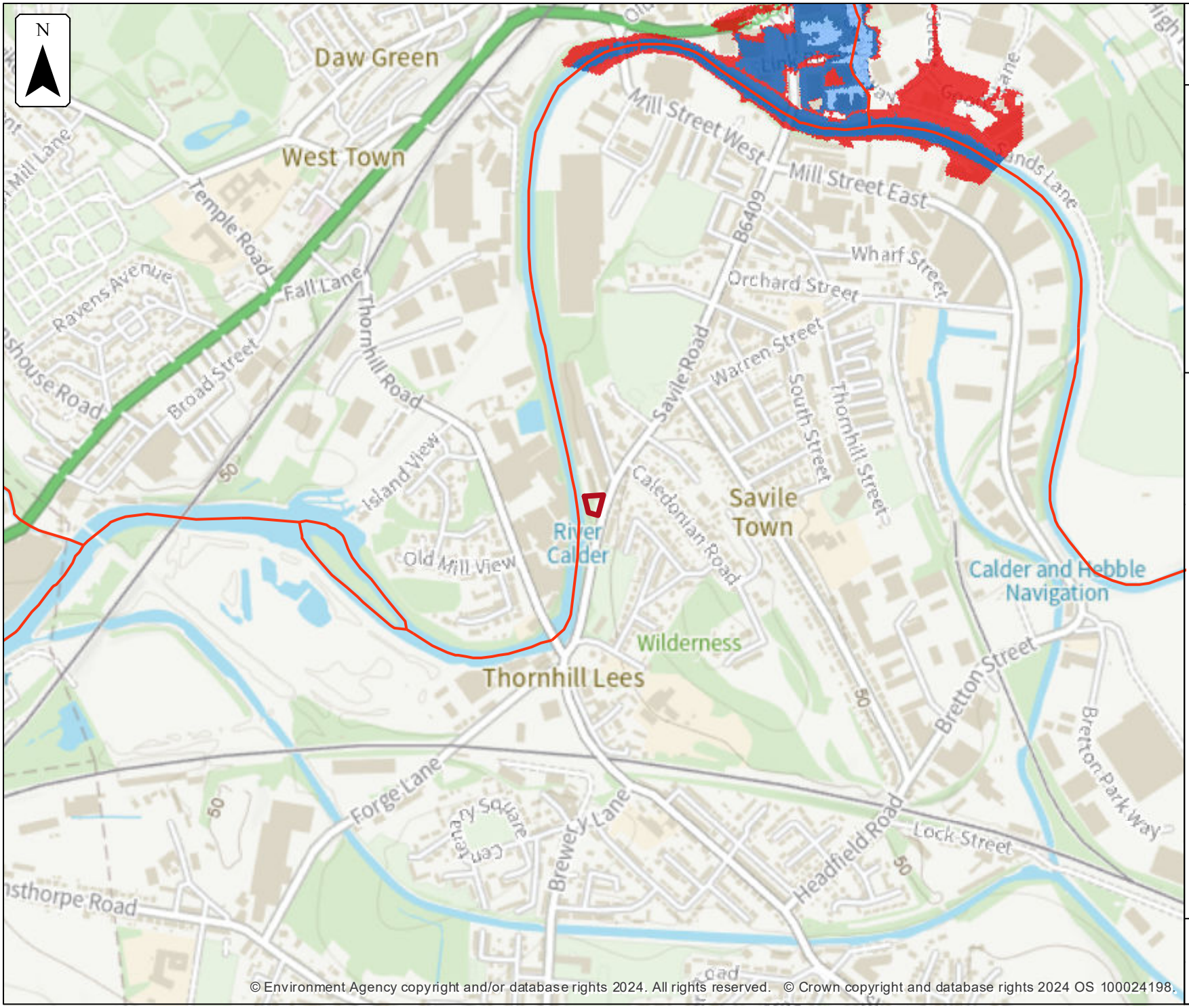
Main river

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

Defended modelled fluvial extent

Location (easting/northing)
424163/420557

Scale
1:10,000

Created
29 Jul 2024

Model name
2015 Batley Beck Mapping Study

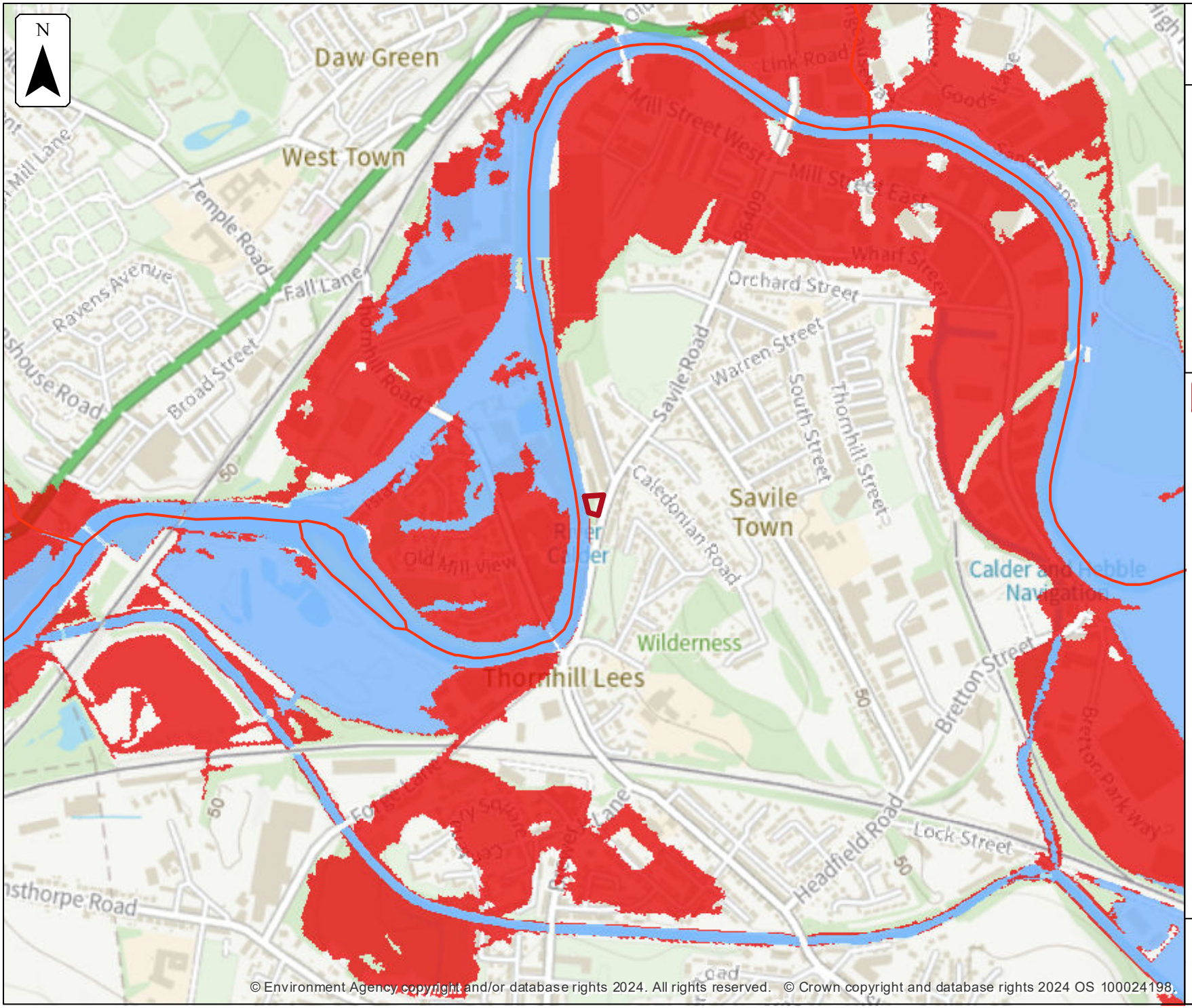
- Selected area
- Main river

Modelled flood extent

- 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

Defences removed modelled fluvial extent

Location (easting/northing)
424163/420557

Scale
1:10,000

Created
29 Jul 2024

Model name
2015 Calder and Canals - downstream

Selected area

Main river

Modelled flood extent

1% 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

Defences removed modelled fluvial extent

Location (easting/northing)
424163/420557

Scale
1:10,000

Created
29 Jul 2024

Model name
2009 FIM River Spen

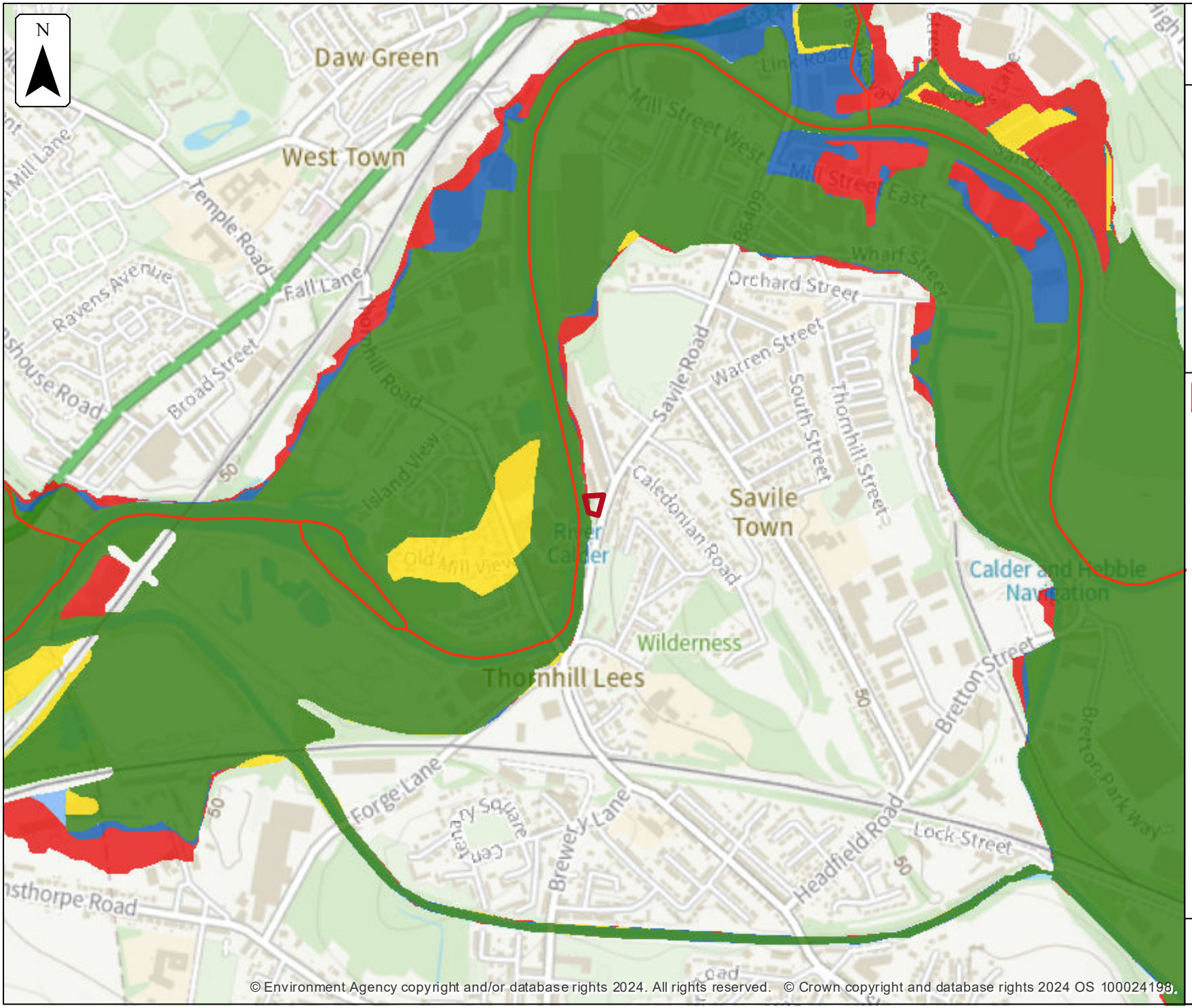
- Selected area
- Main river

Modelled flood extent

- 2% AEP
- 1.33% AEP
- 1% 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

Defences removed modelled fluvial extent

Location (easting/northing)
424163/420557

Scale
1:10,000

Created
29 Jul 2024

Model name
2011 River Calder - Calder

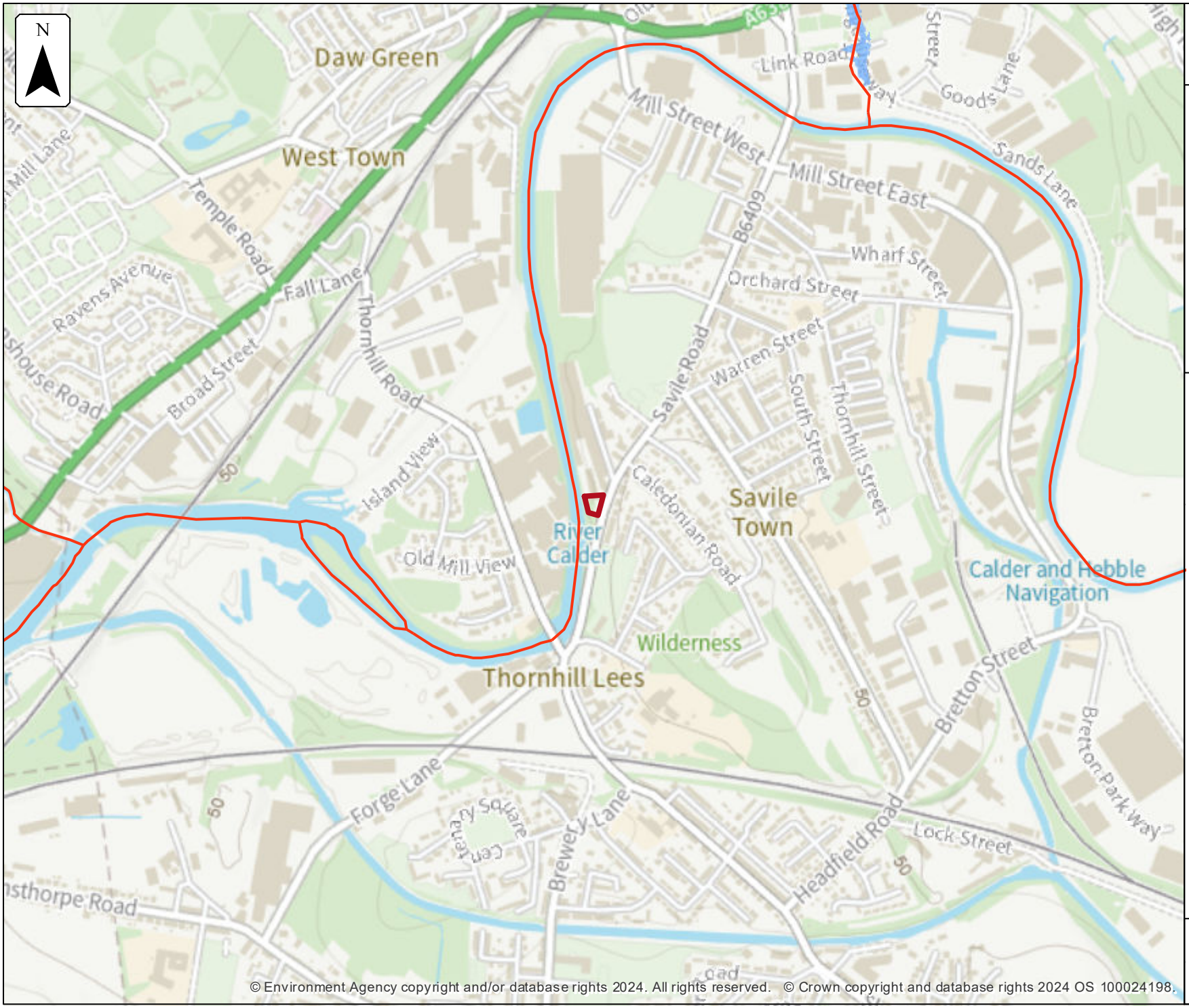
- Selected area
- Main river

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

Defences removed modelled fluvial extent

Location (easting/northing)
424163/420557

Scale
1:10,000

Created
29 Jul 2024

Model name
2015 Batley Beck Mapping Study

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

Defended climate change modelled fluvial extent

Location (easting/northing)
424163/420557

Scale
1:10,000

Created
29 Jul 2024

Model name
2015 Calder and Canals - downstream

Selected area

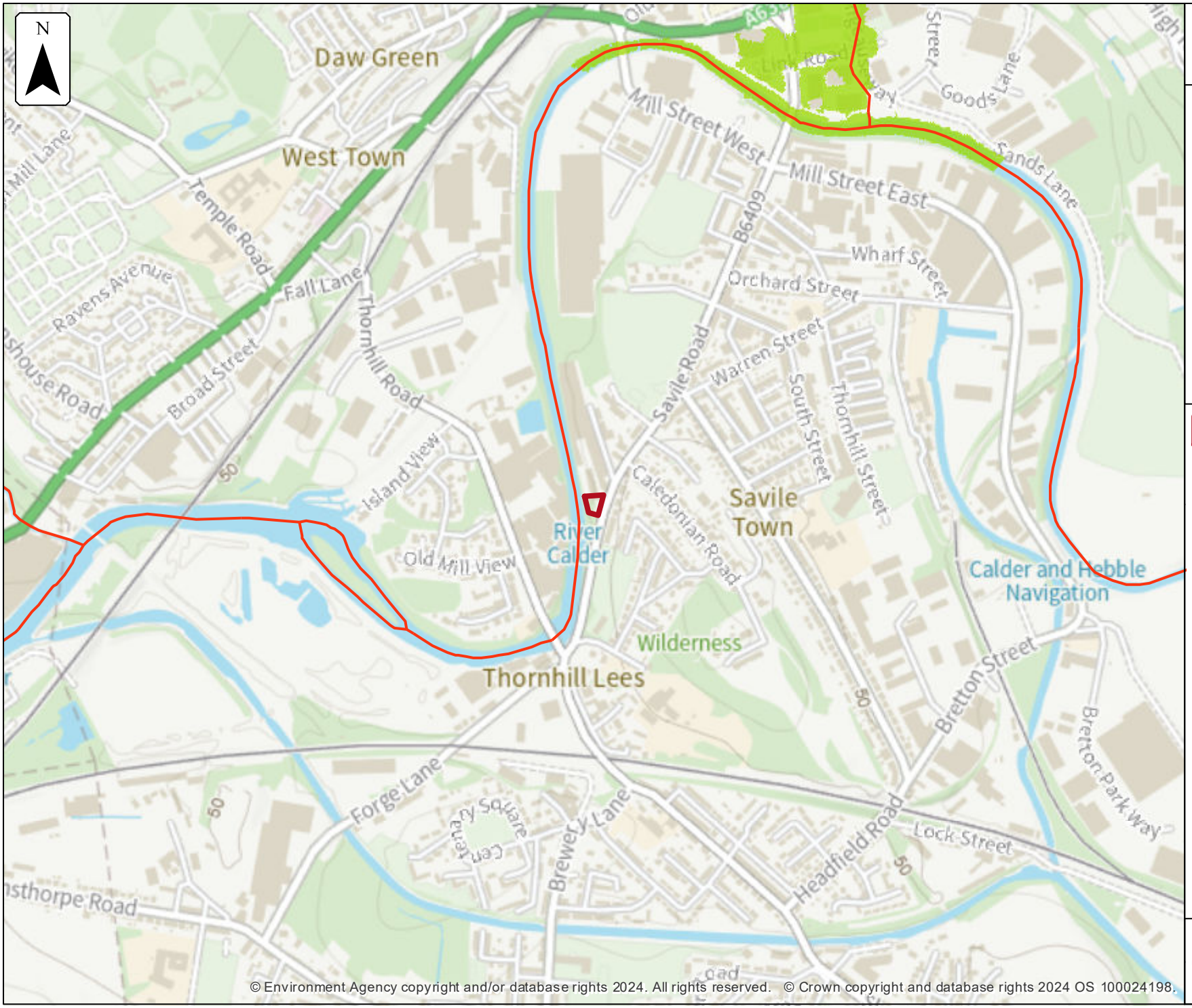
Main river

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

Defended climate change modelled fluvial extent

Location (easting/northing)
424163/420557

Scale
1:10,000

Created
29 Jul 2024

Model name
2015 Batley Beck Mapping Study

Selected area

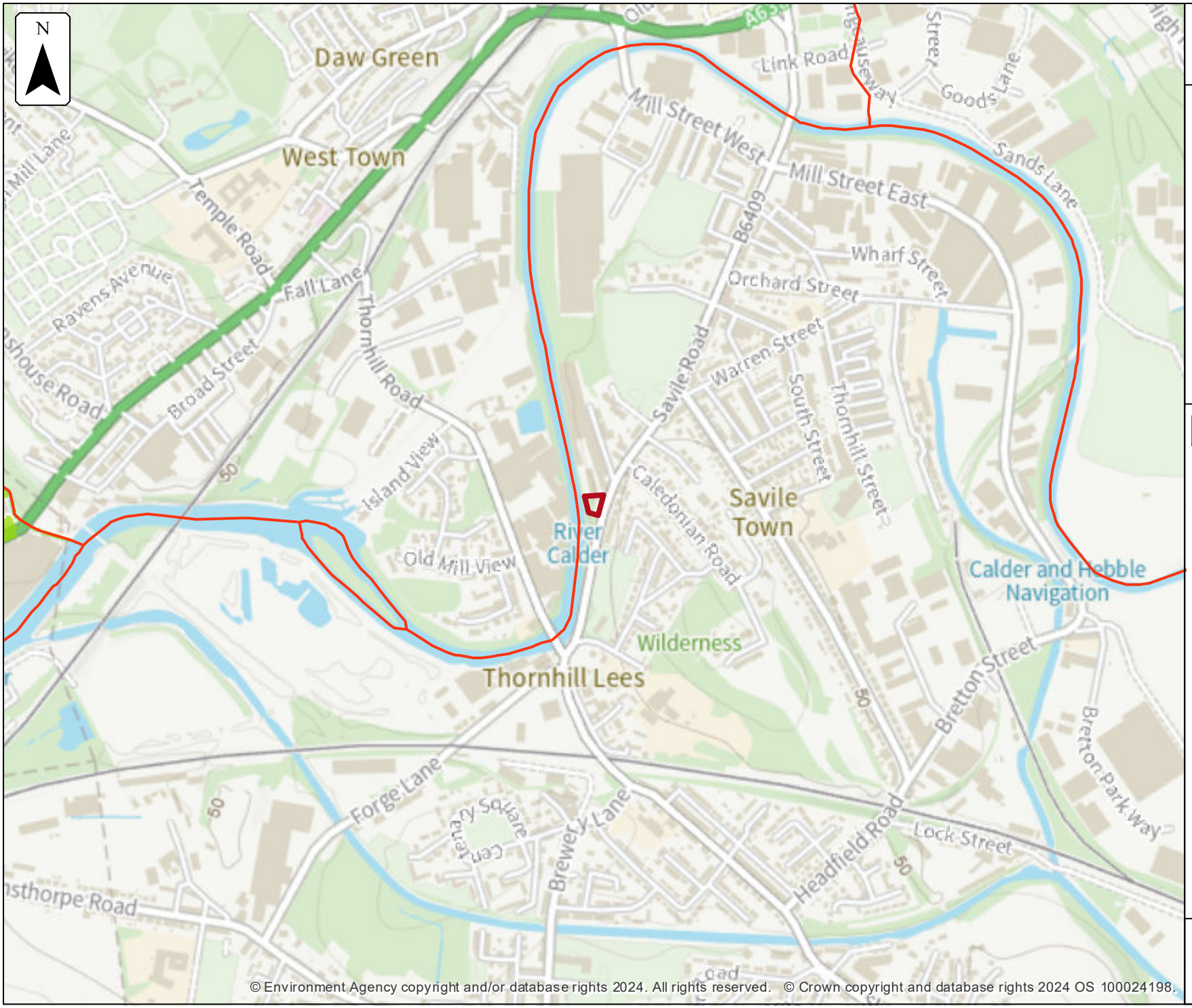
Main river

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

Defences removed climate change modelled fluvial extent

Location (easting/northing)
424163/420557

Scale
1:10,000

Created
29 Jul 2024

Model name
2009 FIM River Spen

Selected area

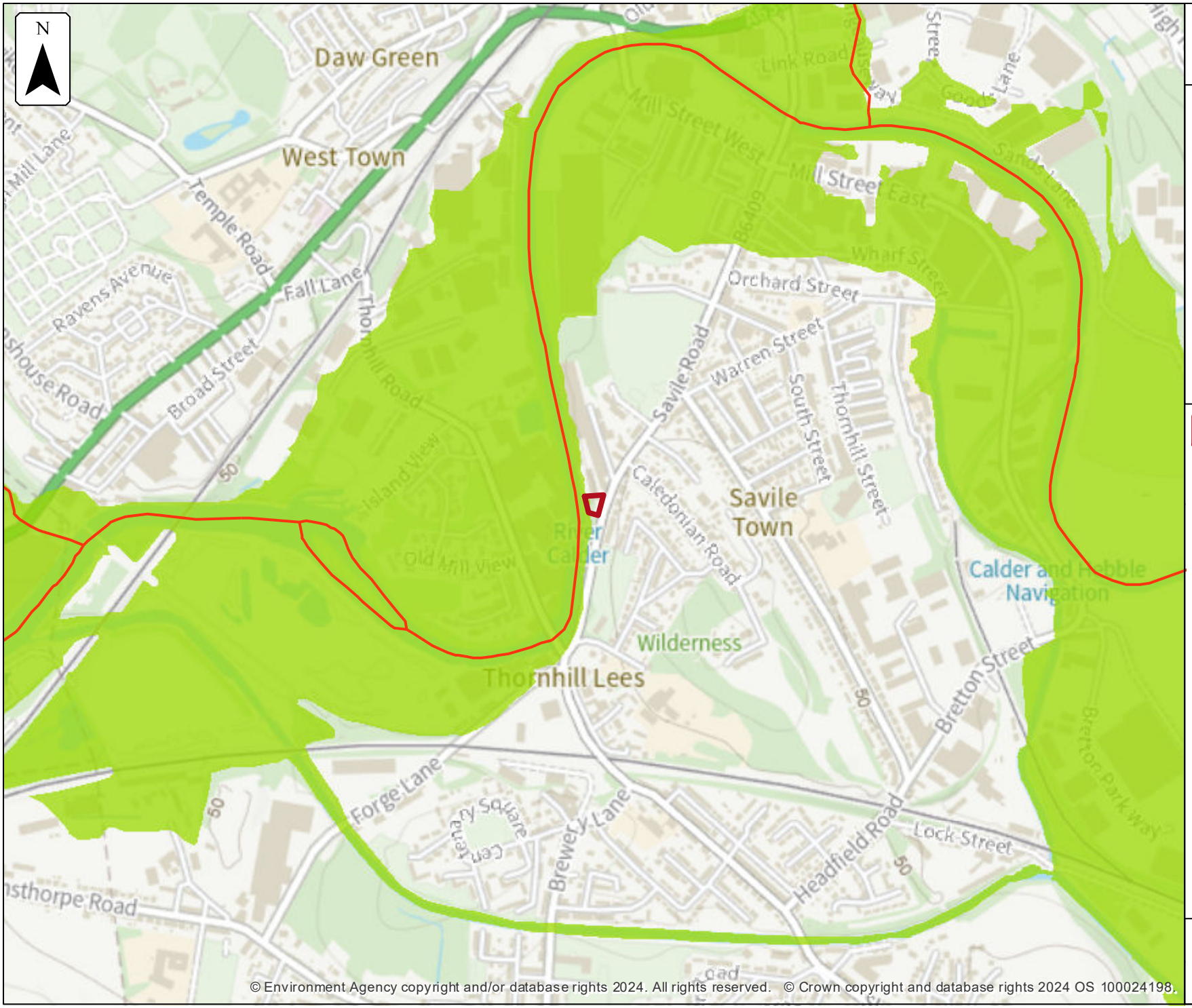
Main river

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

Defences removed climate change modelled fluvial extent

Location (easting/northing)
424163/420557

Scale
1:10,000

Created
29 Jul 2024

Model name
2011 River Calder - Calder

Selected area

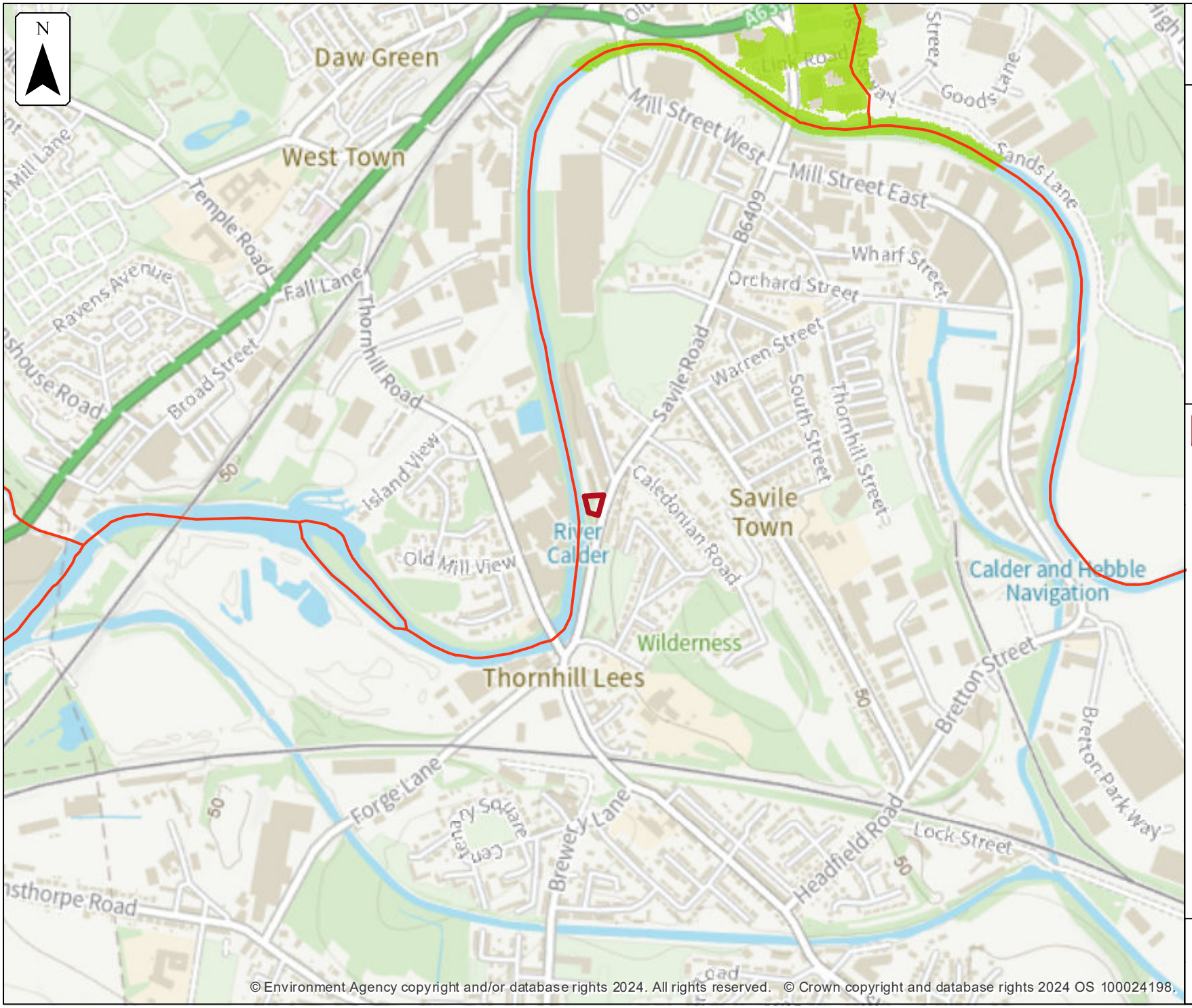
Main river

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

Defences removed climate change modelled fluvial extent

Location (easting/northing)
424163/420557

Scale
1:10,000

Created
29 Jul 2024

Model name
2015 Batley Beck Mapping Study

Selected area

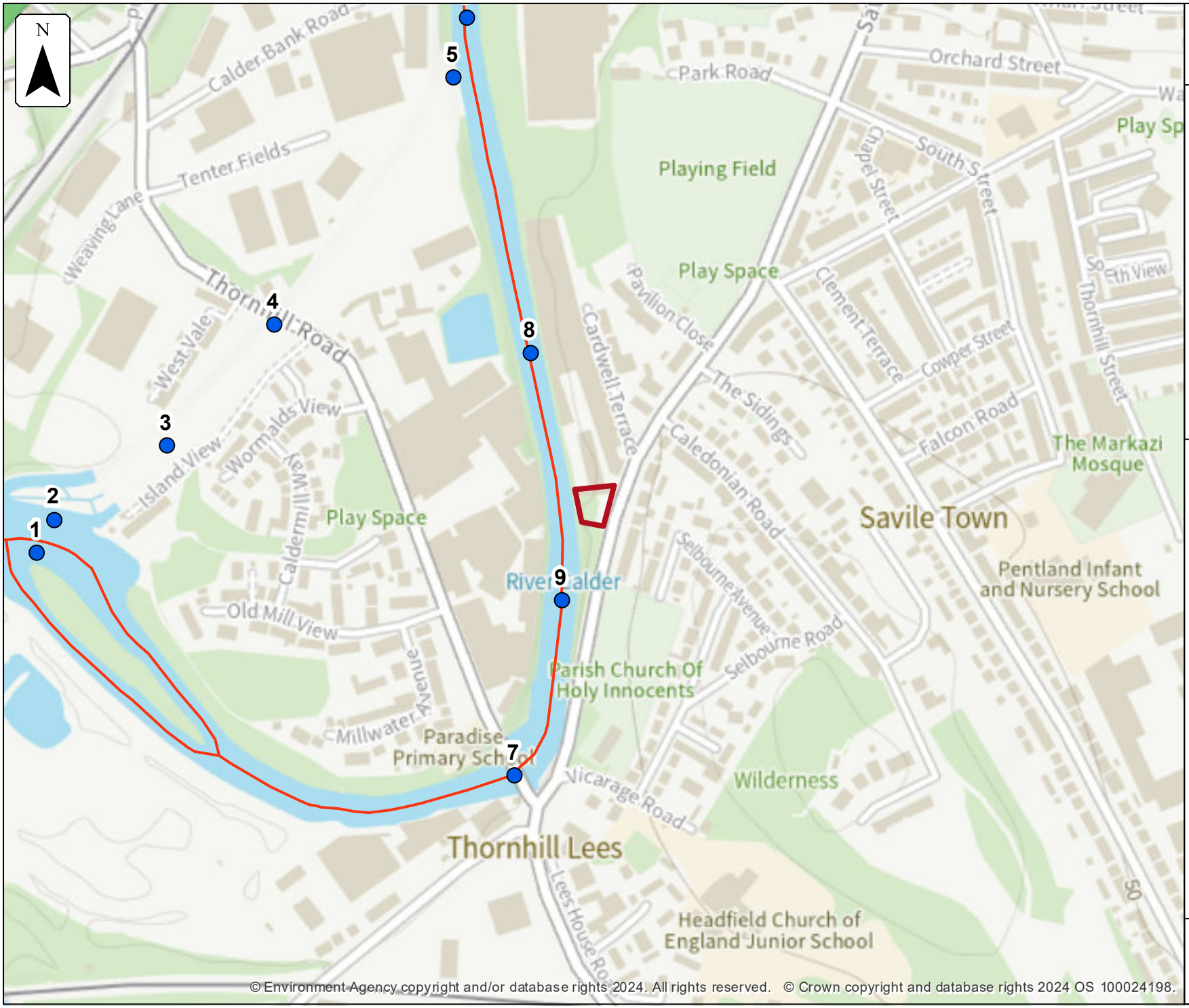
Main river

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

Defended modelled fluvial node locations

Location (easting/northing)
424163/420557

Scale
1:5,000

Created
29 Jul 2024

Model name
2015 Calder and Canals - downstream

Selected area

Modelled location

Main river

0 50 100 150 200 250
metres

Modelled node locations data

Defended

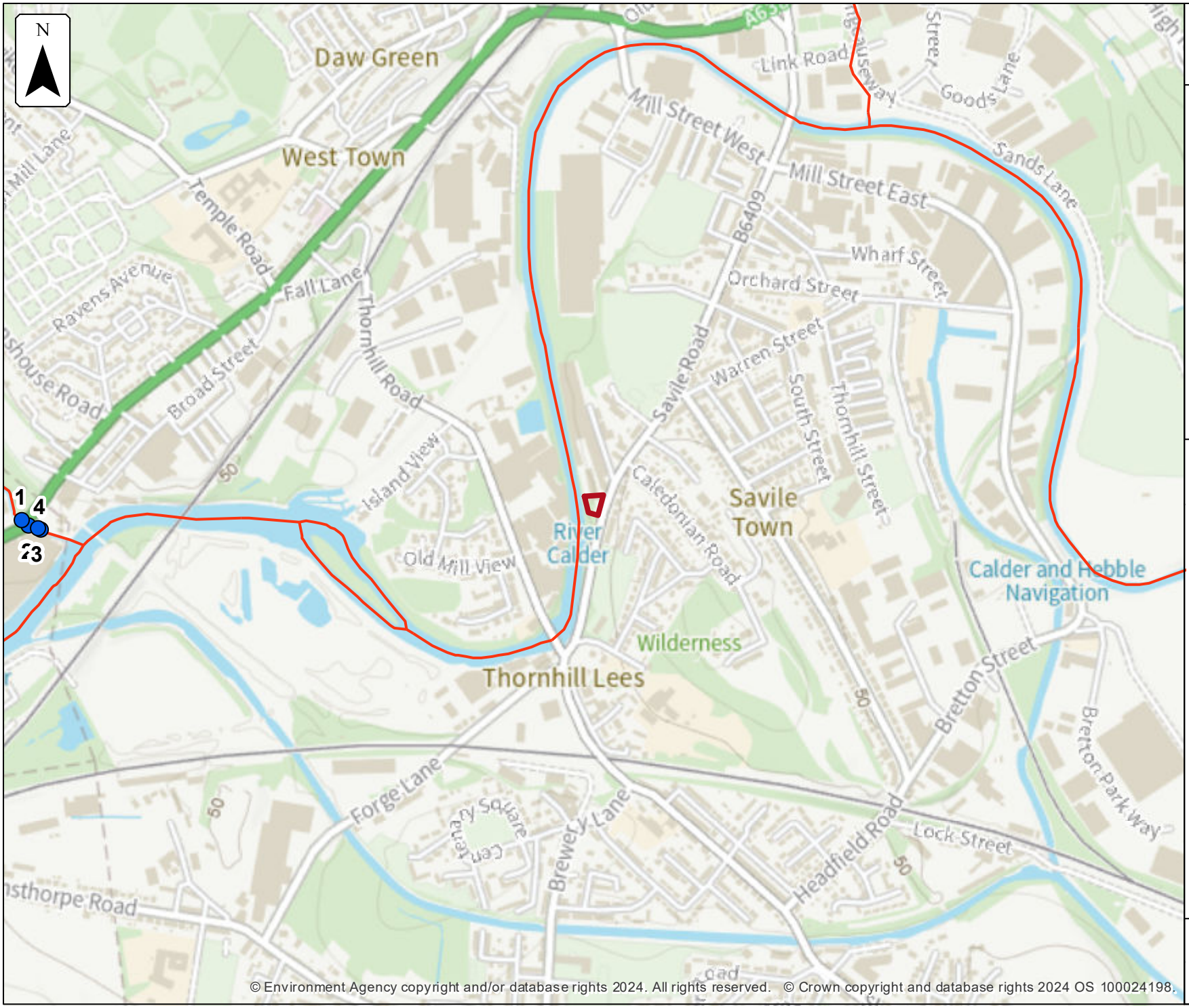
Label	Modelled location ID	Easting	Northing	4% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Level	Level	Level	Level	Level	Level
1	1130101	423621	420509	38.99	39.19	39.27	39.38	39.52	40.72
2	1129925	423638	420541	38.95	39.15	39.23	39.36	39.49	40.70
3	1129711	423748	420613	38.86	39.04	39.11	39.28	39.33	40.70
4	1129695	423852	420731	38.84	39.02	39.09	39.25	39.28	40.56
5	1129880	424026	420971	38.81	38.98	39.04	39.20	39.20	40.30
6	1129898	424040	421030	37.55	37.81	37.90	38.03	38.24	39.42
7	1129677	424087	420292	38.29	38.56	38.66	38.76	39.01	40.14
8	1130123	424103	420703	37.86	38.15	38.26	38.33	38.65	39.81
9	1129626	424132	420462	38.04	38.32	38.43	38.51	38.80	39.96

Data in this table comes from the 2015 Calder and Canals - downstream of Sowerby Bridge 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.
If no level or flow data is available for a scenario, no table will be shown.

Defended

Label	Modelled location ID	Easting	Northing	4% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Flow	Flow	Flow	Flow	Flow	Flow
1	1130101	423621	420509	419.15	464.74	488.11	491.20	534.06	719.38
2	1129925	423638	420541	120.78	145.44	157.44	142.17	199.04	315.49
3	1129711	423748	420613	120.75	145.49	157.34	142.10	199.84	307.35
4	1129695	423852	420731	120.69	145.38	157.47	142.06	198.85	272.65
5	1129880	424026	420971	112.01	120.86	123.76	132.08	132.29	194.67
6	1129898	424040	421030	305.75	339.57	352.79	350.51	401.97	525.96
7	1129677	424087	420292	298.41	318.80	324.28	344.47	344.14	426.11
8	1130123	424103	420703	298.32	318.77	324.19	344.25	344.93	437.89
9	1129626	424132	420462	298.20	318.60	325.38	344.36	344.19	425.45

Data in this table comes from the 2015 Calder and Canals - downstream of Sowerby Bridge 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.
If no level or flow data is available for a scenario, no table will be shown.



Environment Agency

Defended modelled fluvial node locations

Location (easting/northing)
424163/420557

Scale
1:10,000

Created
29 Jul 2024

Model name
2009 FIM River Spen

Selected area

Modelled location

Main river

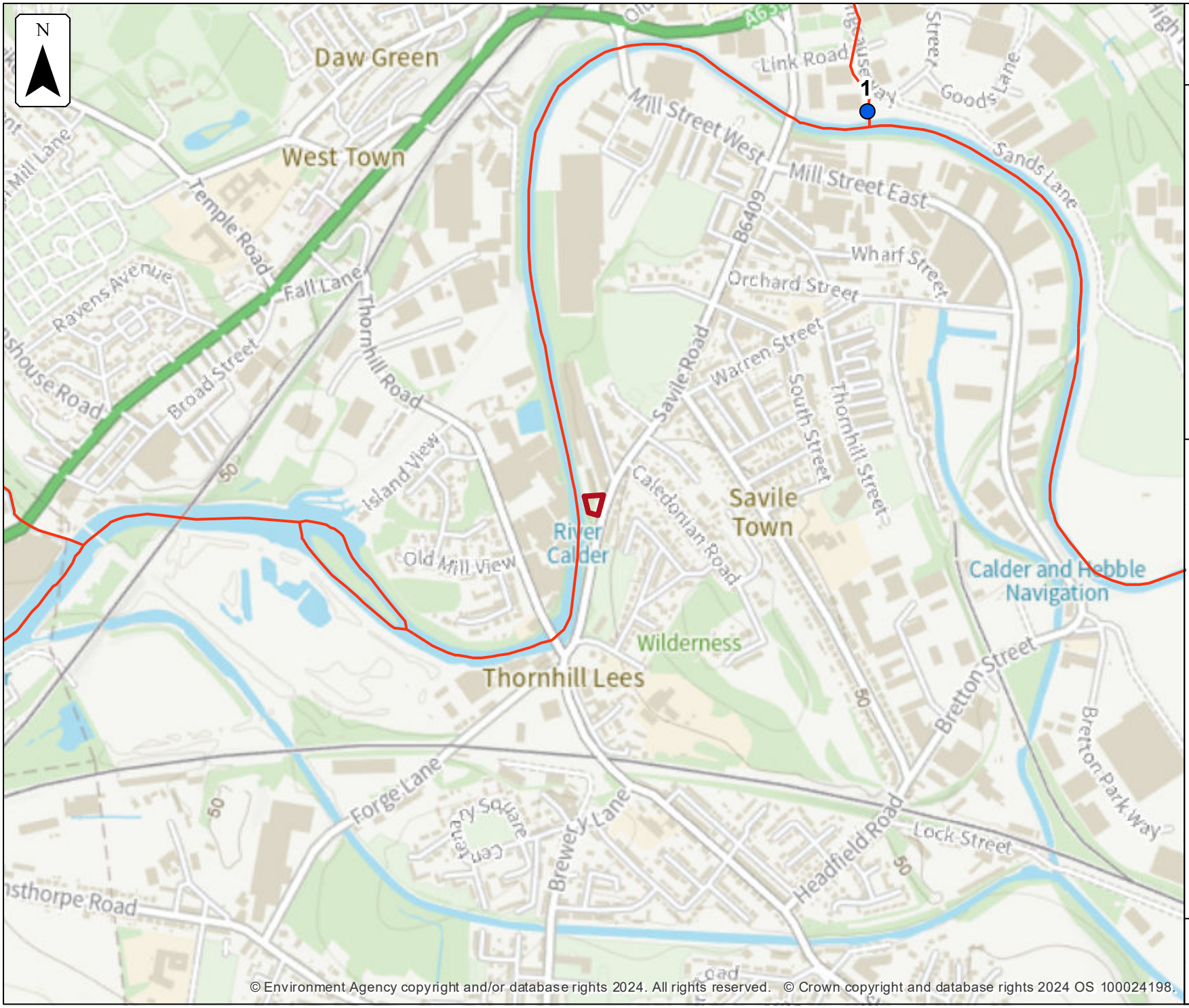
0 100 200 300 400 500
metres

Modelled node locations data

Defended

Label	Modelled location ID	Easting	Northing	1% AEP	1% AEP
				Level	Flow
1	320251	423050	420525	39.45	32.52
2	43913	423063	420514	39.45	32.52
3	335911	423082	420508	39.27	32.52
4	96087	423088	420505	39.27	32.52

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.
If no level or flow data is available for a scenario, no table will be shown.



Environment Agency

Defended modelled fluvial node locations

Location (easting/northing)
424163/420557

Scale
1:10,000

Created
29 Jul 2024

Model name
2015 Batley Beck Mapping Study

- Selected area
- Modelled location
- Main river

0 100 200 300 400 500
metres

Modelled node locations data

Defended

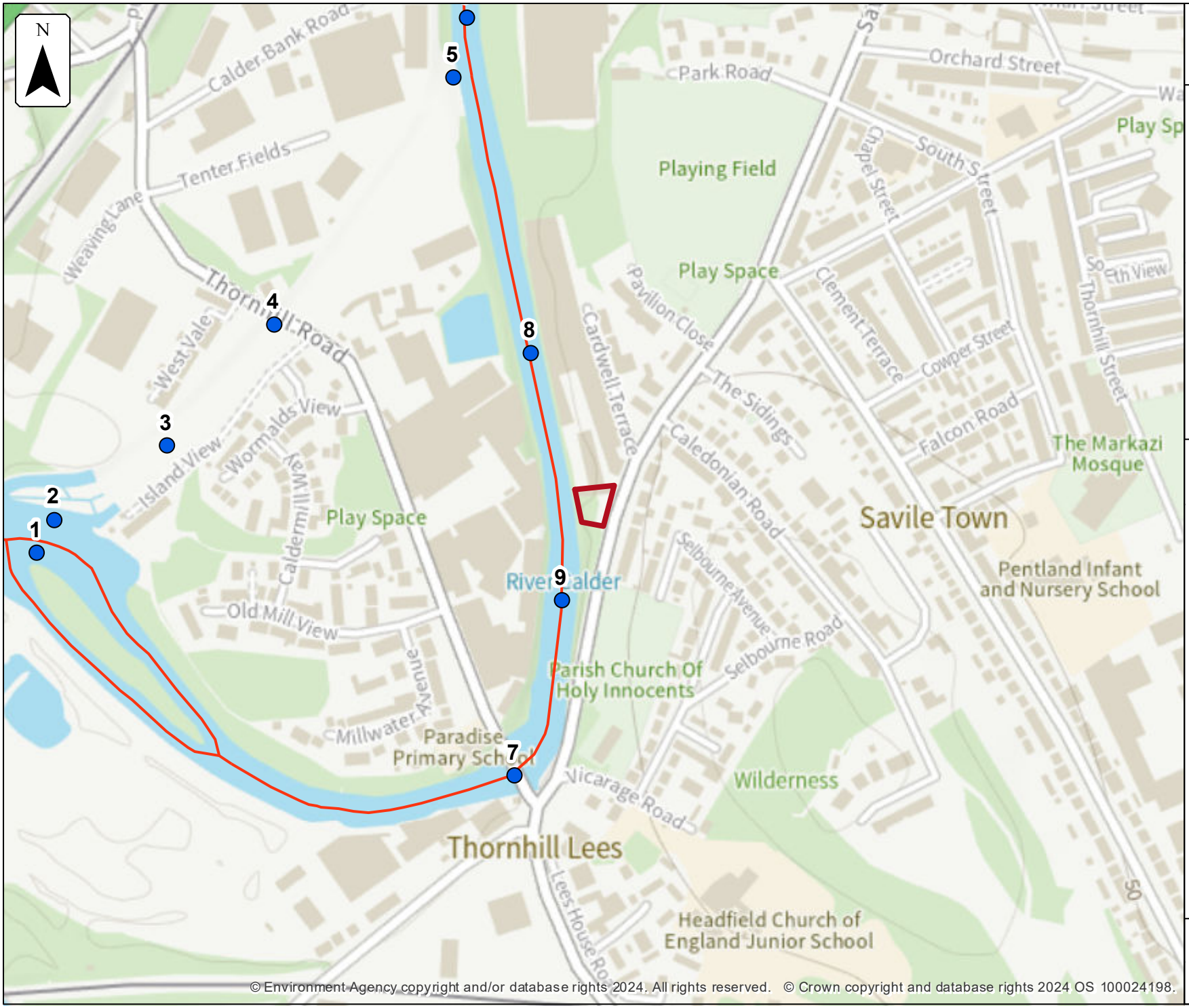
Label	Modelled location ID	Easting	Northing	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Level	Level	Level	Level	Level
1	977831	424697	421321	36.27	36.64	36.79	36.79	36.97

Data in this table comes from the 2015 Batley Beck Mapping Study 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.
If no level or flow data is available for a scenario, no table will be shown.

Defended

Label	Modelled location ID	Easting	Northing	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Flow	Flow	Flow	Flow	Flow
1	977831	424697	421321	25.87	26.51	26.59	27.02	28.18

Data in this table comes from the 2015 Batley Beck Mapping Study 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.
If no level or flow data is available for a scenario, no table will be shown.



Environment Agency

Defences removed modelled fluvial node locations

Location (easting/northing)
424163/420557

Scale
1:5,000

Created
29 Jul 2024

Model name
2015 Calder and Canals - downstream

Selected area

Modelled location

Main river

0 50 100 150 200 250
metres

Modelled node locations data

Defences removed

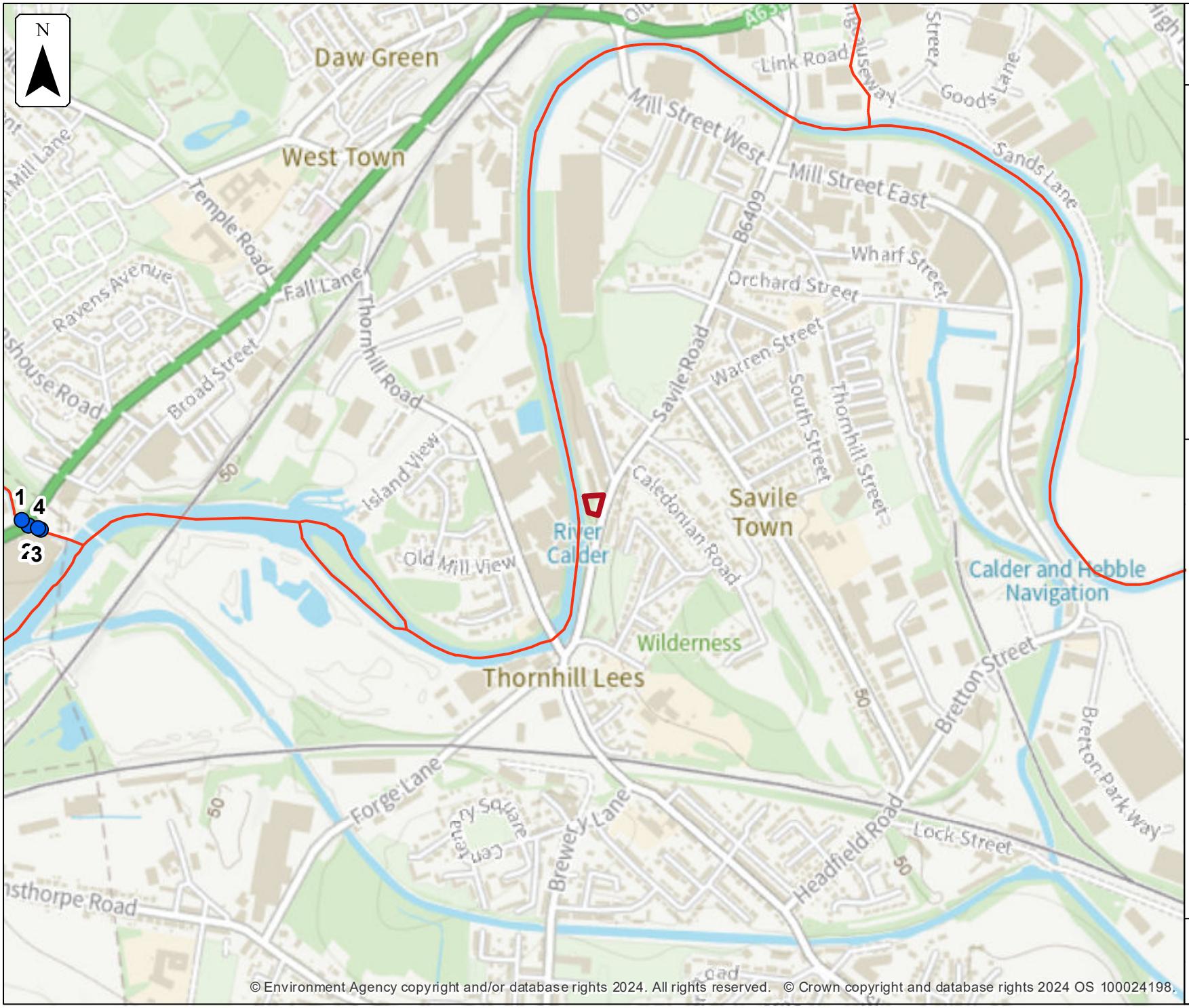
Label	Modelled location ID	Easting	Northing	4% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Level	Level	Level	Level	Level	Level
1	1130101	423621	420509	38.76	38.95	39.06	39.28	39.29	40.73
2	1129925	423638	420541	38.66	38.90	39.02	39.25	39.27	40.71
3	1129711	423748	420613	38.60	38.83	38.95	39.12	39.19	40.71
4	1129695	423852	420731	38.58	38.81	38.93	39.09	39.17	40.57
5	1129880	424026	420971	38.55	38.78	38.90	39.05	39.13	40.31
6	1129898	424040	421030	37.32	37.59	37.73	37.93	38.0	39.43
7	1129677	424087	420292	38.09	38.36	38.52	38.68	38.81	40.16
8	1130123	424103	420703	37.62	37.89	38.04	38.28	38.31	39.82
9	1129626	424132	420462	37.82	38.10	38.25	38.45	38.53	39.98

Data in this table comes from the 2015 Calder and Canals - downstream of Sowerby Bridge 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.
If no level or flow data is available for a scenario, no table will be shown.

Defences removed

Label	Modelled location ID	Easting	Northing	4% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Flow	Flow	Flow	Flow	Flow	Flow
1	1130101	423621	420509	384.88	425.74	449.01	492.44	505.99	722.06
2	1129925	423638	420541	99.36	110.93	116.85	159.46	129.64	316.37
3	1129711	423748	420613	98.99	110.78	116.72	159.41	128.95	308.26
4	1129695	423852	420731	98.94	110.62	116.73	159.30	129.03	273.80
5	1129880	424026	420971	98.69	110.63	116.65	124.36	128.94	195.31
6	1129898	424040	421030	285.17	314.18	332.81	354.04	366.97	528.0
7	1129677	424087	420292	285.63	314.98	332.94	325.88	367.81	423.10
8	1130123	424103	420703	285.38	314.83	332.90	325.82	367.84	439.09
9	1129626	424132	420462	285.45	314.33	332.89	325.72	367.56	426.11

Data in this table comes from the 2015 Calder and Canals - downstream of Sowerby Bridge 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.
If no level or flow data is available for a scenario, no table will be shown.



Environment Agency

Defences removed modelled fluvial node locations

Location (easting/northing)
424163/420557

Scale
1:10,000

Created
29 Jul 2024

Model name
2009 FIM River Spen

Selected area
Modelled location
Main river

0 100 200 300 400 500
metres

Modelled node locations data

Defences removed

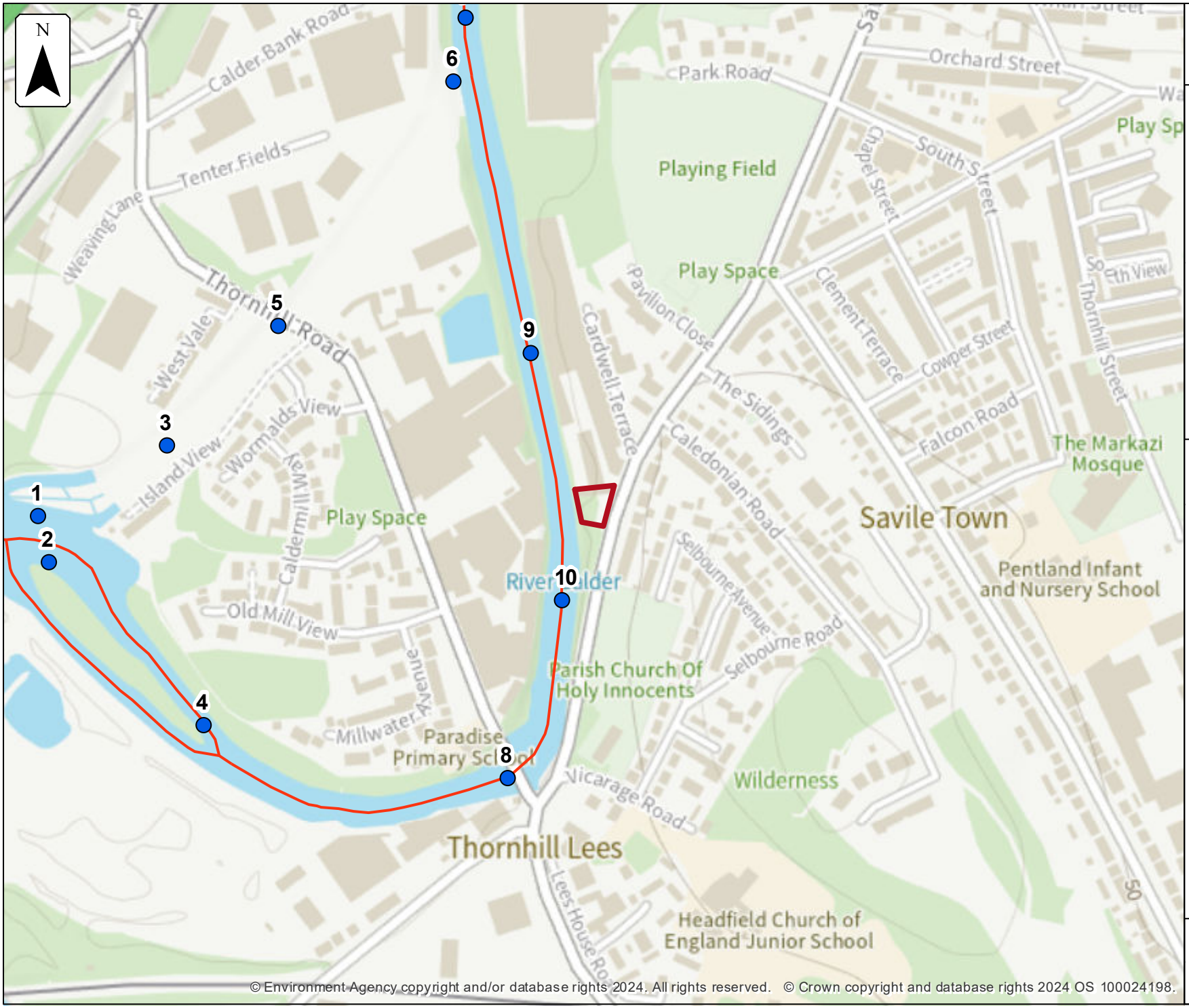
Label	Modelled location ID	Easting	Northing	4% AEP	2% AEP	1.33% AEP	1% AEP	0.1% AEP
				Level	Level	Level	Level	Level
1	320251	423050	420525	39.36	39.47	39.53	39.59	41.14
2	43913	423063	420514	39.36	39.47	39.53	39.59	40.58
3	335911	423082	420508	39.18	39.28	39.34	39.40	39.98
4	96087	423088	420505	39.18	39.28	39.34	39.40	39.98

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.
If no level or flow data is available for a scenario, no table will be shown.

Defences removed

Label	Modelled location ID	Easting	Northing	4% AEP	2% AEP	1.33% AEP	1% AEP	0.1% AEP
				Flow	Flow	Flow	Flow	Flow
1	320251	423050	420525	30.02	32.85	34.56	35.79	52.21
2	43913	423063	420514	30.02	32.85	34.56	35.79	52.21
3	335911	423082	420508	30.02	32.85	34.56	35.79	52.60
4	96087	423088	420505	30.02	32.85	34.56	35.79	52.60

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.
If no level or flow data is available for a scenario, no table will be shown.



Environment Agency

Defences removed modelled fluvial node locations

Location (easting/northing)
424163/420557

Scale
1:5,000

Created
29 Jul 2024

Model name
2011 River Calder - Calder

Selected area
Modelled location
Main river

0 50 100 150 200 250
metres

Modelled node locations data

Defences removed

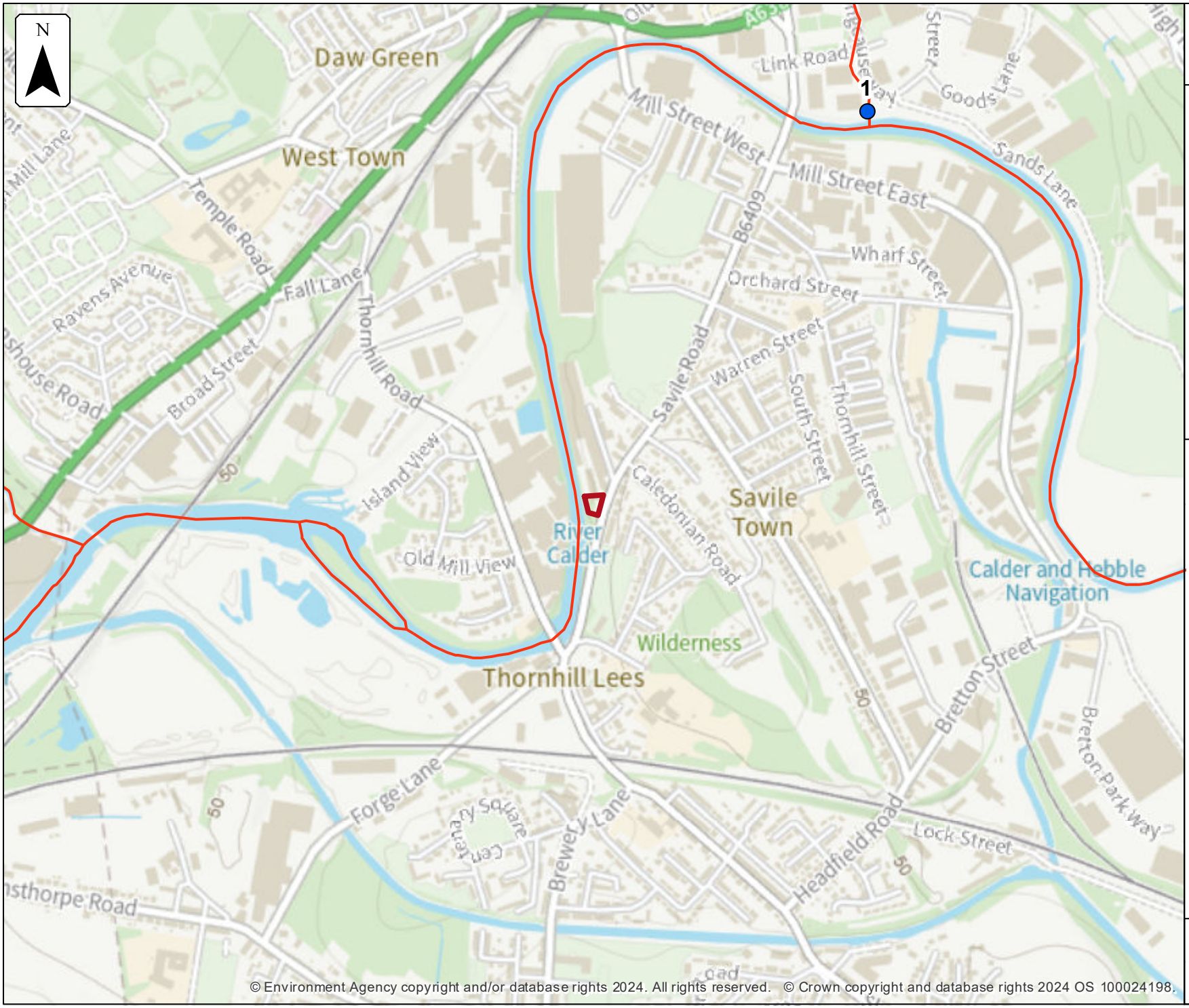
Label	Modelled location ID	Easting	Northing	4% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Level	Level	Level	Level	Level	Level
1	3069	423622	420544	38.65	38.72	38.77	38.83	39.0	39.98
2	61827	423633	420500	38.65	38.72	38.77	38.83	39.0	39.98
3	300146	423748	420613	38.01	38.38	38.62	38.69	38.88	39.95
4	101235	423784	420341	38.14	38.26	38.33	38.40	38.60	39.50
5	346781	423856	420730	37.99	38.37	38.60	38.68	38.87	39.87
6	89252	424027	420968	37.97	38.34	38.57	38.65	38.84	39.75
7	233814	424039	421030	37.33	37.53	37.64	37.72	37.99	39.20
8	71600	424079	420289	37.98	38.12	38.20	38.29	38.52	39.55
9	56457	424103	420703	37.57	37.74	37.84	37.92	38.17	39.32
10	169494	424133	420462	37.71	37.87	37.96	38.05	38.30	39.44

Data in this table comes from the 2011 River Calder - Calder 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.
If no level or flow data is available for a scenario, no table will be shown.

Defences removed

Label	Modelled location ID	Easting	Northing	4% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Flow	Flow	Flow	Flow	Flow	Flow
1	3069	423622	420544	70.76	88.46	100.72	103.85	113.50	180.09
2	61827	423633	420500	314.09	329.62	339.85	353.23	391.17	638.09
3	300146	423748	420613	70.55	88.26	100.25	103.75	113.39	177.25
4	101235	423784	420341	313.28	329.07	339.11	352.45	390.36	635.33
5	346781	423856	420730	70.47	88.19	100.10	103.71	113.35	174.77
6	89252	424027	420968	70.29	88.02	99.72	103.61	113.25	163.69
7	233814	424039	421030	380.74	414.90	436.58	454.0	500.44	801.17
8	71600	424079	420289	311.49	327.74	337.61	350.90	388.38	634.86
9	56457	424103	420703	310.89	327.25	337.18	350.55	387.53	644.10
10	169494	424133	420462	311.25	327.55	337.44	350.75	387.92	634.16

Data in this table comes from the 2011 River Calder - Calder 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.
If no level or flow data is available for a scenario, no table will be shown.



Environment Agency

Defences removed modelled fluvial node locations

Location (easting/northing)
424163/420557

Scale
1:10,000

Created
29 Jul 2024

Model name
2015 Batley Beck Mapping Study

Selected area
Modelled location
Main river

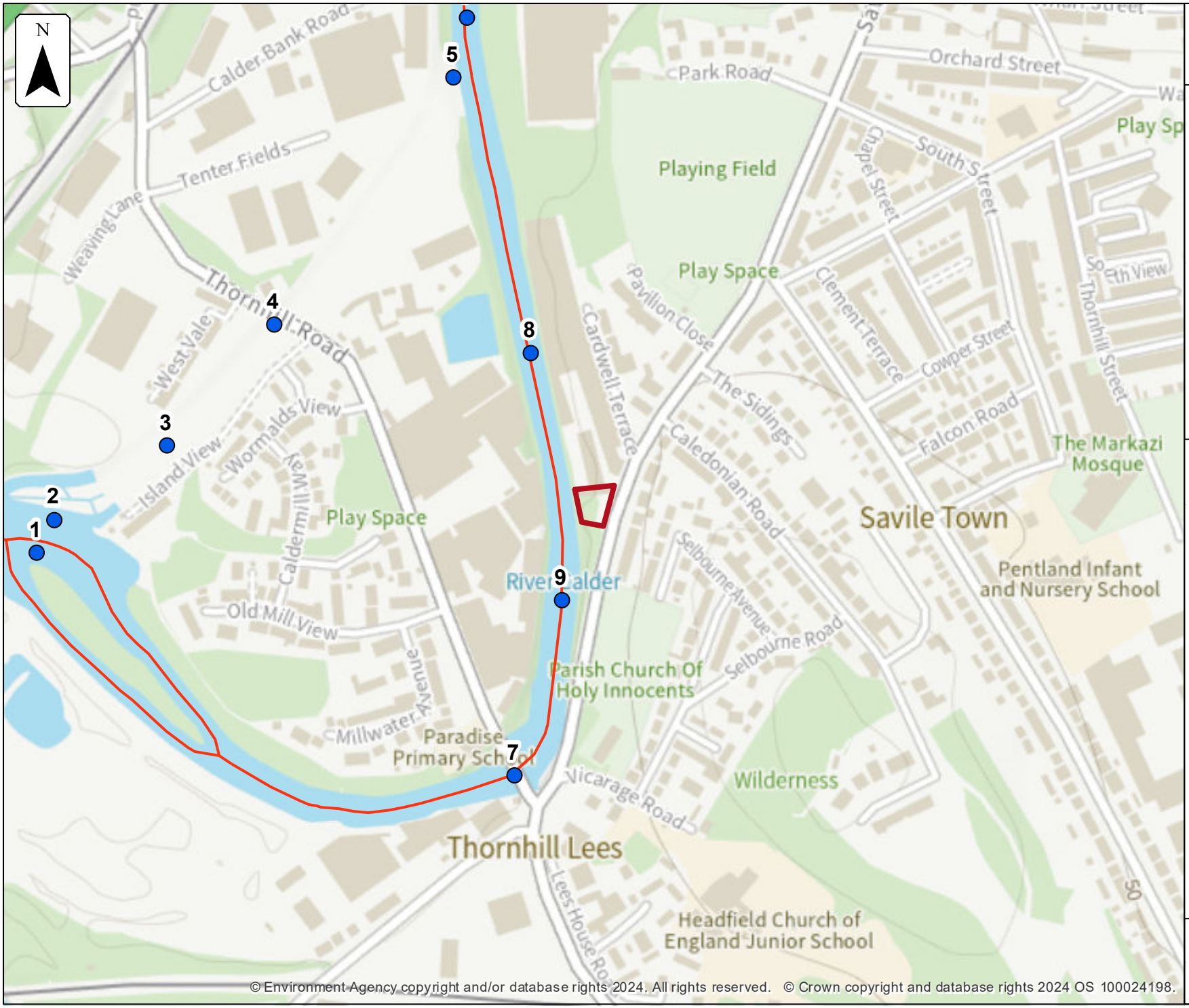
0 100 200 300 400 500
metres

Modelled node locations data

Defences removed

Label	Modelled location ID	Easting	Northing	2% AEP	1.33% AEP	1% AEP	2% AEP	1.33% AEP	1% AEP
				Level	Level	Level	Flow	Flow	Flow
1	977831	424697	421321	36.27	36.64	36.79	25.54	26.48	26.56

Data in this table comes from the 2015 Batley Beck Mapping Study 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.
If no level or flow data is available for a scenario, no table will be shown.



Environment Agency

Defended climate change modelled fluvial node locations

Location (easting/northing)
424163/420557

Scale
1:5,000

Created
29 Jul 2024

Model name
2015 Calder and Canals - downstream

Selected area

Modelled location

Main river

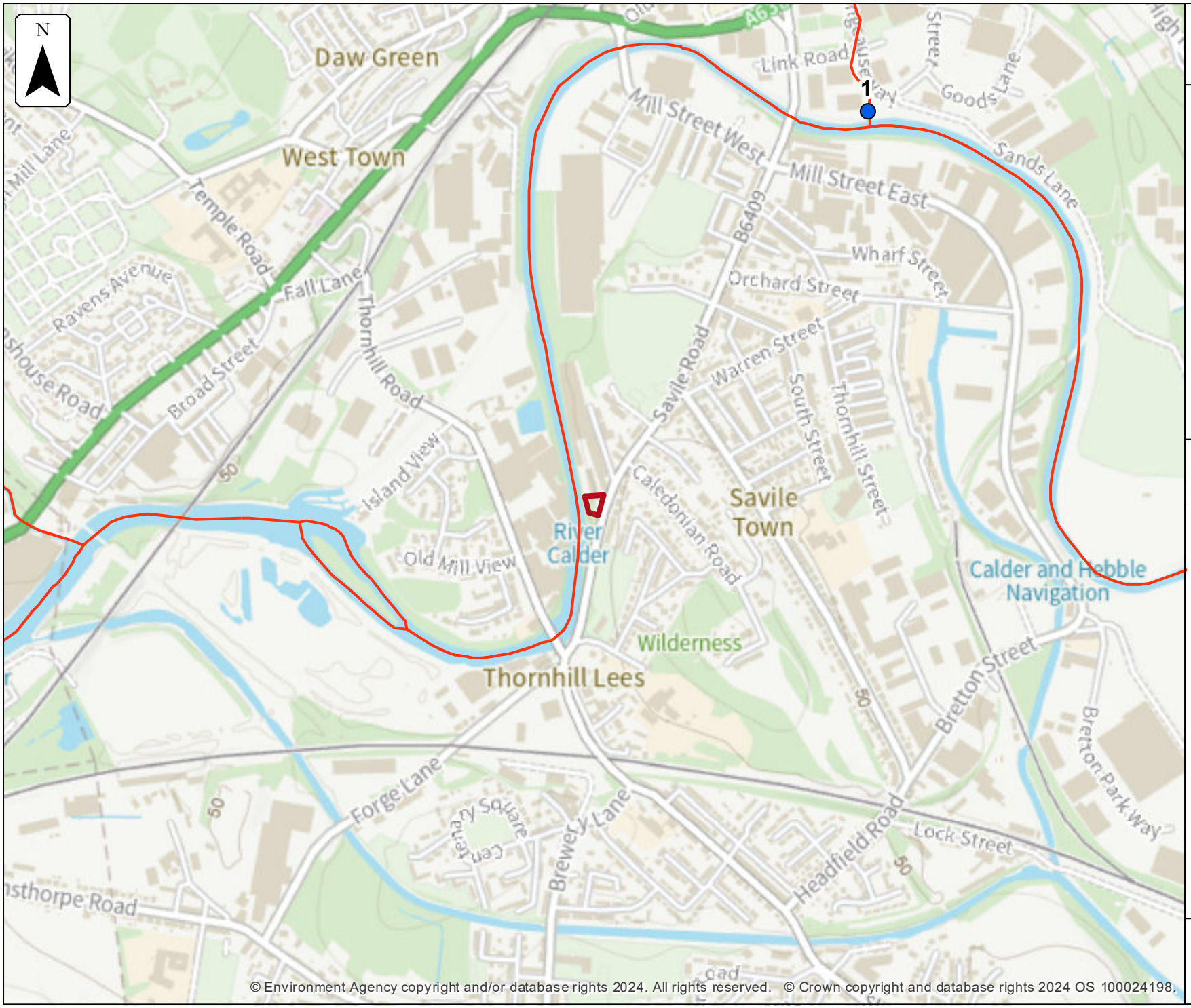
0 50 100 150 200 250
metres

Modelled node locations data

Defended climate change

Label	Modelled location ID	Easting	Northing	1.0% AEP (+20%)	1.0% AEP (+20%)
				Level	Flow
1	1130101	423621	420509	39.67	549.74
2	1129925	423638	420541	39.63	226.87
3	1129711	423748	420613	39.46	226.85
4	1129695	423852	420731	39.39	225.37
5	1129880	424026	420971	39.27	136.50
6	1129898	424040	421030	38.40	428.16
7	1129677	424087	420292	39.19	351.67
8	1130123	424103	420703	38.84	353.16
9	1129626	424132	420462	38.99	351.15

Data in this table comes from the 2015 Calder and Canals - downstream of Sowerby Bridge 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.
If no level or flow data is available for a scenario, no table will be shown.



Environment Agency

Defended climate change modelled fluvial node locations

Location (easting/northing)
424163/420557

Scale
1:10,000

Created
29 Jul 2024

Model name
2015 Batley Beck Mapping Study

- Selected area
- Modelled location
- Main river

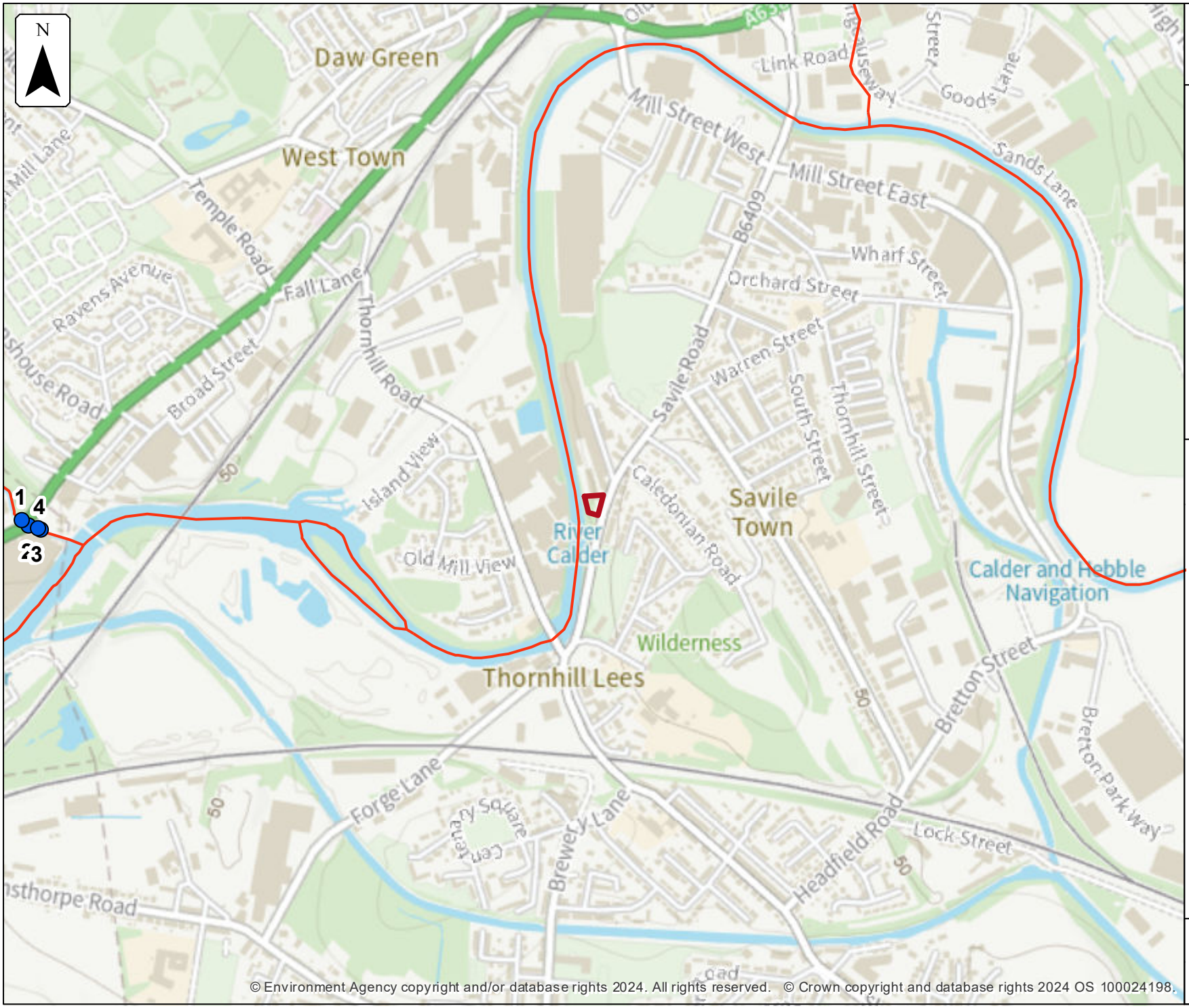
0 100 200 300 400 500
metres

Modelled node locations data

Defended climate change

Label	Modelled location ID	Easting	Northing	1.0% AEP (+20%)	1.0% AEP (+20%)
				Level	Flow
1	977831	424697	421321	36.79	27.04

Data in this table comes from the 2015 Batley Beck Mapping Study 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.
If no level or flow data is available for a scenario, no table will be shown.



Environment Agency

Defences removed climate change modelled fluvial node locations

Location (easting/northing)
424163/420557

Scale
1:10,000

Created
29 Jul 2024

Model name
2009 FIM River Spen

Selected area
Modelled location
Main river

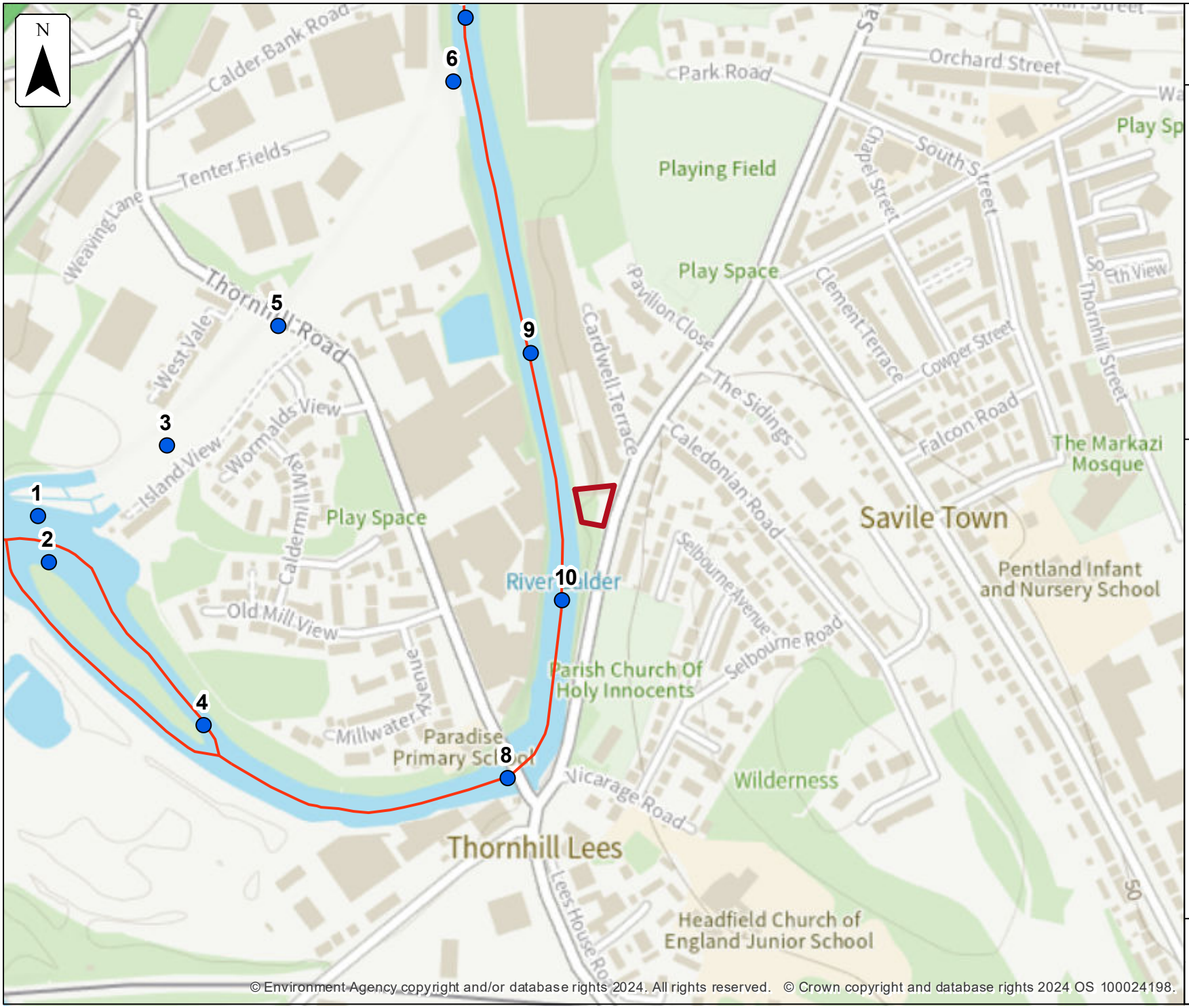
0 100 200 300 400 500
metres

Modelled node locations data

Defences removed climate change

Label	Modelled location ID	Easting	Northing	1.0% AEP (+20%)	1.0% AEP (+20%)
				Level	Flow
1	320251	423050	420525	39.84	42.66
2	43913	423063	420514	39.79	42.66
3	335911	423082	420508	39.56	42.65
4	96087	423088	420505	39.56	42.65

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.
If no level or flow data is available for a scenario, no table will be shown.



Environment Agency

Defences removed climate change modelled fluvial node locations

Location (easting/northing)
424163/420557

Scale
1:5,000

Created
29 Jul 2024

Model name
2011 River Calder - Calder

Selected area
Modelled location
Main river

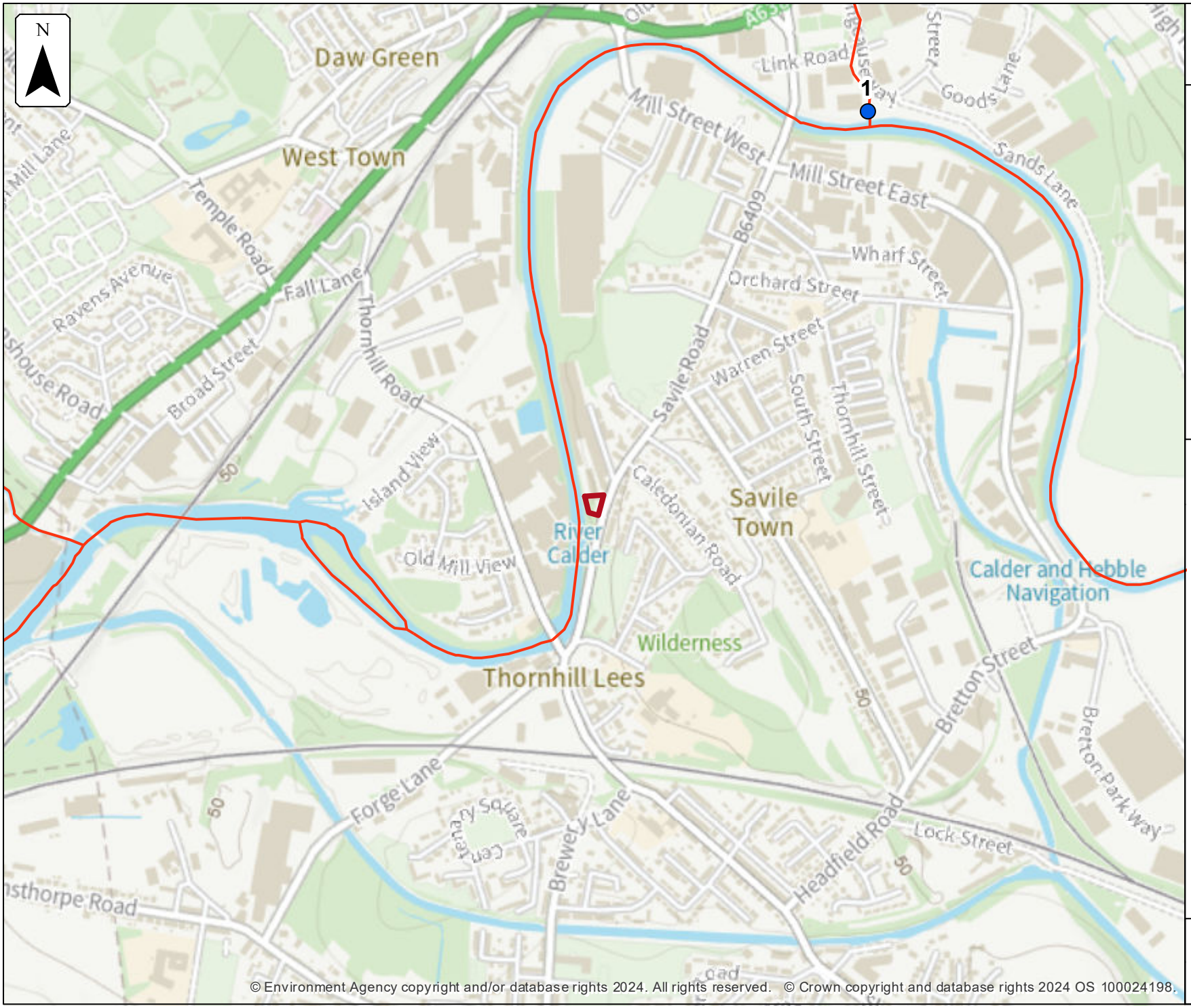
0 50 100 150 200 250
metres

Modelled node locations data

Defences removed climate change

Label	Modelled location ID	Easting	Northing	1.0% AEP (+20%)	1.0% AEP (+20%)
				Level	Flow
1	3069	423622	420544	39.11	119.84
2	61827	423633	420500	39.11	419.11
3	300146	423748	420613	39.01	119.69
4	101235	423784	420341	38.72	418.0
5	346781	423856	420730	38.99	119.64
6	89252	424027	420968	38.96	119.50
7	233814	424039	421030	38.15	533.60
8	71600	424079	420289	38.66	415.23
9	56457	424103	420703	38.33	414.42
10	169494	424133	420462	38.45	414.77

Data in this table comes from the 2011 River Calder - Calder 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.
If no level or flow data is available for a scenario, no table will be shown.



Environment Agency

Defences removed climate change modelled fluvial node locations

Location (easting/northing)
424163/420557

Scale
1:10,000

Created
29 Jul 2024

Model name
2015 Batley Beck Mapping Study

- Selected area
- Modelled location
- Main river

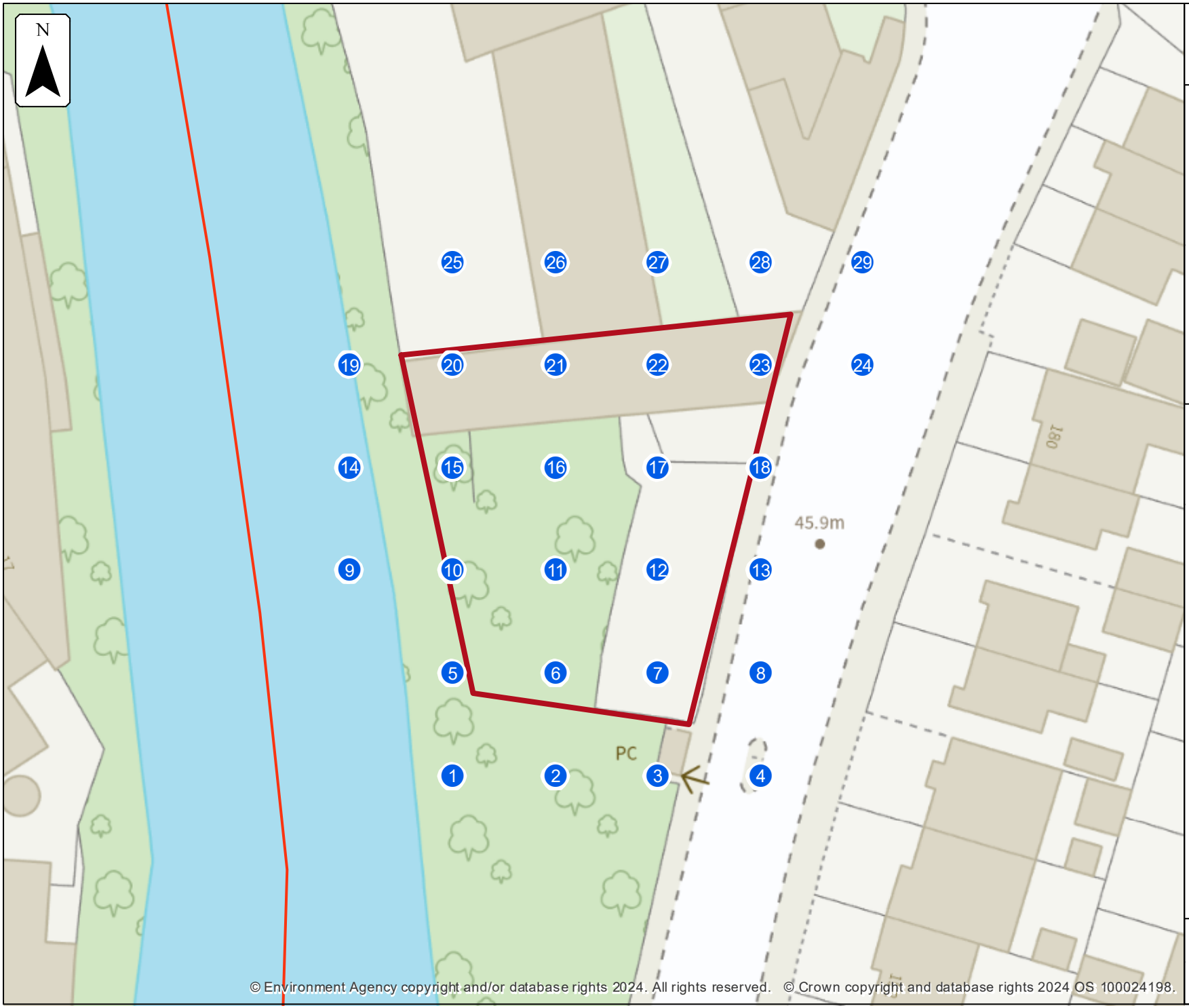
0 100 200 300 400 500
metres

Modelled node locations data

Defences removed climate change

Label	Modelled location ID	Easting	Northing	1.0% AEP (+20%)	1.0% AEP (+20%)
				Level	Flow
1	977831	424697	421321	36.79	27.12

Data in this table comes from the 2015 Batley Beck Mapping Study 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.
If no level or flow data is available for a scenario, no table will be shown.



Environment Agency

Defended modelled fluvial extent and height

Location (easting/northing)
424163/420557

Scale
1:500

Created
29 Jul 2024

Model name
2015 Batley Beck Mapping Study

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 37.0
- 37.0 - 49.5
- 49.5 - 62.0
- 62.0 - 74.5
- 74.5 - 87.0
- 87.0 - 99.5
- 99.5 - 112.0
- 112.0 - 124.5
- 124.5 - 137.0

This map shows the 0.1% AEP height data

0 5 10 15 20
metres

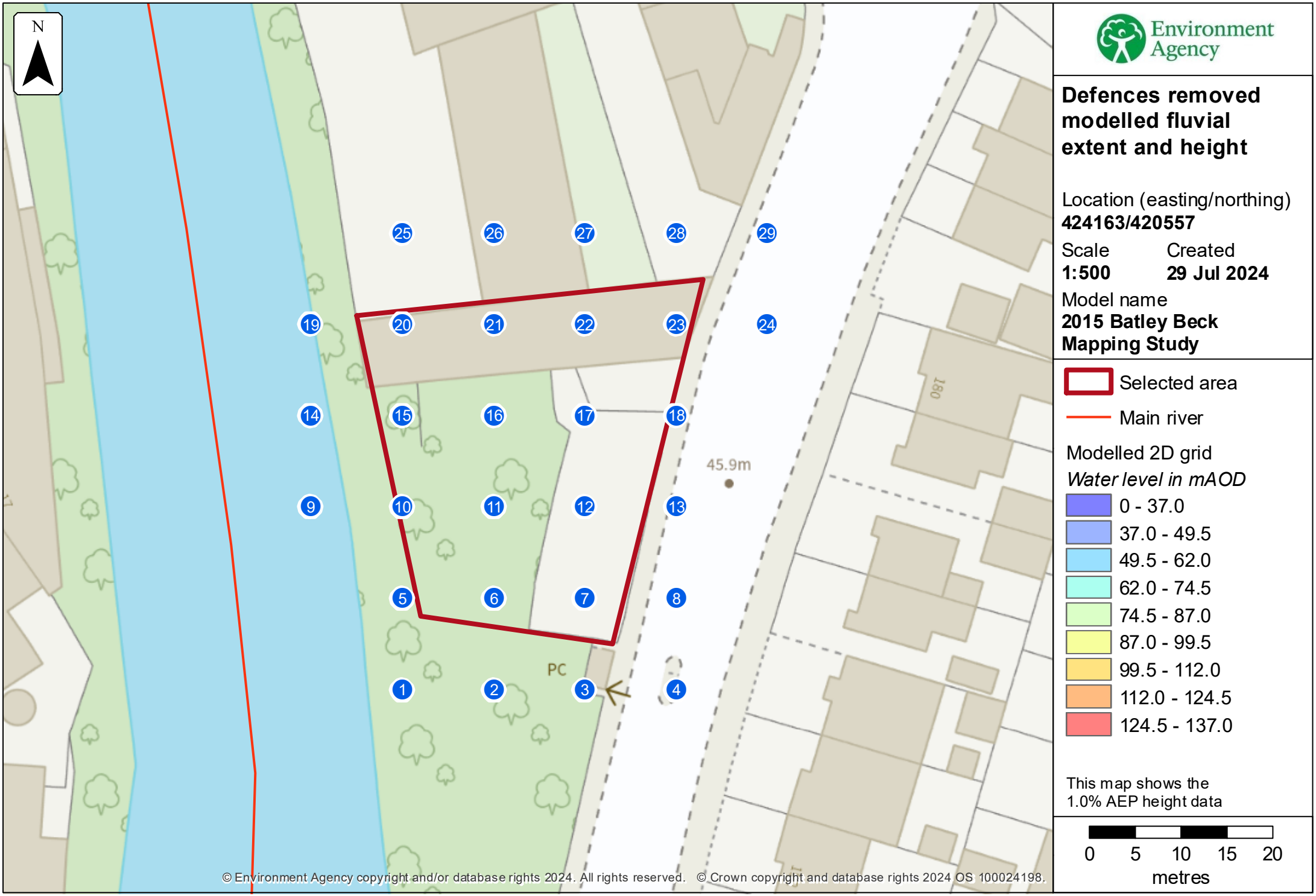
Sample point data

Defended

Label	Easting	Northing	1% AEP	0.5% AEP	0.1% AEP	1% AEP	0.5% AEP	0.1% AEP
			Depth	Depth	Depth	Height	Height	Height
1	424150	420531	NoData	NoData	NoData	NoData	NoData	NoData
2	424160	420531	NoData	NoData	NoData	NoData	NoData	NoData
3	424170	420531	NoData	NoData	NoData	NoData	NoData	NoData
4	424180	420531	NoData	NoData	NoData	NoData	NoData	NoData
5	424150	420541	NoData	NoData	NoData	NoData	NoData	NoData
6	424160	420541	NoData	NoData	NoData	NoData	NoData	NoData
7	424170	420541	NoData	NoData	NoData	NoData	NoData	NoData
8	424180	420541	NoData	NoData	NoData	NoData	NoData	NoData
9	424140	420551	NoData	NoData	NoData	NoData	NoData	NoData
10	424150	420551	NoData	NoData	NoData	NoData	NoData	NoData
11	424160	420551	NoData	NoData	NoData	NoData	NoData	NoData
12	424170	420551	NoData	NoData	NoData	NoData	NoData	NoData
13	424180	420551	NoData	NoData	NoData	NoData	NoData	NoData
14	424140	420561	NoData	NoData	NoData	NoData	NoData	NoData
15	424150	420561	NoData	NoData	NoData	NoData	NoData	NoData
16	424160	420561	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	1% AEP	0.5% AEP	0.1% AEP	1% AEP	0.5% AEP	0.1% AEP
			Depth	Depth	Depth	Height	Height	Height
17	424170	420561	NoData	NoData	NoData	NoData	NoData	NoData
18	424180	420561	NoData	NoData	NoData	NoData	NoData	NoData
19	424140	420571	NoData	NoData	NoData	NoData	NoData	NoData
20	424150	420571	NoData	NoData	NoData	NoData	NoData	NoData
21	424160	420571	NoData	NoData	NoData	NoData	NoData	NoData
22	424170	420571	NoData	NoData	NoData	NoData	NoData	NoData
23	424180	420571	NoData	NoData	NoData	NoData	NoData	NoData
24	424190	420571	NoData	NoData	NoData	NoData	NoData	NoData
25	424150	420581	NoData	NoData	NoData	NoData	NoData	NoData
26	424160	420581	NoData	NoData	NoData	NoData	NoData	NoData
27	424170	420581	NoData	NoData	NoData	NoData	NoData	NoData
28	424180	420581	NoData	NoData	NoData	NoData	NoData	NoData
29	424190	420581	NoData	NoData	NoData	NoData	NoData	NoData
Max value in selected area:			NoData	NoData	NoData	NoData	NoData	NoData

Data in this table comes from the 2015 Batley Beck Mapping Study 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.
If no height or depth data is available for a scenario, no table will be shown.
'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.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180
Environment Agency
Defences removed modelled fluvial extent and height
Location (easting/northing)
424163/420557
Scale
1:500
Created
29 Jul 2024
Model name
2015 Batley Beck Mapping Study
Selected area
Main river
Modelled 2D grid
Water level in mAOD
0 - 37.0
37.0 - 49.5
49.5 - 62.0
62.0 - 74.5
74.5 - 87.0
87.0 - 99.5
99.5 - 112.0
112.0 - 124.5
124.5 - 137.0
This map shows the 1.0% AEP height data
0 5 10 15 20
metres
© Environment Agency copyright and/or database rights 2024. All rights reserved. © Crown copyright and database rights 2024 OS 100024198.

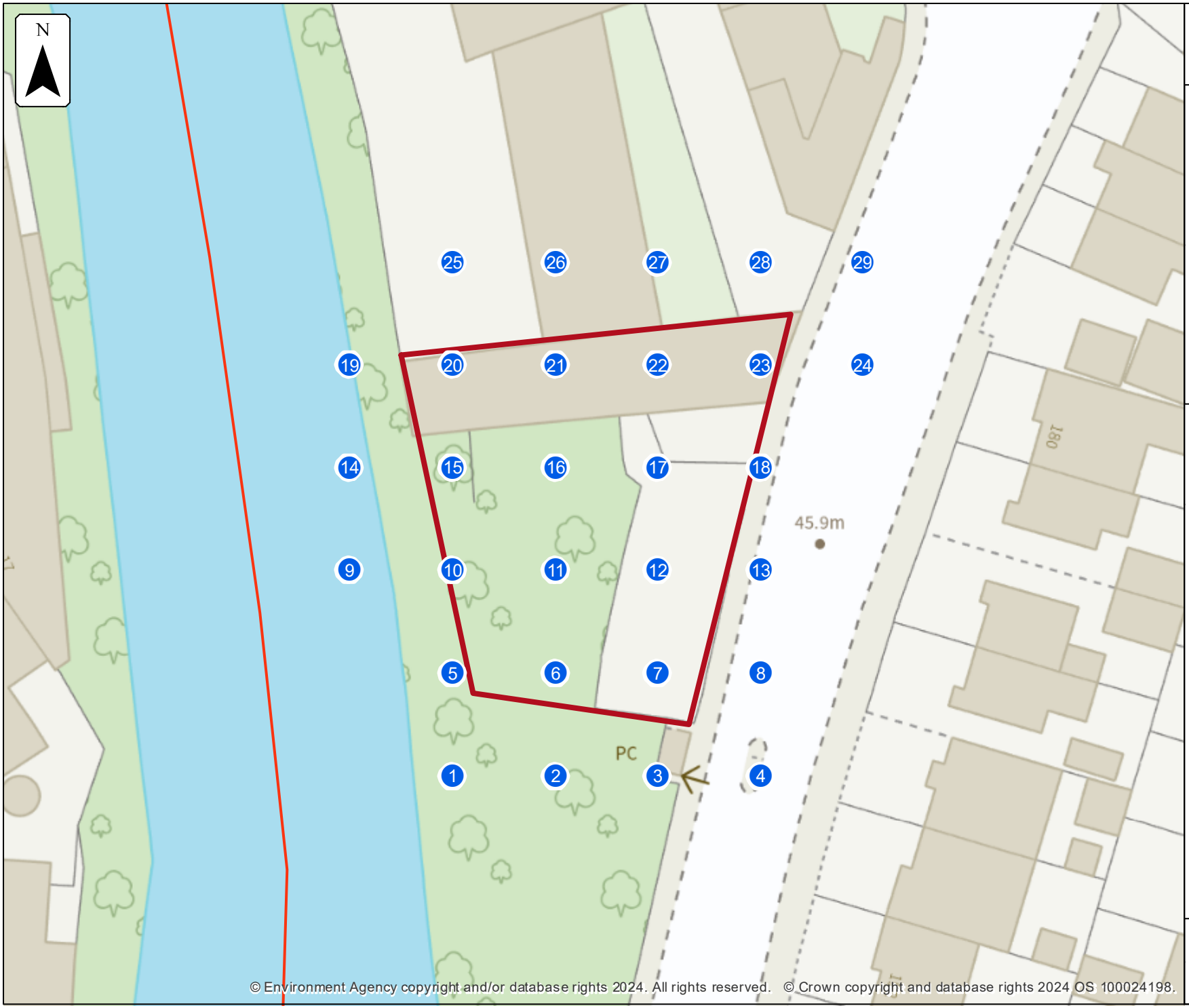
Sample point data

Defences removed

Label	Easting	Northing	1% AEP	1% AEP
			Depth	Height
1	424150	420531	NoData	NoData
2	424160	420531	NoData	NoData
3	424170	420531	NoData	NoData
4	424180	420531	NoData	NoData
5	424150	420541	NoData	NoData
6	424160	420541	NoData	NoData
7	424170	420541	NoData	NoData
8	424180	420541	NoData	NoData
9	424140	420551	NoData	NoData
10	424150	420551	NoData	NoData
11	424160	420551	NoData	NoData
12	424170	420551	NoData	NoData
13	424180	420551	NoData	NoData
14	424140	420561	NoData	NoData
15	424150	420561	NoData	NoData
16	424160	420561	NoData	NoData

Label	Easting	Northing	1% AEP	1% AEP
			Depth	Height
17	424170	420561	NoData	NoData
18	424180	420561	NoData	NoData
19	424140	420571	NoData	NoData
20	424150	420571	NoData	NoData
21	424160	420571	NoData	NoData
22	424170	420571	NoData	NoData
23	424180	420571	NoData	NoData
24	424190	420571	NoData	NoData
25	424150	420581	NoData	NoData
26	424160	420581	NoData	NoData
27	424170	420581	NoData	NoData
28	424180	420581	NoData	NoData
29	424190	420581	NoData	NoData
Max value in selected area:			NoData	NoData

Data in this table comes from the 2015 Batley Beck Mapping Study 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.
If no height or depth data is available for a scenario, no table will be shown.
'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.



Environment Agency

Defended climate change modelled fluvial extent and height

Location (easting/northing)
424163/420557

Scale
1:500

Created
29 Jul 2024

Model name
2015 Batley Beck Mapping Study

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 33.0
- 33.0 - 46.0
- 46.0 - 59.0
- 59.0 - 72.0
- 72.0 - 85.0
- 85.0 - 98.0
- 98.0 - 111.0
- 111.0 - 124.0
- 124.0 - 137.0

This map shows the 1.0% AEP +20% height data

0 5 10 15 20
metres

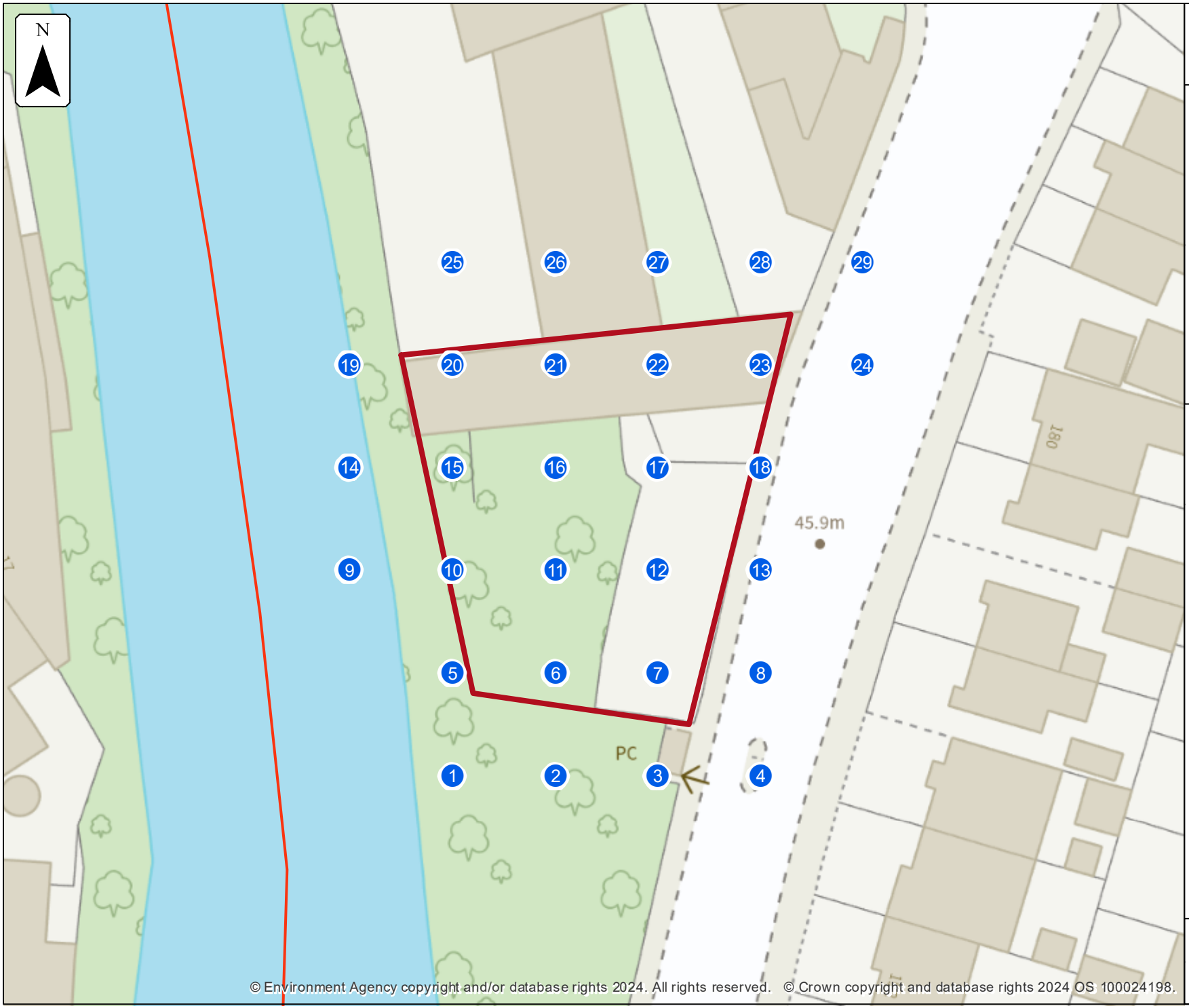
Sample point data

Defended climate change

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+20%)
			Depth	Height
1	424150	420531	NoData	NoData
2	424160	420531	NoData	NoData
3	424170	420531	NoData	NoData
4	424180	420531	NoData	NoData
5	424150	420541	NoData	NoData
6	424160	420541	NoData	NoData
7	424170	420541	NoData	NoData
8	424180	420541	NoData	NoData
9	424140	420551	NoData	NoData
10	424150	420551	NoData	NoData
11	424160	420551	NoData	NoData
12	424170	420551	NoData	NoData
13	424180	420551	NoData	NoData
14	424140	420561	NoData	NoData
15	424150	420561	NoData	NoData
16	424160	420561	NoData	NoData

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+20%)
			Depth	Height
17	424170	420561	NoData	NoData
18	424180	420561	NoData	NoData
19	424140	420571	NoData	NoData
20	424150	420571	NoData	NoData
21	424160	420571	NoData	NoData
22	424170	420571	NoData	NoData
23	424180	420571	NoData	NoData
24	424190	420571	NoData	NoData
25	424150	420581	NoData	NoData
26	424160	420581	NoData	NoData
27	424170	420581	NoData	NoData
28	424180	420581	NoData	NoData
29	424190	420581	NoData	NoData
Max value in selected area:			NoData	NoData

Data in this table comes from the 2015 Batley Beck Mapping Study 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.
If no height or depth data is available for a scenario, no table will be shown.
'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.



Environment Agency

Defences removed climate change modelled fluvial extent and height

Location (easting/northing)
424163/420557

Scale
1:500

Created
29 Jul 2024

Model name
2015 Batley Beck Mapping Study

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 33.0
- 33.0 - 46.0
- 46.0 - 59.0
- 59.0 - 72.0
- 72.0 - 85.0
- 85.0 - 98.0
- 98.0 - 111.0
- 111.0 - 124.0
- 124.0 - 137.0

This map shows the 1.0% AEP +20% height data

0 5 10 15 20
metres

Sample point data

Defences removed climate change

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+20%)
			Depth	Height
1	424150	420531	NoData	NoData
2	424160	420531	NoData	NoData
3	424170	420531	NoData	NoData
4	424180	420531	NoData	NoData
5	424150	420541	NoData	NoData
6	424160	420541	NoData	NoData
7	424170	420541	NoData	NoData
8	424180	420541	NoData	NoData
9	424140	420551	NoData	NoData
10	424150	420551	NoData	NoData
11	424160	420551	NoData	NoData
12	424170	420551	NoData	NoData
13	424180	420551	NoData	NoData
14	424140	420561	NoData	NoData
15	424150	420561	NoData	NoData
16	424160	420561	NoData	NoData

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+20%)
			Depth	Height
17	424170	420561	NoData	NoData
18	424180	420561	NoData	NoData
19	424140	420571	NoData	NoData
20	424150	420571	NoData	NoData
21	424160	420571	NoData	NoData
22	424170	420571	NoData	NoData
23	424180	420571	NoData	NoData
24	424190	420571	NoData	NoData
25	424150	420581	NoData	NoData
26	424160	420581	NoData	NoData
27	424170	420581	NoData	NoData
28	424180	420581	NoData	NoData
29	424190	420581	NoData	NoData
Max value in selected area:			NoData	NoData

Data in this table comes from the 2015 Batley Beck Mapping Study 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.
If no height or depth data is available for a scenario, no table will be shown.
'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.

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