JNP GROUP

CONSULTING ENGINEERS

Flood Risk Assessment and Drainage Strategy

Project: Turnbridge Mills, Quay Street, Huddersfield, HD1 6QT

Client: John L Brierley Ltd.

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P02	19/03/2025	Updated layout & drainage strategy	LS / LC	SLL	SLL
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Contents

1 INTRODUCTION

1.1 Terms of Reference

1.1.1 JNP Group has been commissioned by Robert Halstead Chartered Surveyors & Town Planners on behalf of John L Brierley Ltd to prepare a flood risk assessment and drainage strategy for the proposed redevelopment of Tunbridge Mills in Huddersfield, West Yorkshire, HD1 6QT.

1.1.2 This report assesses flood risk at the development site from all potential sources and describes the measures adopted in the master planning process to manage such risks. It has been prepared in compliance with current policies and best practices.

1.1.3 This report reviews the surface water drainage hierarchy and proposes a drainage strategy. It describes the surface water drainage system and identifies management and maintenance tasks for the system. It also outlines a Surface Water Construction Management Plan for drainage during construction.

1.2 Policy Framework and Key Stakeholders

1.2.1 The *National Planning Policy Framework* (NPPF) sets strict tests to protect people and property from flooding which all local planning authorities are expected to follow. Where these tests are not met, national policy is clear that new development should not be allowed.

1.2.2 In areas at risk of flooding or for sites of one hectare (ha) or more, developers must undertake a site-specific flood risk assessment to accompany applications for planning permission (or prior approval for certain types of permitted development).

1.2.3 In decision-taking, local planning authorities must ensure a sequential approach to site selection and master planning is followed so that development is, as far as reasonably possible, located where the risk of flooding (from all sources) is lowest, taking account of climate change and the vulnerability of future uses to flood risk.

1.2.4 Where development needs to be in locations where there is a risk of flooding, local planning authorities and developers must ensure development is appropriately flood resilient and resistant, safe for its users for the development's lifetime, and will not increase flood risk elsewhere.

1.2.5 The Environment Agency (EA) is a statutory consultee on applications where there is a risk of flooding from the sea or main rivers.

1.2.6 Lead local flood authorities (unitary authorities or county councils) are responsible for managing local flood risk from ordinary watercourses, surface water or groundwater, and for preparing local flood risk management strategies. Local planning authorities work with lead local flood authorities to ensure local planning policies are compatible with the local flood risk management strategy.

1.2.7 Kirklees Council (KC) is the lead local flood authority (LLFA) and its strategy for managing local flood risk is set out in the Kirklees Local Flood Risk Management Strategy (2024).

1.2.8 Kirklees Council is also the local planning authority (LPA) and its policies on flood risk management are set out in the Kirklees Local Plan (February 2019).

1.2.9 Where relevant, local planning authorities and developers must also take advice from:

- Internal drainage boards; to identify the scope of their interests.
- Sewerage undertakers; to ensure they can assess the impact of new development on their assets and plan any required improvements. Yorkshire Water (YW) is the local sewerage undertaker.
- Reservoir undertakers; to avoid an intensification of development within areas at risk from reservoir failure and ensure they can assess the cost implications of any reservoir safety improvements required due to change in land use downstream of their assets.
- Navigation authorities; in relation to developments adjacent to, or which discharge into, canals (especially where these are impounded above natural ground level).

1.3 Sources of Information

1.3.1 This flood risk assessment has been based on the following sources of information:

- Bespoke topographic survey undertaken by TD Jagger Property Consultants in June 2022;
- British Geological Survey's *Geoindex Tool*;

  (*http://mapapps2.bgs.ac.uk/geoindex/home.html)*
- DEFRA / EA's aquifer and source protection data;

  (*https://magic.defra.gov.uk/MagicMap.aspx*)
- British Geological Survey's borehole scans;

  (*http://mapapps.bgs.ac.uk/geologyofbritain/home.html*)
- EA's Flood Map for Planning;

  (*https://flood-map-for-planning.service.gov.uk/*)
- EA's Long Term Flood Risk Information;

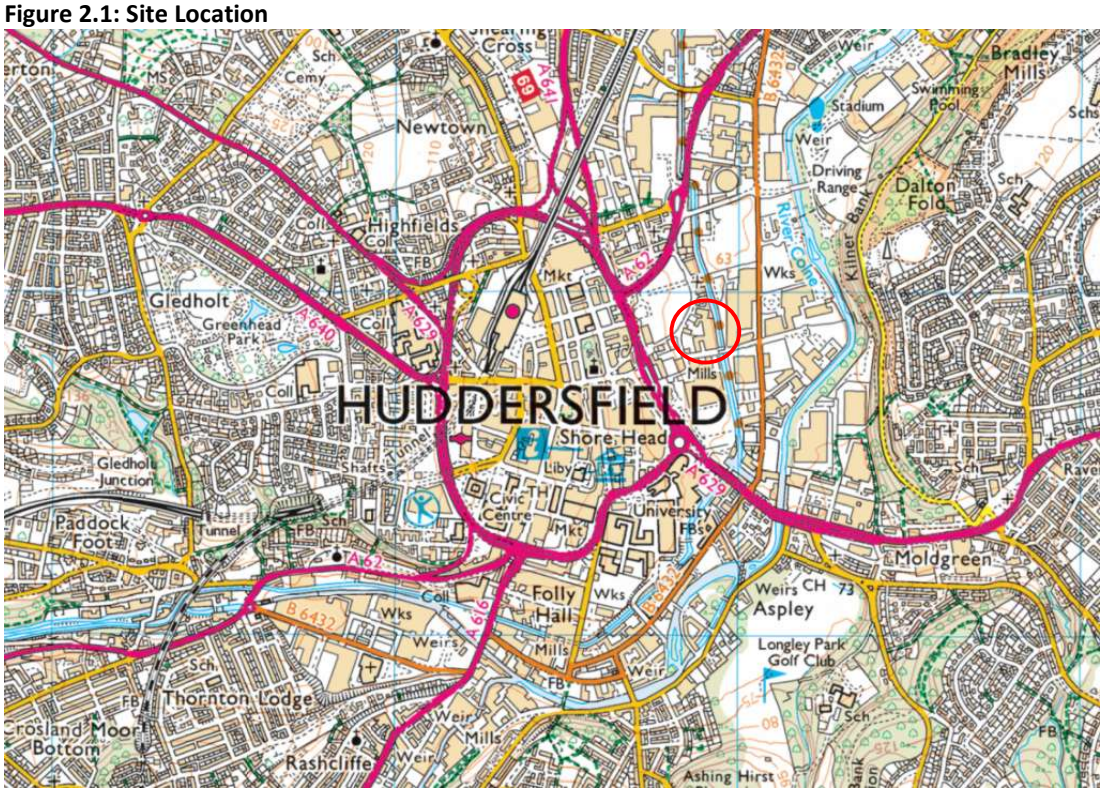
  (*https://*flood*-warning-information.service.gov.uk/long-term-flood-risk/map*)
- KC's Local Flood Risk Management Strategy (2024);
- EA's detailed flood risk information;
- Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015) and The SuDS Manual (2015);
- Design and Construction Guidance (DCG) for foul and surface water sewers offered for adoption under the Code for adoption agreements for water and sewerage companies operating wholly or mainly in England (May 2021).

2 DEVELOPMENT SITE

2.1 Location

2.1.1 The site is located off Quay Street, in Huddersfield, West Yorkshire approximately 500m east of Huddersfield town centre (Figure 2.1). The centre of the site is located at National Grid Reference 414922, 416862. The site covers an area of approximately 0.384 hectares.

Figure 2.1: Site Location



2.1.2 The site comprises a former two to six storey stone-built mill which appears to be currently used for a variety of commercial uses. The existing building occupies most of the site with areas of hard standing located within the western and central parts. The eastern side of the site is adjacent to the Huddersfield Broad Canal.

2.1.3 The proposed development comprises part demolition and part refurbishment of the existing mill building.

2.1.4 The surrounding land uses are summarised in the following table.

Table 2.2: Surrounding Land Use

Direction	Land Use
North	Commercial buildings
East	Huddersfield Broad Canal, beyond which is commercial buildings
South	Quay Street, beyond which is commercial buildings
West	Commercial buildings

2.2 Topography

2.2.1 The available topographic information (Appendix A) shows that the site is relatively flat lying with ground levels ranging between 68.70m AOD in the south west to c. 65.5m AOD in the south east.

2.3 Geology

2.3.1 The geology of the site has been determined by reference to the 1:50,000 scale British Geological Survey (BGS) map 77 (Huddersfield) and the online Geoindex Tool.

2.3.2 No artificial or made ground is indicated to be present underlying the site, however, from the aerial imagery viewed hardstanding is present across most of the site.

2.3.3 The superficial geology of the site to be is indicated to be Head deposits, which is described by the BGS as *"clay, silt, sand and gravel".*

2.3.4 The underlying geology is indicated to be undifferentiated strata of the Pennine Lower Coal Measures, which are described by the BGS as *"interbedded mudstone, siltstone and sandstone, commonly with mudstones containing marine fossils in the lower part, and more numerous and thicker coal seam in the upper part"*.

2.3.5 There are no faults denoted within 500m of the site.

2.3.6 JNP Group have consulted online borehole records held by the BGS. The records of two boreholes exist within 50m of the site. The boreholes encountered between 2.60m and 3.70m of made ground, overlying cohesive soils to depths of between 5.50m and 7.50m below existing ground level (bgl). These cohesive soils are considered to represent the superficial Head Deposits. Below the superficial deposits, mudstone and sandstone bedrock of the Pennine Lower Coal Measures were encountered to depths of between 8.10m and 8.50m bgl. Groundwater was recorded at depths of 2.60m and 7.50m bgl in one of the boreholes and 3.40m bgl in the second.

2.3.7 The Aquifer Maps, obtained from the DEFRA Magic Maps website, indicates that the site is underlain by a Secondary (undifferentiated) Aquifer. The aquifer status refers to the superficial Head Deposits. The Environment Agency define a Secondary (undifferentiated) Aquifer as:

"Cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type."

2.3.8 The Pennine Lower Coal Measures bedrock shown to underlie the site is classified by the Environment Agency as a Secondary A Aquifer. The Environment Agency define a Secondary A Aquifer as:

"Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers."

2.3.9 The site's proximity to groundwater Source Protection Zones (SPZs) was determined by reference to DEFRA's Magic Maps website. These zones show the risk of contamination from any activities that might cause pollution in the area, with the closer the activity, the greater the associated risk. The maps show three main zones (inner, outer and total catchment) to a groundwater source.

2.3.10 The site does not lie within a Source Protection Zone.

2.4 Hydrology

2.4.1 The nearest surface water feature to the site is the Huddersfield Broad Canal which is located adjacent to the eastern boundary of the site.

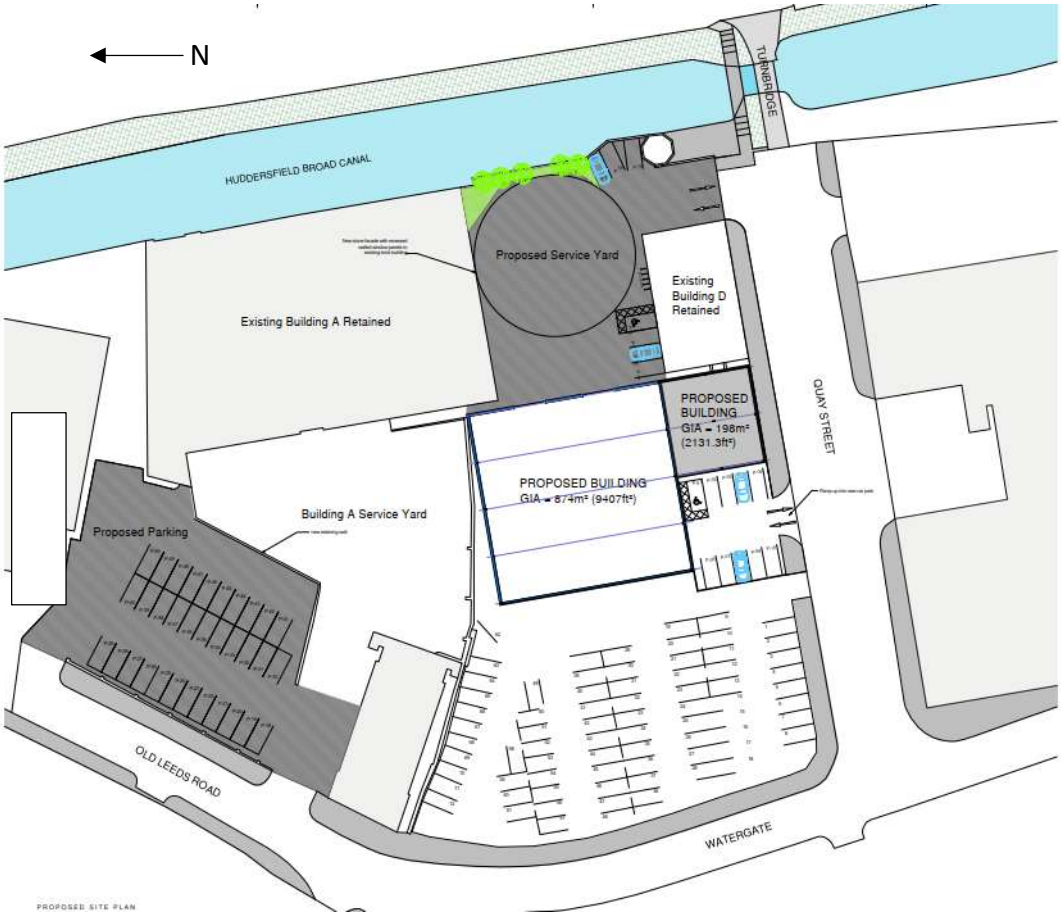
2.4.2 The River Colne is located approximately 290m south-east of the site at its closest point and is recorded to flow towards the north-east.

3 PROPOSED DEVELOPMENT

3.1.1 The proposed development (Figure 3.1) comprises 0.3844 ha of commercial development and comprises part demolition of most of the canal side buildings for the development of a business unit c. 2500m^2.The works also include the refurbishment of the existing mill building. It is understood that the areas where parts of the mill are to be demolished will be used for car parking. No areas of soft paved / permeable surfaces (e.g. gardens, green corridors, public open spaces, etc.) are proposed.

3.1.2 Under Table 2 of the *Flood Risk and Coastal Change Guidance* (August 2021), the proposed commercial development is classified as LESS VULNERABLE.

Figure 3.1: Proposed Development



4 FLOOD RISK ASSESSMENT

4.1 Overview

4.1.1 All potential sources of flood risk at the development site have been assessed based on the information listed in Section 1.3 and are summarised in Table 4.1. The key sources of flood risk to the proposed development are further described in the ensuing sections.

Table 4.1: Potential Sources of Flood Risk

Source	Flood Risk
Coastal	No risk, site in excess of 65m AOD
Fluvial	Low risk in general, but high risk of flooding along the eastern boundary adjacent to the Huddersfield Broad Canal – Refer to Section 4.3
Surface Water	Very low risk, across much of the site but higher risk in the building services yard towards the north west of the site. Refer to Section 4.4.
Groundwater	Low risk
Sewers	Low risk, no known sewer flooding issue
Infrastructure Failure	Potential for flooding from failure of the Bilberry and Blackmoorfoot Reservoirs – Refer to Section 4.5

4.2 Climate Change

4.2.1 The NPPF sets out how the planning system should help minimise vulnerability and provide resilience to the impacts of climate change. This includes demonstrating how flood risk will be managed now and over the development's lifetime, taking climate change into account.

4.2.2 In accordance with the EA's guidance Flood Risk Assessment: Climate Change Allowances (May 2022), the proposed development with anticipated life span into the 2100's (2070 to 2115) must take account of the following allowances. EA's guidance indicates that for less vulnerable development, the central climate change allowance should be used:

- Peak River Flows (Aire and Calder river basin district)
  - Central 23%
- Peak Rainfall Intensity
  - Higher 31%
- Peak Rainfall Intensity (Aire and Calder river basin district, 2070s 1% AEP).
  - Central 30%
  - Upper End 45%

4.3 Fluvial Flood Risk

4.3.1 Fluvial flooding occurs when a catchment area receives greater than usual amounts of water (e.g. rainfall or snow melt). When the converging runoff exceeds the conveyance capacity of the receiving channel, water spills onto the surrounding floodplains and fluvial flooding occurs.

4.3.2 Fluvial flooding usually occurs hours or days after heavy and / or prolonged rainfall and its effects often last several hours or days.

4.3.3 Besides posing a direct flood risk to floodplain areas, high water levels in watercourses can exacerbate other sources of flood risk by surcharging / locking outfalls, thus preventing the normal discharge of flows or even back flowing into tributary drainage systems.

4.3.4 In accordance with the EA's *Flood Map for Planning* (Figure 4.1), most of the site is in Flood Zone 1 (<0.1% AEP). However, the eastern edge of the site is shown to lie within Flood Zone 3 (1% AEP).

4.3.5 The site does not benefit from formal flood defences.

Figure 4.1: Flood Map for Planning

4.3.6 Detailed Product 4 flood risk assessment data was obtained from the EA and is included in Appendix B. The historic flood event map included within the data does not show any historic flooding has occurred on the site or in its proximity.

4.3.7 The detailed modelling established maximum flood levels within the channel of the Huddersfield Broad Canal of 64.26m AOD (1.0% AEP + 20% climate change) and 64.61m AOD (1% AEP + 50% climate change). The data also shows a series of points across the site which were modelled but no maximum flood levels were determined.

4.3.8 The topographical survey of the site shows that existing ground levels, ranging between c. 65.5 AOD and 68.7 AOD, are higher than the maximum modelled flood level for a design storm event (1% AEP + CC) by over 1m for the 1 in 100 year + 20% CC storm event.

4.3.9 Therefore, the residual fluvial flood risk to the site is deemed to be very low / negligible for this level of storm.

4.3.10 The site is currently completely covered by impermeable areas (buildings and associated hard standing) and the proposed redevelopment of the site will not increase the impermeable area and associated surface water run-off.

4.3.11 In conclusion, the proposed development is not at risk of fluvial flooding for the design flood event (1% AEP + CC) and does not increase flood risk off-site.

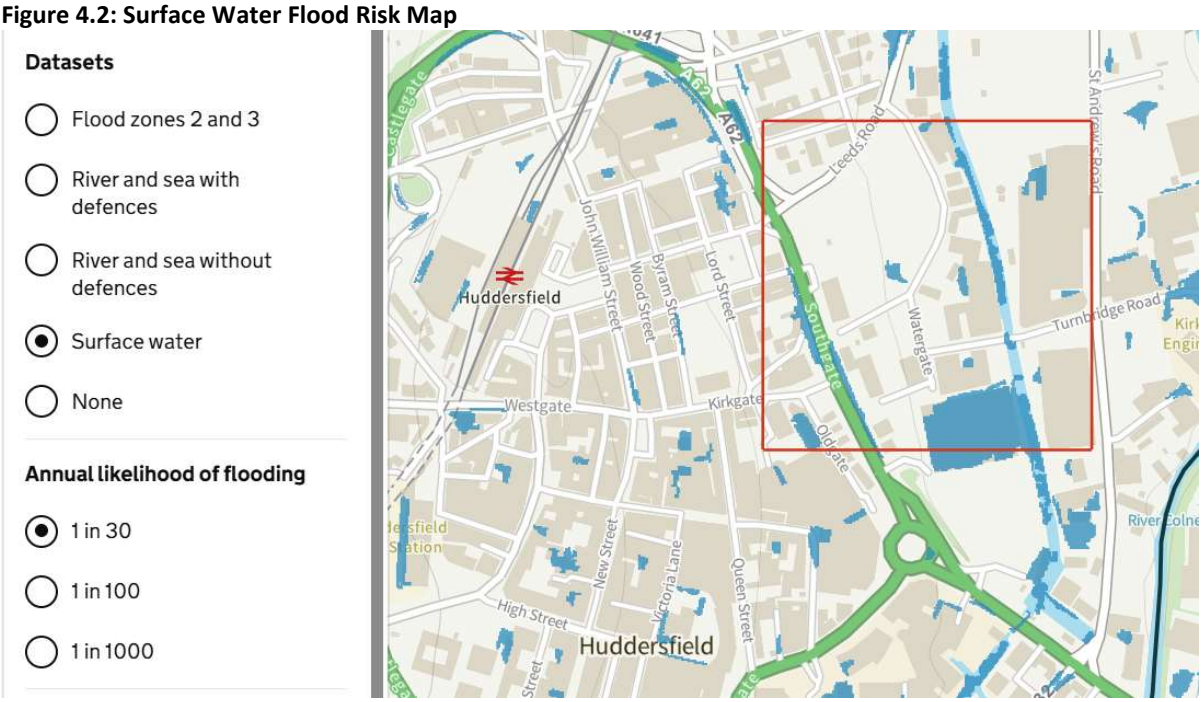
4.4 Surface Water Flood Risk

4.4.1 Surface water flooding is a description for excessive overland flows that have yet to enter a natural or manmade receptor (e.g. aquifer, watercourse or sewer). Surface water flooding also occurs when the amount of runoff exceeds the capacity of the collecting system and spills onto overland flow routes.

4.4.2 Surface water flooding is usually the result of intense, short lived rainfall events, but can also occur during milder, longer lived rainfall events, when collecting systems are at or near capacity or the ground is saturated. It often results in the inundation of low points in the terrain.

4.4.3 In accordance with the EA's *Long Term Flood Risk Information* (Figure 4.2) the development site is mostly at very low (< 0.1% AEP) risk of surface water flooding. However, a small area towards the north west of the site is indicated to be high risk of surface water flooding. This is a service yard with buildings on the downslope sides to the east and south, therefore with no route for surface water to escape. This area is served by an existing drainage system.

Figure 4.2: Surface Water Flood Risk Map



4.4.4 The management measures proposed to deal with off-site overland flows reaching the site are already present.

4.4.5 The risk of surface water flooding from runoff generated within the development site will be managed by the drainage strategy described in Section 6.

4.5 Infrastructure Failure Flood Risk

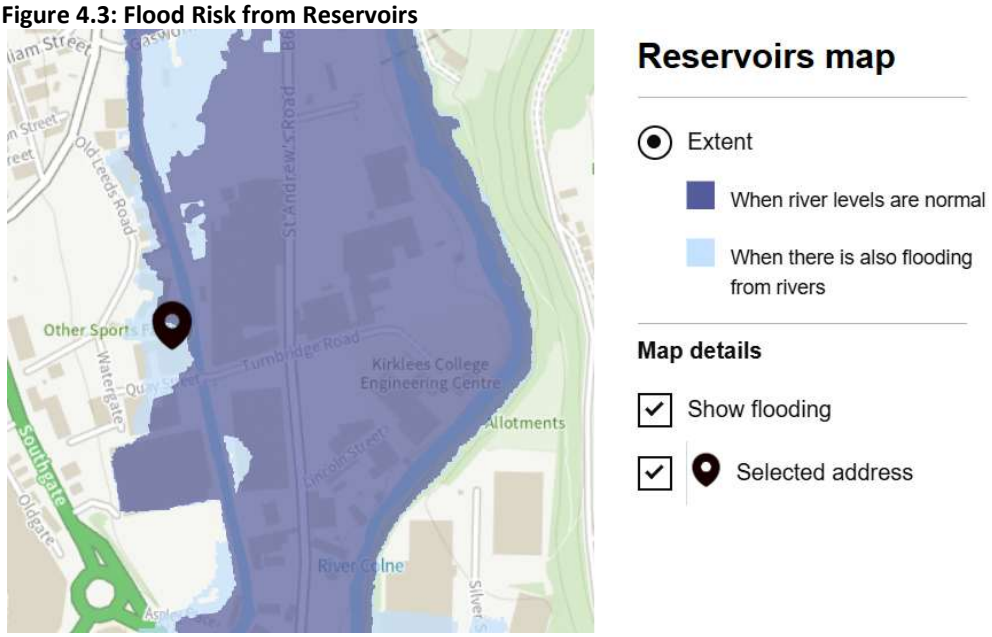
4.5.1 Infrastructure failure flooding occurs when a feature holding water above natural ground levels (e.g. reservoir or canal) is overtopped or breached. Infrastructure failure flooding is usually the result of extreme events in excess of the high standards of protection usually considered in the design of such structures (namely reservoirs).

4.5.2 In accordance with the EA's *Long Term Flood Risk Information*, the development site is at risk of flooding from failure of the Bilberry and Blackmoorfoot reservoirs, both owned and maintained by Yorkshire Water Services Ltd.

4.5.3 Reservoir failures are extremely rare in the UK, as the *Reservoir Act* ensures strict inspection and maintenance of all structures above a certain threshold. Structures under the *Reservoir Act* are also covered by comprehensive emergency plans and warning systems developed in liaison with the relevant civil protection authorities to ensure populations potentially at risk can be safely evacuated in critical situations.

4.5.4 Flood risk from infrastructure failure is mostly managed off-site by the competent authorities. Therefore, the residual risk to the site is deemed to be very low / negligible.

Figure 4.3: Flood Risk from Reservoirs



5 SURFACE WATER DRAINAGE STRATEGY

5.1 Existing Drainage

5.1.1 The existing site is a mix of industrial buildings and car parks. Runoff generated within the existing industrial (brownfield) development is collected by rainwater pipes and gullies and outfalls to the existing combined sewer network surrounding the site and also to the canal. The current site owner has confirmed an agreement is in place for 7no. outfalls to the canal from the existing site. There is evidence of these outfall pipes to the canal by visual inspection.

5.1.2 Large parts of the site are to remain as existing or will undergo relatively minor updates and so it is anticipated that these areas can continue to use the existing drainage system and outfalls.

5.1.3 Brownfield runoff rates have been calculated for the areas that are due to undergo significant development as follows. These have been calculated using the modified rational method as per Appendix D.

Table 5.1 Brownfield Run-off Rates

Area	Area (ha)	Runoff Rate (l/s)
Proposed large parking area	0.135	18.8
Proposed smaller car park and some roof area	0.093	13.0
Proposed service yard and some roof area	0.156	21.6

5.1.4 The greenfield run-off rates for the site are listed below (Appendix D).

Table 5.1 Greenfield Run-off Rates

	Q1 (l/s)	Q_{BAR} (l/s)	Q30 (l/s)	Q100 (l/s)
Proposed large parking area	0.7	0.9	1.5	1.80
Proposed smaller car park and some roof area	0.5	0.6	1.0	1.2
Proposed service yard and some roof area	0.9	1.0	1.7	2.1

5.2 Hierarchy for Surface Water Disposal

5.2.1 The National Standards for Sustainable Drainage Systems (Defra, 2011) state that the following options must be considered in accordance with the hierarchy for surface water disposal:

Discharge to Ground (Infiltration)

5.2.2 Based on the available geological and hydrogeological information (Section 2 of this report), infiltration drainage is deemed unfeasible at the development site. Therefore, an alternative solution is also proposed.

Discharge to Surface Water Body

5.2.3 The Huddersfield Broad Canal is located adjacent to the site. There are existing connections to the canal from parts of the site located along this boundary. It is proposed to reuse these connections for the proposed development runoff adjacent to the canal but at a restricted flow rate to allow for betterment. Site constraints do not allow for all proposed runoff to outfall to the canal, and so some discharge will also go to sewer (below).

Discharge to Sewer

5.2.4 There is a Yorkshire Water combined sewer network surrounding the boundary of the site. Large parts of the site already drain to the combined sewer network. It is proposed to drain these parts of the site that are being developed into the combined sewer network but providing a betterment from existing brownfield rates.

5.3 Proposed Drainage Strategy

5.3.1 The proposed surface water drainage strategy has been designed in accordance with the *DCG* and in compliance with the *NPPF*, local requirements and current best practices, to collect, convey and attenuate runoff from all proposed impermeable areas (0.384 ha) before discharging into a combination of the Huddersfield Broad Canal and the Yorkshire Water combined sewer network. Refer to Appendix E for the Impermeable Areas Plan.

5.3.2 The proposed drainage strategy (Appendix F) intends to collect runoff via a series of rainwater pipes and gullies / channels before discharging into a below ground drainage network and then passing through an attenuation tank and flow control before outfalling from the site at a restricted discharge rate.

5.3.3 A pre-development enquiry will be required with YW to confirm the connection to the sewer network is acceptable. Any new connections will be subject to a Section 106 agreement unless an existing connection can be re-used. Agreement with the Canal and River Trust will typically be required for outfalling to the canal via a Section 6 Application. However, the C+R Trust may be more flexible considering the existing connections.

5.3.4 Given the layout of the site, the development areas have been split into smaller catchments with individual outfalls. Each area has a flow control and attenuation tank prior to outfalling offsite. The restricted runoff rates provide a 50% betterment from the existing brownfield rates as detailed below. Each attenuation tank is designed to store runoff above this rate up to and including the 100yr + 45% climate change event.

Table 5.1 Brownfield Run-off Rates

Area	Existing Brownfield Rate (l/s)	Proposed Discharge Rate with 50% Betterment (l/s)
Proposed large parking area	18.8	9.4
Proposed smaller car park and some roof area	13.0	6.5
Proposed service yard and some roof area	21.6	10.8

5.3.5 The area adjacent to the canal is currently a building which is to be demolished and replaced with a service yard. An oil separator is to be provided for this area to provide a level of treatment to the service yard runoff prior to outfalling to the canal.

5.4 Sustainable Drainage Systems (SuDS)

5.4.1 In accordance with the *NPPF*, (major) developments should incorporate sustainable drainage systems (SuDS) unless there is clear evidence that this would be inappropriate. In addition to water quantity control, SuDS should consider opportunities to provide water quality and amenity / biodiversity benefits (i.e. multifunctionality approach).

5.4.2 While the proposed drainage strategy is largely reliant on an attenuation tank to manage runoff quantity, the table below shortlists other SuDS that should be continuously assessed as the design progresses. The industrial nature of the site will make it difficult to implement many of these SuDS techniques.

5.4.3 It is important to note the need to remove silt from runoff prior to discharge into SuDS features. SuDS such as filter drains, swales, bioretention systems and pervious pavements are sustainable alternatives to proprietary treatment systems otherwise required to manage silt.

Table 5.2: Sustainable Drainage Systems (SuDS)

SuDS Component	Description and Opportunities
Green / Blue Roofs	Green roofs are areas of living vegetation installed on the top of buildings for a range of reasons including visual benefit, ecological value, enhanced building performance and reduction of surface water runoff. A blue roof is a roof designed explicitly to store water for use within the building (rainwater harvesting) or controlled discharge. Green roofs that include reservoir storage zones beneath the growing medium could also be considered blue roofs. Green roofs can improve the thermal performance of buildings, help combat the urban heat island effect and contribute to improved air quality. Through evapotranspiration, green roofs can reduce peak flow rates to a site drainage system (principally for small and medium-sized events) but are unlikely to a have a significant impact on downstream attenuation storage requirements. Blue roofs can be designed to provide significant attenuation (and evapotranspiration). Green roofs could be implemented on any flat roofs.

SuDS Component	Description and Opportunities
Bioretention Systems Tree Pits	Bioretention systems (including rain gardens) are shallow landscaped depressions that can reduce runoff rates and volumes and treat pollution. They also provide attractive landscape features and biodiversity. Bioretention systems can help reduce flow rates from a site by promoting infiltration / evapotranspiration and providing some attenuation storage. Bioretention systems can also provide very effective treatment functionality. Bioretention systems are a very flexible surface water management component that can be integrated into a wide variety of developments / densities using different shapes, materials, planting and dimensions. Rain gardens / tree pits would be difficult to incorporate given the nature of the proposed use of the site.
Pervious Pavements	Pervious pavements provide a pavement suitable for pedestrian and / or vehicular traffic, while allowing rainwater to infiltrate through the surface and into the underlying structural layers. The water is temporarily stored beneath the overlying surface before use, infiltration to the ground or controlled discharge downstream. Pervious pavements help reduce flow rates from a site by providing attenuation storage. A flow control structure is required to constrain the rate of water discharged from the sub-base via an outlet pipe. Pervious pavement drainage has been shown to have decreased concentrations of a range of surface water pollutants, including heavy metals, oil and grease, sediment and some nutrients. Pervious pavements are typically built as an alternative to impermeable surfaces and therefore require no extra development space for their construction. Permeable paving would be difficult to incorporate given the nature of the proposed use of the site.
Attenuation Storage Tanks	Attenuation storage tanks are used to create a below-ground void space for the temporary storage of surface water before use, infiltration or controlled release. Attenuation storage tanks can help reduce flow rates from a site by providing significant attenuation storage. Storage tanks do not provide any form of treatment of surface water runoff and therefore need to be combined in a “management train” with other methods that do provide suitable treatment of all relevant pollutants (coarse sediment must always be removed upstream of a storage tank). The inherent flexibility in size and shape of the typical attenuation storage tank systems means that they can be tailored to suit the specific characteristics and requirements of any site. However, the lack of amenity and biodiversity benefits means that storage tanks should be a last resource in any surface water drainage strategy for a major development. An attenuation tank is proposed for each proposed site outfall to help manage surface water runoff.

5.5 Exceedance Events

5.5.1 In the event of a storm event greater than the 1.0% AEP + 45% climate change, or a failure of the drainage system, exceedance flows may be generated from the drainage network.

5.5.2 It is not proposed to revised levels of the proposed car park area next to Old Leeds Road and so exceedance flows from this area will continue as pre-development conditions.

5.5.3 Within the smaller car park, levels should be designed so that any exceedance flows fall away from buildings and make their way back into the network via the gullies or channels which could be located centrally within the site.

5.5.4 Levels within the service yard typically fall towards the canal. The proposed finished levels of this area shall maintain this approach. Exceedance flows will therefore re-enter the system via gullies or channels or enter the canal.

5.6 Water Quality Management

5.6.1 The suitability of the proposed drainage strategy to manage the development's pollution risk has been assessed using the simple index approach in *The SuDS Manual* (2015), as summarised in the table below. This is specific to the site area adjacent to the canal. The other two site areas are considered relatively low risk areas and are not undergoing a change of use and are already discharging to a combined sewer, therefore further mitigation measures are not provided.

Table 5.3: Surface Water Quality Management (Simple Index Approach)

Runoff Route / Treatment Train				
Land Use / SuDS	Hazard Level	TSS	Metals	Hydrocarbons
Pollution Hazard Indices				
Other roofs (commercial / industrial)	Low	0.3	0.2	0.05
Commercial yard	Medium	0.7	0.6	0.7
SuDS Mitigation Indices				
Oil Separator*		0.84	0.63	0.97
Total SuDS Mitigation Index ≥ Pollution Hazard Index (for each contaminant type)				

* Note the above values are based on the Marsh SuDS SAFE Hydroil oil separator which is manufactured to provide suitable SuDS mitigation Indices for the simple index approach above.

5.7 Operation and Maintenance

5.7.1 The function of the surface water drainage system must be understood by those responsible for maintenance, regardless of whether individual components are below ground or on the surface. In any system properly designed, monitored and maintained, performance deterioration can usually be minimised.

5.7.2 The long-term operation and maintenance of the proposed surface water drainage strategy will be the responsibility of entities, as detailed in the table below. Appropriate legal agreements defining maintenance responsibilities and access rights over the lifetime of the proposed development must be established prior to construction.

Table 5.4: Entities Responsible for SuDS Maintenance

SuDS Component	Location	Function	Responsible Entity
Attenuation storage tank	Car Parks and Service yard	Store runoff	Site owner / private management company

SuDS Component	Location	Function	Responsible Entity
Oil separator	Service Yard	Treat runoff	Site owner / private management company

5.7.3 Where the user / benefiter of a system is not responsible for maintenance, then it is important to ensure that they know when the SuDS is not functioning correctly and who to contact if any issue arises.

5.7.4 Maintenance plans are often required to clearly identify who is responsible for maintaining proposed SuDS as well as the maintenance regime to be applied. Maintenance plans can also form a useful tool for public engagement with SuDS and understanding their wider benefits. The maintenance requirements of the proposed surface water drainage strategy are summarised in the table below.

Table 5.5: Typical Operation and Maintenance Requirements

Operation and Maintenance Activity	Attenuation Storage Tank	Oil Separator
Inspection	■	■
Litter and debris removal	□	□
Sediment management	■	■
Structure rehabilitation/repair	□	□
Key: ■ Will be required □ May be required		

5.8 Drainage During Construction

5.8.1 Drainage is typically an early activity in the construction of a development, taking form during the earthworks phase as it is the responsibility of the contractor to manage all construction runoff rates and water quality. However, the connection of piped drainage system to SuDS components should not take place until the end of construction works, unless a robust strategy for silt removal prior to occupation of the site is implemented.

5.8.2 Silt-laden runoff from construction sites represents a common form of waterborne pollution and cannot enter SuDS components not specifically designed to manage this, as it can overwhelm the system and pollute receiving water features. Any gullies and piped systems should be capped off during construction and fully jetted and cleaned prior to connection to SuDS components.

5.8.3 The three principal aspects of drainage during construction are conveying runoff, controlling runoff and trapping sediments:

- Conveyance of runoff can be achieved through small ditches / swales, channels and drains. Runoff control measures should be implemented to ensure that runoff does not overwhelm the temporary drainage system causing flooding on site or elsewhere.
- Control of runoff can be achieved through perimeter ditches or appropriate grading to ensure that any runoff from the construction site stays on site. Runoff rates leaving

the site should be managed so they do not exceed the proposed rates stated in this report, based on pre-development conditions.

- Construction runoff should be directed to dedicated settlement basins with adequate upstream sediment and pollution control such as sediment basins, silt fences and straw bales prior to infiltration or off-site discharge.

5.8.4 Additional conveyance, control and treatment measures should be installed as needed during grading. Slope stability needs to be considered when using open water features to convey, control and treat runoff across the site. Any necessary surface stabilisation measures should be applied immediately on all disturbed areas where construction work is either delayed or incomplete.

5.8.5 Maintenance inspections should be performed weekly, and maintenance repairs should be made immediately after periods of rainfall.

5.8.6 All drainage infrastructure (namely underground features) must be protected from damage by construction traffic and heavy machinery through the implementation of measures such as protective barriers and storing construction materials away from the drainage infrastructure.

5.8.7 Drainage during constructed should be controlled via a Construction Environmental Management Plan (CEMP) or a Surface Water Management Plan.

6 FOUL WATER DRAINAGE STRATEGY

6.1.1 Sewerage undertakers have a legal obligation under the Water Industries Act 1991 to provide developers with the right to connect to public (foul) networks. The Water Industries Act 1991 also contains safeguards to ensure that flows resulting from new developments do not cause detriment to the existing public sewerage networks by imposing a duty on sewerage undertakers to carry out works required to accommodate additional flows into their networks.

6.1.2 It is assumed that the existing site has a formal foul connection to the existing public sewer network. In accordance with records obtained from Yorkshire Water, the surrounding road network around the site is served by a public network of combined sewers.

6.1.3 It is proposed that foul water from the new development is discharged to the local combined sewer through a new connection or via the on-site system once the location and condition of this is understood. The overall building footprint and potential occupancy of the site is being reduced so the capacity within the existing network will be improved as part of these works.

6.1.4 A pre-development enquiry will be required with YW to confirm this proposal is acceptable. Any new connections will require a Section 106 agreement from the Water Industry Act 1991.

6.1.5 Once planning consent has been granted, it is recommended that this is forwarded to the water company for review and approval.

7 CONCLUSIONS AND RECOMMENDATIONS

7.1.1 JNP Group has been commissioned by Robert Halstead Chartered Surveyors & Town Planners on behalf of John L Brierley Ltd to prepare a Flood Risk Assessment for the proposed redevelopment at Turnbridge Mill in Huddersfield.

7.1.2 The site is brownfield and is approximately 0.384 ha and is located on Quay Street, Huddersfield. The proposed development includes part demolition and refurbishment of the existing mill building. The entire site is to remain as impermeable areas as per the existing site.

7.1.3 The nearest surface water feature is the Huddersfield Broad Canal which is located along the eastern boundary of the site. The River Colne is located approximately 290m south-east of the site.

7.1.4 The EA's *Flood Map for Planning* (Figure 4.1), indicates most of the site is in Flood Zone 1 (<0.1% AEP). However, the eastern edge of the site is shown to lie within Flood Zone 3 (1% AEP).

7.1.5 Detailed flood risk assessment data for the site was obtained from the EA.

7.1.6 The detailed modelling established maximum flood levels within the channel of the Huddersfield Broad Canal of 64.26m AOD (1,0% AEP + 20% climate change) and 64.61m AOD (1% AEP + 50% climate change).

7.1.7 The topographical survey of the site shows that existing ground levels, ranging between c. 65.5 AOD and 68.7 AOD, are higher than the maximum modelled flood level.

7.1.8 The Flood Risk Assessment section of this report demonstrates that the risk of flooding from all sources (fluvial, tidal, surface water, groundwater, sewer and reservoir) is low.

7.1.9 Runoff generated within the existing industrial (brownfield) development is collected by rainwater pipes and gullies and outfalls to the existing combined sewer network surrounding the site and also to the canal. Large parts of the site are to remain as existing or will undergo relatively minor updates and so it is anticipated that these areas can continue to use the existing drainage system and outfalls.

7.1.10 For the areas proposed for more significant development, these will have new drainage systems and outfall to the canal where possible in accordance with the surface water hierarchy, or to the combined sewer network where required.

7.1.11 Due to site constraints, the proposed development is separated into 3no. catchments each with an individual outfall. Flows will be restricted to 50% of the existing brownfield runoff rates.

7.1.12 The proposed drainage strategy intends to collect runoff via rainwater pipes and gullies before discharging to a below ground network and outfalling via an attenuation tank and flow control. Attenuation is provided up to and including the 100yr + 45% climate change event.

7.1.13 Runoff from the service yard will be treated using an oil separator prior to outfalling to the canal.

7.1.14 Exceedance flows will typically follow pre-development conditions. The new service yard and smaller car park will either re-enter the drainage system or flow away from the adjacent buildings.

7.1.15 It is proposed that foul water from the new development is discharged to the local combined sewer through a new connection or via the on-site system once the location and condition of this is understood. The overall building footprint and potential occupancy of the site is being reduced so the capacity within the existing network will be improved as part of these works.

7.1.16 Any connection to the public sewer network will be subject to agreement with Yorkshire Water and any new connection will require a S106 application.

7.1.17 In conclusion, the proposed development is not at risk of flooding for the design flood event (1% AEP + CC) and does not increase flood risk off-site.

8 LIMITATIONS

8.1.1 The information, conclusions and recommendations presented within this report are deemed to be current at the time of issue. No guarantee can be given to the status of this information other than at the time of issuing. Where necessary, the user shall confirm the status of any applicable assessments and consents.

8.1.2 This report has been commissioned by John L Brierley Ltd. No third party may receive a copy of this report without first obtaining our permission in writing.

8.1.3 This report is confidential and has been prepared solely for the benefit of John L Brierley Ltd and those parties with whom a warranty agreement has been executed or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of this report, written approval must be sought from JNP Group and a charge may be levied against such approval. JNP Group accepts no responsibility or liability for the consequences of this document being used for any purpose or project other than for which it was commissioned, or this document being used by any third party with whom an agreement has not been executed.

8.1.4 The copyright of this report remains with JNP Group at all times.

APPENDIX A: TOPOGRAPHICAL SURVEY

N

SET RISE SUMMER DAYLIGHT

SET RISE WINTER DAYLIGHT

Key

Building to be Retained

Buildings for Demolition

TURNBRIDGE MILLS

B

G

C

D

D1

STEVE'S AT THE MILL RESTAURANT

STONE BUILDING

M

CANAL

416860N

416840N

416820N

. BRIERLY LTD

F

ORMATION

Rev	Note	Initial	Date

T D JAGGER
PROPERTY CONSULTANTS

3 Richmond House, Caldene Business Park,
Mytholmroyd, Hebden Bridge,
West Yorkshire, HX7 5QJ
01422 883317
enquiries@tdjagger.ltd.uk
www.tdjagger.ltd.uk

Client: JLB

Project: Roof Remedial Works, Quay Street, Huddersfield

Drawing: Site Plan Demolition

Date	Drawn	Checked	Scale
June 2022	SD	TDJ	1:100@A1

Drwg. No. 1908 45

Revision -

Dont Ignore Health & Safety

Think Safe Build Safe

It Might Just Save Your Life

APPENDIX B: ENVIRONMENT AGENCYS FLOOD RISK ASSESSMENT DATA

Flood risk assessment data

Location of site: 414922 / 416862 (shown as easting and northing coordinates)
Document created on: 23 February 2023
This information was previously known as a product 4.
Customer reference number: 4YYT88PK24CC

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
- 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

Not included in this document

This document does not include a Flood Defence Breach Hazard Map.

If your location has a reduced flood risk from rivers and sea because of defences, you need to request a Flood Defence Breach Hazard Map and information about the level of flood protection offered at your location from the Yorkshire Environment Agency team at neyorkshire@environment-agency.gov.uk. This information will only be available if modelling has been carried out for breach scenarios.

Include a site location map in your request.

Information that's unavailable

This document **does not** contain:

- flood defences and attributes

We aren't able to display flood defence locations and attributes as there are no formal flood defences in the area of interest.

Surface water and other sources of flooding

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

- surface water
- ordinary watercourses
- reservoirs

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

About the models used

Model name: 2011 Huddersfield Study - Allison Dike and Blackhouse Dike
Scenario(s): No defences exist fluvial
Date: 31 March 2011

Model name: 2011 Huddersfield Study - Grimescar Beck / Clayton Dike
Scenario(s): No defences exist fluvial, no defences exist climate change fluvial
Date: 31 March 2011

Model name: 2019 Colne Model
Scenario(s): Defended fluvial, defences removed fluvial, defences removed climate change fluvial
Date: 1 August 2019

Model name: 2019 River Holme model
Scenario(s): No defences exist fluvial, no defences exist climate change fluvial
Date: 1 August 2019

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

Terminology used

Annual exceedance probability (AEP)

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

Metres above ordnance datum (mAOD)

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

Flood map for planning (rivers and the sea)

Your selected location is in flood zone 3.

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

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

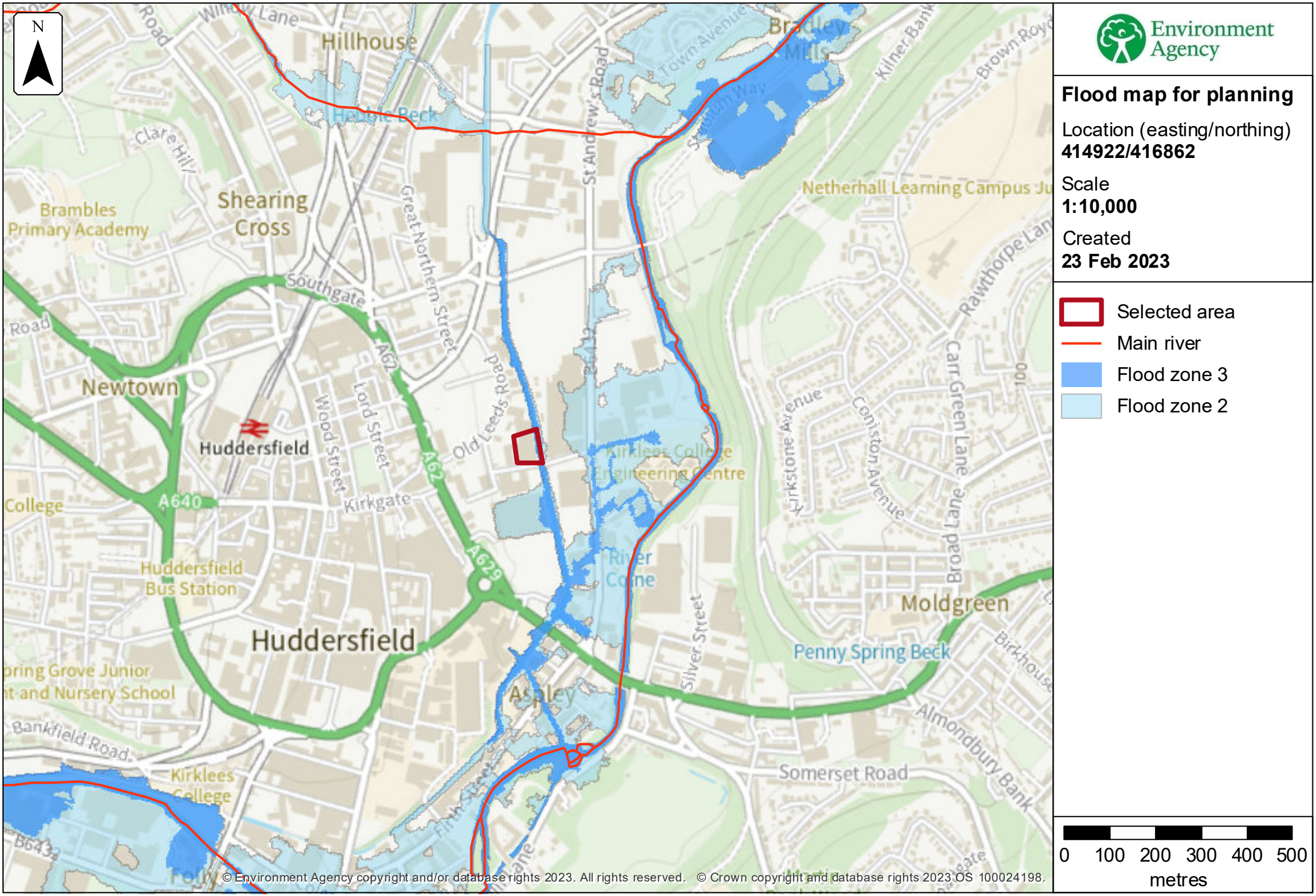
Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

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

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

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

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



Environment Agency

Flood map for planning

Location (easting/northing)
414922/416862

Scale
1:10,000

Created
23 Feb 2023

- Selected area
- Main river
- Flood zone 3
- Flood zone 2

0 100 200 300 400 500
metres

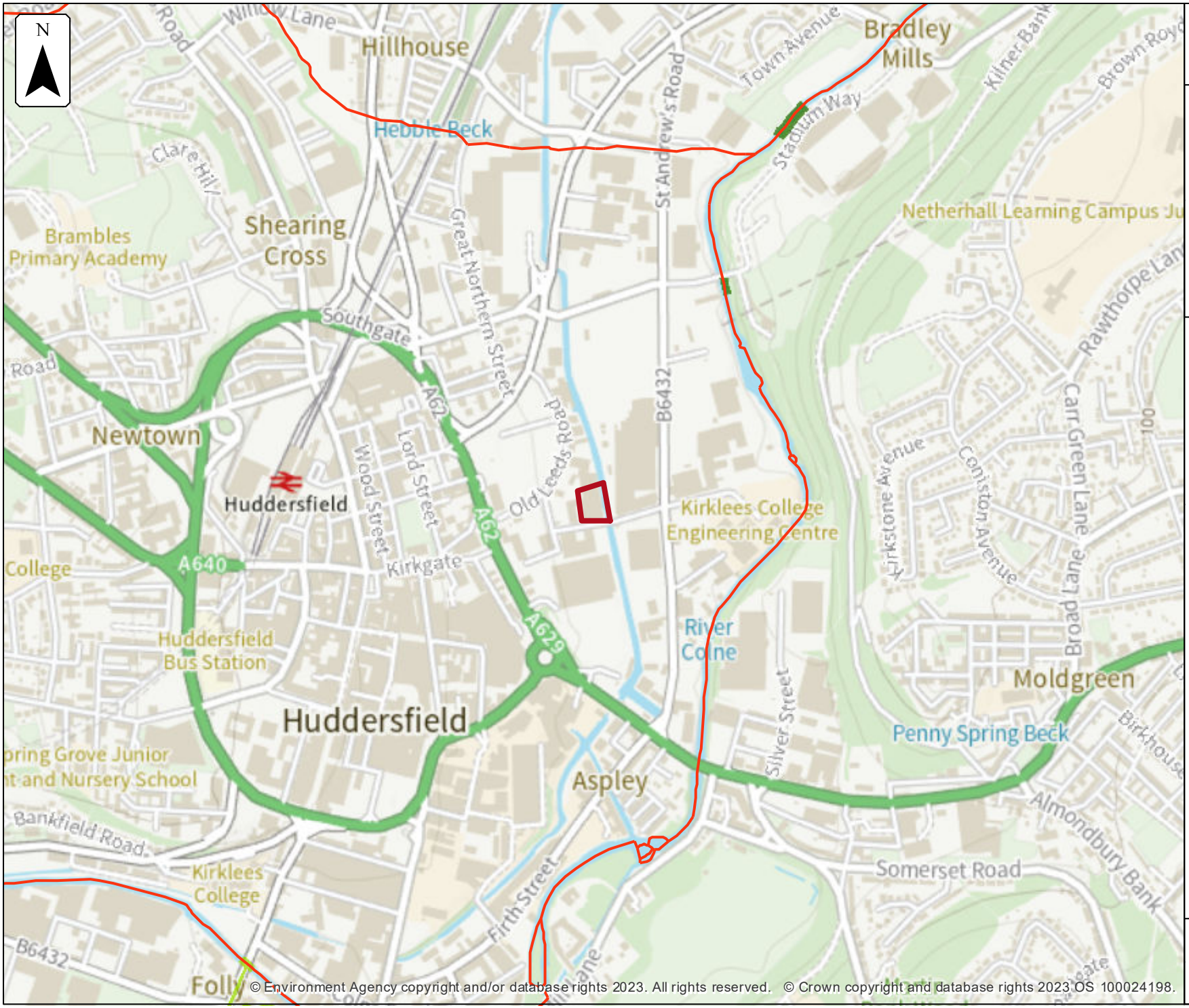
Historic flooding

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

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

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

Download recorded flood outlines in GIS format



Environment Agency

Historic flood map

Location (easting/northing)
414922/416862

Scale
1:10,000

Created
23 Feb 2023

Selected area

Main river

Date of flood event

February, 2022

February, 2020

0 100 200 300 400 500
metres

Historic flood event data

Start date	End date	Source of flood	Cause of flood	Affects location
20 February 2022	28 March 2022	main river	channel capacity exceeded (no raised defences)	No
15 February 2020	19 March 2020	main river	channel capacity exceeded (no raised defences)	No

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

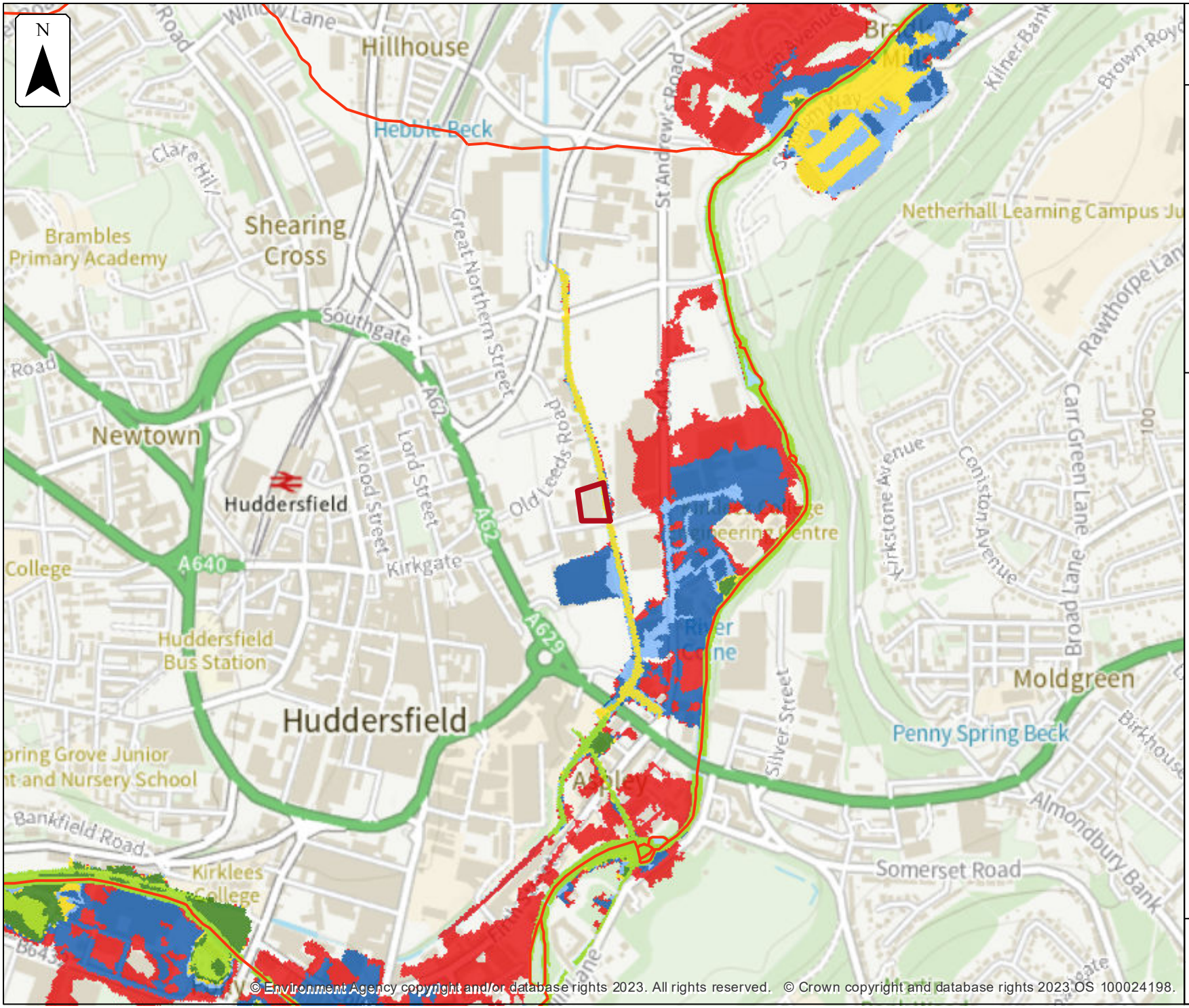
The climate change data included in the models may not include the latest flood risk assessment climate change allowances. Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

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



Environment Agency

Defended modelled fluvial extent

Location (easting/northing)
414922/416862

Scale
1:10,000

Created
23 Feb 2023

Model name
2019 Colne Model

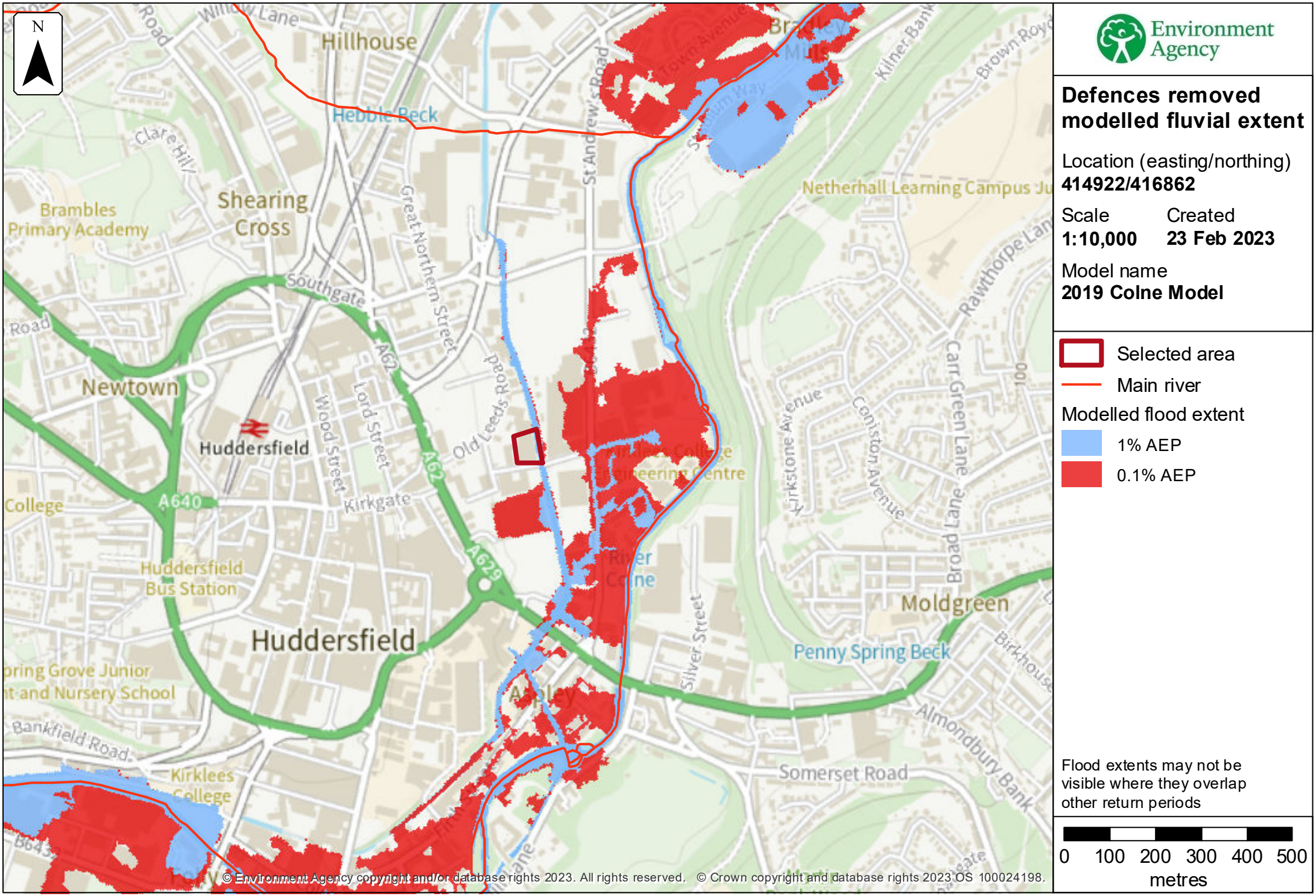
- Selected area
- Main river

Modelled flood extent

- 5% AEP
- 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)
414922/416862

Scale
1:10,000

Created
23 Feb 2023

Model name
2019 Colne Model

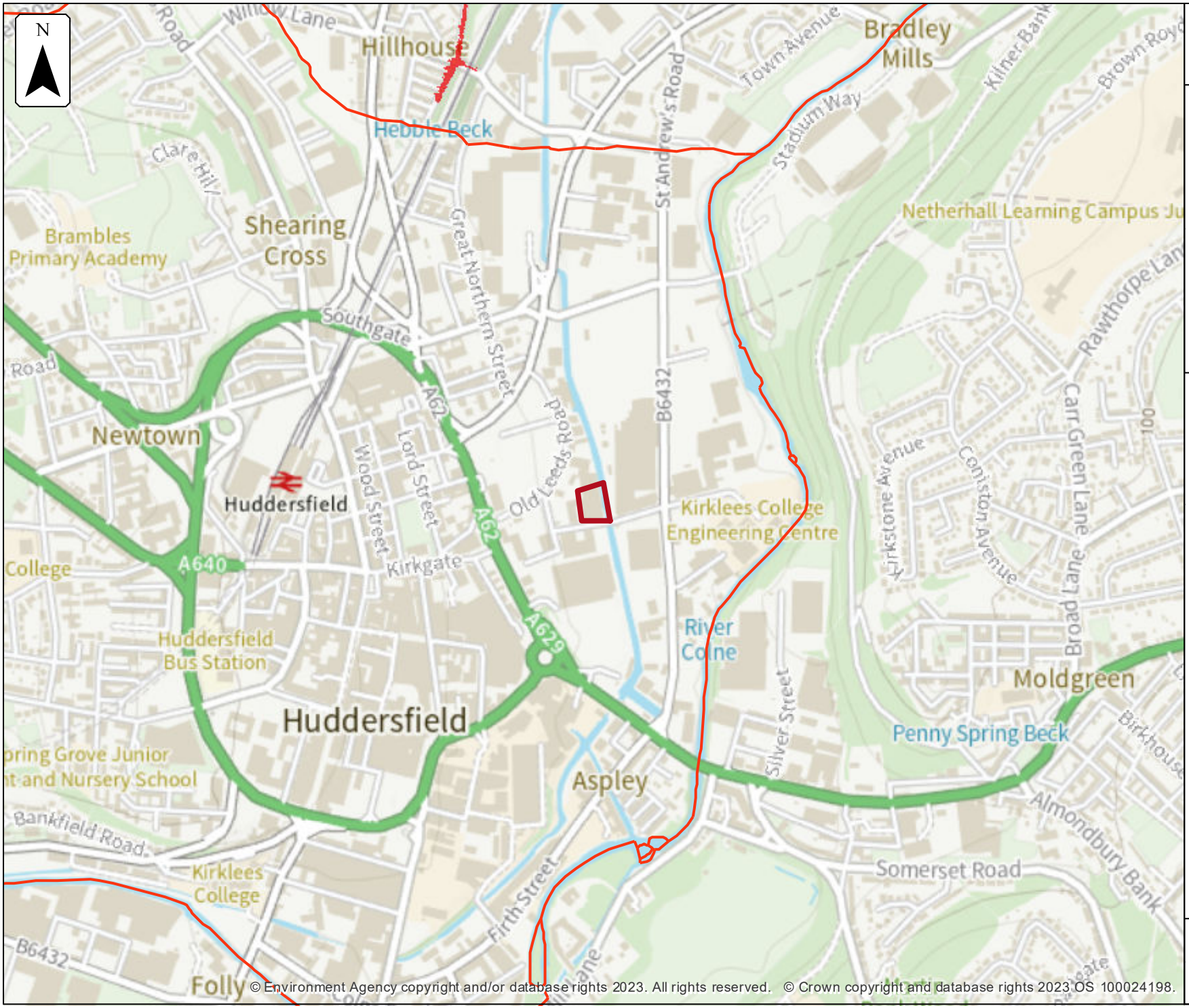
- Selected area
- Main river

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

No defences exist modelled fluvial extent

Location (easting/northing)
414922/416862

Scale
1:10,000

Created
23 Feb 2023

Model name
2011 Huddersfield Study - Allison Dike

Selected area

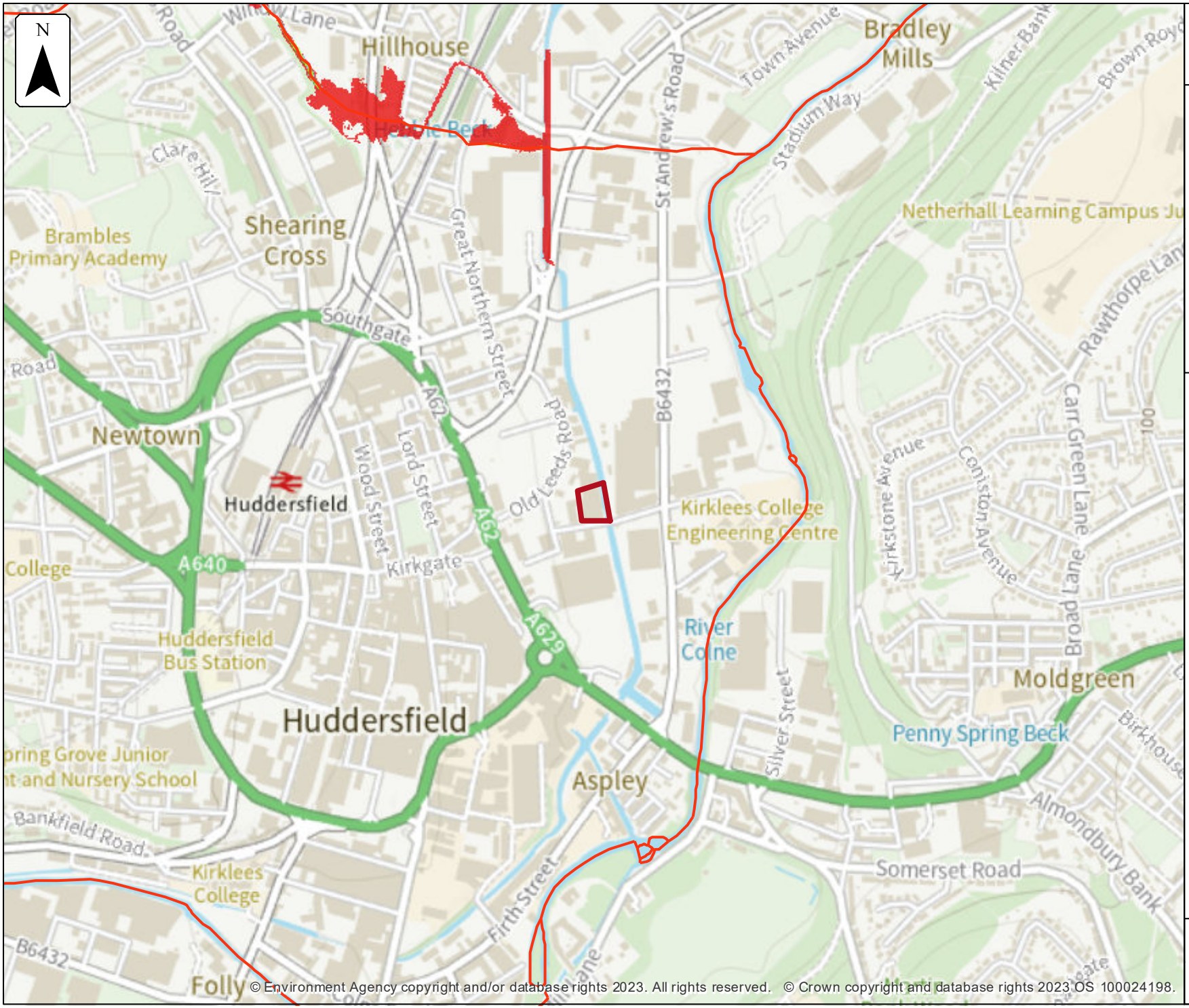
Main river

Modelled flood extent

0.1% AEP

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

0 100 200 300 400 500
metres



Environment Agency

No defences exist modelled fluvial extent

Location (easting/northing)
414922/416862

Scale
1:10,000

Created
23 Feb 2023

Model name
2011 Huddersfield Study - Grimescar

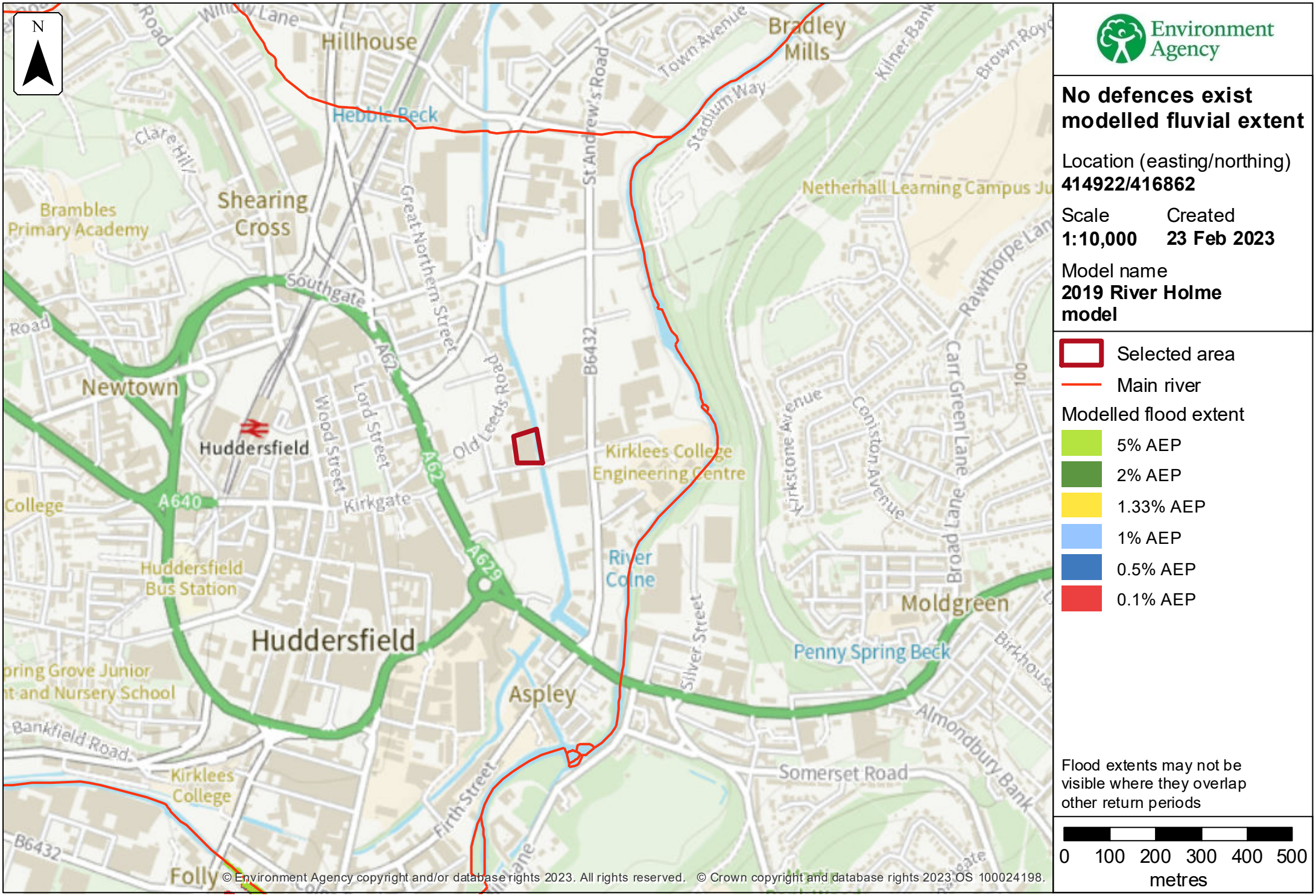
- Selected area
- Main river

Modelled flood extent

- 5% AEP
- 2% 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

No defences exist modelled fluvial extent

Location (easting/northing)
414922/416862

Scale
1:10,000

Created
23 Feb 2023

Model name
2019 River Holme model

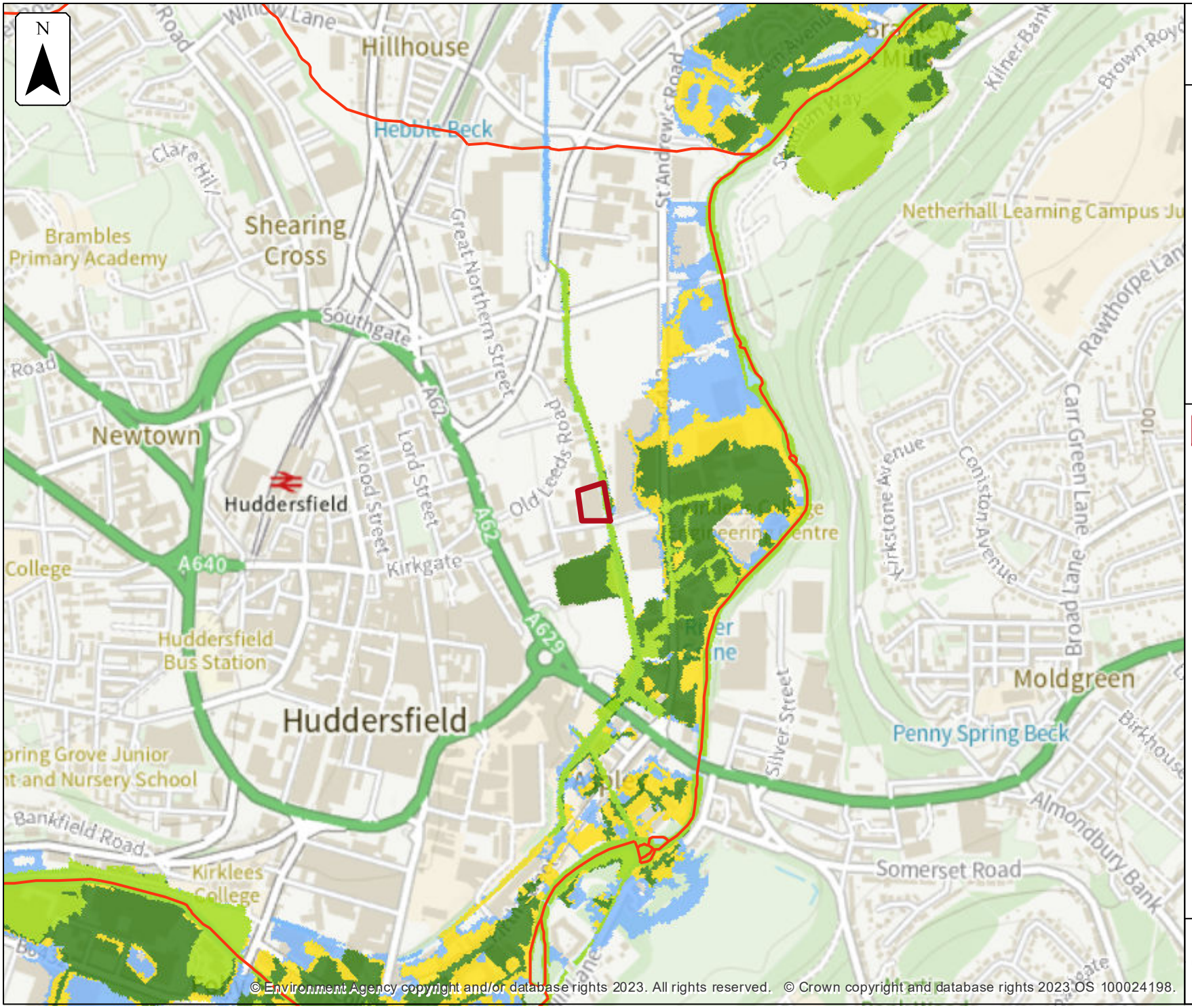
- Selected area
- Main river

Modelled flood extent

- 5% AEP
- 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 climate change modelled fluvial extent

Location (easting/northing)
414922/416862

Scale
1:10,000

Created
23 Feb 2023

Model name
2019 Colne Model

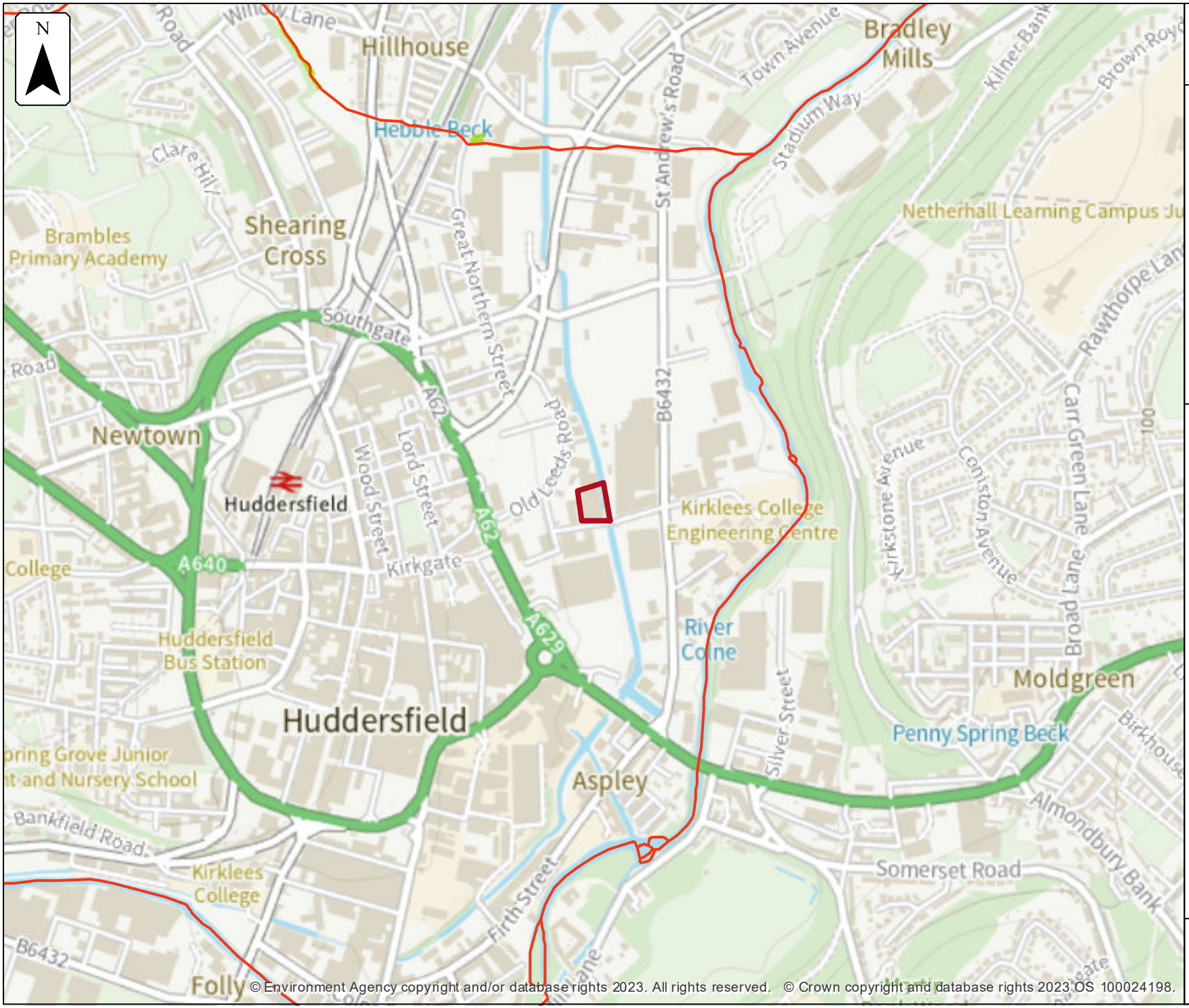
- Selected area
- Main river

Modelled flood extent

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

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

0 100 200 300 400 500
metres



Environment Agency

No defences exist climate change modelled fluvial extent

Location (easting/northing)
414922/416862

Scale
1:10,000

Created
23 Feb 2023

Model name
2011 Huddersfield Study - Grimescar

Selected area

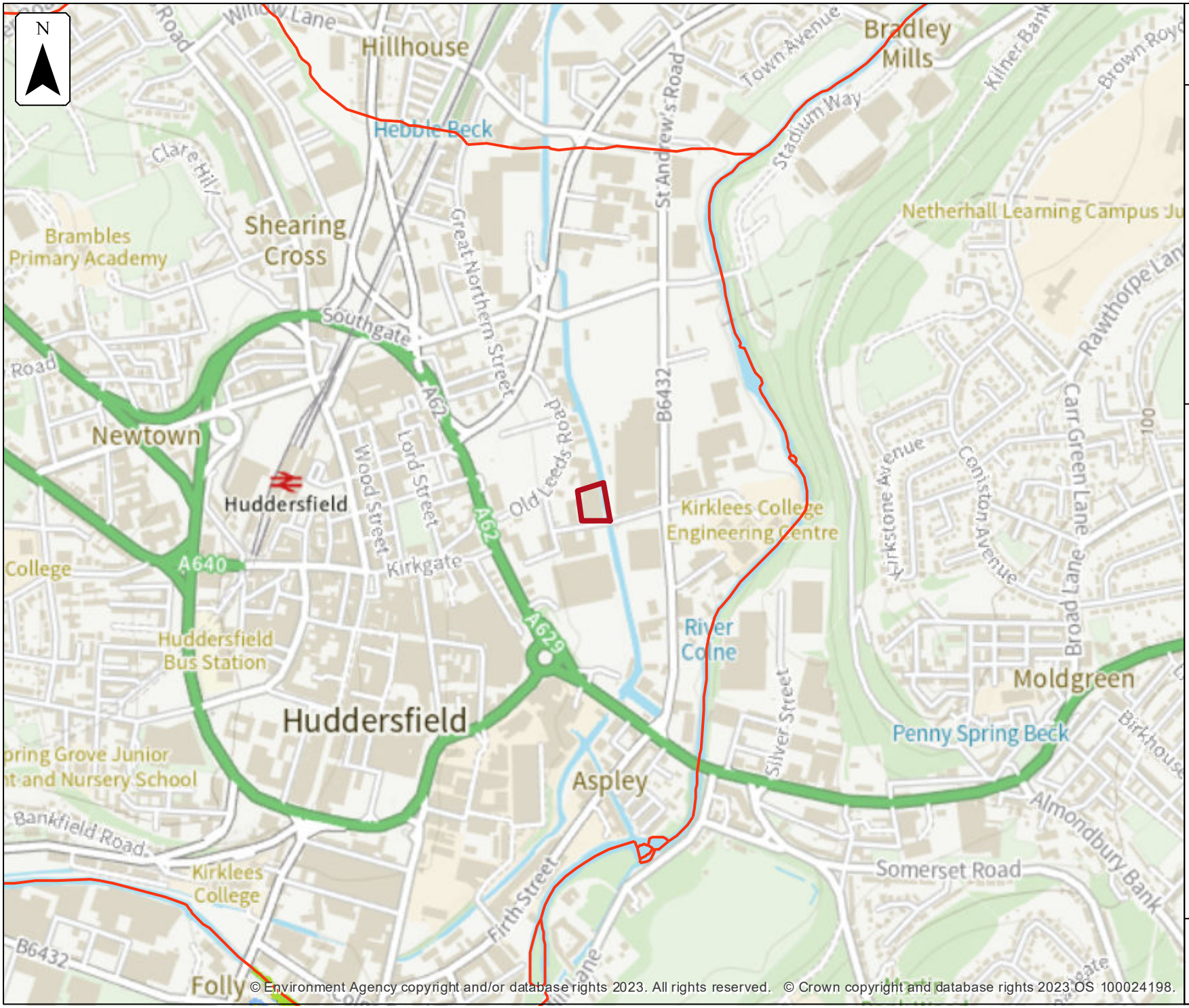
Main river

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

No defences exist climate change modelled fluvial extent

Location (easting/northing)
414922/416862

Scale
1:10,000

Created
23 Feb 2023

Model name
2019 River Holme model

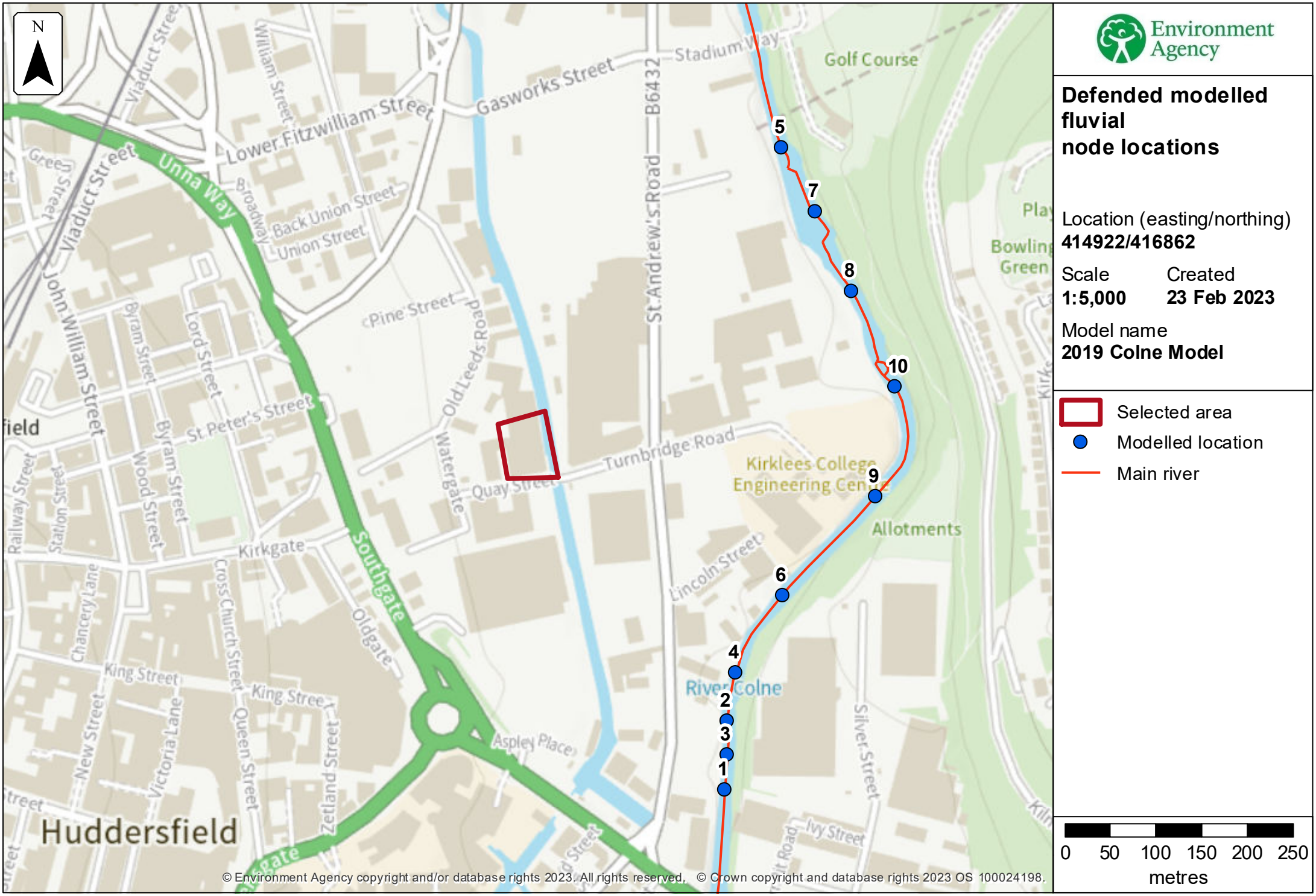
- Selected area
- Main river

Modelled flood extent

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

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

0 100 200 300 400 500
metres


N
Environment Agency
Defended modelled fluvial node locations
Location (easting/northing)
414922/416862
Scale
1:5,000
Created
23 Feb 2023
Model name
2019 Colne Model
Selected area
Modelled location
Main river
0 50 100 150 200 250
metres
Huddersfield
River Colne
Golf Course
Allotments
Kirklees College Engineering Centre
Gasworks Street
Stadium Way
B6432
St Andrew's Road
Lower Fitzwilliam Street
Viaduct Street
Unna Way
John William Street
Southgate
Kirkgate
Old Leeds Road
Watergate
Quay Street
Turnbridge Road
Pine Street
Back Union Street
Union Street
Broadway
Byram Street
Lord Street
St Peter's Street
Wood Street
Railway Street
Station Street
Chancery Lane
Cross Church Street
King Street
Queen Street
New Street
Victoria Lane
Zetland Street
Oldgate
Aspley Place
Lincoln Street
Silver Street
Ivy Street
1
2
3
4
5
6
7
8
9
10
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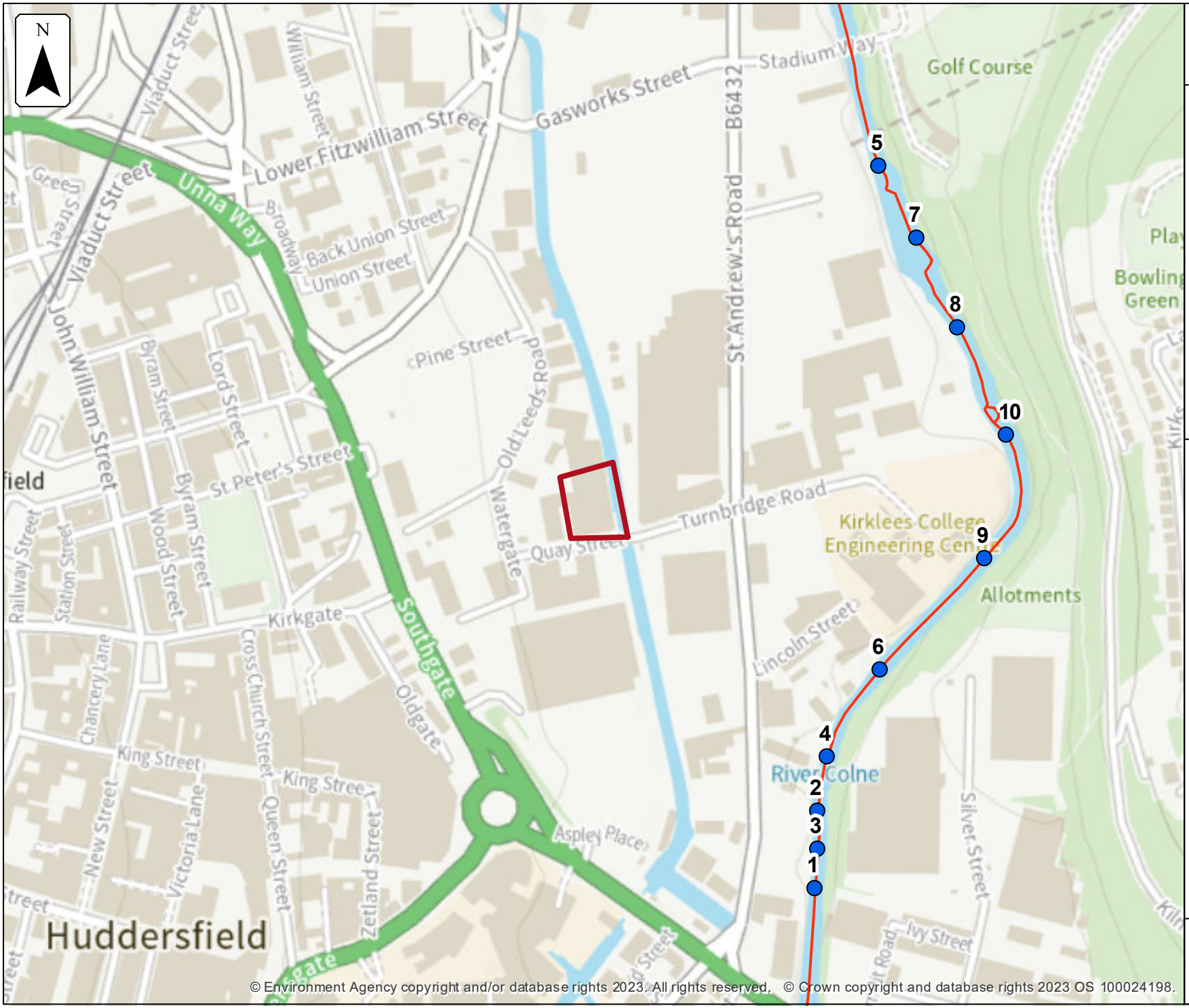
Modelled node locations data

Defended

Label	Modelled location ID	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
				Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow
1	1198153	415138	416487	62.10	100.52	62.49	123.81	62.67	135.48	62.82	145.74	63.17	169.29	63.72	208.58
2	1197939	415141	416563	61.64	100.51	61.97	123.80	62.13	135.47	62.26	145.74	62.57	169.53	62.97	213.97
3	1198259	415141	416525	61.86	100.51	62.21	123.80	62.38	135.48	62.52	145.74	62.84	169.54	63.30	213.66
4	1197902	415150	416615	61.62	100.51	61.97	123.80	62.13	135.47	62.28	145.73	62.60	170.07	63.02	216.20
5	1198283	415200	417190	59.36	100.49	59.77	123.78	59.96	135.43	60.12	145.68	60.54	171.11	61.03	215.20
6	1198100	415201	416700	61.34	100.51	61.68	123.79	61.85	134.93	62.01	144.20	62.37	165.60	62.85	201.16
7	1197778	415237	417120	59.56	100.49	59.97	123.78	60.16	135.44	60.32	145.69	60.73	171.13	61.24	215.21
8	1198023	415278	417033	59.77	100.50	60.14	123.79	60.32	135.45	60.48	145.70	60.87	171.15	61.38	213.38
9	1198101	415303	416809	60.91	100.51	61.21	123.80	61.36	135.47	61.49	145.71	61.81	171.19	62.27	211.68
10	1198198	415324	416929	60.29	100.50	60.59	123.79	60.73	135.46	60.86	145.71	61.20	171.17	61.66	212.94

Data in this table comes from the 2019 Colne Model 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.


N
Environment Agency
Defences removed modelled fluvial node locations
Location (easting/northing)
414922/416862
Scale
1:5,000
Created
23 Feb 2023
Model name
2019 Colne Model
Selected area
Modelled location
Main river
0 50 100 150 200 250
metres
Huddersfield
River Colne
Golf Course
Allotments
Kirklees College Engineering Centre
Gasworks Street
Stadium Way
B6432
St Andrew's Road
Lower Fitzwilliam Street
Viaduct Street
Unna Way
John William Street
Back Union Street
Union Street
Pine Street
Old Leeds Road
Watergate
Quay Street
Turnbridge Road
St Peter's Street
Byram Street
Lord Street
Wood Street
Railway Street
Station Street
Kirkgate
Southgate
Oldgate
Cross Church Street
Chancery Lane
King Street
New Street
Victoria Lane
Queen Street
Zetland Street
Aspley Place
Lincoln Street
Silver Street
Ivy Street
1
2
3
4
5
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10
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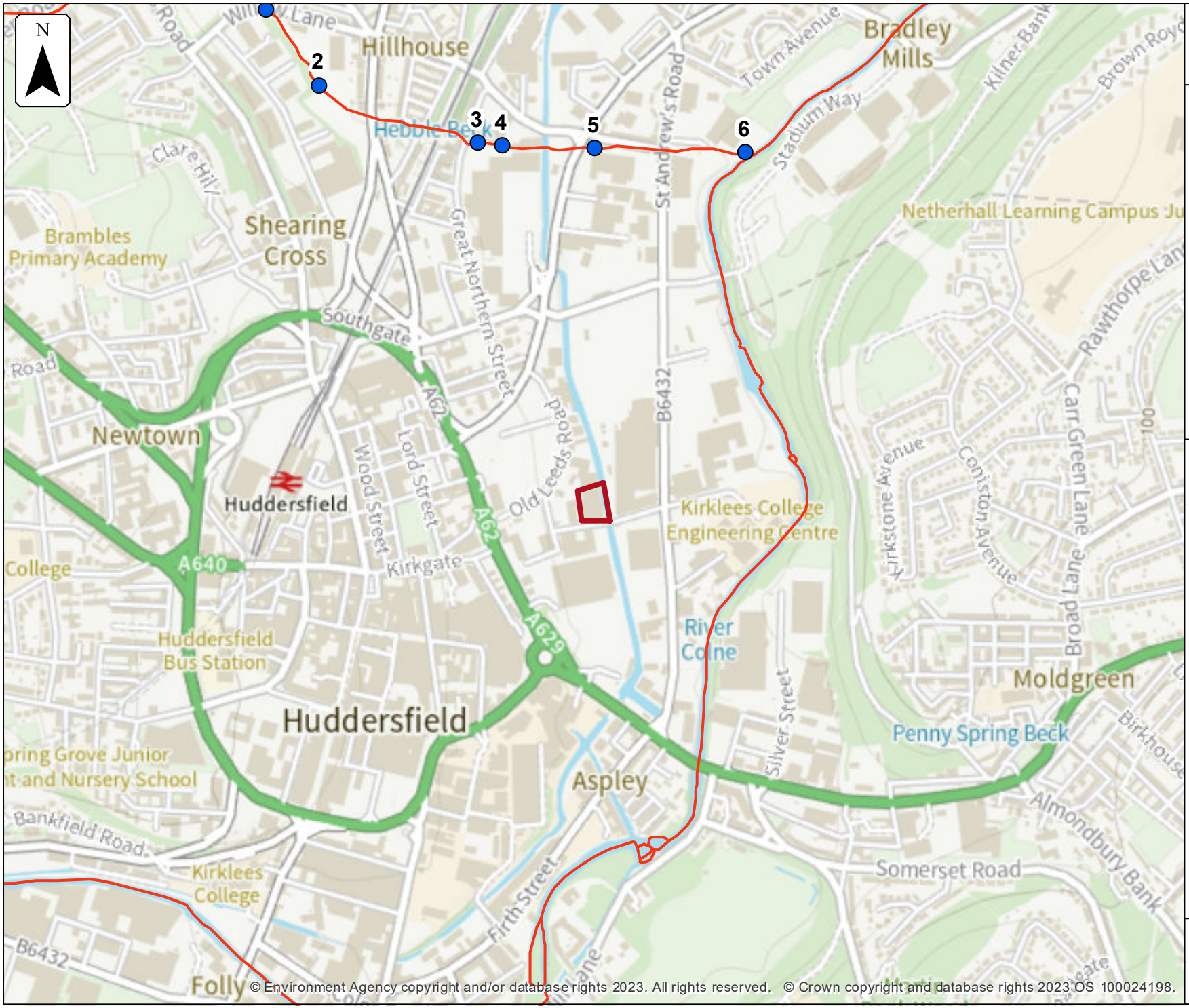
Modelled node locations data

Defences removed

Label	Modelled location ID	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
				Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow
1	1198153	415138	416487							62.82	145.71			63.72	208.71
2	1197939	415141	416563							62.26	145.71			62.98	214.14
3	1198259	415141	416525							62.52	145.71			63.30	213.82
4	1197902	415150	416615							62.28	145.70			63.02	216.38
5	1198283	415200	417190							60.12	145.66			61.03	215.27
6	1198100	415201	416700							62.01	144.17			62.85	201.29
7	1197778	415237	417120							60.32	145.66			61.24	215.27
8	1198023	415278	417033							60.47	145.67			61.38	213.45
9	1198101	415303	416809							61.49	145.69			62.27	211.82
10	1198198	415324	416929							60.86	145.68			61.66	213.04

Data in this table comes from the 2019 Colne Model model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.



Environment Agency

No defences exist modelled fluvial node locations

Location (easting/northing)
414922/416862

Scale
1:10,000

Created
23 Feb 2023

Model name
2011 Huddersfield Study - Grimescar

Selected area
Modelled location
Main river

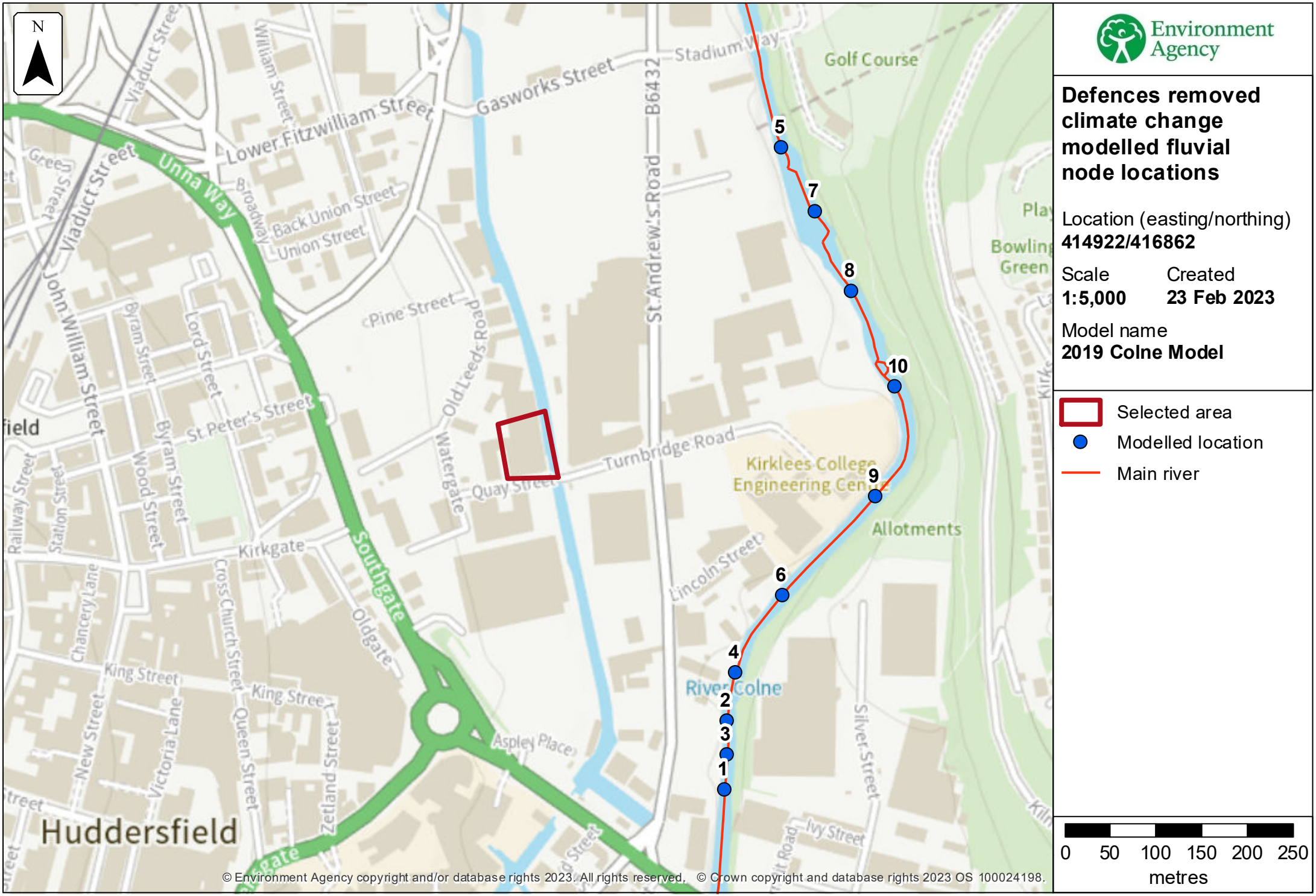
0 100 200 300 400 500
metres

Modelled node locations data

No defences exist

Label	Modelled location ID	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
				Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow
1	205634	414285	417824	73.13	3.51	73.26	4.60	73.34	5.05	73.41	5.33			74.11	5.88
2	338905	414387	417676	71.57	4.30	71.85	5.68	72.03	6.46	72.15	7.08			73.07	10.93
3	342710	414698	417564	66.23	4.29	66.48	5.67	66.57	6.46	66.62	7.07			66.85	10.97
4	273833	414745	417558	65.73	5.10	65.96	6.78	66.05	7.73	66.09	8.49			66.31	15.39
5	21742	414925	417553	62.32	5.10	62.55	6.78	62.59	7.73	62.61	8.49			62.74	15.39
6	344834	415218	417545	58.61	5.06	59.08	6.78	59.08	7.73	59.28	8.53			59.28	11.75

Data in this table comes from the 2011 Huddersfield Study - Grimescar Beck / Clayton Dike 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.


N
Environment Agency
Defences removed climate change modelled fluvial node locations
Location (easting/northing)
414922/416862
Scale
1:5,000
Created
23 Feb 2023
Model name
2019 Colne Model
Selected area
Modelled location
Main river
0 50 100 150 200 250
metres
Huddersfield
River Colne
Golf Course
Allotments
Kirklees College Engineering Centre
Gasworks Street
Stadium Way
B6432
St Andrew's Road
Lower Fitzwilliam Street
Viaduct Street
Unna Way
John William Street
Back Union Street
Union Street
Pine Street
Old Leeds Road
Watergate
Quay Street
Turnbridge Road
St Peter's Street
Byram Street
Lord Street
Wood Street
Railway Street
Station Street
Kirkgate
Southgate
Oldgate
Cross Church Street
Chancery Lane
King Street
New Street
Victoria Lane
Queen Street
Zetland Street
Aspley Place
Lincoln Street
Silver Street
Ivy Street
1
2
3
4
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8
9
10
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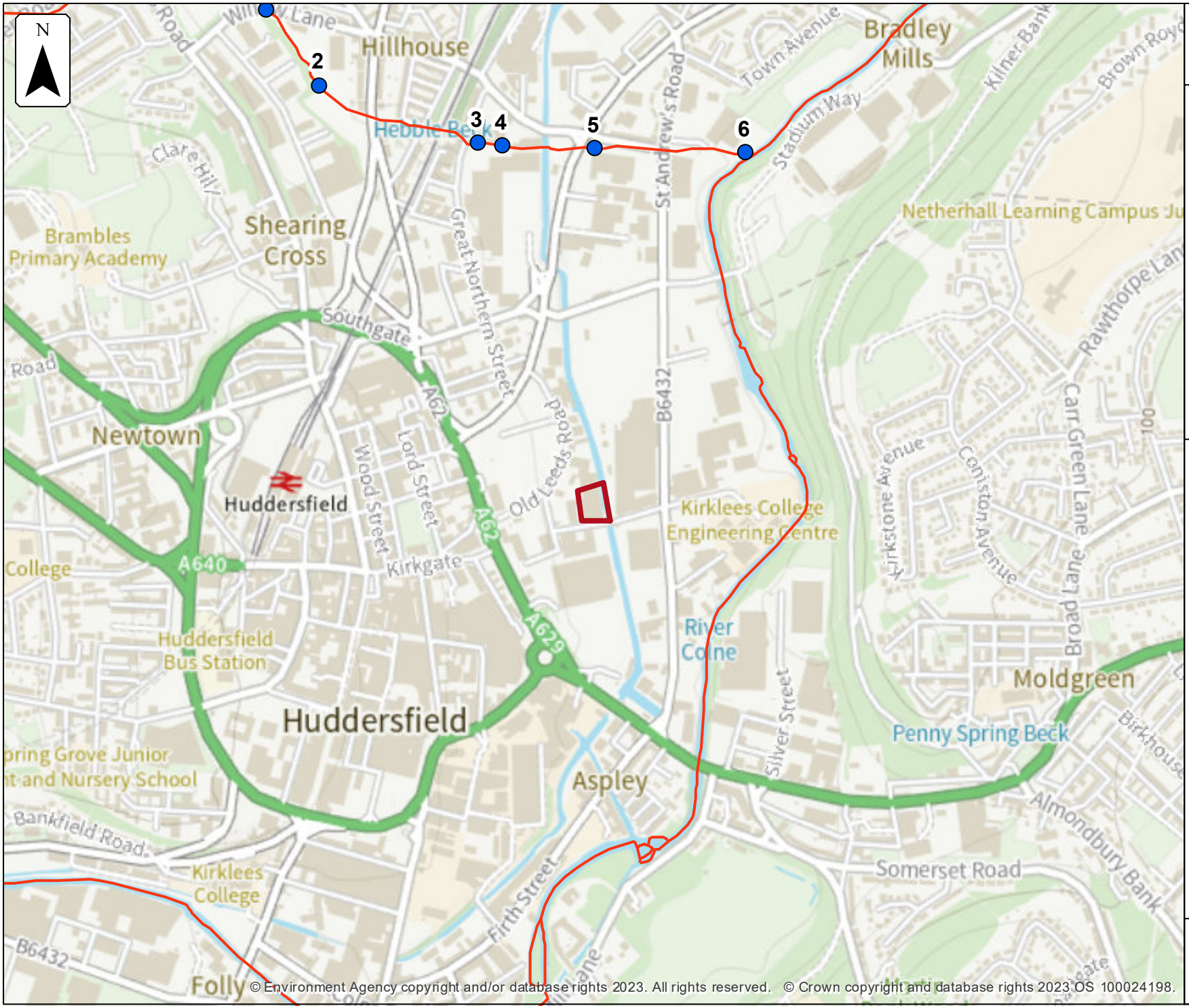
Modelled node locations data

Defences removed climate change

Label	Modelled location ID	Easting	Northing	1.0% AEP (+20%)		1.0% AEP (+30%)		1.0% AEP (+50%)		0.1% AEP (+20%)	
				Level	Flow	Level	Flow	Level	Flow	Level	Flow
1	1198153	415138	416487	63.22	172.70	63.39	185.59	63.71	208.39	64.09	238.58
2	1197939	415141	416563	62.61	173.0	62.75	186.45	62.97	213.73	63.30	247.57
3	1198259	415141	416525	62.88	173.0	63.03	186.45	63.30	213.42	63.68	243.67
4	1197902	415150	416615	62.64	173.66	62.79	187.36	63.02	215.93	63.30	256.40
5	1198283	415200	417190	60.59	174.79	60.75	188.22	61.01	213.33	61.47	261.33
6	1198100	415201	416700	62.41	168.69	62.58	180.03	62.84	201.03	63.20	228.09
7	1197778	415237	417120	60.78	174.81	60.95	188.22	61.22	213.33	61.71	260.98
8	1198023	415278	417033	60.92	174.82	61.08	188.23	61.36	212.36	61.87	252.88
9	1198101	415303	416809	61.86	174.86	62.0	188.25	62.25	211.57	62.67	236.44
10	1198198	415324	416929	61.24	174.84	61.39	188.24	61.64	212.37	62.12	244.36

Data in this table comes from the 2019 Colne Model model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.



Environment Agency

No defences exist climate change modelled fluvial node locations

Location (easting/northing)
414922/416862

Scale
1:10,000

Created
23 Feb 2023

Model name
2011 Huddersfield Study - Grimescar

Selected area
Modelled location
Main river

0 100 200 300 400 500
metres

Modelled node locations data

No defences exist climate change

Label	Modelled location ID	Easting	Northing	1.0% AEP (+20%)	
				Level	Flow
1	205634	414285	417824	73.68	5.56
2	338905	414387	417676	72.37	8.22
3	342710	414698	417564	66.74	8.21
4	273833	414745	417558	66.20	9.92
5	21742	414925	417553	62.67	9.92
6	344834	415218	417545	59.28	9.95

Data in this table comes from the 2011 Huddersfield Study - Grimescar Beck / Clayton Dike model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.

Environment Agency

Defended modelled fluvial extent and height

Location (easting/northing)
414922/416862

Scale
1:500

Created
23 Feb 2023

Model name
2019 Colne Model

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 64.0
- 64.0 - 64.125
- 64.125 - 64.25
- 64.25 - 64.375
- 64.375 - 64.5
- 64.5 - 64.625
- 64.625 - 64.75
- 64.75 - 64.875
- 64.875 - 65.0

This map shows the 0.1% AEP height data

0 5 10 15 20
metres

Sample point data

Defended

Label	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height
1	414902	416826	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
2	414917	416826	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
3	414932	416826	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
4	414947	416826	NoData	NoData	NoData	NoData	NoData	NoData	0.01	64.38	0.08	64.54	0.15	64.61
5	414962	416826	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
6	414902	416841	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
7	414917	416841	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
8	414932	416841	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
9	414947	416841	1.45	64.00	1.45	64.00	1.48	64.04	1.77	64.38	1.90	64.54	1.96	64.61
10	414962	416841	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
11	414887	416856	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
12	414902	416856	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
13	414917	416856	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
14	414932	416856	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
15	414947	416856	1.82	64.00	1.82	64.00	1.85	64.04	2.19	64.38	2.35	64.54	2.42	64.61
16	414887	416871	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height
17	414902	416871	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
18	414917	416871	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
19	414932	416871	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
20	414947	416871	1.99	64.00	1.99	64.00	2.03	64.04	2.37	64.38	2.53	64.54	2.60	64.61
21	414887	416886	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
22	414902	416886	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
23	414917	416886	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
24	414932	416886	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
25	414947	416886	1.64	64.00	1.64	64.00	1.68	64.04	1.99	64.38	2.14	64.54	2.22	64.61
26	414902	416901	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
27	414917	416901	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
28	414932	416901	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
29	414947	416901	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.27	64.54	0.34	64.61

Data in this table comes from the 2019 Colne Model model.
Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.

Environment Agency

Defences removed modelled fluvial extent and height

Location (easting/northing)
414922/416862

Scale
1:500

Created
23 Feb 2023

Model name
2019 Colne Model

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 64.0
- 64.0 - 64.125
- 64.125 - 64.25
- 64.25 - 64.375
- 64.375 - 64.5
- 64.5 - 64.625
- 64.625 - 64.75
- 64.75 - 64.875
- 64.875 - 65.0

This map shows the 0.1% AEP height data

0 5 10 15 20
metres

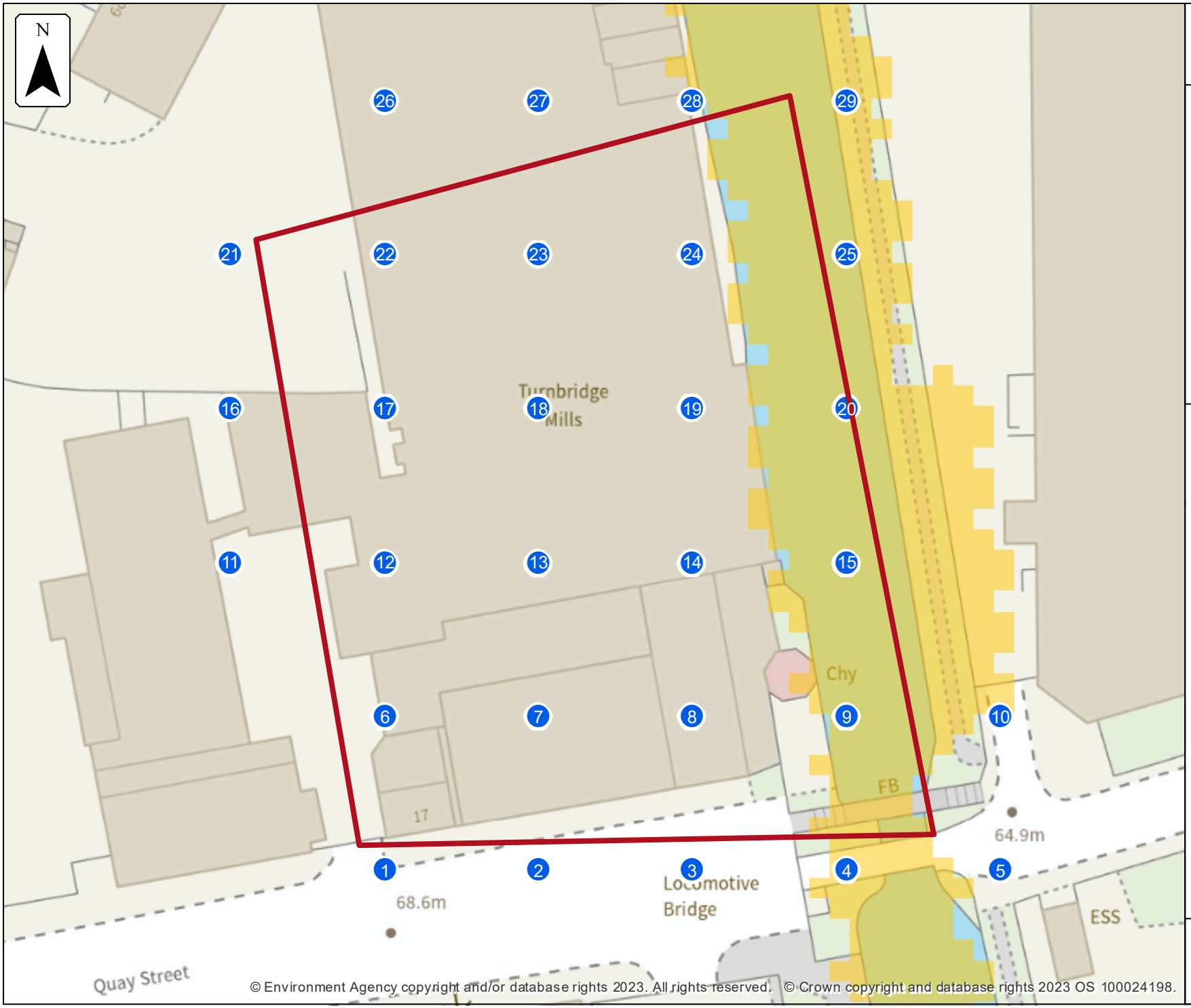
Sample point data

Defences removed

Label	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height
1	414902	416826							NoData	NoData			NoData	NoData
2	414917	416826							NoData	NoData			NoData	NoData
3	414932	416826							NoData	NoData			NoData	NoData
4	414947	416826							0.01	64.38			0.15	64.61
5	414962	416826							NoData	NoData			NoData	NoData
6	414902	416841							NoData	NoData			NoData	NoData
7	414917	416841							NoData	NoData			NoData	NoData
8	414932	416841							NoData	NoData			NoData	NoData
9	414947	416841							1.77	64.38			1.96	64.61
10	414962	416841							NoData	NoData			NoData	NoData
11	414887	416856							NoData	NoData			NoData	NoData
12	414902	416856							NoData	NoData			NoData	NoData
13	414917	416856							NoData	NoData			NoData	NoData
14	414932	416856							NoData	NoData			NoData	NoData
15	414947	416856							2.19	64.38			2.42	64.61
16	414887	416871							NoData	NoData			NoData	NoData

Label	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height
17	414902	416871							NoData	NoData			NoData	NoData
18	414917	416871							NoData	NoData			NoData	NoData
19	414932	416871							NoData	NoData			NoData	NoData
20	414947	416871							2.37	64.38			2.60	64.61
21	414887	416886							NoData	NoData			NoData	NoData
22	414902	416886							NoData	NoData			NoData	NoData
23	414917	416886							NoData	NoData			NoData	NoData
24	414932	416886							NoData	NoData			NoData	NoData
25	414947	416886							1.99	64.38			2.22	64.61
26	414902	416901							NoData	NoData			NoData	NoData
27	414917	416901							NoData	NoData			NoData	NoData
28	414932	416901							NoData	NoData			NoData	NoData
29	414947	416901							NoData	NoData			0.34	64.61

Data in this table comes from the 2019 Colne Model model.
Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.



Environment Agency

Defences removed climate change modelled fluvial extent and height

Location (easting/northing)
414922/416862

Scale
1:500

Created
23 Feb 2023

Model name
2019 Colne Model

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 64.0
- 64.0 - 64.125
- 64.125 - 64.25
- 64.25 - 64.375
- 64.375 - 64.5
- 64.5 - 64.625
- 64.625 - 64.75
- 64.75 - 64.875
- 64.875 - 65.0

This map shows the 0.1% 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 (+30%)		1% AEP (+50%)		0.1% AEP (+20%)	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height
1	414902	416826	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
2	414917	416826	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
3	414932	416826	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
4	414947	416826	NoData	NoData	0.11	64.57	0.15	64.61	0.20	64.65
5	414962	416826	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
6	414902	416841	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
7	414917	416841	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
8	414932	416841	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
9	414947	416841	1.67	64.26	1.93	64.57	1.96	64.61	2.01	64.65
10	414962	416841	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
11	414887	416856	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
12	414902	416856	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
13	414917	416856	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
14	414932	416856	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
15	414947	416856	2.08	64.26	2.38	64.57	2.42	64.61	2.47	64.65
16	414887	416871	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	1% AEP (+20%)		1% AEP (+30%)		1% AEP (+50%)		0.1% AEP (+20%)	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height
17	414902	416871	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
18	414917	416871	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
19	414932	416871	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
20	414947	416871	2.26	64.26	2.56	64.57	2.60	64.61	2.65	64.65
21	414887	416886	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
22	414902	416886	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
23	414917	416886	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
24	414932	416886	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
25	414947	416886	1.87	64.26	2.18	64.57	2.21	64.61	2.26	64.65
26	414902	416901	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
27	414917	416901	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
28	414932	416901	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
29	414947	416901	NoData	NoData	0.30	64.57	0.34	64.61	0.39	64.65

Data in this table comes from the 2019 Colne Model model.
Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.

Strategic flood risk assessments

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

This should give you information about:

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

About this data

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

Flood risk activity permits

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

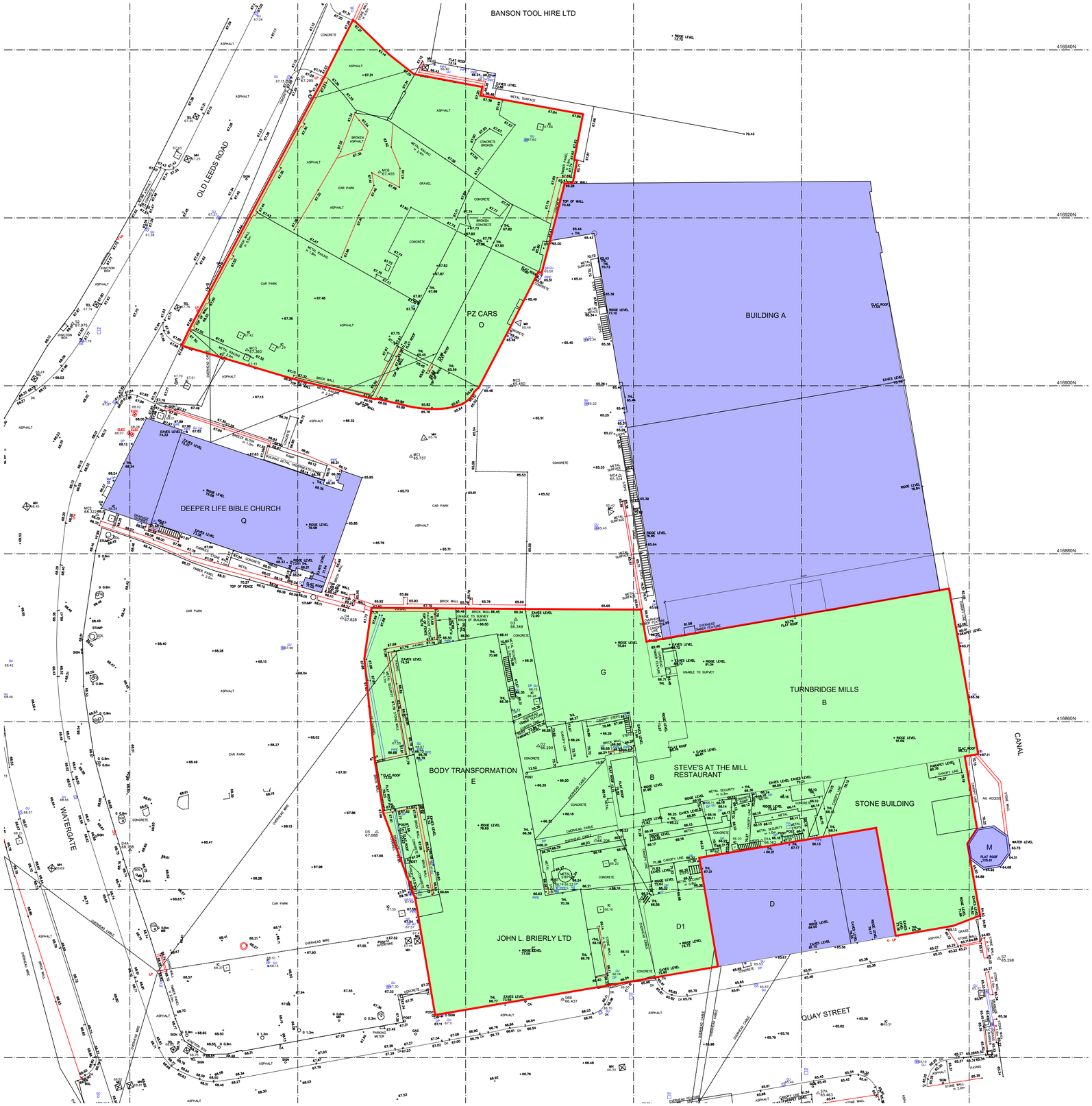
Find out more about flood risk activity permits

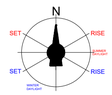
Help and advice

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

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

APPENDIX C: PROPOSED DEVELOPMENT





Key

Building to be Retained

Buildings / External Yards for Demolition

Rev	Note	Initial	Date
D	Update	CS	24.09.04
C	Update	TDJ	24.04.19
B	Update	TDJ	24.03.25
A	Revised Scheme	TDJ	23.11.01

T D JAGGER
PROPERTY CONSULTANTS

3 Richmond House, Caldene Business Park,
Mytholmroyd, Hebden Bridge,
West Yorkshire, HX7 5QJ
01422 883317
enquiries@tdjagger.ltd.uk
www.tdjagger.ltd.uk

Client
JLB

Project
Refurbishment of Building D
Turnbridge Mills, Quay Street,
Huddersfield. HD1 6QT

Drawing
Demolition
Site Plan

Date	Drawn	Checked	Scale
April 2023	SD	TDJ	1:200@A1

Drwg. No.	Revision
1908 46	D

Dont Ignore Health & Safety
Think Safe Build Safe
It Might Just Save Your Life

APPENDIX D: RUNOFF RATES AND STORAGE ESTIMATE CALCULATIONS

Runoff Calculations and Storage Estimates

Existing Greenfield Runoff Rates

Proposed Car Park

Pre-development discharge

Site Makeup	Greenfield
Greenfield Method	IH124
Positively Drained Area (ha)	0.135
SAAR (mm)	891
Soil Index	4
SPR	0.47
Region	3
Betterment (%)	0
QBar (l/s)	0.9

Load

Calc

Return Period (years)	Growth Factor	Q (l/s)
1	0.86	0.7
30	1.75	1.5
100	2.08	1.8

Proposed Buildings and Smaller Car Park

Pre-development discharge

Site Makeup	Greenfield
Greenfield Method	IH124
Positively Drained Area (ha)	0.093
SAAR (mm)	891
Soil Index	4
SPR	0.47
Region	3
Betterment (%)	0
QBar (l/s)	0.6

Load

Calc

Return Period (years)	Growth Factor	Q (l/s)
1	0.86	0.5
30	1.75	1.0
100	2.08	1.2

Proposed Buildings and Service Yard

Pre-development discharge

Site Makeup	Greenfield
Greenfield Method	IH124
Positively Drained Area (ha)	0.156
SAAR (mm)	891
Soil Index	4
SPR	0.47
Region	3
Betterment (%)	0
QBar (l/s)	1.0

Load

Calc

Return Period (years)	Growth Factor	Q (l/s)
1	0.86	0.9
30	1.75	1.7
100	2.08	2.1

Existing Brownfield Runoff Rates – Modified Rational Method

Proposed Car Park

2.78 x 1 x 50 x 0.135 = 18.8 l/s

Proposed Buildings and Smaller Car Park

2.78 x 1 x 50 x 0.093 = 12.9 l/s

Proposed Buildings and Service Yard

2.78 x 1 x 50 x 0.156 = 21.7 l/s

Proposed Discharge Rates and Storage Estimates (based on 50% betterment than existing brownfield runoff rates)

Design Rainfall Criteria

Rainfall Methodology		FSR
FSR Region		England & Wales
M5-60 (mm)		17.000
Ratio-R		0.300
Summer CV	☑	1.000
Winter CV	☑	1.000

Proposed Car Park

Storage Estimate

Return Period (years)	100		OK
Climate Change (%)	45		Cancel
Impermeable Area (ha)	0.135	Update	
Peak Discharge (l/s)	9.400		
Infiltration Coefficient (m/hr) (leave blank if no infiltration)		Calc	
Required Storage (m³)	Calc		
from	37		
to	69		

Proposed Buildings and Smaller Car Park

Storage Estimate

Return Period (years)	100		OK
Climate Change (%)	45		Cancel
Impermeable Area (ha)	0.093	Update	
Peak Discharge (l/s)	6.500		
Infiltration Coefficient (m/hr) (leave blank if no infiltration)		Calc	
Required Storage (m³)	Calc		
from	25		
to	47		

Proposed Buildings and Service Yard

Storage Estimate

Return Period (years)	100		OK
Climate Change (%)	45		Cancel
Impermeable Area (ha)	0.156	Update	
Peak Discharge (l/s)	10.800		
Infiltration Coefficient (m/hr) (leave blank if no infiltration)		Calc	
Required Storage (m³)	Calc		
from	43		
to	79		

APPENDIX E: IMPERMEABLE AREAS PLAN

jnpgroup

PARKING ALLOCATION TABLE
SPACES 1-80
65No JLB GROUP COMPANIES IN BUILDINGS B/H/J/K/L
10No BUILDING B/E/F TENANTS
5No SUBLET
SPACES A1-A14
14No BUILDING B TENANTS

Proposed service yard and half of proposed larger building roof area to outfall to canal utilising existing outfall(s)
Catchment: 1,558m²

HUDDERSFIELD BROAD C

CANAL

TURNBRIDGE

New stone facade with recessed walled window panels to existing brick building

Proposed Service Yard

Existing Building A Retained

Existing Building D Retained

Existing Building A and adjacent service yard to continue to drain as per existing conditions - assumed to a mix of the canal and combined sewer network via gullies and RWPs
Catchment: 3,442m²

PROPOSED BUILDING
GIA = 198m² (2131.3ft²)

PROPOSED BUILDING
GIA = 874m² (9407ft²)

QUAY STREET

Ramp up into new car park

Building A Service Yard

Proposed Parking

new retaining wall

Proposed smaller building and half of proposed larger building roof area and adjacent parking to outfall to combined sewer in Quay Street
Catchment: 934m²

OLD LEEDS ROAD

Proposed parking to outfall to combined sewer in Old Leeds Road
Catchment: 1,347m²

WATERGATE

Existing car park to continue to drain as per existing conditions - assumed to combined sewer network via gullies
Catchment: 2,047m²

BANSON TOOL HIRE LTD

JOHN L. BRIERLY LTD

SERVICE YARD

AS TYRES

PROPOSED SITE PLAN
SCALE 1:200

0 1m 2m 3m 4m 5m 10m 20m
SCALE BAR 1:200

General Notes

1. Where this drawing has been issued in electronic .dwg format, it has been done so in good faith. JNP Group do not take any responsibility for any inaccuracies in the electronic data, which should be checked against the paper (or .pdf) drawing issue. Any apparent discrepancies should be immediately reported to JNP Group. The electronic .dwg file should not be assumed to be to scale and should not be used for 'overlaying', setting out or checking of any third party information. All dimensions should be taken from the paper (or .pdf) version of the drawing. Electronic drawings may contain third party information. JNP Group take no responsibility for this information, which should be checked against the originators paper drawing(s).
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Health & Safety Note
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Legend

- Existing Public Combined Water Sewer
- Areas assumed to remain largely as existing and therefore continue to drain as existing conditions
- Proposed impermeable Areas with new drainage system required

Rev	Date	Description	Drn / Chk'd / App'd
P01	19/03/2025	Issued with Drainage Strategy	LC / SLL / SLL

Suitability: S3 - Suitable for Review & Comment

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Hartlepool ● Sheffield ● Warwick
www.jnpgroup.co.uk

Client: John L Brierley Ltd.

Job: Turnbridge Mills, Quay Street, Huddersfield

Title: Impermeable Areas Plan

Classification: FI_60_20
Scale @ A1: 1:250

bimtracks | CHAS Accredited Contractor | Constructionline Part of Capita plc | Supplier No. 0000016

Project - Originator - Volume/System - Level/Location - Type - Discipline - Number: S12097 - JNP - XX - XX - DR - C - 2001
Document/Drawing Number
Revision: P01

JNP Group Internal Project Number: X00000

APPENDIX F: DRAINAGE STRATEGY

jnpgroup

PARKING ALLOCATION TABLE
SPACES 1-80
65No JLB GROUP COMPANIES IN BUILDINGS B/H/J/K/L
10No BUILDING B/E/F TENANTS
5No SUBLET
SPACES A1-A14
14No BUILDING B TENANTS

HUDDERSFIELD BROAD CANAL

TURNBRIDGE

QUAY STREET

WATERGATE

OLD LEEDS ROAD

Outfall to canal via existing outfall pipe subject to agreement with Canal and River Trust

Oil separator

Flow control manhole
Design head:1.2m
Design flow: 10.80 l/s
(50% betterment from existing brownfield runoff)

CL 65.80
IL 64.02

CL 65.50
IL 64.20

New stone facade with recessed walled window panels to existing brick building

Proposed Attenuation Tank
Storage estimate: 43 - 79m³
10 x 6 x 1.2m dp tank
provides 68.4m³ with 95% voids

Proposed Service Yard

Existing Building A Retained

Existing Building D Retained

Foul drainage from proposed building assumed to be able to connect to existing foul drainage serving other adjacent buildings

CL 66.20
IL 64.28

PROPOSED BUILDING
GIA = 198m² (2131.3ft²)

PROPOSED BUILDING
GIA = 874m² (9407ft²)

New foul drainage to outfall to combined sewer subject to S106 agreement with Yorkshire Water

Ramp up into new car park

CL 67.00
IL 65.30

CL 67.00
IL 65.40

Outfall to combined sewer subject to S106 agreement with Yorkshire Water

Proposed Attenuation Tank
Storage estimate: 25 - 47m³
6 x 6 x 1.2m dp tank
provides 41.04m³ with 95% voids

Flow control manhole
Design head: 1.2m
Design flow: 6.50 l/s
(50% betterment from existing brownfield runoff)

Building A Service Yard

new retaining wall

Proposed Parking

CL 67.72
IL 66.30

CL 67.34
IL 66.13

Proposed Attenuation Tank
Storage estimate: 37 - 69m³
10 x 5 x 1.2m dp tank
provides 57m³ with 95% voids

Flow control manhole
Design head: 1.2m
Design flow: 9.40 l/s
(50% betterment from existing brownfield runoff)

CL 67.13
IL 65.76

Outfall to combined sewer subject to S106 agreement with Yorkshire Water

PROPOSED SITE PLAN
SCALE 1:200

0 1m 2m 3m 4m 5m 10m 20m
SCALE BAR 1:200

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Legend

- Existing Public Combined Water Sewer
- Proposed Surface Water Pipe
- Proposed Foul Water Pipe
- Proposed Attenuation Tank
- Proposed Oil Separator
- Areas assumed to remain largely as existing and therefore continue to drain as existing conditions
- Proposed Car Park Catchment - 0.135ha
- Proposed Buildings and Service Yard Catchment - 0.156ha
- Proposed Buildings and Smaller Car Park Catchment - 0.093ha

Rev.	Date	Description	Drn / Chk'd / App'd
P01	19/03/2025	Issued with Drainage Strategy	LC / SLL / SLL

Suitability:
S3 - Suitable for Review & Comment

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www.jnpgroup.co.uk

Client:
John L Brierley Ltd.

Job:
Turnbridge Mills, Quay Street, Huddersfield

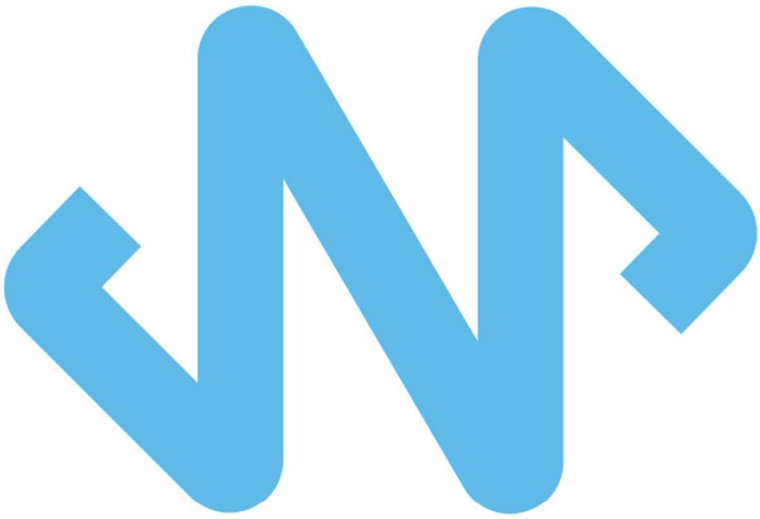
Title:
Drainage Strategy

Classification: FI_60_20
Scale @ A1: 1:250

Project - Originator - Volume/System - Level/Location - Type - Discipline - Number
S12097 - JNP - XX - XX - DR - C - 2002
Document/Drawing Number

Revision: P01

JNP Group Internal Project Number: X00000



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