enzygo
environmental consultants

Water Framework Directive (WFD) Assessment

Marsden Island, Huddersfield

CS District Ltd

SHF.9022.001.HY.R.001.A

Contact Details:

Samuel House
1st Floor
5 Fox Valley Way
Stocksbridge
Sheffield
S36 2AA

tel: 0114 321 5151
www: enzygo.com

Marsden Island, Huddersfield

Project:	Water Framework Directive (WFD) Assessment
For:	CS District Ltd
Status:	Draft for Client Comment
Date:	February 2026
Author:	Dani Lister BA (Hons), MA, MCIWEM - Consultant Hydrologist
Reviewer/ Approver:	Scott Dawson BSc (Hons), MSc, MCIWEM, C.WEM – Associate Director

Contents

Tables & Figures

Appendices

Summary

This report presents a Water Framework Directive (WFD) assessment in support of a planning application for a proposed residential development located on land at Marsden Island, Marsden, Huddersfield.

The report assesses whether there are any elements of the proposed scheme which could have a detrimental effect on the current quality of a receiving water body (Colne from Wessenden Brook to River Holme Water Body).

The assessed impacts have the potential to cause minor, localised, temporary effects, that will revert to background effects, post construction. Potential impacts on the physical habitat, water quality, fish, eels, macrophytes, invertebrates, and diatoms will be mitigated during the construction and operational phase of the development. Therefore, the proposed development is unlikely to significantly impact the water body and its habitats and species.

Regarding the significance of risks to the water body, the nature of the development means that the development has the potential to provide minor, localised, or temporary effects, which will improve post-construction due to the introduction of a new floodplain compensation storage. Potential impacts on the physical habitat, water quality, fish, and eels, macrophytes, invertebrates and diatoms will be mitigated during the construction and operational phase of the development.

Overall, the proposed development is concluded to have no overall significant impact on the water body or its WFD status and will provide an overall betterment.

The report concludes that the proposed development will not negatively impact the WFD status of the River Colne (Colne from Wessenden Brook to River Holme Water Body) or jeopardise the water body status from 'improving'.

1.0 Introduction

1.1 Background

1.1.1 Enzygo Ltd was commissioned by CS District Ltd to carry out a Water Framework Directive (WFD) assessment in support of a planning application for a proposed residential development, located on land at Marsden Island, Marsden, Huddersfield, HD7 5XB.

1.2 Proposed Development

1.2.1 The proposal is for a planning application for a residential development of ’75 dwellings with associated parking, infrastructure, hard and soft landscaping and access from Manchester Road’. This WFD assessment relates to the full planning application.

1.2.2 A copy of the of the surface water drainage strategy is included in Appendix 1. A SuDS drainage scheme is proposed to manage excess runoff from the development. As per the Civic Engineers Ltd Drainage Strategy report, pervious pavements comprising reinforced gravel and reinforced grass surfacing will intercept and treat run-off which will be collected via a network of below ground perforated pipes. Twin perforated 1500mm pipes surrounded by clean stone will be installed to provide additional attenuation and will act as a collection drain for the porous surfacing above. These pipes will then outfall to the River Colne via an existing surface water culvert.

1.2.3 The maximum rate stated for the Site is 4.9l/s, which has been calculated using the FEH Statistical Method using FEH22 point data.

1.2.4 It is proposed that foul flows will outfall to the Yorkshire Water public combined sewer that runs beneath the Site.

Figure 1.1: Drainage Strategy

Figure 1.2: Site Location Summary

Image © 2026 Digital Globe.

1.3 Purpose

1.3.1 The WFD (2000/60/EC)[1] encompasses all surface waters and groundwater in England and Wales. The directive is fully transposed into law in England and Wales by The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017[2]. As such it is unaffected by the UK's EU Exit.

1.3.2 River Colne is >10m wide, and so the Environment Agency requires a bespoke permit to be obtained for discharge of surface water into the watercourse. A WFD Assessment is required to obtain the permit, as it needs to be proven that the proposed development will not impact on the biodiversity of the receiving watercourse.

1.3.3 The development has the potential to affect the water environment during both construction and operation, so an assessment of its compliance with WFD legislation is required. The associated changes could influence the water body classification and status, and this WFD assessment explores such elements in detail.

1.3.4 This assessment was carried out in accordance with Environment Agency Guidance for *'Water Framework Directive Risk Assessment - How to Assess the Risk of Your Activity'* (6th April 2016)[3].

1.3.5 A WFD assessment helps understand:

- The impact the activity may have on the immediate water body and any linked water bodies.
- Whether the activity complies with the River Basin Management Plan (RBMP).
- Whether the activity will affect the water body or linked water body status. The current status is set out in the 2015 (updated 2022) RBMP and is based on the

[1] https://www.eea.europa.eu/policy-documents/water-framework-directive-wfd-2000
[2] https://www.legislation.gov.uk/uksi/2017/407/contents/made
[3] https://www.gov.uk/government/publications/water-framework-directive-how-to-assess-the-risk-of-your-activity

condition of different quality elements in the water body, for example biology and chemistry.

1.3.6 The WFD assessment is required to assess how the proposal will affect the ecology of the water body and should identify any potential impacts the works will have on hydro-morphology (and therefore ecological) quality elements and provide information on how these impacts will be mitigated or avoided.

1.3.7 The Environment Agency online Catchment Data Explorer mapping[4] shows the 'Colne from Wessenden Brook to River Holme Water Body' is classified as heavily modified and therefore has specific mitigation measures, set out in the Humber River Basin Management Plan, to ensure it is able to reach Good Ecological Potential.

1.3.8 The proposed development should aim to deliver (and must not prevent) implementation of these mitigation measures. The WFD assessment requires cumulative impacts of works to be considered that the proposed development does not:

- Cause deterioration in the status of any water body through deterioration in the status of the Biological Quality Elements (BQEs); or,
- Compromise the ability of the water body to achieve its WFD status objectives (through improvement works if necessary); and where possible,
- Indicate how the proposed scheme contributes to the delivery of WFD objectives.

1.4 Report Structure

1.4.1 This report is structured as follows:

- Section 2 describes the site location and background.
- Section 3 details the WFD assessment methodology.
- Section 4 details the waterbodies that are deemed to potentially be affected by the proposed development.
- Section 5 assesses the effects the proposed development could have on ecological and chemical status of the water body.
- Section 6 presents a summary and conclusions.

[4] https://environment.data.gov.uk/catchment-planning/

2.0 Site Location and Description

2.1 Location

2.1.1 The development is located on land at Marsden Island, Marsden, Huddersfield, HD7 5XB and is centred on National Grid Reference (NGR) 405851, 412530.

2.2 Land Use

2.2.1 The development is comprised of brownfield land from the remains of a demolished mill building and a previous unfinished development (Figure 2.1).

2.2.2 The River Colne conveys flows northeast along the southern boundary of the Site.

Figure 2.1: Aerial Image of the Site

Image © 2026 Digital Globe.

The Site

2.2.3 The Site is a brownfield site comprised of a mixture of hardstanding, rubble, woodland, and building foundations (Figure 2.3).

2.2.4 It is bounded by a stone wall along the northern boundary with the Huddersfield Narrow Canal beyond; woodland to the east with the River Colne beyond; the River Colne to the south with a café beyond; and Cellar's Clough pond to the west with woodland beyond.

2.2.5 Vehicle access is via Manchester Road to the south and a track that leads to the development.

Figure 2.3: Site Images

Top Left: *View looking north.* ***Top Right:*** *View looking east.* ***Bottom Left:*** *View looking west.* ***Bottom Right:*** *View looking south.*

2.3 Topographic Information

2.3.1 A detailed topographic survey was carried out during May 2025 (Appendix 2).

2.3.2 The Site is undulating due to various areas of hardstanding, topographic low points, and rubble mounds across the Site. The Site sits at an approximate level of 160 metres Above Ordnance Datum (m AOD).

2.4 Catchment Hydrology

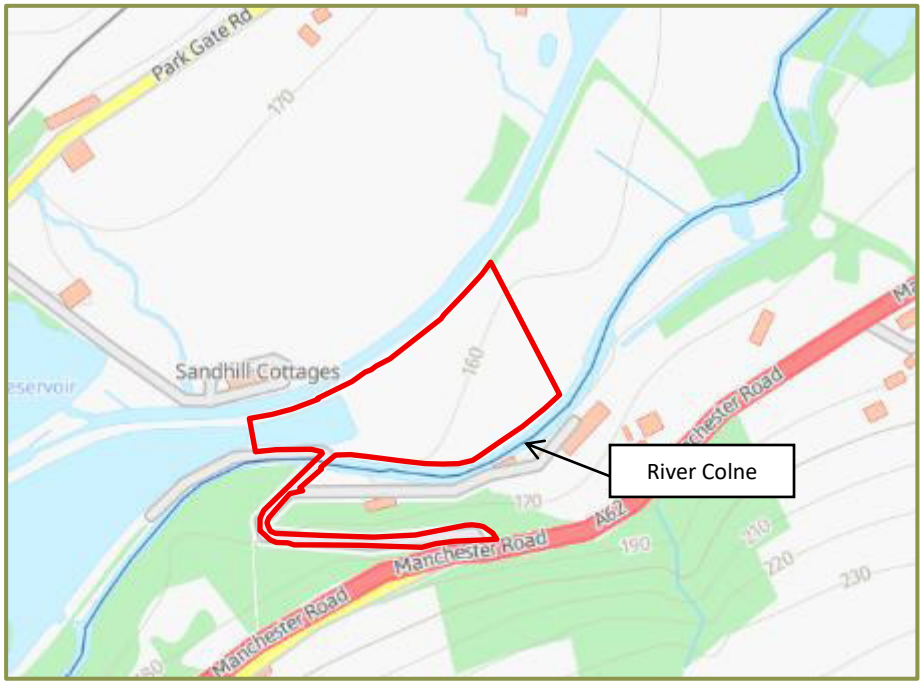
OS Mapping

2.4.1 OS mapping (Figure 2.5) shows the River Colne conveys flows northeast along the southern boundary of the Site.

2.4.2 The watercourse passes beneath a bridge that forms a section of the Site access. It accepts flows from an unnamed stream that flows through the southwestern edge of the Site. It then continues to flow northeast towards Huddersfield.

2.4.3 The Environment Agency online Main River Map shows the River Colne is a ('main river'), which is a watercourse where flood risk work is carried out by the Environment Agency.

Figure 2.5: Map of Watercourses

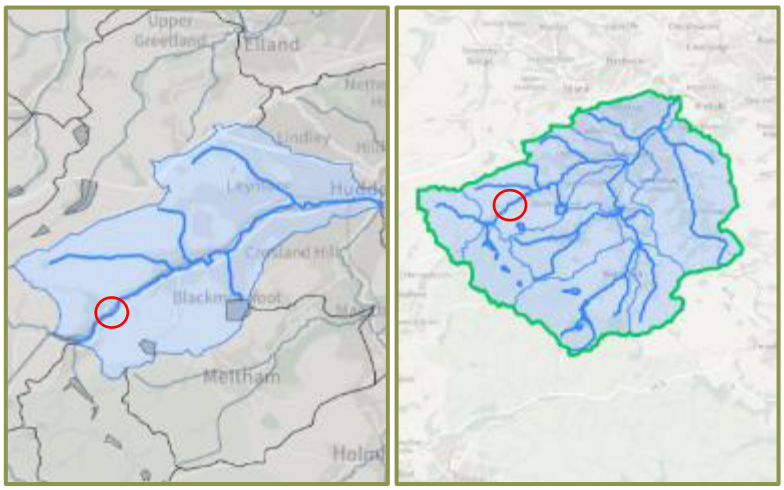


Environment Agency Catchment Data Explorer Mapping

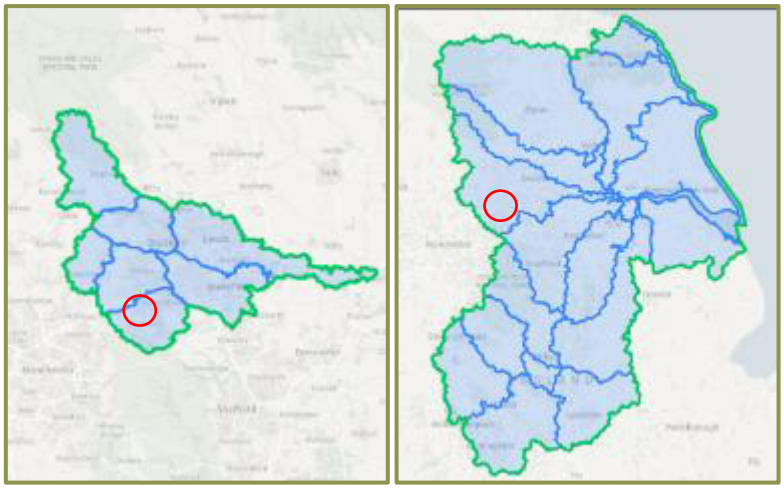
2.4.4 The development resides within the Colne from Wessenden Brook to R Holme Water Body (Figure 2.6), which is in the Colne and Holme Operational Catchment, Aire and Calder Management Catchment, and Humber River Basin District[5].

2.4.5 The climate change allowances for the Aire and Calder Management Catchment are +23% 'central', +31% 'higher central', and +51% 'upper end'.

Figure 2.6: Catchment Data Explorer



[5] http://environment.data.gov.uk/catchment-planning/



Top Left: *Colne from Wessenden Brook to R Holme Water Body.* ***Top Right:*** *Colne and Holme Operational Catchment.* ***Bottom Left:*** *Aire and Calder Management Catchment.* ***Bottom Right:*** *Humber River Basin District. Contains EA information © EA and database right [2026].*

2.5 Designated Sites

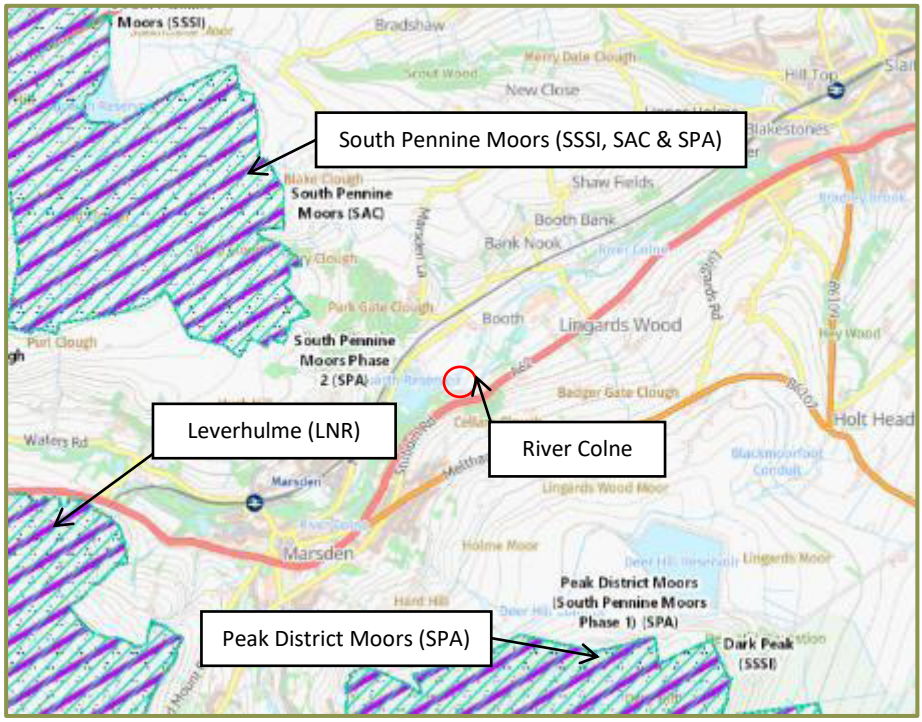
2.5.1 The DEFRA Magic Map (England and Wales)[6] (Figure 2.7) shows the nearest designated sites are:

- Peak District Moors (South Pennine Moors Phase 1) (Special Protection Area [SPA]) located approximately 1.4km south of the Site.
- South Pennine Moors Phase 2 (Special Protection Area and Special Area of Conservation [SPA & SAC]) located approximately 870m northwest of the Site.
- Park Clough and Standedge Road Cutting (Site of Special Scientific Interest [SSSI]) located approximately 2km west of the Site.

2.5.2 None of the above sites are hydrologically connected to the proposed development as they are upstream.

[6] https://magic.defra.gov.uk/magicmap.aspx

Figure 2.7: Designated Sites



From Magic Map. Contains EA information © EA and database right [2026].

2.6 Soils and Geology

Soils Mapping

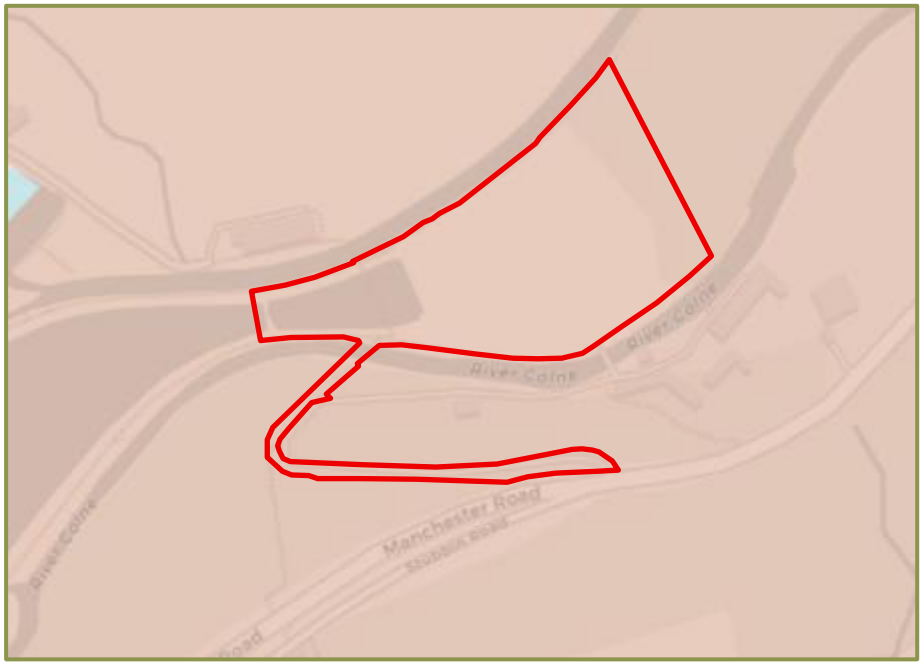
2.6.1 The Soilscapes online soils map viewer[7] shows the development is underlain by freely draining, loamy soils (Figure 2.8).

2.6.2 The soils mapping is indicative and there may be localised variation.

2.6.3 It must be noted that the Site is brownfield and hardstanding and made ground was observed on Site during the walkover.

[7] https://www.landis.org.uk/soilscapes/

Figure 2.8: Soils Mapping



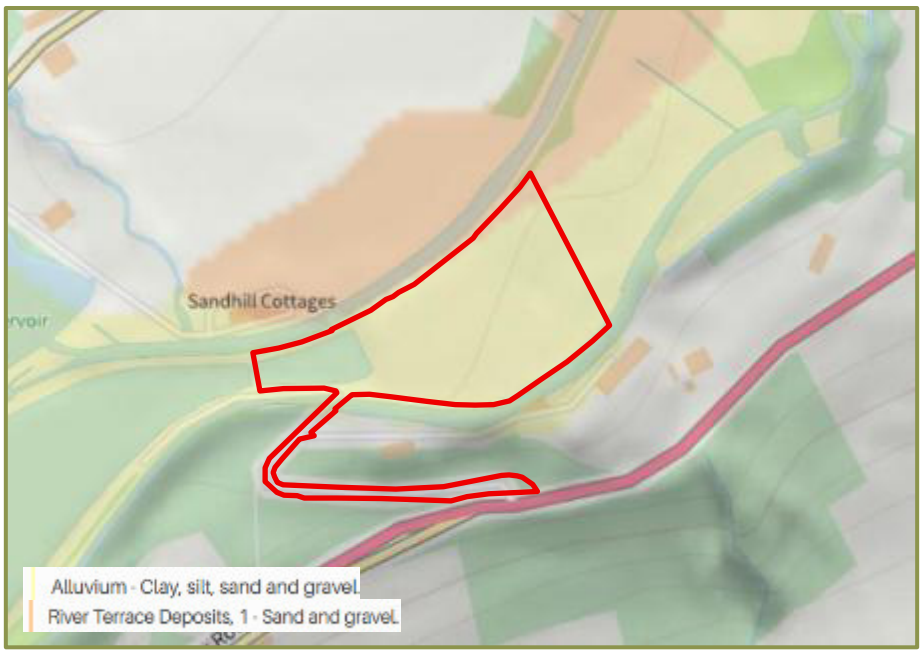
Soils Data © Cranfield University (NSRI) and for the Controller of HMSO [2026].

Geology Mapping

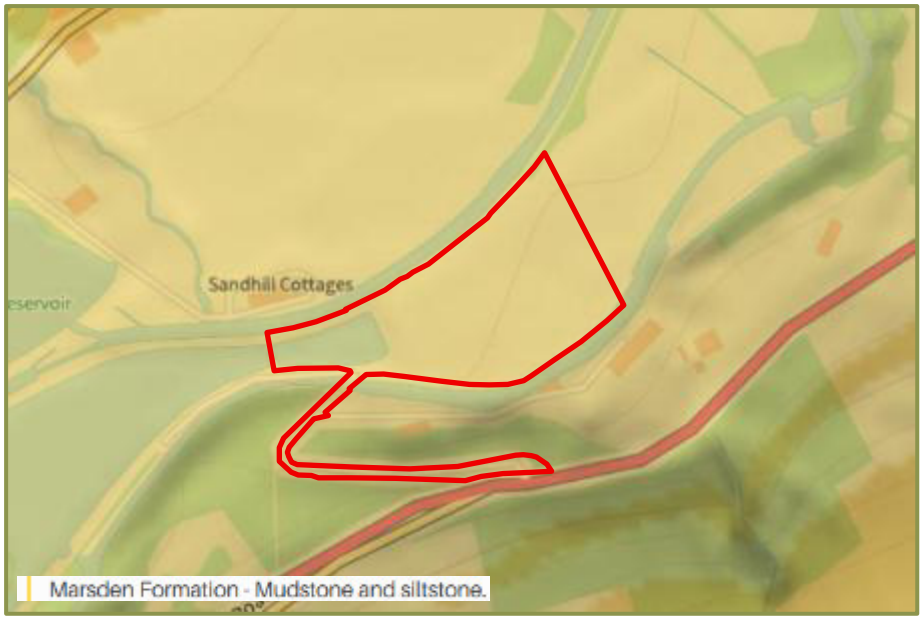
2.6.4 The Geology of Britain online map viewer[8] (Figure 2.9) shows most of the development is underlain by Alluvium – Clay, silt, sand and gravel (superficial deposits). The northern corner of the Site is underlain by River Terrace Deposits, 1 – Sand and gravel.

2.6.5 The bedrock beneath the development is Marsden Formation – Mudstone and siltstone.

Figure 2.9: Geology Mapping



[8] https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/



Top: *Superficial deposits* ***Bottom:*** *Bedrock geology. Contains British Geological Survey materials © NERC [2024].*

2.7 Hydrogeology

2.7.1 Defra Magic Map online mapping (Figure 2.10) shows the development is not located in a groundwater Source Protection Zone (SPZ). These zones show the risk of contamination from any activities that might cause pollution in the area. The closer the activity, the greater the risk.

Figure 2.10: Source Protection Zone Map

From Magic Map. Contains EA information © EA and database right [2026].

2.7.2 The development is located above a Secondary A Aquifer (bedrock and superficial designation) (Figure 2.11). Indirect inputs of clean surface water to groundwater are permissible, for

example where the base of the soakaway is above the water table and there is an unsaturated zone in the aquifer unit.

2.7.3 The development is not located in a Drinking Water Protected Area (Surface Water) or Safeguard Zone (Surface Water and Groundwater).

Figure 2.11: Aquifer Designation Map

***Top:** Aquifer Designation (bedrock). **Bottom:** Aquifer Designation (superficial drift). From Magic Map. Contains EA information © EA and database right [2026].*

BGS Borehole Records

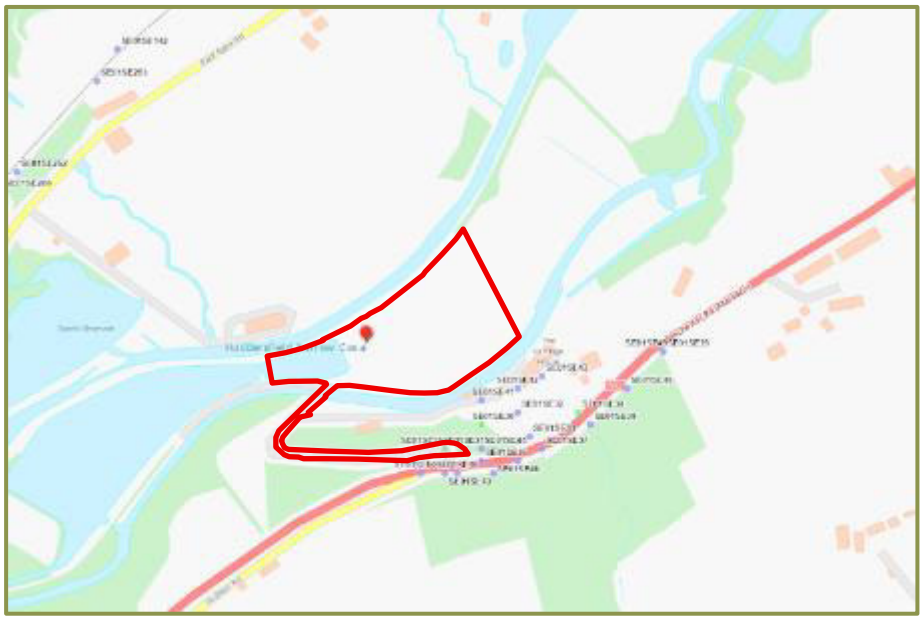
2.7.4 The BGS Borehole Records online mapping [9] (Figure 2.12) shows several boreholes immediately south of the Site, south of the River Colne, including one within the Site access.

[9] https://mapapps2.bgs.ac.uk/geoindex/home.html?layer=BGSBoreholes&_ga=2.188161710.725607099.1730800238-986029992.1730800238

2.7.5 The borehole records confirm the geology as depicted by the Geology of Britain mapping, including the presence of made ground beneath the Site (Appendix 3).

2.7.6 Records shows that groundwater was encountered in multiple boreholes between depths of 0.3m to 12.19m bgl.

Figure 2.12: BGS Borehole Mapping



2.8 Identified Receptors

2.8.1 Identified sensitive receptors, during both construction and operational phases, include:

- Surface Water: River Colne watercourse/catchment

3.0 Water Framework Directive Assessment Methodology

3.1 The Water Framework Directive

3.1.1 The Water Framework Directive (WFD) (2000/60/EC) encompasses all surface waters and groundwater in England and Wales. The EU WFD was transposed into law in England and Wales by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.

3.1.2 A water body is a manageable unit of surface water, being the whole (or part) of a stream, river or canal, lake or reservoir, transitional water (estuary) or stretch of coastal water. A 'body of groundwater' is a distinct volume of groundwater within an aquifer or aquifers.

3.1.3 The water body encompasses the entire stream network draining the river catchment, as classified for the purposes of the WFD. Waterbodies designated as highly modified aim to achieve good ecological potential, while water bodies without this designation aim to achieve good ecological status.

3.1.4 The Directive requires that Environmental Objectives be set for all surface and ground waters in England and Wales to enable them to achieve Good Status (or Good Ecological Potential for Heavily Modified and Artificial Water Bodies) by a defined date.

3.1.5 This WFD assessment aims to determine the effects of the proposal on ecological/biological quality and hydrogeomorphology, identifying any potential impacts that could cause deterioration in the status of a water body or could hinder the water body from meeting its WFD objectives.

3.1.6 The WFD sets objectives for all surface water and groundwater bodies that must be met for the proposed scheme to be compliant with the WFD. Article 4.1 of the WFD outlines the Environmental Objectives as follows:

- Member States shall implement the necessary measures to prevent deterioration of the status of all bodies of surface water (Article 4.1(a)(i)).
- Member States shall protect, enhance, and restore all bodies of surface water, subject to the application of subparagraph (iii) for artificial and heavily modified bodies of water, with the aim of achieving good surface water status by 2015 (Article 4.1(a)(ii)).
- Member States shall protect and enhance all artificial and heavily modified bodies of water, with the aim of achieving good ecological potential and good surface water chemical status by 2015 (Article 4.1(a)(iii)).
- Progressively reduce pollution from priority substances and cease or phase out emissions, discharges, and losses of priority hazard substances (Article 4.1(a)(iv)).
- Prevent Deterioration in Status and prevent or limit input of pollutants to groundwater (Article 4.1(b)(i)).

3.1.7 These Environmental Objectives are detailed in the list below:

- Prevent deterioration in the status of aquatic ecosystems, protect them and improve the ecological condition of waters.
- Aim to achieve at least "good status" for all water bodies by 2015. Where this is not possible and subject to the criteria set out in the Directive, aim to achieve good status by 2021 or 2027.
- Meet the requirements of Water Framework Directive Protected Areas.

- Promote sustainable use of water as a natural resource.
- Conserve habitats and species that depend directly on water.
- Progressively reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to the aquatic environment.
- Progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants.
- Contribute to mitigating the effects of floods and droughts.

3.2 Preventing Deterioration in Status

3.2.1 Any activity with the potential to impact on the ecology of a water body will need consideration of whether it could cause deterioration in its Ecological Status or Potential.

3.2.2 For each water body, three different status objectives are identified. These are the overall status objective, the ecological status or potential objective and the chemical status objective. A default objective for all waterbodies is to prevent the deterioration in the Ecological Status (or Ecological Potential for Heavily Modified and Artificial Water Bodies).

3.2.3 This report should prove that the following receptors are not negatively affected:

- Physical habitat - the distribution and diversity of habitat including the physical processes that sustain and create new habitat. Physical habitat is essential for fish, macrophytes and invertebrates to live and thrive.
- Water quality - particularly physico-chemical aspects of water quality - such as levels of dissolved oxygen, phosphorus, and ammonia;
- Fish and eels.
- Macrophytes - water plants visible to the naked eye, growing in the river.
- Invertebrates - insects, worms, molluscs, crustacea etc living on the riverbed.
- Diatoms - microscopic diatoms (algae) found on rocks and plants.

3.2.4 These elements are in turn supported by a series of physico-chemical and hydromorphological Quality Elements. These Quality Elements are taken from Annex V of the Directive. The overall Ecological Status is determined by the lowest element status.

3.2.5 Any activity that has the potential to have an impact on any of the Quality Elements will need consideration of whether it could cause deterioration in the status of a water body. The activity will also need to be considered in terms of whether it will compromise the ability of the water body to reach Good Ecological Status or Good Ecological Potential by the date specified in the Environment Agency RBMP.

3.3 WFD Methodology

3.3.1 Activities near bodies of water have the potential to cause deterioration of either or both ecological or chemical status of a water body, or to compromise improvements which may cause an impasse to a water body meeting its WFD objectives. The Environment Agency's '*Water Framework Directive Risk Assessment - How to assess the risk of your activity'* guidance sets out the process for ensuring that the effects of the construction and operation of the proposed development do not have an adverse effect upon the WFD status of the receiving water body.

3.3.2 The guidance comprises of three stages:

- Stage One: Screening
- Stage Two: Scoping
- Stage Three: Impact Assessment

3.3.3 The guidance methodology states that the purpose of the screening stage is to identify if further assessment of the works taking place is required. If the activity is determined to be of low risk, then no further action is required.

3.3.4 By referring to the Environment Agency's guidance, this assessment considers the effects of the development upon the existing WFD status.

3.4 Stage One: Screening

3.4.1 In the screening stage of the assessment, activities can be 'screened' due to the nature, intensity or the frequency of the activity being undertaken. This process excludes activities that do not need to go through the later assessment stages.

3.5 Stage Two: Scoping

3.5.1 If an activity is not screened out during stage one, the scoping stage identifies any activities that have a potential risk to the WFD receptors and need an impact assessment. The receptors are detailed below:

- Physical habitat
- Water quality
- Fish and eels
- Macrophytes
- Invertebrates
- Diatoms
- Protected areas

3.6 Stage Three: Impact Assessment

3.6.1 Any activities that have been scoped in Stage Two will continue to the assessment stage. This stage considers the potential impact of the activity and identifies processes to avoid and minimise those impacts and details if the activity may cause deterioration of the receiving water body to achieve good status.

3.7 Available Data

3.7.1 The following information has been used to inform this report:

- Ordnance Survey mapping.
- Detailed topographic survey (Appendix 2).
- Environment Agency 1m LiDAR Data[10].

[10] https://environment.data.gov.uk/DefraDataDownload/?Mode=survey

- Environment Agency online mapping (Flood Map for Planning[11], Long Term Flood Risk Assessment for Locations in England[12], Catchment Data Explorer[13] and Main River Map[14], and Migratory and freshwater fish monitoring surveys[15]).
- Environment Agency Water Framework Directive Risk Assessment Guidance[16]
- River Basin District (RBD) Maps[17] (Humber RBD).
- DEFRA's Magic Map for identifying Designated Sites[18].
- Humber RBMP[19].
- Civic Engineers Flood Risk Assessment and Drainage Strategy and associated drawings (October 2025) (Appendix 1)
- European Environment Agency WFD protected area spatial data sets[20].

[11] https://flood-map-for-planning.service.gov.uk/
[12] https://flood-warning-information.service.gov.uk/long-term-flood-risk/
[13] http://environment.data.gov.uk/catchment-planning/
[14] https://environment.maps.arcgis.com/apps/webappviewer/index.html?id=17cd53dfc524433980cc333726a56386
[15] https://environment.data.gov.uk/ecology/explorer/
[16] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/522426/LIT_10445.pdf
[17] https://www.gov.uk/government/publications/flood-risk-assessments-river-basin-district-maps
[18] https://magic.defra.gov.uk/magicmap.aspx
[19] River basin management plans: 2015 - GOV.UK (www.gov.uk)
[20] https://www.eea.europa.eu/data-and-maps/data/wise-wfd-protected-areas-2

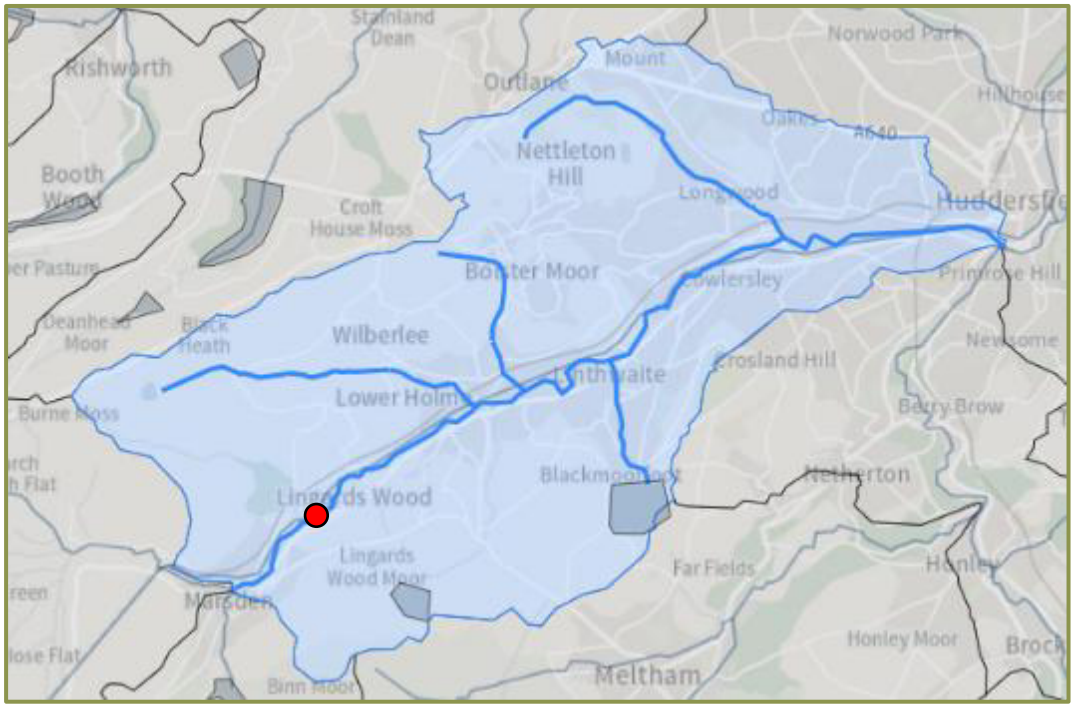
4.0 Potentially Affected Waterbodies

4.1 Surface Water (River Colne watercourse/catchment)

Introduction

4.1.1 The proposed residential development will be located within the Colne from Wessenden Brook to River Holme Water Body (Figure 4.1).

Figure 4.1: Colne from Wessenden Brook to River Holme Water Body



Red circle denotes site location.

Current Water Body Status – Colne from Wessenden Brook to River Holme

4.1.2 A summary of the current water body status is provided in Table 4.1 (data sourced from Environment Agency Catchment Data Explorer online mapping). The table details an overview of the status of the water body (inclusive of overall, ecological, and chemical status) and whether the water body is failing to achieve this status.

Table 4.1: Colne from Wessenden Brook to River Holme Water Body Summary[21]

Data Categories	Data Summary
Water Body ID	GB104027063330
National Grid Reference	SE1014217274
River Basin District Name	Humber
Water Body Type	River
Catchment Area (ha)	4223.49
Hydromorphological Designation	Heavily Modified

[21] https://environment.data.gov.uk/catchment-planning/WaterBody/GB104027063330

Data Categories	Data Summary
Overall Water Body Status	Moderate
Ecological Status	Moderate
Chemical Status	Does not require assessment (Failed previously in 2019)
Target Water Body Status	Reaching 'Good' ecological status by 2027 and 'Good' chemical status by 2063
Hydromorphological Status	Not assessed
Parameters not at Good Status (2022)	**Ecological:** Fish, Invertebrates **Chemical:** Does not require assessment
Reasons for not achieving good (RNAG)	Physical Modification, and pollution from wastewater relating to the chemicals Mercury, Polybrominated diphenyl ethers (PBDE) and Perfluorooctane sulphonate (PFOS)
Is the water body heavily modified (HMWB)?	Yes
Protected Areas	South Pennine Moors, South Pennine Moors Phase 2, Peak District Moors (South Pennine Moors Phase 1)
Monitoring sites	Stoney Battery Lane, Lees Mill Lane, Longwood Brook at Market St-Milnsbridge, Crimble Clough, Wessenden Brook at Fall Lane, Holme Mills, 1183, Colne at Slaithwaite Footbridge, Slaithwaite Park Footbridge, 153344, Colne at Marsden U/S Wessenden Brook, DS Slaithwaite Park, Colne D/S Pennine Chemicals, Titanic Mill, 1181, 152875, Pollard Street and Stafford Mills
Downstream water bodies	Colne from River Holme to River Calder

Water Framework Directive Protected Habitats

4.1.3 The European Environment Agency Water Information System for Europe (WISE)[22] WFD protected area spatial dataset was used to ascertain if any protected habitats were located within the catchment. Interrogation of the protected area data sets which include information about European drinking water protected areas, designated waters such as fish protected areas and shellfish protected areas, urban wastewater sensitive areas and bathing water protected areas, details that there are none near the development.

4.1.4 The protected areas are part of the Water Framework Directive register of protected areas and were reported in second RBMP or under other related reporting obligations. The data sets are part of the WISE, and compile information reported by the EU Member States, Albania, Iceland, Norway, Montenegro, Switzerland and the United Kingdom to the European Commission EC and the European Environment Agency EEA.

Humber River Basin Management Plan

4.1.5 The Humber RBMP[23] was produced by the Environment Agency to 'provide a framework for protecting and enhancing the benefits provided by the water environment'; this aligns with the objectives and requirements of the WFD and EU directives.

4.1.6 Waterbodies located in the Humber RBD have been provided status objectives by the Environment Agency, which exist to consider the requirements of the water body to prevent deterioration. The RBMP details these status objectives for waterbodies in the Humber RBD and the year the status should be achieved by.

[22] https://water.europa.eu/
[23] https://www.gov.uk/guidance/humber-river-basin-district-river-management-plan-updated-2022

4.1.7 The RBMP also sets out the current plans for the different operational catchments in the RBD to achieve by 2027, inclusive of future aims. The Humber RBMP states that the priority river basin management issues that are to be dealt within in the Aire and Calder catchment are:

- Physical modifications
- Pollution from wastewater
- Pollution from rural areas
- Changes to the natural flow and level of water
- Pollution from towns, cities, and transport
- Negative effects of non-native invasive species
- Pollution from abandoned mines

Jeopardising Water Body Status

4.1.8 Every water body has a WFD target status that it is expected to achieve by a set date. The proposed works must therefore be considered if it will jeopardise the water body meeting its target status.

4.1.9 As detailed in Table 4.1, the Colne from Wessenden Brook to River Holme Water Body has a '*Moderate*' status for ecology classification and a '*Fail*' *status* at present for chemical classification, based on the 2019 classification. 2022 classifications still present ecology as '*Moderate*', though chemical classification is stated as '*Does not require assessment*'. Environment Agency data[24] for the water bodies state that a 'Good' status for Biological Quality Elements (Ecological) classification should be reached by 2027. Though it is stated that this goal has a low rate of confidence of occurring due to it being disproportionately expensive and causes disproportionate burdens. A 'Good' status for Chemical classification is detailed to be reached by 2063. Although, additional comments provided state that returning to natural conditions is technically infeasible and no technical solution to reach a status of 'Good' is currently available.

4.1.10 Due to the potential impact of the proposed works on water quality and designated habitat protected areas identified through this assessment process it is imperative that the development does not jeopardise the objectives and status of the water bodies.

[24] https://environment.data.gov.uk/catchment-planning/WaterBody/GB104027063330

5.0 Water Framework Directive Assessment

5.1 Background

5.1.1 The initial stage of the assessment screens the proposal against the Ecological and Chemical Status objectives for the water bodies potentially affected by the scheme, and their Quality Elements. The aim of this process is to determine whether the works affecting the River Colne could have an impact on any of these criteria. Those criteria for which no potential adverse effects are identified are not considered further in the assessment.

5.1.2 An assessment is then undertaken to determine the effects that the proposal could have upon those Quality Elements screened into the assessment. Any impacts identified are then considered in relation to the Ecological and Chemical Status of the water body and the status objectives.

5.1.3 To aid this assessment, for all Artificial or Heavily Modified Water Bodies, the proposal is also assessed against their relevant mitigation measures to reduce the existing hydro-morphological impacts on the water body and all measures needed to be in place for the water body to achieve Good Ecological Status or Potential.

5.1.4 The following assessment objectives are then used to determine whether the proposal complies with the overarching objectives of the WFD.

- Objective 1: The proposed scheme does not cause deterioration in the Status of the Biological Elements of the water body.
- Objective 2: The proposed scheme does not compromise the ability of the water body to achieve its WFD status objectives.
- Objective 3: The proposed scheme does not cause a permanent exclusion or compromised achievement of the WFD objectives in other bodies of water within the same River Basin District.
- Objective 4: The proposed scheme contributes to the delivery of the WFD objectives.

5.1.5 If it is predicted that the proposal will cause deterioration in water body status or prevent a water body from meeting its ecological objectives, then an assessment is also made against the conditions listed in Article 4.7 of the WFD.

5.1.6 Article 4.7 of the Directive defends deterioration in status or failure to meet WFD objectives resulting from new modifications or sustainable human development activities, if all conditions set out under this Article are met. Member States will not be in breach of this Directive if all the conditions are met.

5.1.7 The purpose of this section is to screen potential impacts for the quality elements of the scoped in water bodies in proximity to the Proposed Scheme, and identify any need for further, more detailed assessment.

5.2 Stage One: Screening

5.2.1 The proposed development is not classed as a ‘low’ risk activity. As such, the development would need to be progressed to the WFD scoping stage.

5.3 Stage Two: Scoping

5.3.1 As the proposed development for the site has not been screened out at Stage One of the assessment, the proposed development now needs to be considered for its interaction with WFD receptors. A list of the WFD receptor groups and a summary of the scoping stage is shown in Table 5.1.

Table 5.1: Summary of WFD Scoping Assessment

Receptor	Potential Risk to Receptor?	Risk Issues for Impact Assessment
Hydromorphology - the physical characteristics of watercourses, estuaries, and coasts	**Yes**	The development will utilise an existing outfall into the River Colne. Therefore, there will be no modification to the watercourse.
Physical Habitat - The distribution and diversity of habitat including the physical process that sustain and create new habitat. Physical habitat is essential for fish, macrophytes and invertebrates to live and thrive.	**Yes**	There will be disruption of the physical habitat during construction of the development. Post construction planned maintenance may cause disruption.
Water Quality - particularly physico-chemical aspects of water quality – such as levels of dissolved oxygen, phosphorus and ammonia	**Yes**	There may be sediment that will be disturbed during the construction process. During the construction of drainage features sediment may be washed into the watercourse and there may be chemicals that are on the Environmental Quality Standards Directive (EQSD) list used.
Fish and Eels	**Yes**	Downstream of the site (~0.7km) a survey was undertaken (in 2015) detailing fish present downstream of the site at NGR SE0634313053. At the time the following was identified: • Brown / sea trout • Stone loach Downstream of the site (~3.5km) a survey was undertaken (in 2025[25]) detailing fish present downstream of the site at NGR SE0900414249. At the time the following was identified: • Brown / sea trout • Stone loach • Grayling

[25] https://environment.data.gov.uk/ecology/explorer/

Receptor	Potential Risk to Receptor?	Risk Issues for Impact Assessment
		• Bullhead • 3-spined stickleback • Minnow It should be noted that just because only six varieties of fish were observed from the survey, that these are not the only types present in the watercourse.
Macrophytes - Water plants visible to the naked eye, growing in the river	**Yes**	Downstream of the site (~3.5km) a survey was undertaken (between 2022-2025) detailing macrophytes present downstream of the site at SE1719917262.
Invertebrates - Insects, worms, molluscs, crustacea etc living on the riverbed	**Yes**	The site provides excellent habitat for a wide range of invertebrates, which may potentially be disturbed. Downstream of the site (~3.5km) a survey was undertaken (2021-2025) detailing invertebrates present downstream of the site at NGR SE0902814155.
Diatom - Microscopic diatoms (algae) found on rocks and plants	**Yes**	Downstream of the site (~3.5km) a survey was undertaken (2021-2024) detailing microscopic diatoms present downstream of the site at SE0902814155.

5.4 Stage Three: Impact Assessment

5.4.1 This section completes Stage 3 of the WFD assessment of the potential effects the proposed development may have on the receptors identified at the scoping stage. It is recommended that a Construction and Environment Management Plan (CEMP) is also considered to outline how the construction of the proposed development will avoid, minimise and/or mitigate effects on the environment and surrounding area. This could be recommended through a suitably worded planning condition.

5.4.2 It is also recommended that a Construction Surface Water Management Plan (CSWMP) is also considered to outline how silt will be managed as drainage is installed but preceding completion.

Physical Environment

5.4.3 Changes to the physical environment for the development, relate to construction-based works for the proposed development on the site. The construction process of all works is likely to cause minor localised alterations to the flow (if any), which are unlikely to cause greater affects to the entire Colne from Wessenden Brook to River Holme Water Body.

5.4.4 Maintenance of any SuDS assets on site and outfalls/headwalls will need to be undertaken as per the guidance detailed in The SuDS Manual CIRIA:C753 (Chapter 28). It is likely that this maintenance will cause minimal disruption to the physical environment.

5.4.5 A Flood Risk Assessment was undertaken by Civic Engineers in September 2025 (Appendix 1). The report details the proposed flood compensation storage area and drainage strategy for the development.

5.4.6 The surface water drainage will utilise the existing onsite outfall to the River Colne, subject to confirming the condition of the existing outfall.

5.4.7 Overall, in the context of the scale of the Colne from Wessenden Brook to River Holme Water Body, the effects of the proposed development are minor, however they will provide a betterment to the existing conditions by providing floodplain compensation and mitigating flood risk around the development. It is concluded that during construction and operation that there are expected to be minimal effects on the physical environment for the water body with the implementation of the above proposed plans (e.g. CEMP) and the consented drainage strategy. The proposed development would not prevent the water body from meeting the WFD objectives for the physical environment.

Biological Status

The proposed scheme will continue to be a positive contribution to achieving a better biological status through the use of onsite SuDS (i.e. floodplain compensation, permeable paving and perforated pipe) and following the recommendations of the PEA and undertaking the recommended planting scheme.

Water Quality

5.4.8 Water quality should be included within the assessment if the proposals include a discharge pipeline or outfall and could affect the following:

- Water clarity, temperature, salinity, oxygen levels, nutrients, or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days).
- Is in a water body with a phytoplankton status of moderate, poor or bad.
- Is in a water body with a history of harmful algae.

5.4.9 There is a history of harmful algae present in the Colne and Holme catchment, however, there are no phytoplankton present. These aspects of water quality are investigated below.

5.4.10 Additionally, 'Pollution from Physical Modifications' and 'Pollution from Waste Water' are the main contributors for the water bodies not achieving 'Good' status, which could attribute to the 'Moderate' status of the Phosphate classification for the water bodies. The proposed foul water from the site will enter the public sewer network, while surface water will enter SuDS features to ensure surface water enters a treatment train before discharging to the River Colne and the Yorkshire Water sewer. As such, providing a betterment to existing conditions.

5.4.11 The introduction of SuDS to the site for the proposed impermeable areas are there to help to increase the quality of water discharged to the River Colne from the site. The SuDS that are proposed to be incorporated for the hardstanding areas of the site include; permeable paving, perforated pipes and soft landscaping.

5.4.12 The Simple Index Approach (SIA) Tool is based on current CIRIA C753 guidance to the 'Simple Index Approach' as per Chapter 26: Water Quality Management: Design Methods of the CIRIA SuDS Manual 2015. A Site Pollution Index value and Impact Level can be calculated and assigned for each of the three indicators chosen for surface water quality (TSS, Metals and Hydrocarbons) allowing the impact on the receiving watercourse to be ascertained.

5.4.13 The inclusion of SuDS features to a site would assist in controlling the impact that chemical and ecological parameters have upon the receiving watercourse. SuDS assets such as

detention basins or certain types of planting can be used to slow down, scrub and intercept sediments to filter out pollutants prior to flows being discharged from a site.

5.4.14 Water quality improvements are achieved by decreasing flow rates, which in turn traps silt, sediment, and pollutants before discharging to the River Colne.

5.4.15 The online Simple Index Approach (SIA) Tool [26] has been used to demonstrate the effectiveness of the proposed strategy to manage surface water discharging to the River Colne.

5.4.16 The SIA tool has been used to demonstrate the effectiveness of SuDS components on all aspects of the development.

5.4.17 The use of perforated pipes (input as filter drains), permeable paving and soft landscaping would provide a sufficient level of treatment. A summary of the calculations is included in Table 5.2 and the full calculations are included in Appendix 4.

Table 5.2: Simple Index Approach Results Summary (residential roofing)

	Total Suspended Solids	Metals	Hydrocarbons
Pollution Hazard Score	0.2	0.2	0.05
Pollution Mitigation Score	0.75	0.7	0.75
Sufficiency of SuDS	Sufficient	Sufficient	Sufficient

5.4.18 Table 5.2 shows that using SuDS features on the site (perforated pipes, permeable paving and soft landscaping) would result in >0.95 mitigation (Site Pollution Index Value 'sufficient') to the receiving watercourse from TSS, Metals and Hydrocarbons at this outline stage. This sufficient mitigation for the receiving watercourse will ensure that the proposed development will not affect the River Colne from achieving its required status.

5.4.19 Overall, it is considered that there are not expected to be any permanent effects caused by the proposed development on water quality. The proposed development would not prevent the water body from meeting the WFD objectives for water quality.

Fish and Eels

5.4.20 Potential indirect impacts from construction and operational stage of the development can be managed and no likely significant effects are anticipated on the water environment. There will be no significant change to the water body flow or creation of new structures allowing for minimal disruption to the existing environment.

5.4.21 The introduction of SuDS to the proposed development will ensure that the quality of water entering the River Colne will continue to be of a standard that will benefit any fish or eel habitat.

5.4.22 Overall, it is considered that there are not expected to be any non-temporary effects caused by the proposed development on fish and eels. The proposed development would not prevent the water body from meeting the WFD objectives for fish and eels.

Macrophytes

[26] https://www.susdrain.org/resources/SuDS_Manual.html

5.4.23 During works, there is potential for deterioration in quantity and quality of existing macrophytes in the localised area of working. The potential indirect impacts from construction stage of the development can be managed and no likely significant effects are anticipated on the water environment.

5.4.24 The introduction of SuDS to the proposed development will ensure that the quality of water entering the River Colne will continue to be of a standard that will benefit any macrophytes habitat.

5.4.25 Overall, it is considered that there are not expected to be any permanent effects caused by the proposed development on macrophytes. The proposed development would not prevent the water body from meeting the WFD objectives for macrophytes.

Invertebrates

5.4.26 Sediment could be remobilised during works with potential for smothering downstream channel bed features or spawning grounds (localised and temporary sediment remobilisation). There will be significant changes to WFD water bodies due to construction or operation due to the construction of the new floodplain storage. Potential direct impacts from construction stage of the development can be managed and an overall betterment on the water environment will be achieved from this.

5.4.27 The introduction of SuDS and the new floodplain to the proposed development will ensure that the quality of water entering the River Colne will continue to be of a standard that will benefit any invertebrates habitat.

5.4.28 Overall, it is considered that there are not expected to be any non-temporary effects caused by the proposed development on invertebrates. The proposed development would not prevent the water body from meeting the WFD objectives for invertebrates.

Diatom

5.4.29 During the construction process there is potential sediment remobilisation during works resulting in potential deterioration in quantity and quality, with permanent localised impact. Potential indirect impacts from construction stage of the development can be managed and an overall betterment on the water environment will be achieved.

5.4.30 The introduction of SuDS to the proposed development will ensure that the quality of water entering the River Colne will continue to be of a standard that will benefit any diatom habitat.

5.4.31 Overall, it is considered that there are not expected to be any non-temporary effects caused by the proposed development on diatoms. The proposed development would not prevent the water body from meeting the WFD objectives for diatoms.

6.0 Summary and Conclusions

6.1 Introduction

6.1.1 This WFD Assessment has been carried out for CS District Ltd in support of a planning application for a proposed residential development, located on land at Marsden Island, Marsden, Huddersfield.

6.2 Summary

6.2.1 The assessment exercise presented within this report has demonstrated that there are no identified adverse impacts to the water quality elements measured under the WFD assessment for the River Colne.

6.2.2 The Colne from Wessenden Brook to River Holme Water Body falls within the Humber River Basin District and is designated as a river water body. Based on the 2022 WFD cycles this water body is designed to have a current overall status of 'Moderate', with a 'Moderate' ecological status and 'does not require assessment' chemical status.

6.2.3 To avoid potential pollution and run-off impacts during construction, site works will be undertaken in accordance with best practice and the through adoption of the appropriate guidance, such as Defra and the Environment Agency's (2023) *Pollution prevention for businesses.*

6.2.4 The proposed works will be designed to be compliant with Article 4.1 (a)(i-iii) as they will seek to prevent the ecological and chemical deterioration of the waterbodies' status.

6.2.5 The usage of current CIRIA C753 guidance to the 'Simple Index Approach' as per Chapter 26: Water Quality Management: Design Methods of the CIRA SuDS Manual 2015, shows that the proposed development would have minimal impact upon the receiving watercourse.

6.2.6 Table 6.1 details if the site complies with the environmental objectives of the WFD, as detailed within this report.

Table 6.1: Compliance with the Environmental Objectives of the Water Framework Directive

Environmental Objective	Proposed Scheme	Compliance with the WFD
Objective 1: The proposed scheme does not cause deterioration in the Status of the Biological Elements of the water body	The proposed scheme will continue to be a positive contribution to achieving a better biological status through the use of onsite SuDS (i.e. permeable paving, oversized pipes) and following the recommendations of the PEA and undertaking the recommended planting scheme. The introduction of a new compensation storage will provide a betterment to the watercourse and have ecological benefits to it.	YES

Environmental Objective	Proposed Scheme	Compliance with the WFD
Objective 2: The proposed scheme does not compromise the ability of the water body to achieve its WFD status objectives	The proposed development will not compromise the ability of the water bodies to achieve its WFD status objectives.	YES
Objective 3: The proposed scheme does not cause a permanent exclusion or compromised achievement of the WFD objectives in other bodies of water within the same River Basin District	The proposed development will not cause deterioration in the status of the water bodies.	YES
Objective 4: The proposed scheme contributes to the delivery of the WFD objectives	The proposed scheme through the use of onsite SuDS (i.e. oversized pipes) and following the recommendations of the PEA and undertaking the recommended planting scheme will contribute to the delivery of the WFD objectives.	YES

6.3 Conclusion

6.3.1 The proposed development is not expected to negatively impact the WFD status of the River Colne, nor jeopardise the water body status from its 'improving' classification.

6.3.2 The impacts discussed in this report, have the potential to provide minor, localised, or temporary effects, which will improve post-construction due to the introduction of a new floodplain compensation storage. Potential impacts on the physical habitat, water quality, fish, and eels, macrophytes, invertebrates and diatoms will be mitigated during the construction and operational phase of the development. Therefore, the proposed development is unlikely to significantly impact the water bodies and their habitats and species and will provide an overall betterment to it.

6.3.3 Regarding the significance of risks to the water bodies, the nature of the development means that it is not expected to cause detrimental permanent change to receiving waterbodies. Overall, the proposed development is concluded to have no overall significant impact on the water bodies and the WFD status of them.

APPENDICES

Appendix 1 – Civil Engineers FRA and Drainage Strategy

CIVIC ENGINEERS

Cellars Clough, Marsden

Flood Risk Assessment and Drainage Strategy

September 2025

PREPARED FOR

CS District Ltd

Flood Risk Assessment and Drainage Strategy

Prepared By	James Fawcett
Reviewed By	James Fawcett
Report Reference	3884-CIV-XX-XX-R-C-300001
Issued	01/10/2025
Revised	

CONTENTS

1. Introduction

This Flood Risk Assessment and Drainage Strategy (FRA) has been prepared on behalf of CS District (the 'Applicant') to support a full planning application for the proposed residential development known as Cellars Clough off Manchester Road, near Marsden, Huddersfield (the 'Site'). The description of the development is as follows:

The development comprises the construction of 75 residential dwellings with associated external car parking and amenity space on a 1.49 hectare site approximately 1km to the east of the village of Marsden, Huddersfield.

This report provides an overview of the nature of flood risk to the Site in accordance with current national, regional and local policy and guidance, in addition to details on how this risk will be mitigated throughout the expected lifetime of the development.

In particular, this FRA shall:

- Provide information on the existing hydrological aspects of the Site and identify any changes to this as a result of the proposed development.
- Provide an assessment of the existing and future risk of flooding to the Site from all sources, accounting for effects of climate change, as well as the impact of proposals on flood risk within its vicinity.
- Outline and summarise the guidance and documentation used to inform the above assessment.
- Propose an outline drainage strategy and further measures to mitigate any residual risks of flooding.

This document is based on currently available information held by Civic Engineers and all comments and conclusions contained within are based upon the assumption that the sourced data is reliable. Civic Engineers accepts no liability for any inaccurate conclusions or assumptions resulting from inaccurate information. Proposals presented in this report represent the design intent and may be subject to alteration or adjustment in finalising the detailed design for this project.

2. Existing Site

2.1. Location and Description

The Site is located off Manchester Road, near Marsden, Huddersfield. A location plan is provided in Figure 1.

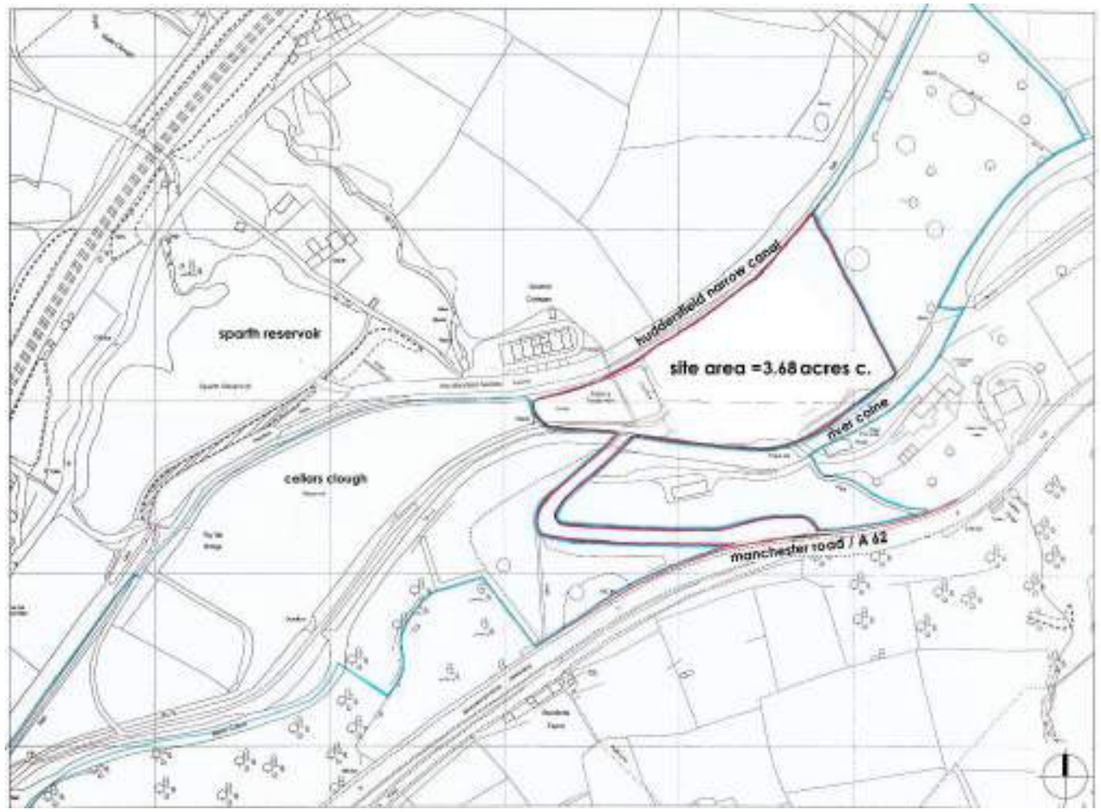


Figure 1: Site location

The nearest post code is HD7 6LY , with the approximate centre of the Site located at National Grid Reference 405831, 412515. The red line boundary encompasses an area of approximately 1.49 hectares.

The existing site generally comprises rough made ground. The site was once a former mill which has been demolished to makeway for a residential development under a previous succesful planning application, foundations for a number of units which were started on site are visible.

The site is bounded to the north by the Huddersfield Narrow Canal tow path, and the River Colne forms the southern boundary. A former mill pond is located to the west which now acts as a fishing pond. The pond comprises 2 no. bays. The larger western bay forms the western site boundary and is currently used as a fishing pond. The smaller eastern bay had been drained down and will form part of the ecological zone and open space for the site.

2.2. Topography

A topographical survey of the Site was conducted by Powers in May 2025 and is provided in Appendix A.

The site levels generally fall in an easterly direction with a typical level of 163m AOD in the west falling to 159m AOD in the east. The tow path to the north of the site has a typical level of 162.5m AOD. The southern boundary is formed by the River Colne with an existing wall, which has a top of wall level varying from 162.7m AOD in the west falling to 159.5m AOD in east. The top of wall level surrounding the former mill pond is approximately 165.5m AOD.

2.3. Geology and Hydrogeology

A Phase 2 intrusive site investigation was undertaken by Enviro Solution Ltd in July 2019 to support the previous planning application and which identified made ground deposits to depths between 0.2m and 3m bgl. The made ground is described as demolition fill material comprising medium dense sandy slightly clayey gravel with frequent cobbles. Beneath the made ground alluvium described a brown/black silty clay was uncovered with a thickness of approximately 1.8m.

The bedrock under the alluvium is described as the Marsden Formation, which comprises two distinct layers. The upper layer consists of weathered sandstone which was recorded to have a maximum thickness of 2.5m, under which the lower part of the formation consists of weathered mud stone.

2.4. Hydrology and Drainage Infrastructure

Water Bodies

The nearest water bodies are the Huddersfield Narrow Canal to the north, and the River Colne which forms the southern boundary.

The Huddersfield Canal has a water levels of approximately 162m AOD, around 2m above the existing site levels. The River Colne levels vary with the topography, falling in an easterly direction. Water levels were generally observed to be between 2-3m below the site level. The main mill pond has a number of flow controls and over flows, and is also connected to the smaller pond which forms part of the development site via a sluice gate.

The smaller mill pond has a sluice inlet into the former mill's turbine, which is connected into the River Colne approximately 200m downstream of the site via a culvert that runs through site.

Foul Drains

Yorkshire Water records have been obtained which indicate that a public combed sewer runs under the River Colne and through the south east corner of the site before heading in an easterly direction. The size and depth of this sewer is unknown. A copy of the sewer records is contained in Appendix B.

3. Proposed Development

An excerpt of the development proposals is shown in shown in Figure 2 below. This drawing is additionally provided in Appendix B.

Figure 2: Proposed Development

The proposals are for the redevelopment of the brownfield site into a residential development comprising 75no. dwellings, with associated car parking and amenity space.

4. Relevant Legislation, Policy and Guidance

This FRA has been produced in accordance with the requirements of the National Planning Policy Framework (NPPF) and Planning Practice Guidance (PPG), as well as the following regional or local policy and documentation:

- Kirklees Local Flood Risk Management Strategy 2024
- Kirklees Local Plan 2019

Particularly relevant aspects of these documents and frameworks are presented below.

4.1. National Planning Policy Framework 2024 & Planning Practice Guidance 2024

The NPPF outlines planning policies within England and provides information on their application. The framework is supported by the PPG, which includes advice on the assessment and management of flood risk during the planning and development process.

With regard to flood risk, the NPPF primarily aims to steer development away from areas with an unacceptable risk of flooding and relocate them in areas deemed more appropriate.

4.1.1. Flood Map for Planning

To support FRAs, the EA's Flood Map for Planning divides land into Flood Zones, which represent the susceptibility of an area of land to flooding from rivers and seas ignoring the presence of any flood defences. Definitions of each Flood Zone are provided in Table 1.

Figure 3 displays the extent of Flood Zones within the Site. The Site is shown to lie within Flood Zones 1, 2 and 3 and is therefore assessed as having a 1 in 100 (1%) annual probability of flooding from rivers and seas in any given year, without the presence of flood defences.

4.1.2. Sequential Test

A sequential test is one of the primary measures of mitigating flood risk and considers alternative available sites within the vicinity of a proposed development, assessing whether these have a lower risk of flooding than the currently proposed development location with the intention of prioritising development within areas with reduced flood risk.

As the proposed development is in Flood Zone 3 a sequential test is required.

4.1.3. Development Suitability

Where a sequential test has been passed or is not required, a comparison of a site's flood risk probability and vulnerability, informed by the EA's Flood Map for Planning and a classification of vulnerability based on land use, determines the suitability of a development within a given location.

Flood Map for Planning

The EA's Flood Map for Planning divides land into Flood Zones, which represent the susceptibility of an area of land to flooding from rivers and seas ignoring the presence of any flood defences. Definitions of each Flood Zone are provided in Table 1.

Table 1: Reproduction of Table 1 of the Planning Practice Guidance (Flood Risk and Coastal Change), providing definitions of Flood Zones within the Flood Map for Planning.

FLOOD ZONE	DEFINITION
ZONE 1 – LOW PROBABILITY	Land assessed as having a less than 1 in 1000 (<0.1%) annual probability of river or sea flooding in any one year.
ZONE 2 – MEDIUM PROBABILITY	Land assessed as having between 1 in 100 and 1 in 1000 annual probability of river flooding (1%-0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1%) in any year.
ZONE 3A – HIGH PROBABILITY	Land assessed as having 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
ZONE 3B – FUNCTIONAL FLOODPLAIN	Land where water from rivers or the sea has to flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. Functional floodplain will normally comprise: • land having a 1 in 30 (3.3%) or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or • land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding). Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

Figure 3 displays the extent of Flood Zones within the Site. The Site is shown to lie within Flood Zones 1, 2 and 3 and is therefore assessed as having a 1 in 100 probability of flooding from rivers and sea.

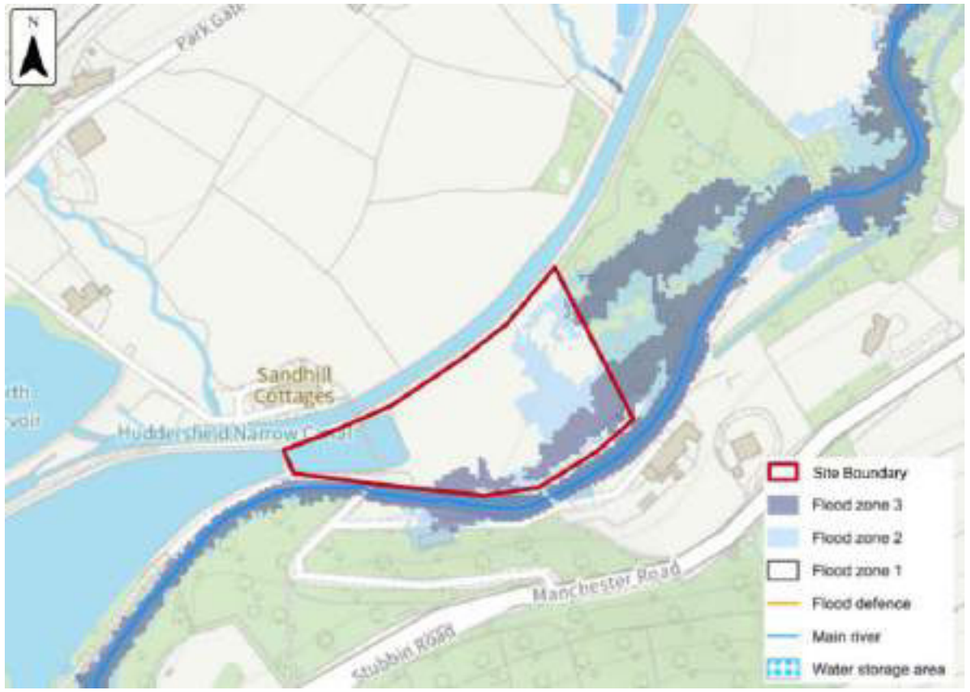


Figure 3: Environment Agency Flood Map for Planning

Table 2: Reproduction of Table 2 of the Planning Practice Guidance (Flood Risk and Coastal Change), showing where development is appropriate based on flood risk vulnerability and Flood Zones.

FLOOD RISK VULNERABILITY CLASSIFICATION		ESSENTIAL INFRASTRUCTURE	HIGHLY VULNERABLE	MORE VULNERABLE	LESS VULNERABLE	WATER COMPATIBLE
FLOOD ZONE	ZONE 1	√	√	√	√	√
	ZONE 2	√	Exception Test Required	√	√	√
	ZONE 3A	Exception Test Required	×	Exception Test Required	√	√
	ZONE 3B	Exception Test Required	×	×	×	√
√ Development is appropriate × Development should not be permitted.						

Flood Vulnerability Classification

The Planning Practice Guidance defines five classifications of flood vulnerability based on development usage: 'water compatible', 'less vulnerable', 'more vulnerable', 'highly vulnerable' and 'essential infrastructure'. Descriptions of developments encompassed by the classifications are provided in Table 3. The development is categorised as more vulnerable based on its planned use.

Assessment

To assess the suitability of a particular development within a given location, is used to compare the proposed development's flood risk vulnerability with its Flood Zone and defines whether the development is considered appropriate, as well as outlining whether an Exception Test is required. A *More Vulnerable* development within Flood Zone 3 is deemed appropriate(, provided the exception test is passed).

Details of the Sequential Test and Exception Test are outlined in a separate report provided by Zerum.

Table 3: Reproduction of Annex 3 of the National Planning Policy Framework, providing information on flood vulnerability classification.

CLASSIFICATION	DESCRIPTION
ESSENTIAL INFRASTRUCTURE	• Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including infrastructure for electricity supply including generation, storage, and distribution systems; including electricity generating power stations, grid and primary substations storage; and water treatment works that need to remain operational in times of flood. • Wind turbines. • Solar farms.
HIGHLY VULNERABLE	• Police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes, and park homes intended for permanent residential use. • Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as 'Essential Infrastructure'.)
MORE VULNERABLE	• Hospitals • Residential institutions such as residential care homes, children's homes, social services homes, prisons, and hostels. • **Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs, and hotels.** • Non–residential uses for health services, nurseries, and educational establishments. • Landfill and sites used for waste management facilities for hazardous waste. • Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.
LESS VULNERABLE	• Police, ambulance, and fire stations which are not required to be operational during flooding. • Buildings used for shops; financial, professional, and other services; restaurants, cafes, and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the 'more vulnerable' class; and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill* and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Water treatment works which do not need to remain operational during times of flood. • Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place. • Car parks.
WATER-COMPATIBLE DEVELOPMENT	• Flood control infrastructure. • Water transmission infrastructure and pumping stations. • Sewage transmission infrastructure and pumping stations. • Sand and gravel working. • Docks, marinas, and wharves. • Navigation facilities. • Ministry of Defence installations. • Ship building, repairing, and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. • Water-based recreation (excluding sleeping accommodation). • Lifeguard and coastguard stations. • Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. • Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

5. Flood Risk

5.1. Criteria for Assessment

5.1.1. Design Flood

Estimation of probable flood levels across the Site following a flood event is based on the 'design flood'. This is considered to be the following flood events with associated annual probabilities:

- River flooding with an annual probability of 1 in 100 (1%) in any given year.
- Tidal flooding with an annual probability of 1 in 200 (0.5%) in any given year.
- Surface water flooding with an annual probability of 1 in 100 (1%) in any given year.

The above events should include an allowance for climate change, as discussed in Section 5.1.2

As the Site is located in Flood Zone 1, 2 and 3, the design flood is considered to be the 1 in 100 year fluvial flood event (incorporating the relevant climate change allowance).

5.1.2. Climate Change Allowances

To account for changes to peak river flow, peak rainfall intensity, sea level rise, offshore wind speed and extreme wave height as a result of climate change, the EA publishes climate change allowances to enable future flood risk to sites to be assessed and to facilitate resilient design of developments.

EA guidance on the application of climate change allowances provides the following recommendations:

- Residential development should be considered to have a minimum lifetime of 100 years.
- FRAs should assess the upper end allowances for peak rainfall for events with an annual probability of 1 in 30 (3.3%) and 1 in 100 (1%) in any given year.
- FRA's should assess the central allowance for climate change for river flow for more vulnerable development in flood zone 3.
- Developments should be designed to be safe from surface water flooding and not increase flood risk elsewhere based on the upper end allowance for peak rainfall for events with an annual probability of 1 in 100 (1%) in any given year.

The peak river flow and rainfall allowances for the Site are provided in Table 4 and Table 5 respectively. In accordance with the Environment Agency's standing advice, the central allowance should be used for a *More Vulnerable* development in Flood Zone 3,. An upper end allowance is adopted for peak rainfall in the assessment of surface water flood risk in the 1 in 30 year event, with an upper end allowance adopted for peak rainfall in the assessment of surface water flood risk in the 1 in 100 year event. The climate change allowances for the peak river flow and rainfall intensities are based on the EA dataset for the Aire and Calder Management Catchment with the relevant climate change allowances highlighted in blue.

Table 4: Peak river flow allowances for the Aire and Calder Management Catchment.

ALLOWANCE CATEGORY	TOTAL POTENTIAL CHANGE ANTICIPATED FOR THE '2020S' (2015 TO 2039)	TOTAL POTENTIAL CHANGE ANTICIPATED FOR THE '2050S' (2040 TO 2069)	TOTAL POTENTIAL CHANGE ANTICIPATED FOR THE '2080S' (2070 TO 2115)
Upper	24%	31%	51%
Higher	15%	18%	31%
Central	11%	13%	23%

Table 5: Peak rainfall allowances for the Irwell Management Catchment.

ALLOWANCE CATEGORY	TOTAL POTENTIAL CHANGE ANTICIPATED FOR THE '2050S' (UP TO 2060)	TOTAL POTENTIAL CHANGE ANTICIPATED FOR THE '2070S' (2061 TO 2125)
3.3% AEP rainfall event		
Upper end	35%	40%
Central	20%	25%
1% AEP rainfall event		
Upper end	40%	45%
Central	25%	30%

5.2. Historical Flooding

A review of the EA's Recorded Flood Outlines and Historic Flood Map dataset indicates that there have been no recorded incidents of flooding on the Site.

5.3. Fluvial and Tidal Flooding

Fluvial or tidal flooding occurs when the water level in a river or sea rises above the surrounding ground level. Heavy or prolonged rainfall, melting of ice and snow and – in seas and rivers subjected to tidal processes – high tides and storm surges are the primary causes of this source of flooding.

As discussed in Section 4.1.1, the part of the Site is located within Flood Zone 3 indicates that it is at high risk (1 in 100 or 1% annual probability) of fluvial flooding within a given year, not accounting for mitigation provided by existing flood defences.

5.3.1. Impacts of Climate Change

The EA flood map for planning additionally indicates flood risk extents accounting for the impacts of climate change on peak river flow. This mapping incorporates the central climate change allowance for the 2080s epoch and is presented in Figure 4.

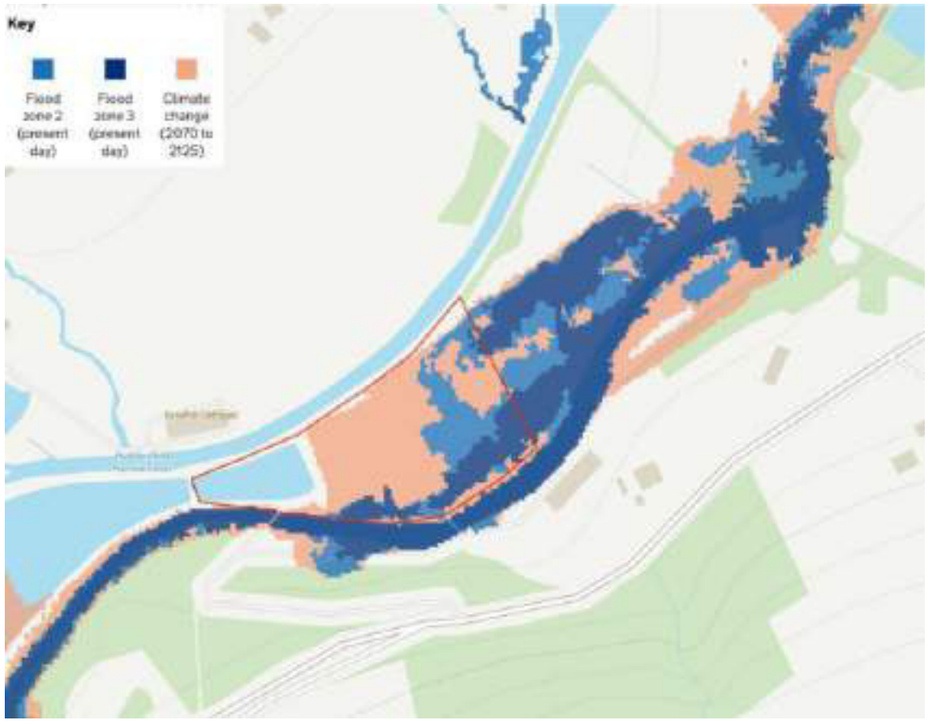


Figure 4: Environment Agency Flood Map for Planning

5.4. Surface Water Flooding

Ponding and heavy flows of water outside of watercourses due to rainfall are termed surface water flooding and typically result due to intense rainfall events which overwhelm drainage systems or the ability of the ground to absorb runoff and/or infiltrate it into underlying strata.

The EA Risk of Flooding from Surface Water (RoFSW) map indicates the likelihood of surface water flooding based on national modelling, with additional input from compatible, local modelling produced by LLFAs.

Mapping within the vicinity of the Site indicates that parts of the site are at high risk of flooding, i.e., more than 3.3% annual probability in any given year (ref. Figure 5).

There is a potential for proposed properties to be affected by this flooding based on the proposals presented in Section 3 and suitable measures should be incorporated within the drainage strategy for the proposed development to mitigate this risk, presented in Section 7.

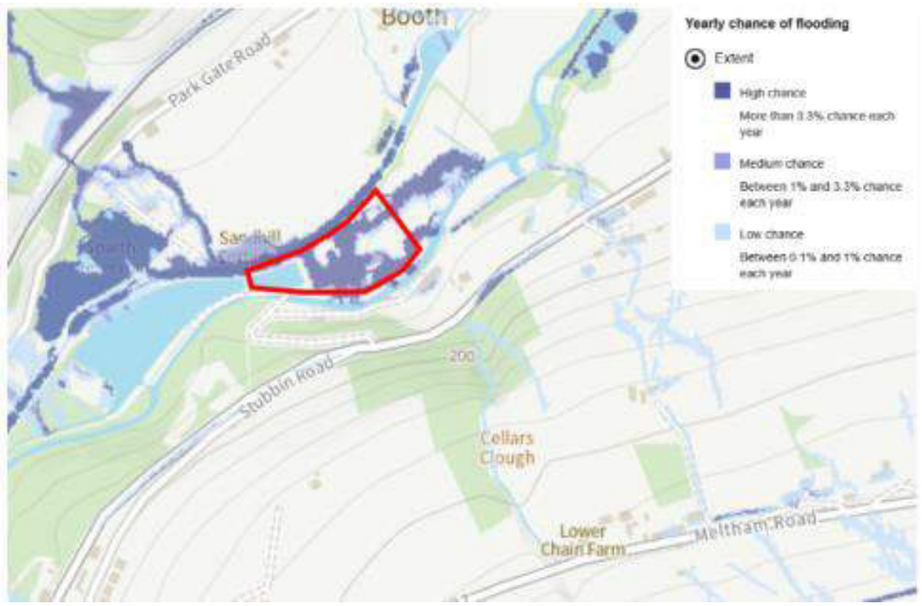


Figure 5: Environment Agency Risk of Flood From Surface Water Map

5.4.1. Impacts of Climate Change

The RoFSW contains additional flood risk extents accounting for the impacts of climate change on peak rainfall. This mapping incorporates the central climate change allowance for the 2050s epoch (25%) and is shown in 6.

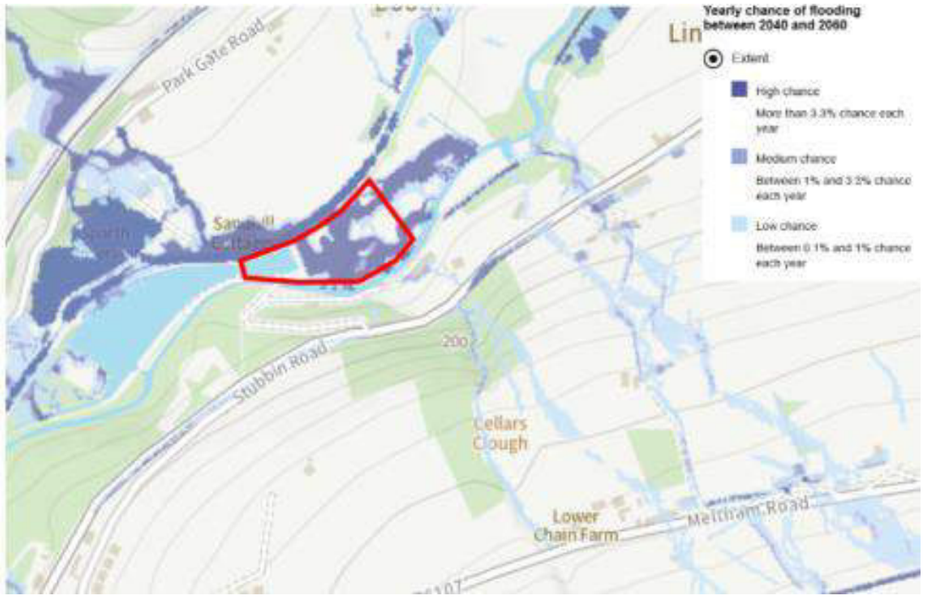


Figure 6: Environment Agency Risk of Flood From Surface Water – Climate Change Applied

5.5. Groundwater Flooding

Groundwater flooding is the result of an elevated underground water table enabling water to permeate to the surface.

The Environment Agency's long term flood risk dataset indicates that the area around the development site is at low risk of ground water flooding.

5.6. Flooding from Reservoirs

The site lies within the Environment Agency's mapped reservoir flood risk zone. The EA dataset does not specify the source reservoir, and several reservoirs are located upstream of the site; however, Sparth Reservoir, located to the northwest, represents the most immediate risk.

Sparth Reservoir is owned and maintained by the Canal & River Trust as a reservoir to support water levels in the Huddersfield Narrow Canal. The structure comprises an earth fill dam with a stone and concrete spillway approximately 8 m in width and 40 m in length. In accordance with the Reservoirs Act, the dam is subject to statutory inspection and maintenance.

Reservoirs may flood in the event of a dam collapse resulting in the release of a significantly large volume of water, however, reservoirs in the UK have an excellent safety record and the probability of such an event is considered extremely low.

Figure 7: Environment Agency Risk of Flood From Reservoirs

5.7. Flooding from Canals

The Huddersfield Narrow Canal forms the northern site boundary. Flood risk associated with canals is generally different from that of natural rivers, as flow volumes and water levels are regulated through engineered structures such as locks, sluices, spillways, and bypass weirs.

The canal level is approximately 162.3m AOD, which is approximately 300mm above the proposed site level along the northern boundary where development levels are proposed to be raised compared to the existing. Taking into account the structural integrity of the canal system, ongoing maintenance by the Canal & River Trust, and the minimal level difference between the canal and the site the risk of flooding is considered low.

5.8. Flooding from Mill Pond

The existing mill pond to be retained (Cellars Clough) is not maintained by the Canal and Rivers Trust and is a potential source of flooding to the site. The condition of the mill pond was previously raised as a concern by Kirklees Council in 2014, where it identified a potential breach risk from the mill ponds. The development proposals include for this pond drained down and will form part of the ecological zone and open space for the site.

5.9. EA Product 4 Data

Flood risk assessment data was obtained from the EA in March 2025, and which included modelled river levels in the River Colne for a variety of events along a series of nodes bounding the site. The node location are presented in Figure 8 below. The EA flood risk assessment data is contained in Appendix C

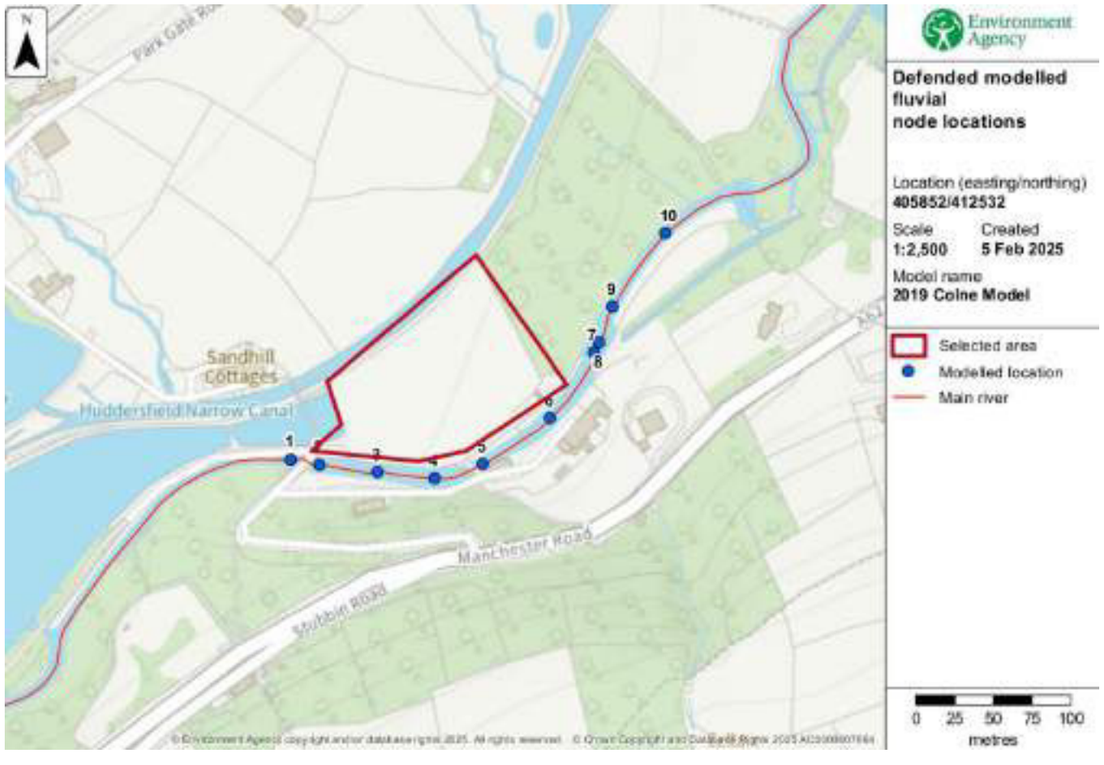


Figure 8: Environment Agency Flood Risk Data Node Locations

Nodes 3-6 are immediately adjacent to the proposed housing, and modelled water levels for the River Colne have been provided for the 1% AEP event with climate change allowances of both 20% and 30%. As outlined in Section 5.1.2 a climate change allowance of 23% shall be applied to the peak river flows. To provide a robust assessment, the design flood will be taken as the 1% AEP event plus 30% climate change.

5.10. Summary

A summary of the assessed risk of flooding to the Site from various sources is presented in Table 6.

Table 6: Summary of assessed flood risk to the Site.

FLOOD SOURCE	ASSESSED RISK LEVEL				JUSTIFICATION
	High	Medium	Low	Very Low	
Fluvial	X				Development is located within Flood Zone 1,2 and 3 and is therefore at high risk of flooding without mitigation.
Tidal				X	Development is inland and nearby water bodies are not subject to tidal processes.
Surface Water		X			EA RoFSW maps indicate notable extents of low surface water flood risk within the red line boundary, which may impact the development without suitable mitigation. The effects of climate change are anticipated to increase the risk of this flooding to medium in future, however, modelling is not available for the design flood to confirm this.
Groundwater				X	The EA dataset confirms the site is at low risk of ground water flooding
Reservoirs				X	The Site is located within flood extents shown in the EA's Reservoir Flood Extents Dry Day and Wet Day datasets, however is considered to be low risk given that maintenance of reservoirs is regulated by legislation .
Canals			X		The Huddersfield Narrow Canal forms the northern site boundary. Scheme proposals include raising the levels of the site boundary to reduce the risk of a breach scenario.
Mill Ponds			X		The mill pond on the eastern boundary will drained , thereby removing the risk of breaching immediately adjacent the site.

6. Proposed Mitigation

Proposed Levels

The EA flood risk assessment data has been reviewed, and indicates that water levels in the River Colne will vary from 160.92m AOD at the western frontage onto the river, to 159.89m AOD to the eastern site extents during the 1% AEP event with 30% climate change. The topographical survey undertaken in May 2025 indicates that the existing site levels are typically 160.30m AOD in the western part of the site (excluding the existing mill pond which is elevated at around 163m AOD). The site will therefore be at risk of flooding without mitigation. It is therefore proposed that site levels will be raised a minimum of 300mm above the modelled flood level for the 1% AEP event plus 30% climate change in accordance with the EA standing advice.

All FFL's are proposed to be at 162m AOD, which is a minimum of 1.08m above the modelled water level for the design flood at the western end of the site, and the eastern end of the site the free board increases to 2.11m. A minimum freeboard of 0.79m is also provided above the 0.1% AEP event plus 20% climate change. Access route levels have been set at least 300mm above the modelled water level for the design flood.

This design approach ensures all properties are protected from fluvial flooding and safe access is provided at all times.

Compensatory Storage

In order to ensure that properties are protected from fluvial flooding the existing site levels will be raised, which does have the potential to increase flood risk off site due to the displacement of flood storage volume available on site. In order to mitigate this risk an assessment of the volume of water stored during the design flood has been undertaken, based on the modelled river levels for the 1% AEP event plus climate change. The modelling indicates that approximately 476m^3 of flood would could be displaced during the flood event. To mitigate this, it is proposed that land beyond the site boundary within the Client's control will be reshaped to prove the volume lost on site. Details can be found on drawing no.3884-CIV-XX-XX-D-C-00001 in Appendix E.

7. Drainage Strategy

7.1. Proposed Surface Water Drainage

The proposed surface water drainage design is to utilise Sustainable Drainage Systems (SuDS) in accordance with the specifications outlined in CIRIA C753 ('The SuDS Manual') as well as best practices defined in other local and national guidance. SuDS incorporate nature-based solutions and aim to mimic natural drainage processes by restricting runoff volumes and rates from developments, encouraging discharge of runoff in line with the natural water cycle (i.e. into waterbodies and aquifers), protecting or enhancing water quality as well as providing increased biodiversity and creating better places to live, work and play, amongst other benefits.

SuDS design is guided by 'four pillars' encompassing these benefits: water quantity, water quality, amenity and biodiversity.

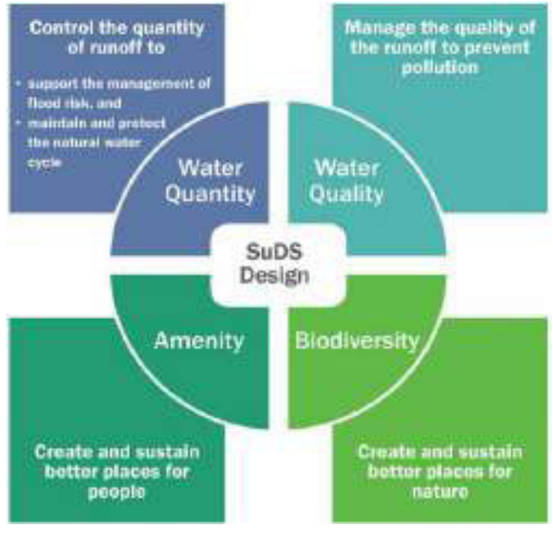


Figure 9. The four pillars of SuDS design (reproduced from Figure 2.1 of CIRIA C753 The SuDS Manual)

In this section, the proposed surface water drainage design is presented in relation to these four pillars.

7.1.1. Strategy Overview

A proposed surface water drainage strategy drawing (drawing no. 3884-CIV-XX-XX-D-C-30001) is provided in Appendix F of this report, highlighting the proposed drainage connection point, indicative piped drainage network and areas of attenuation.

The proposed drainage strategy has been developed to include SuDS components as a primary method of surface water management. Pervious pavements comprising reinforced gravel and reinforced grass surfacing will intercept and treat run-off which will be collected via a network of below ground perforated pipes. The sub-base under these porous surfaces will provide an element of surface water attenuation, however due to the change in external levels across the site additional surface water storage will need to be provided bellow ground. It is proposed that perforated twin 1500mm pipes surrounded by clean stone are installed to provide the balance of the attenuation, these will also act as a collection drain for the porous surfacing above.

7.1.2. Water Quantity Design

Designing for water quantity involves controlling how fast surface water is discharged (the peak runoff rate) and how much surface water is discharged (the peak runoff volume) from a site, as well as where this runoff is discharged to. As a result of restricting runoff, it is necessary to provide attenuation within the surface water network so that runoff can be temporarily stored on site.

The design criteria related to this SuDS pillar are presented in Table 7, with further information on the derivation of these values provided in this section.

Table 7. Water quantity design criteria

CRITERIA	VALUE
Rainfall Methodology	FEH22
Total Site Area	1.278 ha
Area Positively Drained (Impermeable Area)	n/a
Peak Runoff Rate	4.9 l/s (Q_{BAR})
Discharge Method	SuDS Approach 2 (restriction of discharge rates to equivalent greenfield values only)
Rainfall Climate Change Allowance	45%
Attenuation Requirement (For 1 in 100 year plus 45% climate change storm event)	1,200 m^3

Point of Discharge

In SuDS designs, runoff should be discharged in a manner that closely matches the natural water cycle, where feasible. This means aiming to discharge water into the ground via infiltration or to surface water bodies instead of direct to sewers. The NPPF specifies the following hierarchy of drainage options for the way rainfall leaves a development, in order of most preferred to least preferred:

1. To the ground (infiltration).
2. To a surface water body.
3. To a surface water sewer, highway drain, or another drainage system.
4. To a combined sewer.

Based on the existing information presented in Section 2, these potential discharge options have been assessed and a summary of the feasibility of each option is presented in Table 8.

It is proposed that the surface water network will connect to the River Colne on the southern site boundary at the equivalent greenfield run-off rate. The surface water drainage will connect into the existing site surface water culvert crossing the site which ultimately outfalls into the river, subject to confirming the condition of the existing infrastructure and approval of the discharge rate from the LLFA.

Table 8: Feasibility of surface water discharge options in line with discharge hierarchy presented within National Planning Policy Framework.

SURFACE WATER DISCHAGRE OPTION	PROPOSED	JUSTIFICATION
Infiltration	✗	As outlined in Section 2.3 a Phase 2 intrusive site investigation indicates that the site is underlain by mudstone bedrock. This typically has infiltration rates less than 10^{-6} m/s, which is considered to be the threshold at which infiltration as a primary means of disposal is deemed viable within CIRIA C753. ***Infiltration unlikely to be feasible as a primary means of surface water discharge due to low infiltration rates.***
Water Body	✓	The River Colne forms the southern boundary, and an existing surface water outfall is present which serves the site. It is therefore proposed that this forms the surface water outfall.
Surface Water Sewer	✗	N/A as outfall to water body is present.
Combined Sewer	✗	N/A as outfall to water body is present.

Runoff Rates

When restricting runoff to greenfield rates, two approaches are typically adopted to conform to the 'Non-statutory standards for sustainable drainage systems' published by the Department for Environment, Food and Rural Affairs (DEFRA) in 2015:

- **SuDS Approach 1** – restricting peak 1 in 1 year and 1 in 100 year rates and 1 in 100 year 360 minute discharge volume to equivalent greenfield values, or
- **SuDS Approach 2** – restricting only peak rates up to the 1 in 100 year storm to Q_{BAR} (approximately equal to the 1 in 2.3 year greenfield rate).

The strategy currently proposed utilises SuDS Approach 2 as infiltration rates are not viable to accommodate long-term storage areas required within SuDS Approach 1, which discharge via infiltration or at a lower discharge rate of 2 l/s/ha.

An estimate of Q_{BAR} equal to 4.9 l/s has been determined via the FEH Statistical Method using FEH22 point data obtained for the approximate centroid of the Site. Calculations of this rate have been provided in Appendix G.

A flow control chamber will restrict surface water flows leaving the Site to Q_{BAR} for all storm events up to the 1 in 100 year storm event plus an allowance for climate change (45%, as discussed below and in Section5) with all excess runoff being attenuated within the proposed surface water network.

Attenuation Requirements

As discussed in Section 5, in determining the attenuation requirements for the development, the design will consider an allowance of 45% climate change on peak rainfall for the 1 in 100 year storm event.

The required volume of attenuation has been calculated using Causeway Flow based on the proposed development impermeable area indicates that approximately 1,200m^3 of storage will be required.

Perforated pipes will collect runoff from permeable pavements and rain gardens, the sub-base of the permeable pavement will be used for storage at the lower part of the Site.

7.2. Foul Water Drainage Strategy

Yorkshire Water records have been obtained which indicate that a public combed sewer runs under the River Colne and through the south east corner of the site before heading in an easterly direction. The size and depth of this sewer is unknown. However the ground levels where the sewer is indicated to run is lower than the proposed site levels, and as such a gravity connection into this sewer is considered to be feasible therefore it is proposed that foul drainage from the site will connect into this public sewer.

The foul connection will be subject to formal agreement with Yorkshire Water under the S106 of the Water Industry Act 1991

8. Conclusions

This report has assessed the current and future risk of flooding to a proposed residential-led development at Cellars Clough, Marsden. A drainage strategy for the proposed development is also presented.

The Flood Risk Assessment has been undertaken in accordance with the National Planning Policy Framework (NPPF) and associated guidance on flood risk and coastal change contained within the Planning Practice Guidance.

75 residential dwellings with associated external car parking and amenity space. Full planning permission is being sought for the proposed development.

The proposed development is located within Flood Zones 1, 2 and 3 and is considered "More Vulnerable". Flood Risk from all sources has been considered and mitigation measures proposed to unsure the development is not at risk of flooding and can be safely accessed at all times during the design flood.

Surface Water discharge for the development will be limited to greenfield runoff rates for the equivalent Site area at 4.9l/s. Attenuation will be provided for a 1 in 100-year storm event including 45% climate change allowance. Where possible SuDS will be incorporated to further improve water quality. Surface water discharge to the River Colne. With the incorporation of the proposed mitigation measures, as described above, the proposed development will comply with National Local Planning Policy.

The surface water connection and discharge rate will be subject to agreement with the LLFA.

Foul drainage from the Site is proposed to discharge into the existing combined sewer located to the southeast of the Site.

Appendix A – Topographical Survey

Members of

Legend

AV	Air valve
BH	Borehole
BOL	Bollard
BT	British Telecom cover
CATV	Cable television cover
CL	Cover level
DPC	Damp proof coarsing level
Earth/ER	Earthing rod
ELEC	Electric cover
EP	Electricity pole
Fence I/R	Iron railing fence
Fence C/B	Closeboard fence
Fence C/P&P	Concrete post & panel fence
Fence Pa	Palisade fence
Fence P/W	Post and wire fence
Fence P/R	Post and rail fence
Fence P/P	Post and panel fence
FFL	Finished floor level
F/B	Flower bed
FH	Fire Hydrant
G	Gulley
GAS	Gas cover
IC	Inspection chamber
IL	Invert level
INV	Invert level
LP	Lamp post
LT	Light
MH	Manhole
Nynex	Telecommunications cover
OSBM	Ordnance Survey Bench Mark
PTM	Parking ticket machine
RE	Rodding eye
RS	Road sign
R/t wall	Retaining wall
SBX	Switch box
SP	Sign post
SPS	Safety playing surface
ST	Stop tap
SV	Service valve
TBM	Temporary Bench Mark
TP	Telegraph pole
TRP	Trial pit
TRL	Traffic light
W	Water cover
WL	Water level
WO	Wash out

SURVEY STATIONS

Name	Easting	Northing	Height
1	405805.066	412478.293	160.820
1A	405760.199	412469.582	163.096
1B	405775.209	412485.423	165.396
1B1	405723.553	412484.155	162.716
1C	405763.400	412516.603	165.272
1D	405747.879	412513.851	162.646
1E	405786.684	412533.568	162.613
1F	405846.424	412575.760	162.528
2	405827.217	412482.075	160.367
3	405859.615	412478.238	160.272
3A	405868.972	412459.644	161.883
3B	405901.097	412450.444	167.125
4	405896.861	412507.580	159.432
4A	405941.528	412555.721	158.653
4B	405963.326	412593.372	157.899
4C	406001.011	412648.371	157.576
4D	405955.389	412711.051	160.169
4E	405919.555	412682.804	162.464
4F	405930.258	412675.932	160.413
4G	405910.688	412627.628	160.116
5	405879.253	412541.144	160.351
D1	405735.817	412451.557	165.166
D1A	405793.546	412460.981	161.044
D1B	405827.540	412458.657	160.797
D1C	405817.541	412446.939	160.916
D2	405721.996	412428.750	168.089
D3	405749.743	412419.868	170.786
D3A	405759.263	412397.495	179.525
D3B	405734.245	412378.807	178.704
D3C	405691.428	412438.640	169.091
D3D	405646.937	412389.986	170.522
D3E	405676.602	412364.377	176.038
D4	405806.805	412419.265	175.365
D5	405876.758	412425.753	181.277
D6	405890.671	412420.067	181.713
D7	405758.970	412382.737	185.149
B1	405873.755	412473.751	160.880

KEY DIMENSIONS SHOULD BE CHECKED ON SITE
BEFORE COMMENCEMENT OF ANY WORKS

NOTE

Grid and levels related to OS using GPS data

Amendments

	Date	Surveyor	Description of work

powers
Integrated Survey Partner

Meridian House
58/60 Hillside Road, Frodsham, Cheshire WA6 6AG
Tel: 01928 734473 Fax: 01928 735573
Email: mail@powerstiltman.co.uk
www.powerstiltman.co.uk

Cellars Clough Mill

Marsden

Regrade Survey

Client : Citu Group Developments Ltd

Surveyed By : FR	Date : 28/05/25	Scale
Drawn By : FR	Drawing No : 7432/01	1:500
Checked By : JL	Amendment :	

Appendix B– Yorkshire Water Records

YORKSHIRE WATER
PROTECTION OF MAINS AND SERVICES

1. The position of Yorkshire Water Services Ltd (YWS) apparatus shown on the existing mains record drawing(s) indicates the ***general*** position and nature of our apparatus and the accuracy of this information cannot be guaranteed. Any damage to YWS apparatus as a result of your works may have serious consequences and you will be held responsible for all costs incurred. Prior to commencing major works, the exact location of apparatus must be determined on site, if necessary by excavating trial holes. The actual position of such apparatus and that of service pipes which have not been indicated must be established on site by contacting the Customer Helpline on 0345 124 24 24 for both water and sewerage.

2. The public sewer and water network is lawfully retained in its existing position and the sewerage and water undertaker is entitled to have it remain so without any disturbance. The provisions of section 159 of the Water Industry Act 1991 provides that the undertaker may "inspect, maintain, adjust, repair or alter" the network. Those rights are given to enable the undertaker to perform its statutory duties. Any development of the land or any other action that unacceptably hindered the exercise of those rights would be unlawful. The provisions contained in Section 185 of the Water Industry Act 1991 state that where it is reasonable to do so, a person may require the water supply undertaker to alter or remove a pipe where it is necessary to enable that person to carry out a proposed change of use of the land. The provisions contained in Section 185 also require the person making the request to pay the full cost of carrying out the necessary works.

3. Ground levels over existing YWS apparatus are to be maintained. Sewers in highways will ***generally*** be laid to give 1200mm of cover from finished ground level working to kerb races, other permanent identification of the limits of the road or to an agreed line and level. Substantial increases or decreases to this 1200mm depth of cover will result in the sewer being re-laid at your expense. Water mains and services will ***generally*** be laid with a minimum of 750mm depth of cover however some mains and services usually those installed over 50 years ago may have less ground cover.

4. If surface levels are to be decreased / increased significantly the effects on existing water supply apparatus will be carefully considered and if any alterations are necessary, the costs of the alterations will be recharged to you in full. Outlets on fire hydrants must be no more than 300mm below the new levels and all surface boxes must be adjusted as part of the scheme.

5. To enable future repair works to be carried out without hindrance; any pipe, cable, duct, etc. installed parallel to a water main or service pipe should not be installed directly over or within 300mm of a water main or service pipe or 1000mm of a waste water asset. Where a pipe, cable, duct, etc. crosses a main or service it should preferably cross perpendicular or at an angle of no less than 45o and with a minimum clearance of 150mm. These requirements apply to activities within an existing highway and are relevant to the installation of pipes, cables, ducts, etc. up to and including 250mm in diameter *(see illustration below)*. Necessary protection measures for installations greater than 250mm in diameter and/or in private land will need to be agreed on an individual basis. Installations within a new development site must comply with the National Joint Utilities Group publication Volume 2: NJUG Guidelines On The Positioning Of Underground Utilities Apparatus For New Development Sites.

6. All excavation works near to YW apparatus should be by hand digging only.

7. Backfilling with a suitable material to a minimum 300mm above YW apparatus is required.

8. Adequate support must be provided where any works pass under YW apparatus.

9. Jointing chambers, lighting columns and other structures must be installed in such a way that future repair or maintenance works to YW apparatus will not be hindered.

10. Apparatus such as; railings, sign posts, etc. must not be placed in such a way that they prevent access to or full operation of controlling valves, hydrants or similar apparatus. YWS surface boxes must not be covered or buried. Any adjustment, alteration or replacement of manhole covers must be agreed on site prior to the commencement of the works with a YWS Inspector who may be contacted via our Call Centre on 0345 124 24 24.

11. Explosives shall not be used within 100 metres of any Yorkshire Water Services apparatus or installations.

12. Vibrating plant should not be used directly over any apparatus. Movement or operation by vehicles or heavy plant is not to be permitted in the immediate vicinity of YWS plant or apparatus unless there has been prior consultation and, if necessary, adequate protection provided without cost to YWS.

13. ***Under no circumstances*** should thrust boring or similar trenchless techniques commence until the actual position of the Company's mains/services along the proposed route have been confirmed by trial holes.

14. Any alterations to the highway should be notified following the procedures outlined in the New Road and Street Works Act 1991 Code of Practice; Measures Necessary Where Apparatus Is Affected By Major Works (Diversionary Works).

15. You will be held responsible for any damage or loss to YWS apparatus during and after completion of work, caused by yourselves, your servant or agent. Any damage caused or observed to YWS plant or apparatus should be immediately reported to YWS. Should YW incur any costs as a result of non-compliance with the above, all costs will be rechargeable in full.

16. You should ensure that nothing is done on the site to prejudice the safety or operation of YWS employees, plant or apparatus.

17. In accordance with the New Roads and Street Works Act 1991, Chapter 22, Part 3, Section 80. The location of any identified YW asset "*which is not marked, or is wrongly marked, on the records made available*" should be communicated back to Yorkshire Water. The location of the apparatus should be identified on copies of the supplied plans which should be returned to Yorkshire Water (Asset Records Team) with photographic supporting evidence where possible.

18. The Government has decided that responsibility for private sewers serving two or more properties and lateral drains (the section of pipe beyond the boundary of a single property, connecting it to the public sewer) will be transferred to the water companies on Oct 1 2011.

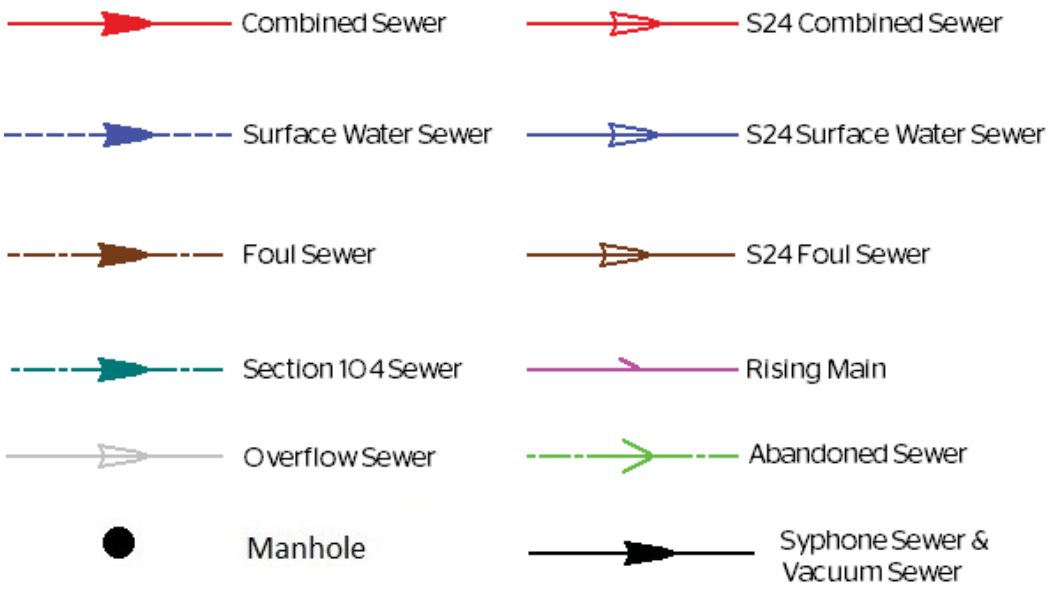
Private pumping stations will also transfer during the period 1 October 2011 – 1 Oct 2016. Records of these assets may not yet be shown on the existing mains record drawing(s). If you encounter any of these assets you must inform Yorkshire Water Services Ltd (YWS).

19. Please note that the information supplied on the enclosed plans is reproduced from Ordnance Survey material with the permission of the Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, © Crown Copyright. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings. Licence Number AC0000857457.

20. This information is for guidance only and the position and depth of any YW apparatus is approximate only. Likewise, the nature and condition of any YW apparatus cannot be guaranteed. YW has no responsibility for recording the locations of privately owned apparatus. As of 1 October 2011, there may be some lateral drains and/or public sewers which are not documented on YW records but may still be present. For the avoidance of doubt, this information is not a substitute for appropriate professional and/or legal advice. YW accepts no responsibility for any inaccuracy or omissions in this information. The actual position of YW apparatus must be determined on site by excavating trail holes by hand. YW requires a minimum of two working days' written notice of the intention to excavate any trial holes before any excavation can be undertaken. If there are any queries in this respect please contact Yorkshire Water on 0345 124 24 24.

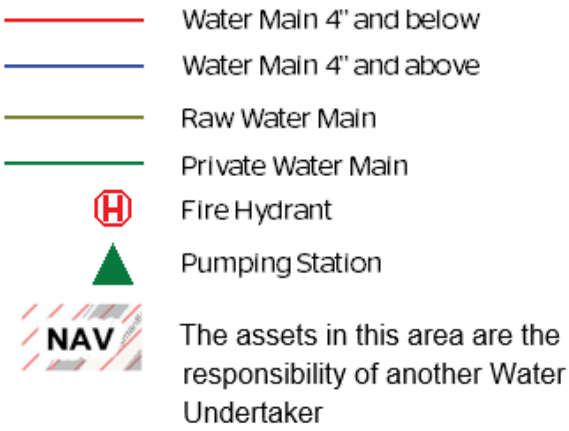
Property Identfier

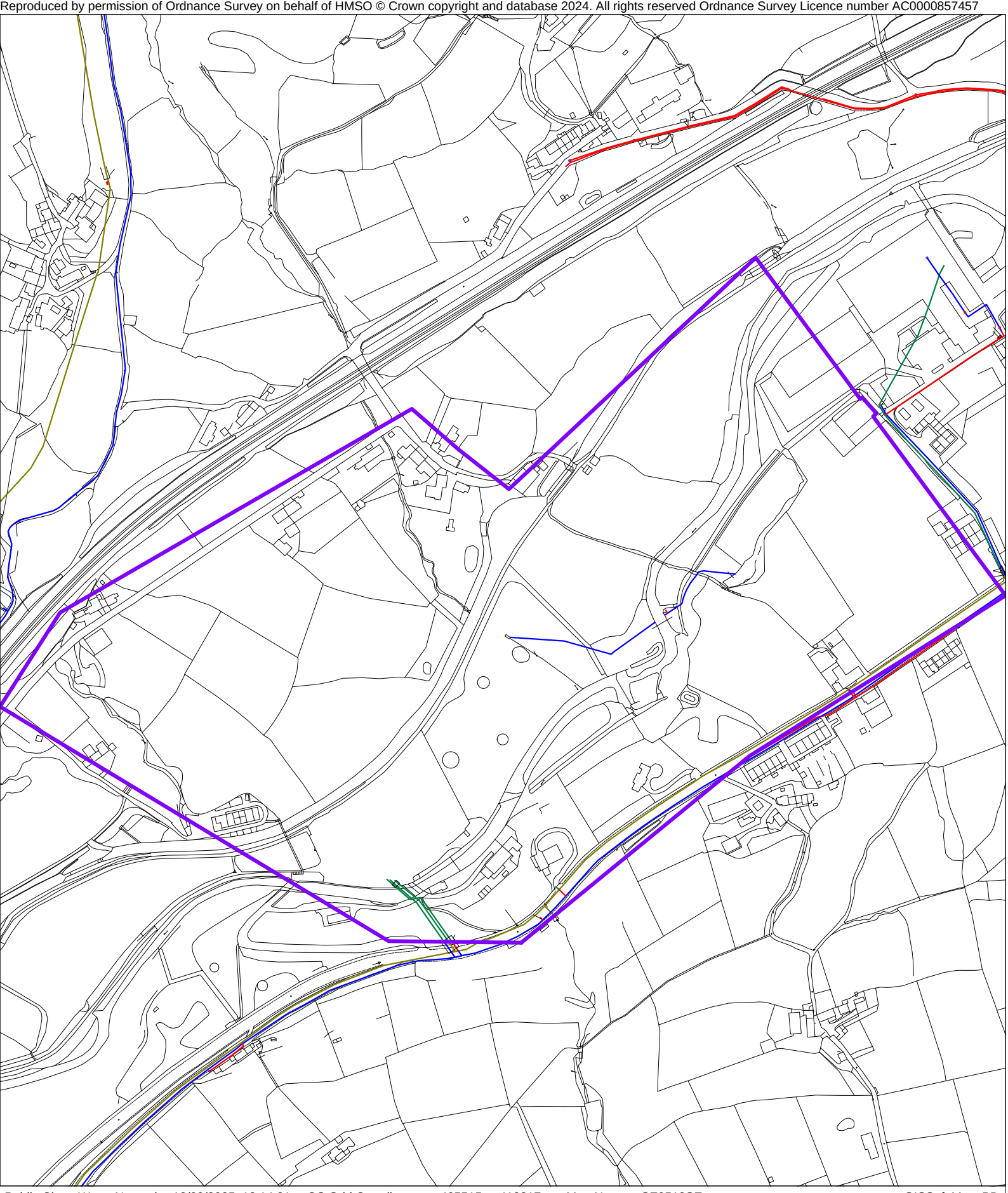
Sewer Legend



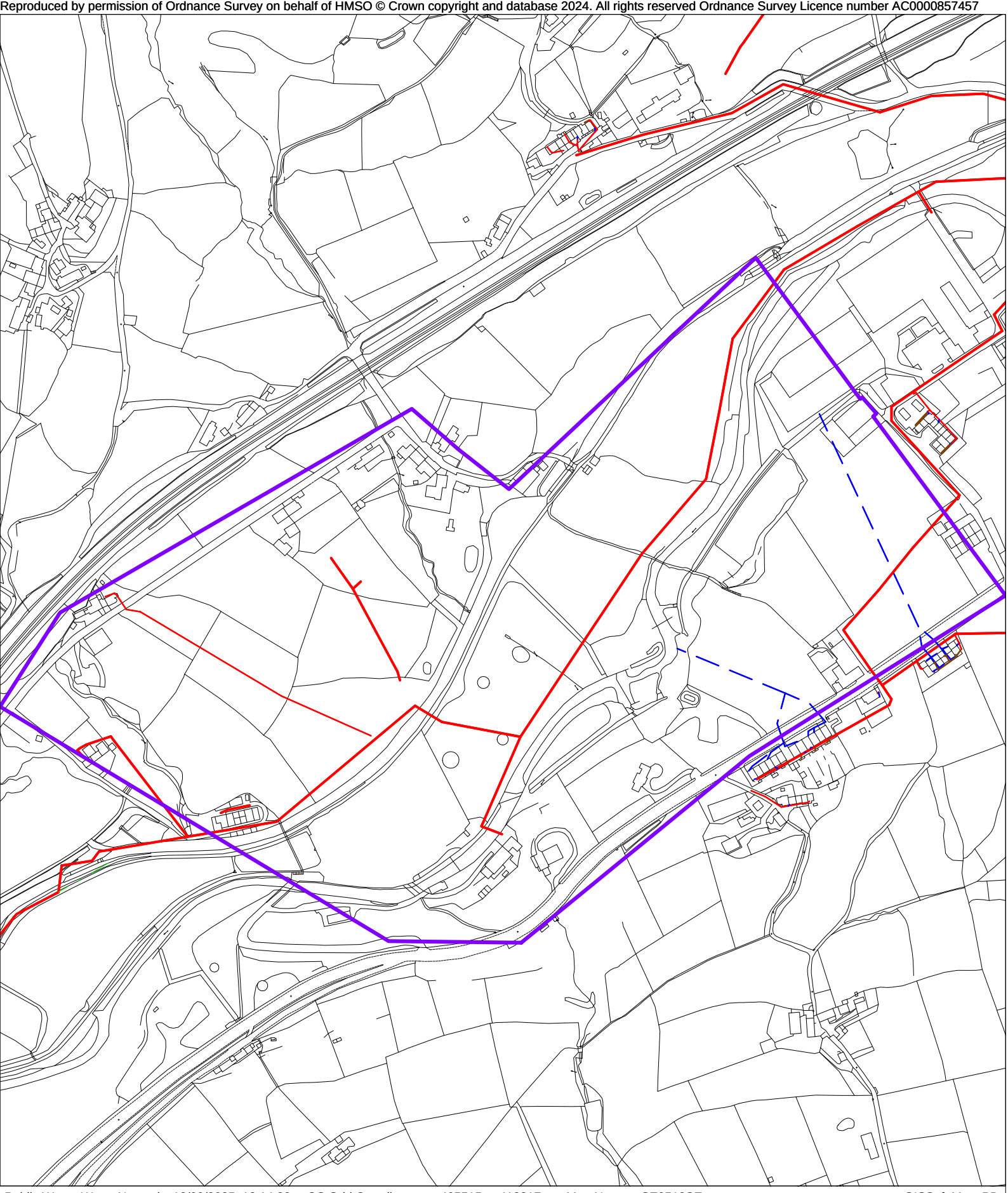
Please note that the direction of flow arrows may not always appear depending on the scale of the map.

Water Legend





Public Clean Water Network 12/09/2025 13:14:31 OS Grid Coordinates: 405515 : 412217 Map Name : SE0512SE svcGISSafeMovePD



Public Waste Water Network 12/09/2025 13:14:32 OS Grid Coordinates: 405515 : 412217 Map Name : SE0512SE svcGISSafeMovePD

Appendix C – Development Proposals

total homes = 75

mix
2 beds = 29
3 beds = 36
4 beds = 10

car parking = 117
bike spaces = 206

Sandhill Cottages

huddersfield narrow canal

vol 1
vol 2
vol 3
vol 4
vol 5
vol 6
vol 7

open pasture

car park

natural and semi natural open space

play area (pos)

2m high pond wall

river colne

access bridge

bridge

proposed site plan

WIP 19.0.25

REVISIONS

Pipeline The Studio PLANNING

Marsden Island

Drawing Number MI - CITU - PP003

Title propsoed site plan

Scale @ A1 1 : 250 | Revised by | Rev | Drawn SM | Reviewed SN | Sheet Created 19/09/25

1:250 / 1:500 / 1:1000 0 5/10/20 10/20/40 15/30/60 20/40/80

1:50 / 1:100 / 1:2000 0 1/2/4 2/4/8 3/6/12 4/8/16

CITU DESIGN

T : 0113 320 2305 E : info@citu.co.uk W : www.citu.co.uk

Appendix D – Environment Agency Flood Risk Assessment Data

Flood risk assessment data

Location of site: 405852 / 412532 (shown as easting and northing coordinates)
Document created on: 5 February 2025
This information was previously known as a product 4.
Customer reference number: H182UXMAM64A

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)
- 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

Information that's unavailable

This document **does not** contain:

- past floods
- flood defences and attributes

We do not have past flooding data for this location.

Please note that:

- 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 floodng from rivers or the sea

You can 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.

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

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

Your Lead Local Flood Authority is Kirklees District.

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

About the models used

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

Model name: 2019 Crowhill Model
Scenario(s): No defences exist fluvial, no defences exist climate change fluvial
Date: 8 January 2019

Model name: 2019 Wessenden 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

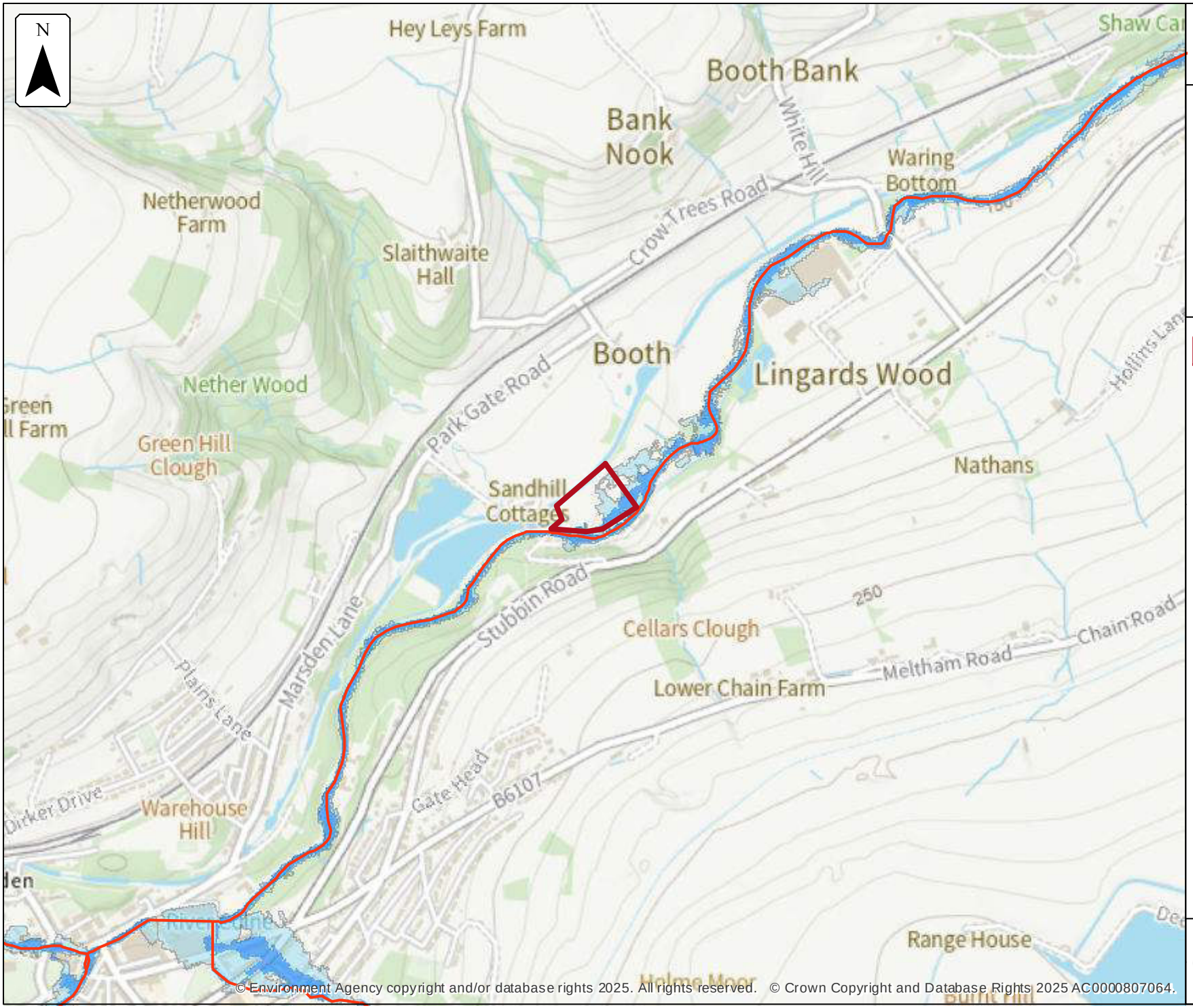
Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- 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

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)
405852/412532

Scale
1:10,000

Created
5 Feb 2025

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

0 100 200 300 400 500
metres

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

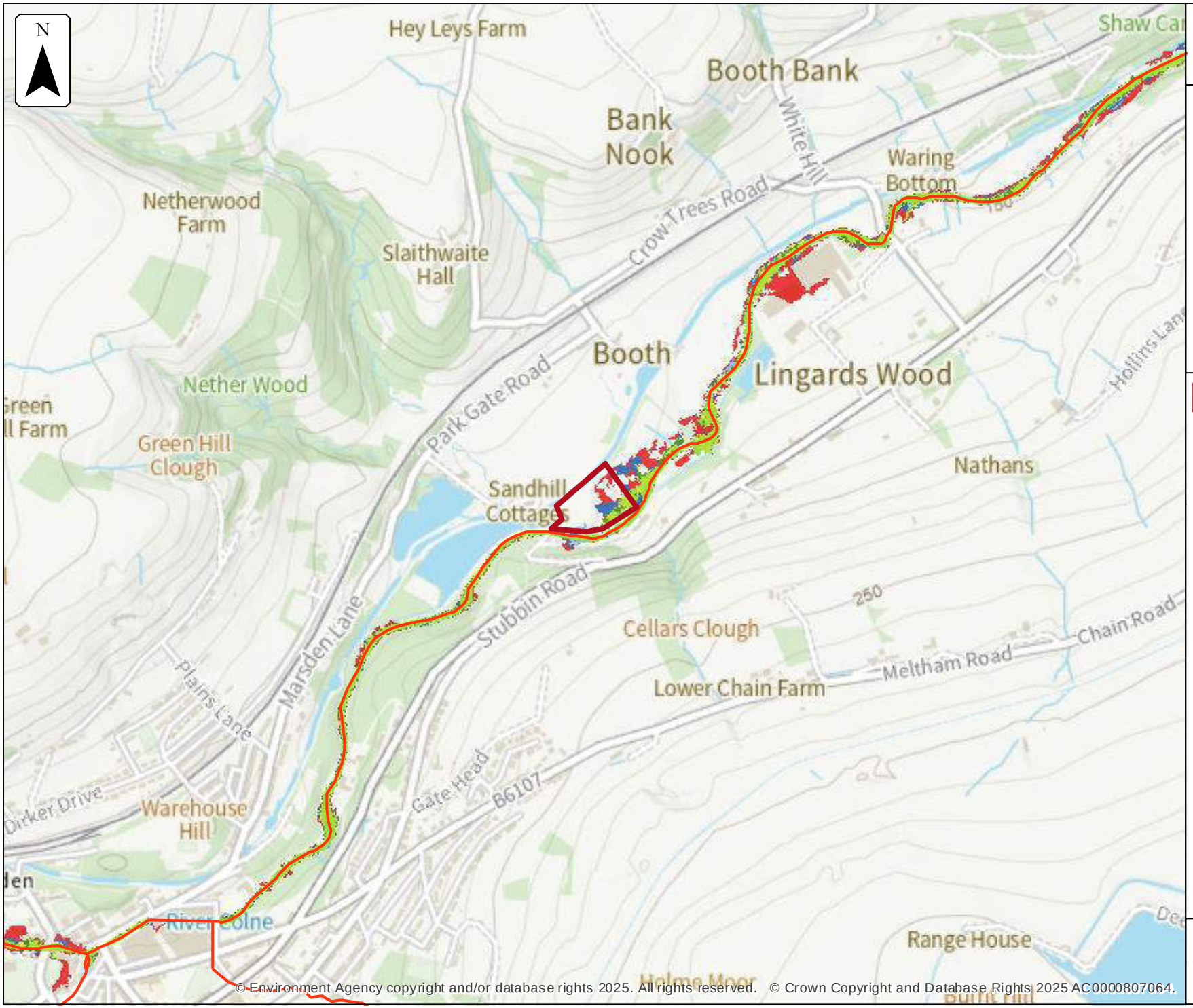
The climate change data included in the models may not include the latest flood risk assessment climate change allowances. Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

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)
405852/412532

Scale
1:10,000

Created
5 Feb 2025

Model name
2019 Colne Model

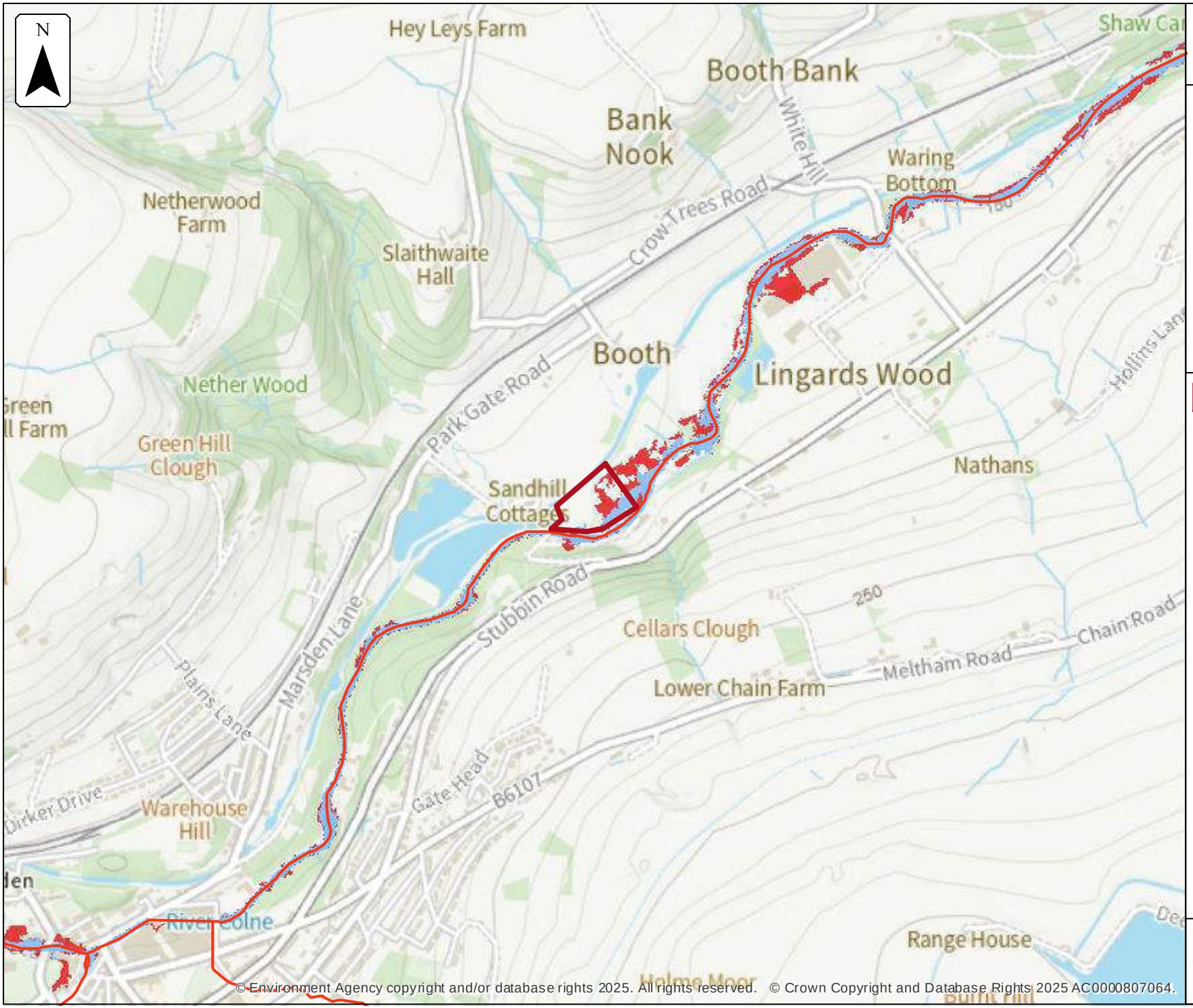
- Selected area
- Main river

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)
405852/412532

Scale
1:10,000

Created
5 Feb 2025

Model name
2019 Colne Model

Selected area

Main river

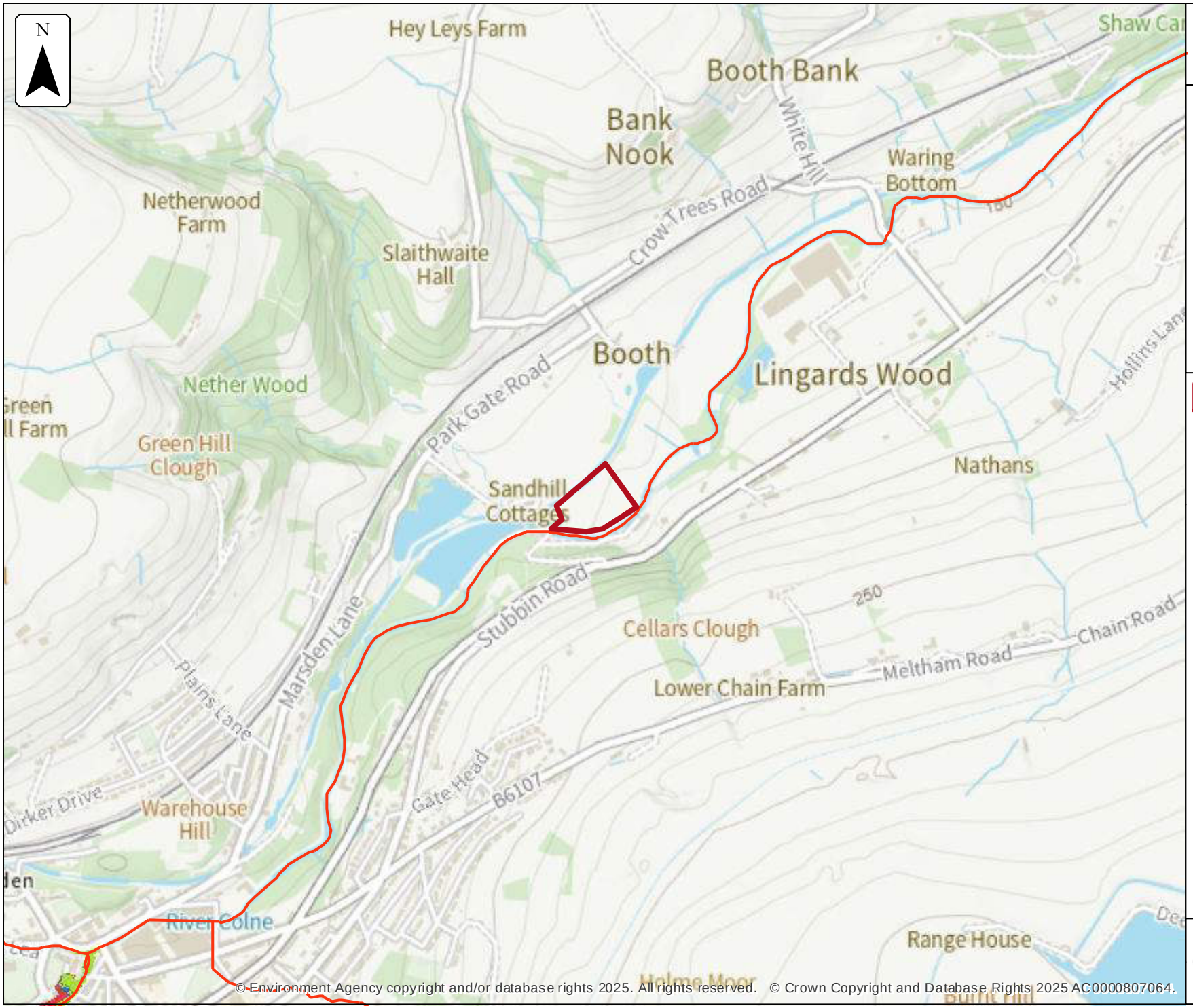
Modelled flood extent

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)
405852/412532

Scale
1:10,000

Created
5 Feb 2025

Model name
2019 Wessenden Model

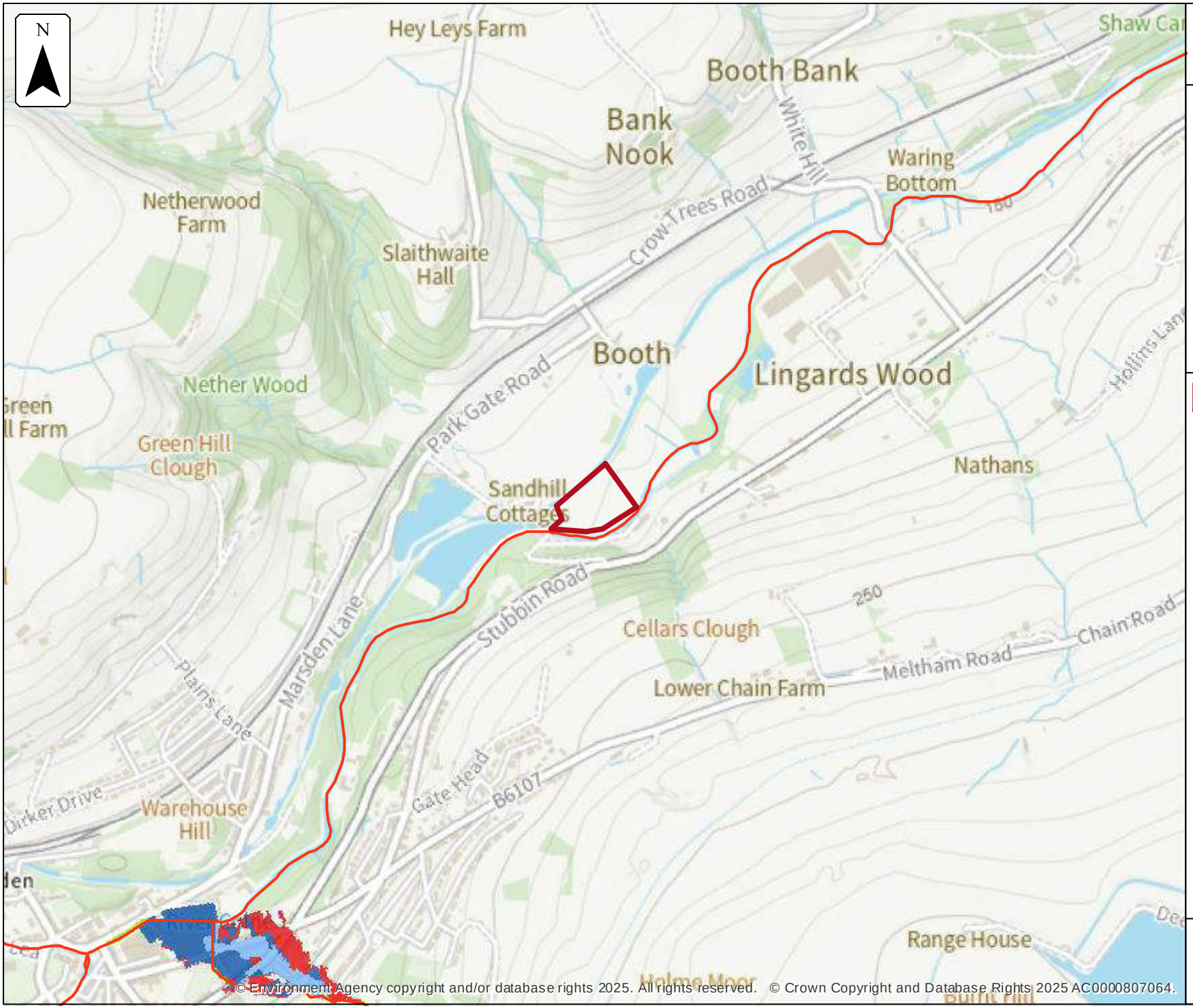
- Selected area
- Main river

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

No defences exist modelled fluvial extent

Location (easting/northing)
405852/412532

Scale
1:10,000

Created
5 Feb 2025

Model name
2019 Crowhill Model

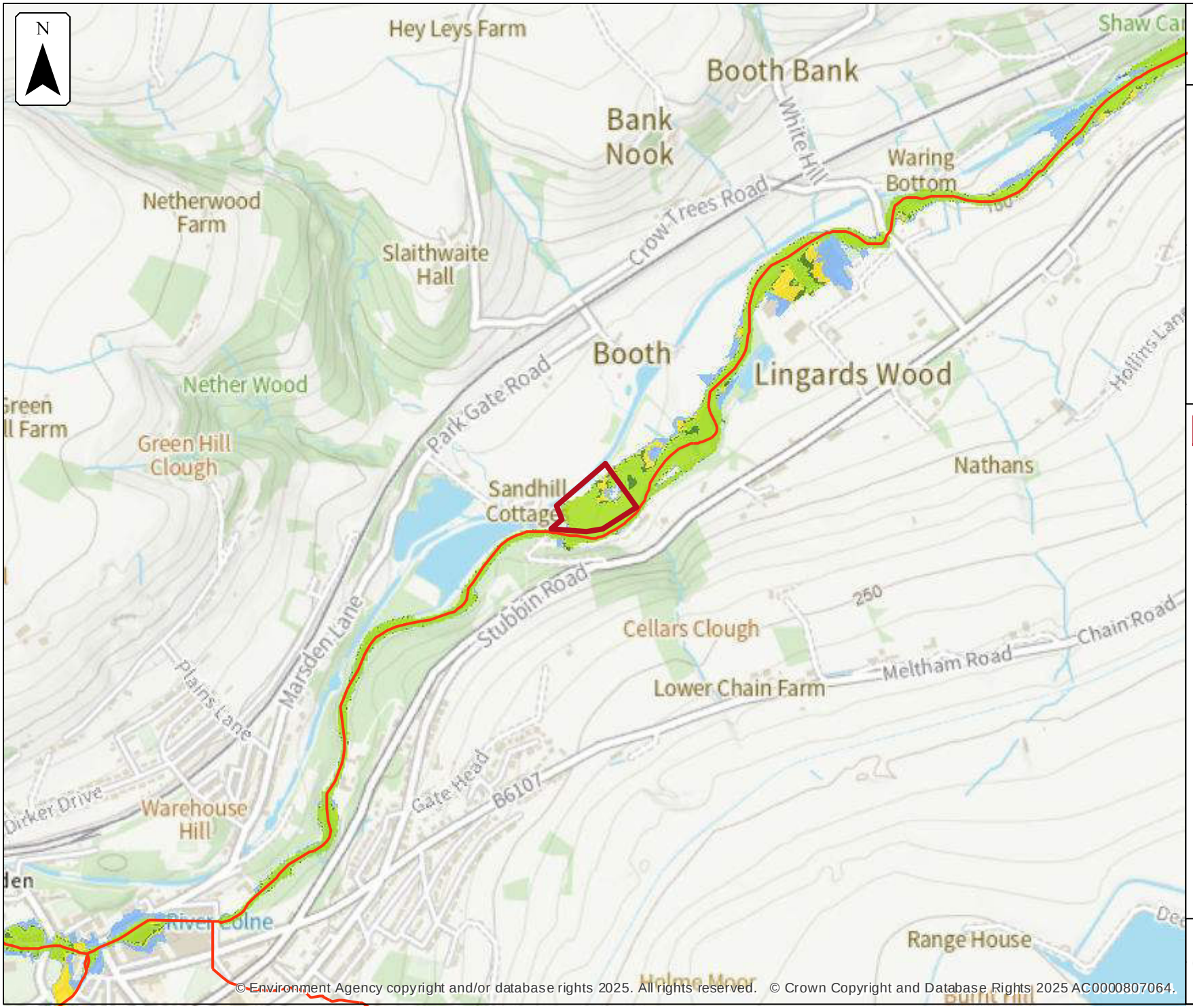
- Selected area
- Main river

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)
405852/412532

Scale
1:10,000

Created
5 Feb 2025

Model name
2019 Colne Model

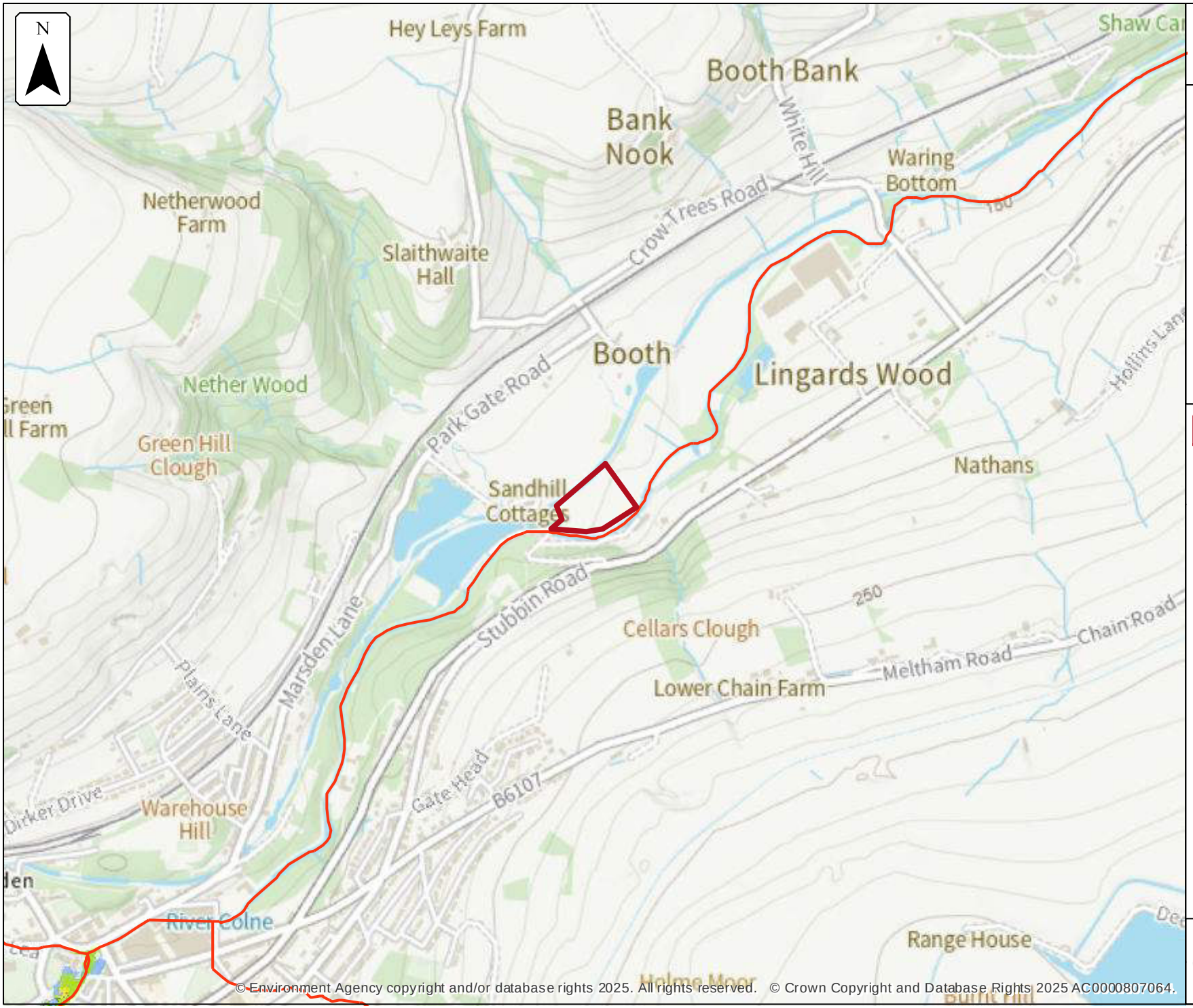
- Selected area
- Main river

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)
405852/412532

Scale
1:10,000

Created
5 Feb 2025

Model name
2019 Wessenden Model

Selected area

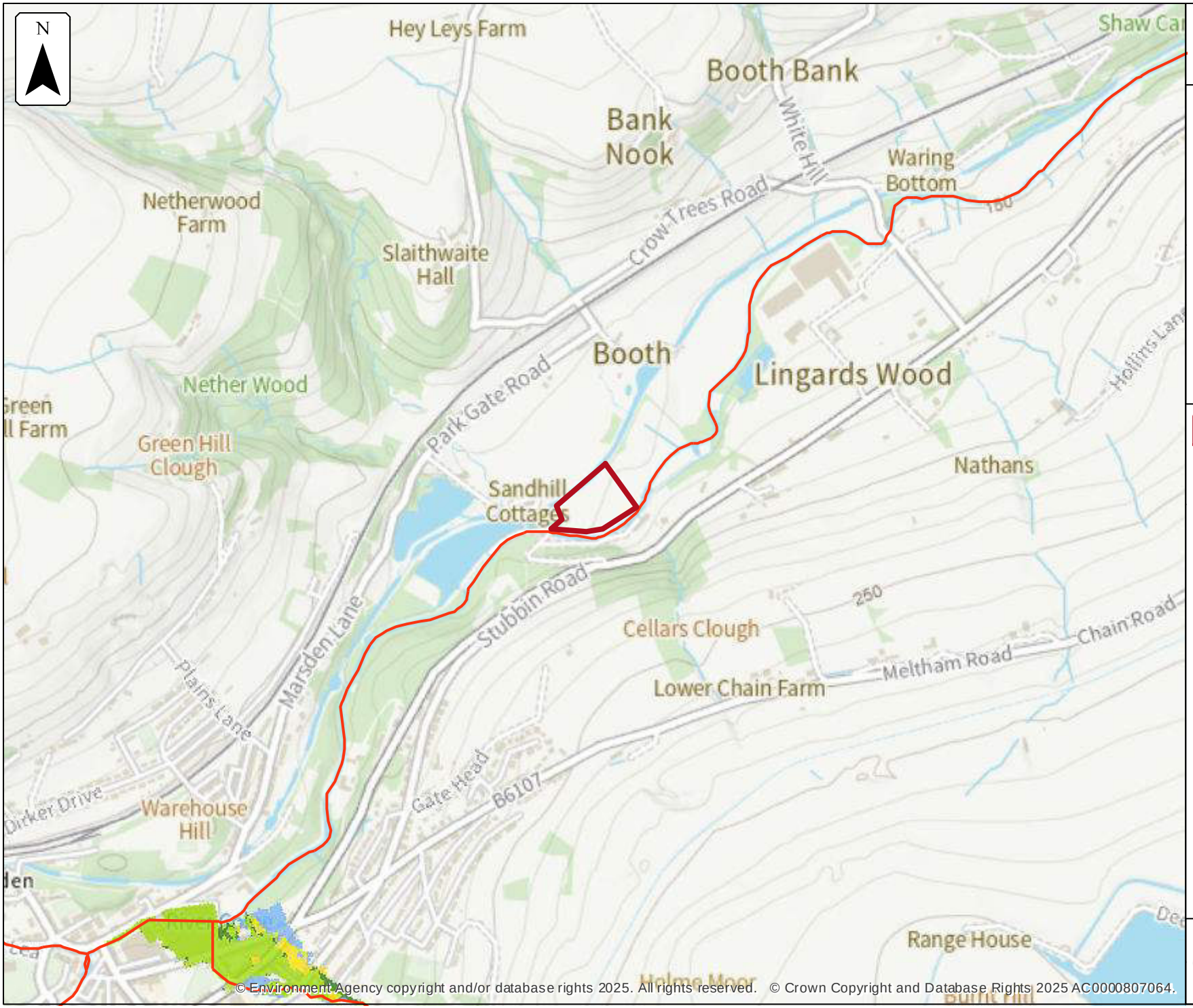
Main river

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)
405852/412532

Scale
1:10,000

Created
5 Feb 2025

Model name
2019 Crowhill 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

Defended modelled fluvial node locations

Location (easting/northing)
405852/412532

Scale
1:2,500

Created
5 Feb 2025

Model name
2019 Colne Model

Selected area
Modelled location
Main river

0 25 50 75 100
metres

Modelled node locations data

Defended

Label	Modelled location ID	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Level	Level	Level	Level	Level	Level	Level	Level	Level	Level	Level
1	1198288	405755	412478	160.06	160.25	160.44	160.62	160.68	160.72	160.86	160.96	160.98	161.06	161.16
2	1198187	405773	412474	160.06	160.25	160.44	160.62	160.68	160.72	160.86	160.96	160.98	161.06	161.16
3	1197932	405811	412469	159.69	159.89	160.06	160.21	160.25	160.27	160.34	160.44	160.68	160.92	161.05
4	1197914	405848	412465	159.50	159.69	159.84	160.01	160.08	160.12	160.28	160.41	160.50	160.69	160.92
5	1197850	405880	412475	159.31	159.50	159.66	159.81	159.86	159.88	159.99	160.08	160.14	160.26	160.57
6	1198163	405923	412505	158.90	159.09	159.23	159.32	159.37	159.40	159.50	159.59	159.66	159.80	160.07
7	1198043	405951	412547	158.51	158.65	158.77	158.89	158.93	158.95	159.04	159.12	159.17	159.29	159.54
8	1197816	405955	412554	157.87	158.05	158.22	158.40	158.47	158.51	158.67	158.79	158.85	158.90	159.17
9	1198065	405963	412576	157.57	157.71	157.85	157.99	158.04	158.07	158.20	158.30	158.36	158.47	158.73
10	1198020	405998	412624	156.81	156.90	156.97	157.05	157.07	157.09	157.14	157.18	157.22	157.35	157.73

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

Defended

Label	Modelled location ID	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow
1	1198288	405755	412478	21.36	27.15	32.94	39.41	42.09	43.64	49.77	55.17	60.47	68.53	92.79
2	1198187	405773	412474	21.36	27.15	32.94	39.41	42.09	43.64	49.77	55.17	60.47	68.53	92.79
3	1197932	405811	412469	22.55	28.74	34.84	41.66	44.44	46.10	52.53	58.19	62.61	72.42	98.98
4	1197914	405848	412465	22.55	28.74	34.84	41.66	44.44	46.10	52.53	58.19	62.61	78.31	98.98
5	1197850	405880	412475	22.55	28.74	34.84	41.66	44.44	46.10	52.53	58.19	62.61	72.42	98.98
6	1198163	405923	412505	22.55	28.74	34.88	41.66	44.44	46.10	52.53	58.19	62.61	73.43	98.97
7	1198043	405951	412547	22.55	28.74	35.0	41.66	44.44	46.10	52.53	58.19	62.61	72.42	98.97
8	1197816	405955	412554	22.55	28.74	35.0	41.66	44.44	46.10	52.53	58.19	62.61	72.42	98.97
9	1198065	405963	412576	22.55	28.74	34.94	41.66	44.44	46.10	52.53	58.19	62.61	72.42	98.97
10	1198020	405998	412624	22.55	28.74	34.94	41.66	44.44	46.10	52.53	58.19	62.61	72.42	98.97

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.
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)
405852/412532

Scale
1:2,500

Created
5 Feb 2025

Model name
2019 Colne Model

Selected area
Modelled location
Main river

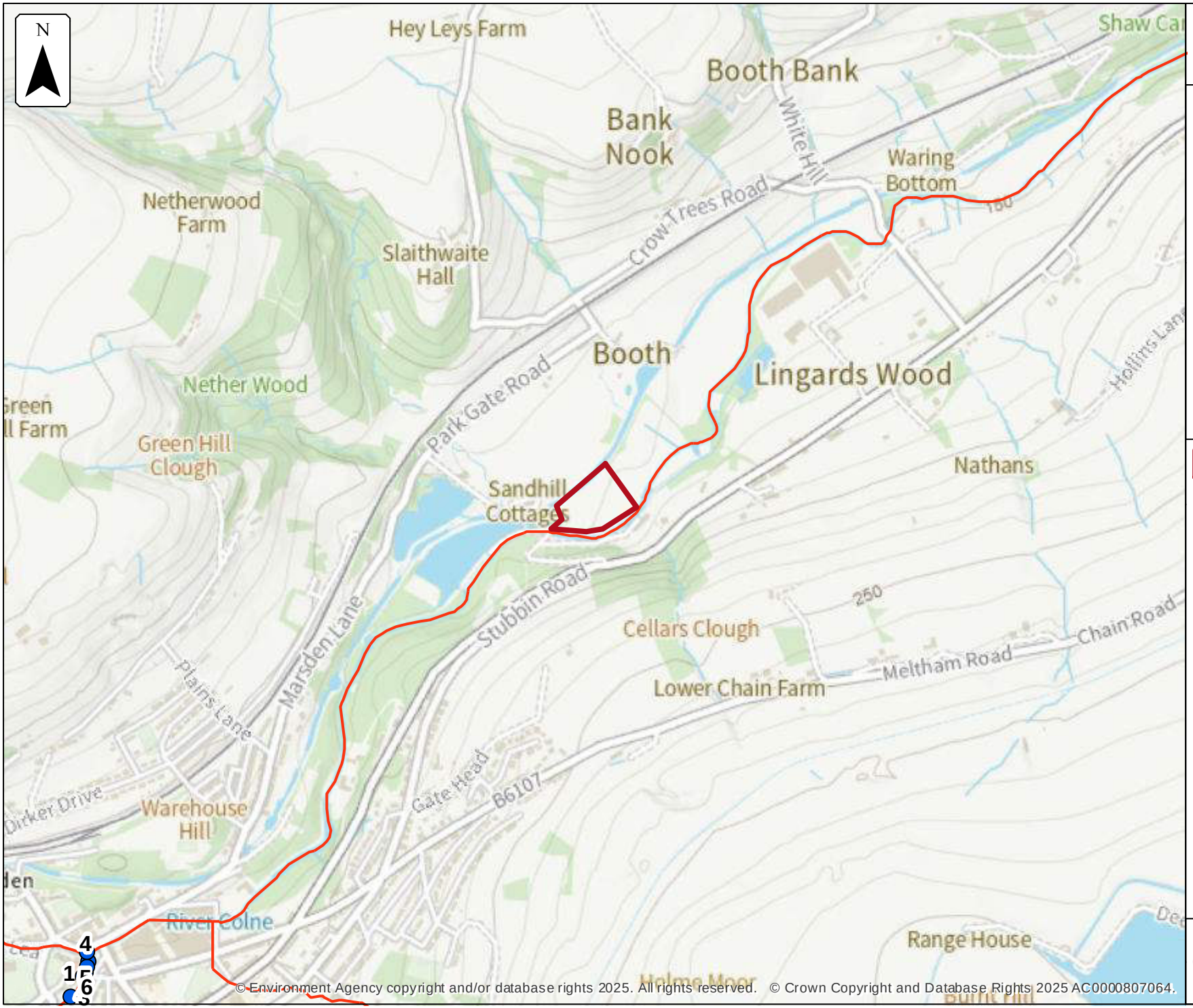
0 25 50 75 100
metres

Modelled node locations data

Defences removed

Label	Modelled location ID	Easting	Northing	10% AEP	3.33% AEP	1% AEP	0.1% AEP	10% AEP	3.33% AEP	1% AEP	0.1% AEP
				Level	Level	Level	Level	Flow	Flow	Flow	Flow
1	1198288	405755	412478	160.44	160.72	160.98	161.16	32.94	43.64	60.47	92.79
2	1198187	405773	412474	160.44	160.72	160.98	161.16	32.94	43.64	60.47	92.79
3	1197932	405811	412469	160.06	160.27	160.68	161.05	34.84	46.10	62.61	98.98
4	1197914	405848	412465	159.84	160.12	160.50	160.92	34.84	46.10	62.61	98.98
5	1197850	405880	412475	159.66	159.88	160.14	160.57	34.84	46.10	62.61	98.98
6	1198163	405923	412505	159.23	159.40	159.66	160.07	34.88	46.10	62.61	98.97
7	1198043	405951	412547	158.77	158.95	159.17	159.54	35.0	46.10	62.61	98.97
8	1197816	405955	412554	158.22	158.51	158.85	159.17	35.0	46.10	62.61	98.97
9	1198065	405963	412576	157.85	158.07	158.36	158.73	34.94	46.10	62.61	98.97
10	1198020	405998	412624	156.97	157.09	157.22	157.73	34.94	46.10	62.61	98.97

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



Environment Agency

No defences exist modelled fluvial node locations

Location (easting/northing)
405852/412532

Scale
1:10,000

Created
5 Feb 2025

Model name
2019 Wessenden Model

Selected area
Modelled location
Main river

0 100 200 300 400 500
metres

Modelled node locations data

No defences exist

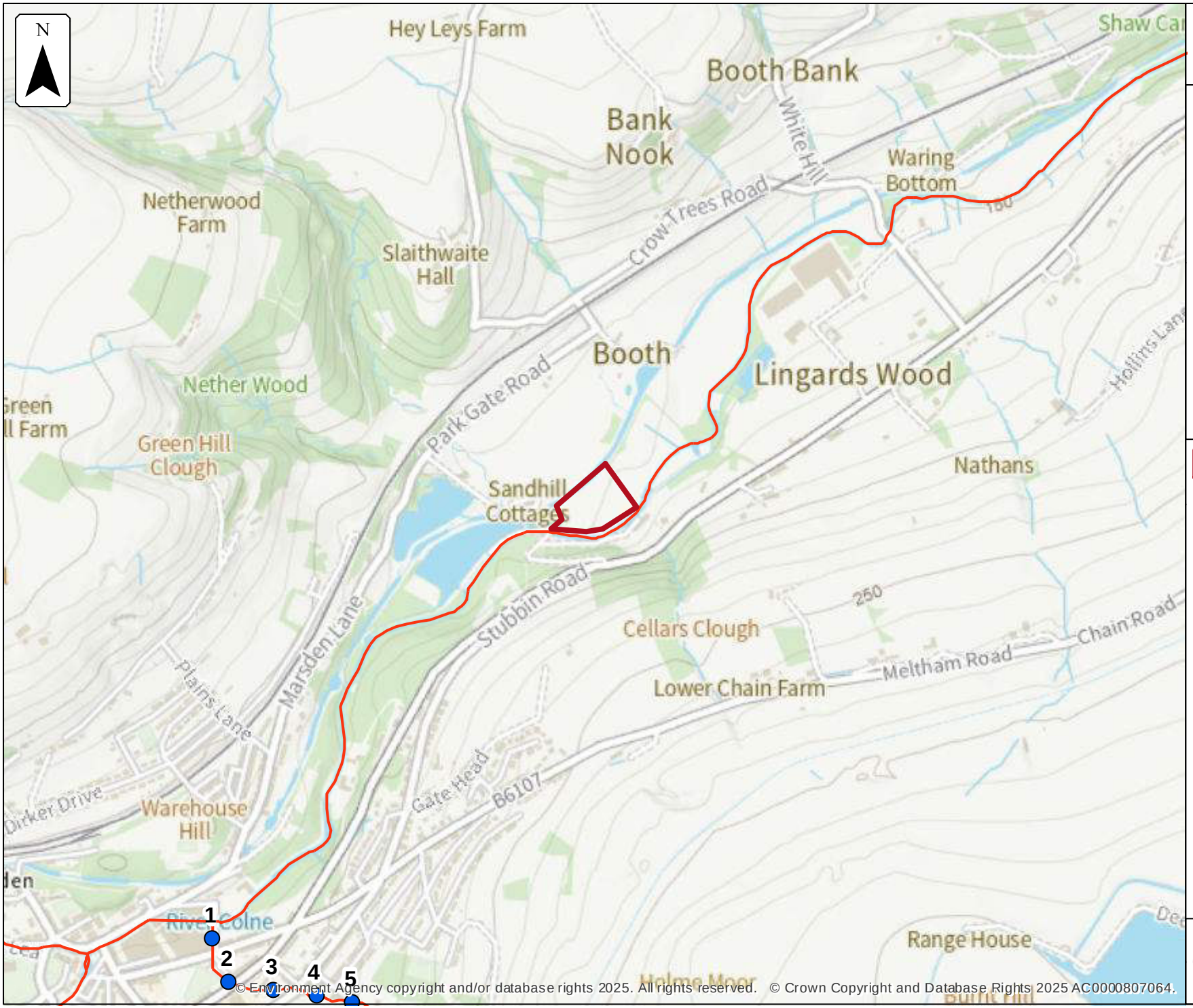
Label	Modelled location ID	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Level	Level	Level	Level	Level	Level	Level	Level	Level	Level	Level
1	1199842	404833	411571	180.45	180.58	180.67	180.77	180.79	180.82	180.89	180.95	181.0	181.12	181.49
2	1199856	404858	411610	180.23	180.31	180.35	180.40	180.41	180.42	180.46	180.48	180.50	180.55	180.66
3	1199839	404862	411618	180.23	180.31	180.35	180.40	180.41	180.42	180.46	180.48	180.50	180.55	180.65
4	1199840	404865	411628	180.20	180.28	180.33	180.38	180.39	180.41	180.45	180.48	180.51	180.57	180.75
5	1199851	404866	411658	178.0	178.0	178.0	178.0	178.0	178.0	178.0	178.0	178.0	178.0	178.0
6	1199831	404867	411639	178.0	178.01	178.01	178.01	178.02	178.02	178.02	178.03	178.03	178.05	178.10

Data in this table comes from the 2019 Wessenden 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.
If no level or flow data is available for a scenario, no table will be shown.

No defences exist

Label	Modelled location ID	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow
1	1199842	404833	411571	9.0	12.08	14.41	16.98	17.86	18.63	20.95	22.98	24.54	28.84	41.99
2	1199856	404858	411610	9.0	12.08	14.41	16.98	17.86	18.63	20.95	22.98	24.55	28.84	41.99
3	1199839	404862	411618	9.0	12.08	14.41	16.98	17.86	18.63	20.95	22.98	24.55	28.84	41.99
4	1199840	404865	411628	9.0	12.08	14.41	16.98	17.86	18.63	20.95	22.98	24.55	28.84	41.99
5	1199851	404866	411658	9.0	12.08	14.41	16.98	17.86	18.63	20.95	22.98	24.55	28.84	41.99
6	1199831	404867	411639	9.0	12.08	14.41	16.98	17.86	18.63	20.95	22.98	24.55	28.84	41.99

Data in this table comes from the 2019 Wessenden 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.
If no level or flow data is available for a scenario, no table will be shown.



Environment Agency

No defences exist modelled fluvial node locations

Location (easting/northing)
405852/412532

Scale
1:10,000

Created
5 Feb 2025

Model name
2019 Crowhill Model

Selected area
Modelled location
Main river

Modelled node locations data

No defences exist

Label	Modelled location ID	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Level	Level	Level	Level	Level	Level	Level	Level	Level	Level	Level
1	1199909	405109	411684	175.81	175.93	176.01	176.11	176.14	176.17	176.24	176.31	176.35	176.40	176.49
2	1199916	405141	411599	184.07	184.13	184.17	184.21	184.22	184.24	184.33	184.43	184.49	184.57	184.68
3	1199927	405227	411583	191.81	191.92	192.0	192.08	192.11	192.14	192.20	192.27	192.30	192.35	192.43
4	1199914	405311	411573	199.72	199.75	199.77	199.80	199.80	199.81	199.83	199.84	199.85	199.86	199.87
5	1199928	405383	411560	207.13	207.29	207.41	207.55	207.60	207.64	207.86	208.48	209.18	210.32	210.55

Data in this table comes from the 2019 Crowhill 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.
If no level or flow data is available for a scenario, no table will be shown.

No defences exist

Label	Modelled location ID	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow
1	1199909	405109	411684	0.46	0.65	0.79	0.96	1.02	1.07	1.22	1.36	1.44	1.56	1.76
2	1199916	405141	411599	0.46	0.65	0.79	0.96	1.02	1.07	1.22	1.36	1.44	1.56	1.76
3	1199927	405227	411583	0.46	0.65	0.79	0.96	1.02	1.07	1.22	1.36	1.44	1.56	1.74
4	1199914	405311	411573	0.46	0.65	0.79	0.96	1.02	1.07	1.22	1.36	1.44	1.53	1.61
5	1199928	405383	411560	0.46	0.65	0.79	0.96	1.02	1.07	1.22	1.36	1.90	1.98	2.07

Data in this table comes from the 2019 Crowhill 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.
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)
405852/412532

Scale
1:2,500

Created
5 Feb 2025

Model name
2019 Colne Model

Selected area
Modelled location
Main river

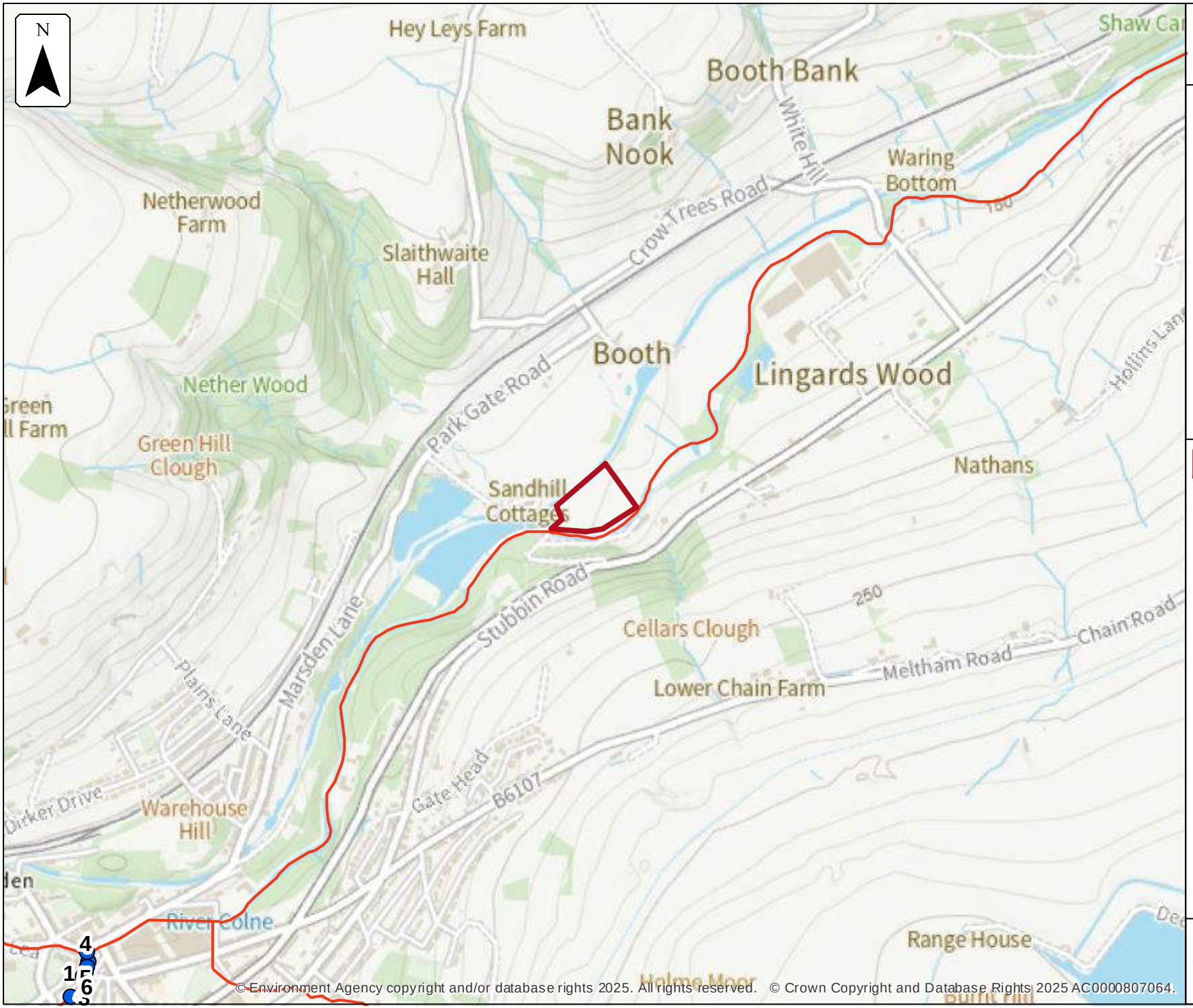
0 25 50 75 100
metres

Modelled node locations data

Defences removed climate change

Label	Modelled location ID	Easting	Northing	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)
				Level	Level	Level	Level	Flow	Flow	Flow	Flow
1	1198288	405755	412478	161.06	161.09	161.13	161.36	71.25	77.19	89.06	111.25
2	1198187	405773	412474	161.06	161.09	161.13	161.36	71.25	77.19	89.06	111.25
3	1197932	405811	412469	160.91	160.92	161.01	161.21	75.14	81.40	93.92	118.51
4	1197914	405848	412465	160.71	160.77	160.88	161.07	78.44	81.40	93.92	118.51
5	1197850	405880	412475	160.29	160.39	160.53	160.77	75.14	81.40	93.92	118.51
6	1198163	405923	412505	159.82	159.89	160.01	160.16	75.14	81.40	93.92	118.51
7	1198043	405951	412547	159.32	159.38	159.49	159.70	75.14	81.40	93.92	118.51
8	1197816	405955	412554	158.92	158.99	159.12	159.34	75.14	81.40	93.92	118.51
9	1198065	405963	412576	158.49	158.55	158.67	158.88	75.14	81.40	93.92	118.51
10	1198020	405998	412624	157.39	157.49	157.66	158.0	75.14	81.40	93.92	118.51

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



Environment Agency

No defences exist climate change modelled fluvial node locations

Location (easting/northing)
405852/412532

Scale
1:10,000

Created
5 Feb 2025

Model name
2019 Wessenden Model

Selected area
Modelled location
Main river

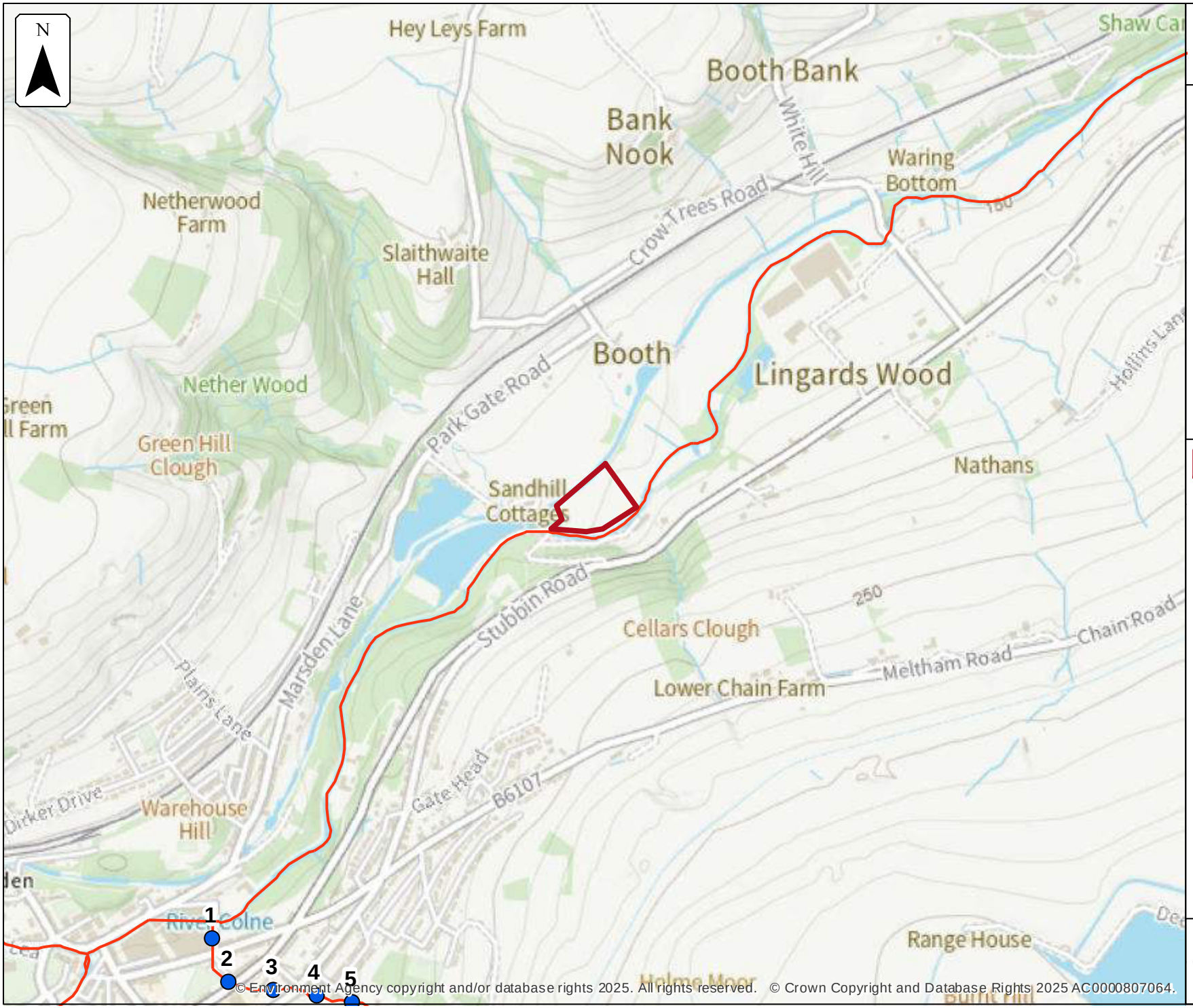
0 100 200 300 400 500
metres

Modelled node locations data

No defences exist climate change

Label	Modelled location ID	Easting	Northing	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)
				Level	Level	Level	Level	Flow	Flow	Flow	Flow
1	1199842	404833	411571	181.13	181.20	181.38	181.81	29.47	32.01	36.84	52.18
2	1199856	404858	411610	180.56	180.59	180.61	181.31	29.47	32.60	36.84	50.40
3	1199839	404862	411618	180.55	180.59	180.61	180.98	29.47	32.60	36.84	50.40
4	1199840	404865	411628	180.58	180.62	180.68	180.86	29.47	31.92	36.84	50.40
5	1199851	404866	411658	178.0	178.0	178.0	178.0	29.47	32.34	36.84	50.40
6	1199831	404867	411639	178.05	178.09	178.09	178.19	29.47	31.92	36.84	50.40

Data in this table comes from the 2019 Wessenden 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.
If no level or flow data is available for a scenario, no table will be shown.



Environment Agency

No defences exist climate change modelled fluvial node locations

Location (easting/northing)
405852/412532

Scale
1:10,000

Created
5 Feb 2025

Model name
2019 Crowhill Model

Selected area
Modelled location
Main river

Modelled node locations data

No defences exist climate change

Label	Modelled location ID	Easting	Northing	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)
				Level	Level	Level	Level	Flow	Flow	Flow	Flow
1	1199909	405109	411684	176.40	176.42	176.43	176.55	1.56	1.59	1.64	1.89
2	1199916	405141	411599	184.57	184.59	184.61	184.74	1.56	1.59	1.64	1.88
3	1199927	405227	411583	192.35	192.37	192.38	192.47	1.56	1.59	1.63	1.86
4	1199914	405311	411573	199.86	199.86	199.86	199.87	1.53	1.55	1.57	1.65
5	1199928	405383	411560	210.32	210.38	210.46	210.62	1.99	1.98	2.05	2.10

Data in this table comes from the 2019 Crowhill 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.
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)
405852/412532

Scale
1:1,000

Created
5 Feb 2025

Model name
2019 Colne Model

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 48.0
- 48.0 - 52.0
- 52.0 - 56.0
- 56.0 - 60.0
- 60.0 - 64.0
- 64.0 - 68.0
- 68.0 - 72.0
- 72.0 - 76.0
- 76.0 - 80.0

This map shows the 0.1% AEP height data

0 10 20 30 40
metres

Sample point data

Defended

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth
1	405768	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
2	405796	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
3	405824	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
4	405852	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
5	405880	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
6	405796	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
7	405824	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
8	405852	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
9	405880	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
10	405908	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
11	405768	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
12	405796	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
13	405824	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
14	405852	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
15	405880	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
16	405908	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth
17	405936	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
18	405796	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
19	405824	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
20	405852	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
21	405880	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
22	405908	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
23	405852	412588	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
24	405880	412588	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
25	405908	412588	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
26	405880	412616	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
Max value in selected area:			NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

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.
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.

Defended

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Height	Height	Height	Height	Height	Height	Height	Height	Height	Height	Height
1	405768	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
2	405796	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
3	405824	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
4	405852	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
5	405880	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
6	405796	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
7	405824	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
8	405852	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
9	405880	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
10	405908	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
11	405768	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
12	405796	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
13	405824	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
14	405852	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
15	405880	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
16	405908	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
17	405936	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
18	405796	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Height	Height	Height	Height	Height	Height	Height	Height	Height	Height	Height
19	405824	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
20	405852	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
21	405880	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
22	405908	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
23	405852	412588	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
24	405880	412588	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
25	405908	412588	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
26	405880	412616	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
Max value in selected area:			NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

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.
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 modelled fluvial extent and height

Location (easting/northing)
405852/412532

Scale
1:1,000

Created
5 Feb 2025

Model name
2019 Colne Model

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 48.0
- 48.0 - 52.0
- 52.0 - 56.0
- 56.0 - 60.0
- 60.0 - 64.0
- 64.0 - 68.0
- 68.0 - 72.0
- 72.0 - 76.0
- 76.0 - 80.0

This map shows the 0.1% AEP height data

0 10 20 30 40
metres

Sample point data

Defences removed

Label	Easting	Northing	10% AEP	3.33% AEP	1% AEP	0.1% AEP	10% AEP	3.33% AEP	1% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Height	Height	Height	Height
1	405768	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
2	405796	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
3	405824	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
4	405852	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
5	405880	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
6	405796	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
7	405824	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
8	405852	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
9	405880	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
10	405908	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
11	405768	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
12	405796	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
13	405824	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
14	405852	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
15	405880	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
16	405908	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	10% AEP	3.33% AEP	1% AEP	0.1% AEP	10% AEP	3.33% AEP	1% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Height	Height	Height	Height
17	405936	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
18	405796	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
19	405824	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
20	405852	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
21	405880	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
22	405908	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
23	405852	412588	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
24	405880	412588	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
25	405908	412588	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
26	405880	412616	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
Max value in selected area:			NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

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.
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

No defences exist modelled fluvial extent and height

Location (easting/northing)
405852/412532

Scale
1:1,000

Created
5 Feb 2025

Model name
2019 Crowhill Model

Selected area

Main river

Modelled 2D grid

Water level in mAOD

- 0 - 174.0
- 174.0 - 178.625
- 178.625 - 183.25
- 183.25 - 187.875
- 187.875 - 192.5
- 192.5 - 197.125
- 197.125 - 201.75
- 201.75 - 206.375
- 206.375 - 211.0

This map shows the 0.1% AEP height data

0 10 20 30 40
metres

Sample point data

No defences exist

Label	Easting	Northing	4% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP	4% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Height	Height	Height	Height	Height	Height
1	405768	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
2	405796	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
3	405824	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
4	405852	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
5	405880	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
6	405796	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
7	405824	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
8	405852	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
9	405880	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
10	405908	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
11	405768	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
12	405796	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
13	405824	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
14	405852	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
15	405880	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
16	405908	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	4% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP	4% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Height	Height	Height	Height	Height	Height
17	405936	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
18	405796	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
19	405824	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
20	405852	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
21	405880	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
22	405908	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
23	405852	412588	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
24	405880	412588	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
25	405908	412588	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
26	405880	412616	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
Max value in selected area:			NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Data in this table comes from the 2019 Crowhill 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.
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)
405852/412532

Scale
1:1,000

Created
5 Feb 2025

Model name
2019 Colne Model

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 48.0
- 48.0 - 52.125
- 52.125 - 56.25
- 56.25 - 60.375
- 60.375 - 64.5
- 64.5 - 68.625
- 68.625 - 72.75
- 72.75 - 76.875
- 76.875 - 81.0

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

0 10 20 30 40
metres

Sample point data

Defences removed climate change

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)
			Depth	Depth	Depth	Depth	Height	Height	Height	Height
1	405768	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
2	405796	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
3	405824	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
4	405852	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
5	405880	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
6	405796	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
7	405824	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
8	405852	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
9	405880	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
10	405908	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
11	405768	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
12	405796	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
13	405824	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
14	405852	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
15	405880	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
16	405908	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)
			Depth	Depth	Depth	Depth	Height	Height	Height	Height
17	405936	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
18	405796	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
19	405824	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
20	405852	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
21	405880	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
22	405908	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
23	405852	412588	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
24	405880	412588	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
25	405908	412588	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
26	405880	412616	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
Max value in selected area:			NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

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.
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

No defences exist climate change modelled fluvial extent and height

Location (easting/northing)
405852/412532

Scale
1:1,000

Created
5 Feb 2025

Model name
2019 Crowhill Model

Selected area

Main river

Modelled 2D grid

Water level in mAOD

- 0 - 174.0
- 174.0 - 178.625
- 178.625 - 183.25
- 183.25 - 187.875
- 187.875 - 192.5
- 192.5 - 197.125
- 197.125 - 201.75
- 201.75 - 206.375
- 206.375 - 211.0

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

0 10 20 30 40
metres

Sample point data

No defences exist climate change

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)
			Depth	Depth	Depth	Depth	Height	Height	Height	Height
1	405768	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
2	405796	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
3	405824	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
4	405852	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
5	405880	412476	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
6	405796	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
7	405824	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
8	405852	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
9	405880	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
10	405908	412504	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
11	405768	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
12	405796	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
13	405824	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
14	405852	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
15	405880	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
16	405908	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)	1% AEP (+20%)	1% AEP (+30%)	1% AEP (+50%)	0.1% AEP (+20%)
			Depth	Depth	Depth	Depth	Height	Height	Height	Height
17	405936	412532	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
18	405796	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
19	405824	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
20	405852	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
21	405880	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
22	405908	412560	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
23	405852	412588	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
24	405880	412588	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
25	405908	412588	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
26	405880	412616	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
Max value in selected area:			NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Data in this table comes from the 2019 Crowhill 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.
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 District.

About this data

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

Flood risk activity permits

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

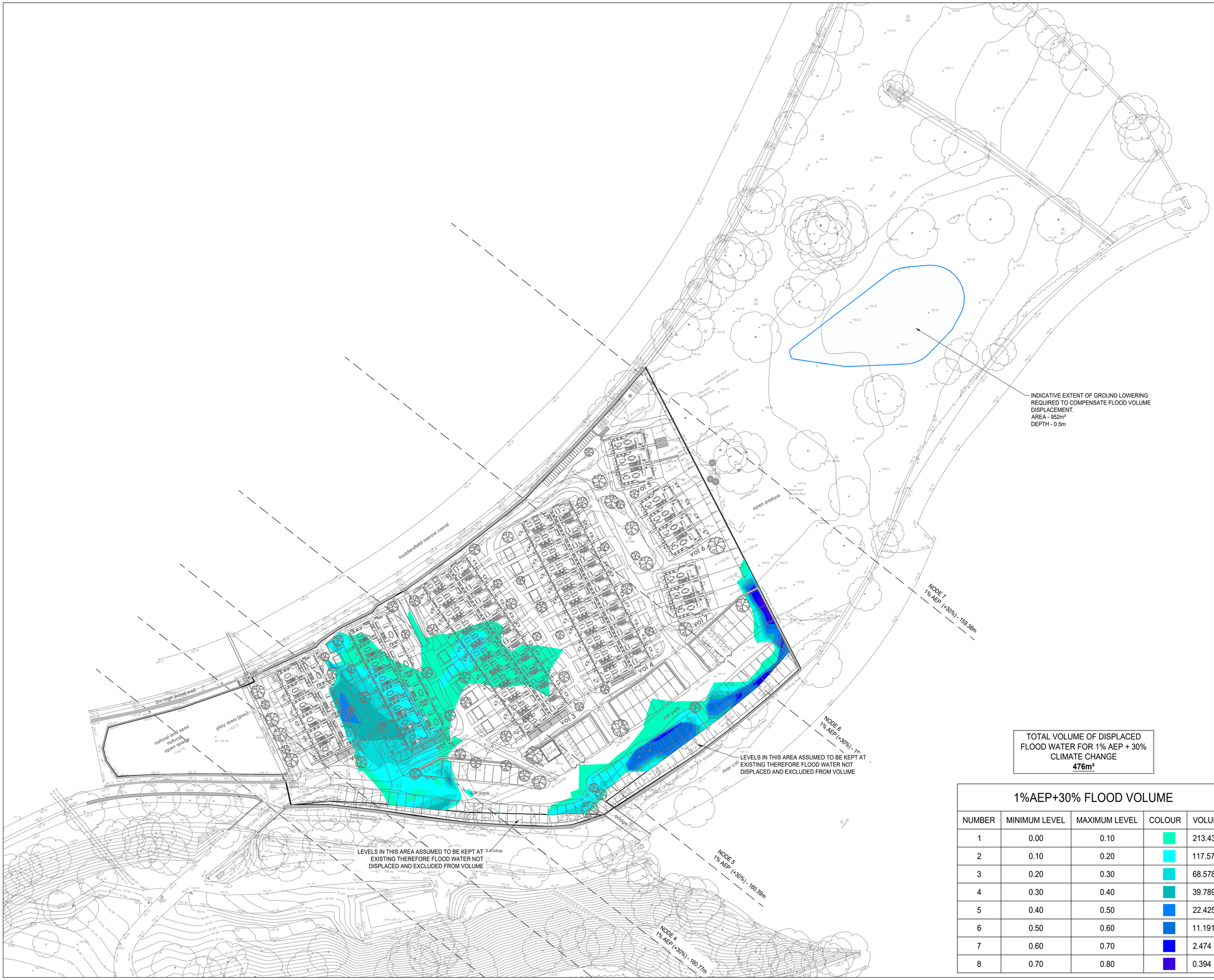
Find out more about flood risk activity permits

Help and advice

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

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

Appendix E – Compensatory Storage



TOTAL VOLUME OF DISPLACED FLOOD WATER FOR 1% AEP + 30% CLIMATE CHANGE
476m³

1%AEP+30% FLOOD VOLUME

NUMBER	MINIMUM LEVEL	MAXIMUM LEVEL	COLOUR	VOLUME
1	0.00	0.10		213.433
2	0.10	0.20		117.575
3	0.20	0.30		68.578
4	0.30	0.40		39.789
5	0.40	0.50		22.425
6	0.50	0.60		11.191
7	0.60	0.70		2.474
8	0.70	0.80		0.394

STANDARD NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS AND THE SPECIFICATIONS.
2. THIS DRAWING SHOULD NOT BE SCALED.
3. ALL DIMENSIONS ARE TO BE VERIFIED BY THE CONTRACTOR ON SITE.
4. ALL DISCREPANCIES SHOULD BE REPORTED TO C.A./E.A. PRIOR TO THE COMMENCEMENT OF WORKS.

NOTES

1. SITE PLAN RECEIVED FROM CITU 15.08.2025, DRG REFERENCE XREF-SITE PLAN.
2. TOPOGRAPHICAL SURVEY RECEIVED FROM CITU 29.07.2025, UNDERTAKEN BY POWERS ON 28.05.2025
3. 1% AEP + 30% CLIMATE CHANGE RIVER FLOOD LEVELS RECEIVED FROM THE ENVIRONMENT AGENCY 05.03.2025.

DATE	REV	DESCRIPTION	DRAWN	CHKD
13.08.25	P01	ISSUED FOR INFORMATION	TC	JF

CIVIC ENGINEERS

civicengineers.com

PROJECT
CELLARS CLOUGH
MARSDEN

TITLE
1% AEP + 30% CLIMATE CHANGE FLOOD EXTENT

DRAWING STATUS	STATUS CODE
INFORMATION	-

CE PROJECT No.	SCALE @ A1	DATE CREATED	DRAWN	CHECKED
3884	1:500	AUG 25	TC	JF

DRAWING No. 3884-CIV-XX-XX-D-C-00001 REV P01

FILE LOCATION PATH: P:\PROJECTS HOT\3884 CELLARS CLOUGH, MARSDEN\004 BIM\CIVILS\DRAWINGS\3884-CIV-XX-XX-D-C-00001 1%AEP+30% FLOOD EXTENT.DWG

Appendix F – Drainage Strategy

STANDARD NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS AND THE SPECIFICATIONS.
2. THIS DRAWING SHOULD NOT BE SCALED.
3. ALL DIMENSIONS ARE TO BE VERIFIED BY THE CONTRACTOR ON SITE.
4. ALL DISCREPANCIES SHOULD BE REPORTED TO C.A./E.A. PRIOR TO THE COMMENCEMENT OF WORKS.

NOTES

1. SITE PLAN RECEIVED FROM CITU 15.08.2025, DRG REFERENCE XREF-SITE PLAN.
2. TOPOGRAPHICAL SURVEY RECEIVED FROM CITU 29.07.2025, UNDERTAKEN BY POWERS ON 28.05.2025

KEY

- FOUL DRAIN AND INSPECTION CHAMBER
- PERFORATED SURFACE WATER DRAIN UNDER POROUS SURFACE
- SURFACE WATER DRAIN
- SW INSPECTION CHAMBER

POROUS SURFACES

- REINFORCED GRASS SURFACING
- REINFORCED GRAVEL SURFACING
- RESIN BOUND GRAVEL

NEW ACCESS TO BE FORMED ON EXISTING SURFACE WATER CULVERT. END OF CULVERT TO BE CAPPED, AND REDUNDANT CULVERT TO BEGRUBBED UP.

FOUL WATER CONNECTION TO YORKSHIRE WATER COMBINED WATER SEWER.

LOCATION OF SEWER APPROXIMATE BASED ON YW ASSET MAPS, SIZE AND DEPTH OF SEWER TBC

OUTLET FROM ATENUATION TANK TO BE RESTRICTED TO 4.9 l/s AND CONNECTED INTO EXISTING SURFACE WATER CULVERT

2 X 1500mm TWIN STORE PIPE BY VIACON TO PROVIDE 1,000m³ STORAGE

LAND DRAIN IN POS TO CONNECT INTO EXISTING CULVERT

EXISTING CULVERT FROM SPARTH RESERVOIR TO RIVER COLNE

tree root protection zone

floor risk zone 3 line

tree root protection line

30.09.25	P01	FIRST ISSUE		JSF	JSF
DATE	REV	DESCRIPTION		DRAWN	CHKD

CIVIC ENGINEERS

civicengineers.com

PROJECT

CELLARS CLOUGH
MARSDEN

TITLE

BELOW GROUND DRAINAGE GA

DRAWING STATUS				STATUS CODE
INFORMATION				-
CE PROJECT No.	SCALE @ A0	DATE CREATED	DRAWN	CHECKED
3884	1:500	SEP 25	TC	JF
DRAWING No.				REV
3884-CIV-XX-XX-D-C-30001				P01

FILE LOCATION PATH: P:\PROJECTS\HOT\3884-CELLARS CLOUGH, MARSDEN\CIVIL\SDR\WIP\GS\3884-CIV-XX-XX-D-C-30001 BELOW GROUND DRAINAGE GENERAL ARRANGEMENT.DWG

Appendix G - Greenfield Run Off Rate

EX CATCHMENT AREA
1.275ha or 12753m²

DISCHARGE RATE
QBAR 4.9l/s

STANDARD NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS AND THE SPECIFICATIONS.
2. THIS DRAWING SHOULD NOT BE SCALED.
3. ALL DIMENSIONS ARE TO BE VERIFIED BY THE CONTRACTOR ON SITE.
4. ALL DISCREPANCIES SHOULD BE REPORTED TO C.A./E.A. PRIOR TO THE COMMENCEMENT OF WORKS.

NOTES

1. SITE PLAN RECEIVED FROM CITU 15.08.2025, DRG REFERENCE XREF-SITE PLAN.
2. TOPOGRAPHICAL SURVEY RECEIVED FROM CITU 29.07.2025, UNDERTAKEN BY POWERS ON 28.05.2025

DATE	REV	DESCRIPTION	DRAWN	CHKD
20.08.25	P01	ISSUED FOR INFORMATION	TC	JF

CIVIC ENGINEERS
civicengineers.com

PROJECT
CELLARS CLOUGH
MARSDEN

TITLE
EXISTING CATCHMENT GA

DRAWING STATUS	STATUS CODE
INFORMATION	-

CE PROJECT No.	SCALE @ A1	DATE CREATED	DRAWN	CHECKED
3884	1:500	AUG 25	TC	JF

DRAWING No.	REV
3884-CIV-XX-XX-D-C-10001	P01

FILE LOCATION PATH: P:\PROJECTS HOT\3884 CELLARS CLOUGH, MARSDEN\004 BIM\CIVILS\DRAWINGS\3884-CIV-XX-XX-D-C-10001 EXISTING CATCHMENT GA.DWG

CIVIC

thriving
together

civicengineers.com

Appendix 2 - Topographic Survey

Members of

Legend

AV	Air valve
BH	Borehole
BOL	Bollard
BT	British Telecom cover
CATV	Cable television cover
CL	Cover level
DPC	Damp proof coarsing level
Earth/ER	Earthing rod
ELEC	Electric cover
EP	Electricity pole
Fence I/R	Iron railing fence
Fence C/B	Closeboard fence
Fence C/P&P	Concrete post & panel fence
Fence Pa	Palisade fence
Fence P/W	Post and wire fence
Fence P/R	Post and rail fence
Fence P/P	Post and panel fence
FFL	Finished floor level
F/B	Flower bed
FH	Fire Hydrant
G	Gulley
GAS	Gas cover
IC	Inspection chamber
IL	Invert level
INV	Invert level
LP	Lamp post
LT	Light
MH	Manhole
Nynex	Telecommunications cover
OSBM	Ordnance Survey Bench Mark
PTM	Parking ticket machine
RE	Rodding eye
RS	Road sign
R/t wall	Retaining wall
SBX	Switch box
SP	Sign post
SPS	Safety playing surface
ST	Stop tap
SV	Service valve
TBM	Temporary Bench Mark
TP	Telegraph pole
TRP	Trial pit
TRL	Traffic light
W	Water cover
WL	Water level
WO	Wash out

SURVEY STATIONS

Name	Easting	Northing	Height
1	405805.066	412478.293	160.820
1A	405760.199	412469.582	163.096
1B	405775.209	412485.423	165.396
1B1	405723.553	412484.155	162.716
1C	405763.400	412516.603	165.272
1D	405747.879	412513.851	162.646
1E	405786.684	412533.568	162.613
1F	405846.424	412575.760	162.528
2	405827.217	412482.075	160.367
3	405859.615	412478.238	160.272
3A	405868.972	412459.644	161.883
3B	405901.097	412450.444	167.125
4	405896.861	412507.580	159.432
4A	405941.528	412555.721	158.653
4B	405963.326	412593.372	157.899
4C	406001.011	412648.371	157.576
4D	405955.389	412711.051	160.169
4E	405919.555	412682.804	162.464
4F	405930.258	412675.932	160.413
4G	405910.688	412627.628	160.116
5	405879.253	412541.144	160.351
D1	405735.817	412451.557	165.166
D1A	405793.546	412460.981	161.044
D1B	405827.540	412458.657	160.797
D1C	405817.541	412446.939	160.916
D2	405721.996	412428.750	168.089
D3	405749.743	412419.868	170.786
D3A	405759.263	412397.495	179.525
D3B	405734.245	412378.807	178.704
D3C	405691.428	412438.640	169.091
D3D	405646.937	412389.986	170.522
D3E	405676.602	412364.377	176.038
D4	405806.805	412419.265	175.365
D5	405876.758	412425.753	181.277
D6	405890.671	412420.067	181.713
D7	405758.970	412382.737	185.149
B1	405873.755	412473.751	160.880

KEY DIMENSIONS SHOULD BE CHECKED ON SITE BEFORE COMMENCEMENT OF ANY WORKS

NOTE

Grid and levels related to OS using GPS data

Amendments

Date	Surveyor	Description of work

powers
Integrated Survey Partner

Meridian House
58/60 Hillside Road, Frodsham, Cheshire WA6 6AG
Tel: 01928 734473 Fax: 01928 735573
Email: mail@powerstiltman.co.uk
www.powerstiltman.co.uk

Cellars Clough Mill

Marsden

Regrade Survey

Client : Citu Group Developments Ltd

Surveyed By : FR	Date : 28/05/25	Scale
Drawn By : FR	Drawing No : 7432/01	1:500
Checked By : JL	Amendment :	

Appendix 3 – BGS Borehole Records

BOREHOLE No. AND LOCATION	DEPTH From	DEPTH To	SOIL DESCRIPTION	SAMPLES Depth	SAMPLES Test and Result
Borehole I. +560.2ft. 170-75 SE01SE 30	G.L.	9'0"	Loose filling of mudstone and siltstone fragments bound in a clayey matrix.	2'0"-4'0"	LL 36 PL 25 m 15
				5'6"-6'6"	N 7 LL 30 PL 21 m 13
				6'6"-7'6"	LL 35 PL 26 m 21
				8'6"-9'0"	LL 37 PL 28 m 27
	9'0"	14'0"	Soft becoming firm grey silty clay containing a few mudstone and sandstone fragments.	9'6"-10'6"	LL 36 PL 28 m 31 m 27 DD 96 c U 3 Φ U 0
				11'3"	LL 35 PL 26 m 25
				11'6"-13'0"	LL 36 PL 28 m 30
				14'0"	LL 37 PL 26 m 27
	14'0"	18'6"	Firm grey mottled with brown silty clay passing into very weathered clayey mudstone.	14'6"-16'0"	LL 44 PL 29 m 15 m 24 DD 101 c U 8 Φ U 0
				16'3"-16'6"	LL 47 PL 28 m 24
	18'6"	31'0"	Weathered grey mudstone of firm to stiff clay consistency and showing a contorted bedding structure. Possible fault zone.	19'6"	LL 46 PL 30 m 24
				20'6"-22'0"	LL 43 PL 29 m 22
				22'6"	LL 39 PL 24 m 20

/Continued .....

BOREHOLE No. AND LOCATION	DEPTH From	DEPTH To	SOIL DESCRIPTION	SAMPLES Depth	SAMPLES Test and Result
Borehole I. (Continued)	I8'6"	3I'0		25'0"-25'9"	LL 37 PL 25 m 23
				25'9"-27'3"	LL 39 PL 23 m 22 m 20 DD I07 c U I8 Φ U 0
				27'9"	LL 33 PL 23 m I8
	3I'0"	32'6"	Contorted weathered mudstone with band of wet brown silt.	3I'3"	LL 39 PL 28 m 32
	32'6"	35'6"	Dark grey shaly mudstone.	3I'6"-33'0"	LL 46 PL 30 m I8 m I5 DD II2 c U 4 ϕ U 33
				33'6'	LL 23 PL I9 m I0
				3[illegible]'0"-35'0'	N 92 LL 36 PL 22 m I0
			Water encountered at I4'0' rising to 7'0' over weekend.		
			End of Borehole.		
Borehole 2. (Pilcon) +578.8ft. SE01SE 31	0	4'0"	Depth below concrete footing of existing wall in open pit.		
	4'0"	I3'6"	Disturbed ground comprising fragments of weathered clayey mudstone with occasional sandstone fragments.	8'6"-I0'0"	LL 32 PL 23 m I8
				I0'6"	LL 33 PL 25 m I5
				II'6"-I2'6"	LL 34 PL 22 m I5
				I2'6"-I4'0"	LL 3I PL 24 m I5

/Continued .....

BOREHOLE No. AND LOCATION	DEPTH From	DEPTH To	SOIL DESCRIPTION	SAMPLES Depth	SAMPLES Test and Result
Borehole 2. (Continued) SE01SE 31	25'0"	41'6"		35'6" – 36'6"	N 80, LL 48, PL 28, m 15
				40'6" – 41'6"	N 90, LL 41, PL 28, m 14
			Borehole dry except for a trace of water found at bottom of hole at 32'0" depth after standing overnight. End of Borehole.		
Borehole 2A. Hand Auger in bottom of open pit.			Datum is base of concrete footing of existing wall. Base of pit 8'6" below footing.		
	Datum	7'0"	Random mudstone fill covered by sheet piling.		
	7'0"	8'6"	Mudstone and sandstone fragments in a brown sandy silt matrix.	7'6"	Fm II, DD 87
	8'6"	11'9"	Dark grey sandy silty mudstone.		
	11'9"	12'6"	Loose damp fine to medium sand with a few small brown sandstone fragments at the base. End of Borehole.		
Borehole 2B. Hand Auger in bottom of open pit.	Datum	12'0"	Strata encountered as Borehole 2A.		
	12'0"	12'9"	Loose damp fine to medium sand. End of Borehole.		
Borehole 3. (Pilcon) +532.3ft. SE01SE 32	G.L.	0'4"	Leaf mould and topsoil.		
	0'4"	1'0"	Brown clayey sand and sandstone fragments.	1'0"	LL 44, PL 27, m 28
	1'0"	10'9"	Disturbed ground comprising fragments of weathered mudstone and sandstone. These fragments are in a clayey matrix in parts and the whole is rather loose. Occasionally cobble size sandstone fragments were encountered.	1'6" – 3'0"	LL 45, PL 27, m 18
				3'6"	LL 75, PL 43, m 33
				5'6" – 6'9"	LL 45, PL 29, m 20, m 22, DD ICO, c U 17, ϕ U 11

/Continued .....

BOREHOLE No. AND LOCATION	DEPTH From	DEPTH To	SOIL DESCRIPTION	SAMPLES Depth	SAMPLES Test and Result
Borehole 3. (Continued)	I'0"	I0'9"		6'9" 8'3"	LL 34 PL 24 m I8
SE01SE 32				8'9"	LL 28 PL 20 m I9
	I0'9"	I3'6"	Weak ironstained shaly mudstone. Very jointed, with some free water within the joints.	9'9" II'0"	LL 28 PL 2I m I7
				II'6"	LL 28 PL I9 m I0
				I2'6" I3'6'	N 8I LL 3I PL 20 m 8
			Borehole dry. End of Borehole.		
Borehole 4. (Filcon) +575.7ft.	G.L.	0'9"	Leaf mould, ash and topsoil.		
	0'9"	6'9"	Suspected fill comprising many weathered sandstone fragments and some mudstone fragments. Towards the base a soft pale brown clay forms a matrix for the rock fragments.	I'0" 3'0"	LL 36 PL 22 m I4
SE01SE 33				4'0" 5'0"	LL 4I PL 23 m I8
				5'0" 6'0"	LL 40 PL 27 m I7 m I3 DD I08 c U 0 ϕ U 37
				6'9"	LL 33 PL 2I m I7
	6'9"	8'0"	Pale brown fine to medium sand, possibly decomposed sandstone.	7'3"	LL 32 PL 20 m I5
	8'0"	II'6"	Disturbed ground comprising broken sandstone in a clayey sand and sandy clay matrix.	9'6"	LL 29 PL I8 m I8
				I0'3" II'9"	LL 30 PL 2I m I3 m I5 DD II6 c U 6 ϕ U 34

/Continued .....

BOREHOLE No. AND LOCATION	DEPTH From	DEPTH To	SOIL DESCRIPTION	SAMPLES Depth	SAMPLES Test and Result
Borehole 6. +589.7ft. SE01SE 35	G.L.	4'0"	Black ash fill.		
	4'0"	4'6"	et brown sand and sandy silt.		
	4'6"	10'6"	Brown clayey silty sand with occasional mudstone fragments and very occasional large fragments of gritstone. Rock fragments increasing in frequency towards base.	5'6"- 7'0"	m 19 PL 21 LL 24
	10'6"	39'0"	Gravel to cobble size fragments of sandstone and grit in a sandy silt or silty sand matrix.	10'0"- 11'6"	m 20 PL 27 LL 35
				23'0"- 24'6"	m 14 PL 16 LL 19
				28'0"- 29'6"	m 14 PL 19 LL 22
				38'0"- 39'6"	m 16 PL 20 LL 26
	39'0"	50'0"	Fragments of sandstone and grit as above but matrix appears to comprise very decayed fragments of weathered mudstone. Boulder size broken sandstone between 48'0" and 50'0".	48'0"- 49'6"	m 16 PL 22 LL 25
	50'0"	63'3"	Grey but ironstained micaceous silty mudstone with sandstone bands showing distorted bedding. Water encountered at 53'0" rising to 40'0". Traces of sand evident in bedding at depth up to 60ft.	56'6"- 58'0"	m 17 PL 21 LL 28
	63'3"	66'6"	Dark grey shaly mudstone with nearly horizontal bedding.	62'6"- 64'0"	m 12 PL 21 LL 26 DD 116 c U 13.5 ϕ U 34
				65'6"- 66'6"	N 110

Date	Time	Depth of B.H.	Depth of Lining	Depth to water
17/11	-	20'0"	Nil	Trace with borehole caving.
17/11	P.M.	25'0"	25'0"	Dry
18/11	A.M.	"	"	"
"	P.M.	40'0"	40'0"	"
19/11	A.M.	"	"	"
"	P.M.	59'0"	54'6"	40'0"
20/11	A.M.	"	"	26'0"
"	-	66'6"	Drawn	40'0"

End of Borehole.

A.62 Cellars Clough — APPENDIX

BOREHOLE No. AND LOCATION	DEPTH From	DEPTH To	SOIL DESCRIPTION	SAMPLES Depth	SAMPLES Test and Result
Borehole IO. +587.5ft. SE01SE 39	G.L.	2'6"	Road Construction.		
	2'6"	4'0"	Compact pale brown sand and broken sandstone, bottom 6 inch clayey.		
	4'0"	9'0"	Brown and grey very clayey mudstone showing dips up to 20 degrees on bedding planes.	5'6"-7'0"	m 23 PL 27 LL 38 DD I02 c U I4 Φ U 8
	9'0"	20'6"	Dark grey, part ironstained, shaly mudstone. Intact with near horizontal bedding.	9'6"-II'0"	m I5 PL I7 LL 4I DD I09 c U 5 Φ U 40
				I3'0"-I4'6"	m I9 PL 25 LL 37
				I7'0"-I8'6"	m I9 PL 25 LL 37
				I9'6"-20'6"	N 60
			Borehole dry. End of Borehole.		
Borehole II. +597.2ft. SE01SE 40	G.L.	2'0"	Road construction.		
	2'0"	I0'9"	Fragments of mudstone and some sandstone in a matrix comprising sandy silt. Fragments are generally platey and lie horizontally, although vertically bedded fragments are evident.		
	I0'9"	I5'0"	Grey very weathered and ironstained silty mudstone. Dips up to 30 degrees evident.	I4'0"-I5'0"	N 45
			Borehole dry. End of Borehole.		
Borehole I2. +530.0ft. SE01SE 41	G.L.	8'0"	Fill comprising compacted grey micaceous silty mudstone fragments with occasional sandstone fragments.	6'0"	N II
	8'0"	II'6"	Fill comprising dark grey clayey mudstone and occasional small fragments of sandstone. Sandy band 9'9" to I0'6".		
	II'6"	I2'6"	Dark grey micaceous silty clay containing decayed organic matter. Probably alluvium.		
	I2'6"	I5'6"	Compact dark brown sand and rounded gravel. Alluvium.	I5'0"	N 36

/Continued .....

BOREHOLE No. AND LOCATION	DEPTH From	DEPTH To	SOIL DESCRIPTION	SAMPLES Depth	SAMPLES Test and Result
Borehole I2. (Continued) SE01SE 41	I5'6"	I6'3"	Pale brown flaggy sandstone, rather weathered.		
	I6'3"	25'7"	Hard dark grey mudstone with silty and sandy partings. Bedding is horizontal. Sandstone bands increasing towards base.	20'6" 25'0"	N 70 N >200

Date	Time	Depth of B.H.	Depth of lining	Depth to water
22/4	P.M.	I0'6"	Nil	Dry
23/4	A.M.	"	"	I'0"
"	P.M.	24'0"	24'0"	I8'0"
24/4	A.M.	"	"	I0'0"

		End of Borehole.			
Borehole I3. +530.0ft. SE01SE 42	G.L.	I'0"	Topsoil.		
	I'0"	6'6"	Fill comprising black ash, layers of old topsoil and sandstone flags.		
	6'6"	9'3"	Wet dark brown clayey sand with broken sandstone of gravel and cobble size. Mudstone fragments evident towards base. Possibly fill. Water encountered at 8'0".		
	9'3"	I0'6"	Very loose sandstone boulders, probably of alluvial origin.		
	I0'6"	I3'0"	Dark grey weathered mudstone fragments with broken sandstone and some sand and silt. Organic smell, probably of alluvial origin.	I0'6" II'6"	N 23 N II
	I3'0"	20'6"	Weathered dark grey micaceous shaly mudstone. Bedding horizontal. Sandy and silty bands occur particularly towards the base.	I7'0" 20'0"	N I2I N >400

Date	Time	Depth of B.H.	Depth of lining	Depth to water
20/4	P.M.	I6'6"	I5'0"	8'6"
2I/4	A.M.	"	"	8'0"

		End of Borehole.			

BOREHOLE No. AND LOCATION	DEPTH From	DEPTH To	SOIL DESCRIPTION	SAMPLES Depth	SAMPLES Test and Result
Borehole I2. (Continued) SE01SE 41	I5'6"	I6'3"	Pale brown flaggy sandstone, rather weathered.		
	I6'3"	25'7"	Hard dark grey mudstone with silty and sandy partings. Bedding is horizontal. Sandstone bands increasing towards base.	20'6" 25'0"	N 70 N >200

Date	Time	Depth of B.H.	Depth of lining	Depth to water
22/4	P.M.	I0'6"	Nil	Dry
23/4	A.M.	"	"	I'0"
"	P.M.	24'0"	24'0"	I8'0"
24/4	A.M.	"	"	I0'0"

		End of Borehole.			
Borehole I3. +530.0ft. SE01SE 42	G.L.	I'0"	Topsoil.		
	I'0"	6'6"	Fill comprising black ash, layers of old topsoil and sandstone flags.		
	6'6"	9'3"	Wet dark brown clayey sand with broken sandstone of gravel and cobble size. Mudstone fragments evident towards base. Possibly fill. Water encountered at 8'0".		
	9'3"	I0'6"	Very loose sandstone boulders, probably of alluvial origin.		
	I0'6"	I3'0"	Dark grey weathered mudstone fragments with broken sandstone and some sand and silt. Organic smell, probably of alluvial origin.	I0'6" II'6"	N 23 N II
	I3'0"	20'6"	Weathered dark grey micaceous shaly mudstone. Bedding horizontal. Sandy and silty bands occur particularly towards the base.	I7'0" 20'0"	N I2I N >400

Date	Time	Depth of B.H.	Depth of lining	Depth to water
20/4	P.M.	I6'6"	I5'0"	8'6"
2I/4	A.M.	"	"	8'0"

		End of Borehole.			

Appendix 4 – SIA Tool

SUMMARY TABLE		DESIGN CONDITIONS			
		1	2	3	4
Land Use Type	Residential roofing				
Pollution Hazard Level	Very low				
Pollution Hazard Indices					
TSS	0.2				
Metals	0.2				
Hydrocarbons	0.05				
SuDS components proposed					
Component 1	Filter drain (where the trench is not designed as an infiltration component)	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B	Filter drains should be preceded by upstream component(s) that trap(s) silt, or designed specifically to retain sediment in a separate zone, easily accessible for maintenance, such that the sediment will not be re-suspended in subsequent events		
Component 2	Pervious pavement (where the pavement is not designed as an infiltration component)	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B			
Component 3	None				
SuDS Pollution Mitigation Indices					
TSS	0.75				
Metals	0.7				
Hydrocarbons	0.75				
Groundwater protection type	None				
Groundwater protection Pollution Mitigation Indices					
TSS	0				
Metals	0				
Hydrocarbons	0				
Combined Pollution Mitigation Indices					
TSS	0.75	Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England			
Metals	0.7				
Hydrocarbons	0.75				
Acceptability of Pollution Mitigation					
TSS	Sufficient				
Metals	Sufficient				
Hydrocarbons	Sufficient				