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**FLOOD RISK ASSESSMENT AND DRAINAGE STRATEGY
FOR A PROPOSED INDUSTRIAL DEVELOPMENT
ON LAND AT SANDBROOK BUSINESS PARK
SANDBROOK WAY, ROCHDALE OL11 1RJ
PREPARED FOR NORTHERN TRUST COMPANY LIMITED**



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1.0 EXECUTIVE SUMMARY

This site is located on Sandbrook Business Park, Sandbrook Way in Rochdale and is currently an un-developed brownfield site, located within an existing and well-established commercial and industrial estate. Sandbrook Business Park lies entirely within the ownership of the applicant and the proposed site is steeply sloping land, made up entirely of grassland.

This flood risk assessment has been prepared with the benefit of information compiled from the Environment Agency, Lead Local Flood Authority, Local Planning Authority, and other relevant sources, together with our own insights resulting from the phased development of the site over a 20-year period. The assessment has concluded that the proposed development is classified as a 'less vulnerable' development, due to the change in use being from that of un-developed brownfield land to industrial premises. The Northern half of this site lies within flood zone 1, whilst an area in the Southern half of the development is identified to lie within Flood Zone 2. Therefore, this site is considered to have a Medium Risk of flooding from rivers and the sea, with 0.1% to 1.0% chance of flooding from rivers and 0.1% to 0.5% chance of flooding from the sea, in any given year. The previous phase of the development to the West of the site, is also identified to lie within this flood zone 2 area, but since the site was developed in 2004, no flooding has ever occurred.

According to the Environment Agency's flood maps, there is a high-risk of flooding from surface water sources. The area of the site which is identified to have a high risk of flooding from surface water, is in the higher-lying land to the North of the site. The surface water flood maps indicate this to be localised flooding, which appears to be contained within the site and is not identified to flow on or off the site in any direction. The localised flooding identified in this area has most likely been identified due to the presence of natural depressions in the land and floodwater in this area typically soaks into the ground or evaporates, rather than flowing off the site. There is no identified risk of flooding from groundwater sources, reservoirs, or any other sources of open water bodies.

The development proposal is to construct a total of four individual industrial buildings, with two buildings proposed for the Northern half of the site and two buildings proposed for the Southern half of the site. There will be two access points leading into the site from Sandbrook Way – one at the North-western end of the development, serving Blocks A & B and one at the South-western end, which will serve Blocks C & D. There will be vehicular access provision for HGV's leading into each of the industrial units, in addition to the provision of car parking spaces to serve each of the business units and provision for bicycle parking, which will serve the whole phase of this development.

There are no public sewers identified in the immediate vicinity of this site, as the local foul water sewers are private and currently owned by the developer. There are no surface water sewers (public or private) in the immediate vicinity of the site, as the former two phases of this development benefit from soakaways. There is however a main river culverted watercourse within 20m

of the site, to the South which is open watercourse prior to being culverted at the location indicated in Appendix E.

These proposals intend to utilise the private foul water sewer (constructed during the previous two phases of this development), for the discharge of wastewater from the site. The drainage design from the previous phases of this development was sized to accommodate all three phases of the development. Wastewater will be discharged into the private 150mm dia. Foul water sewer in Sandbrook Way, at an un-restricted rate of discharge. Due to the failure of the soakaway tests, the surface water will discharge into sudden Brook at the restricted flow rate by attenuation and a flow control device.

Although this site is considered to have a medium risk of flooding from the river, and the lowest area of the site being approximately 4m higher in elevation than the nearby main river Sudden Brook, a Flood Risk Assessment has been carried out.

2.0 INTRODUCTION

Graham Schofield Associates Ltd have been appointed by Northern Trust Company Limited, to undertake a Flood Risk Assessment and Drainage Strategy, in support of a planning application for the development of a brownfield site on land at Sandbrook Business Park, Sandbrook Way, Rochdale OL11 1RJ.

The existing site is approximately 0.57 hectares in area and is presently an undeveloped brownfield site, located within a well-established commercial and industrial estate known as Sandbrook Business Park in Rochdale.

The proposals for this development involve the construction of four separate industrial buildings (Blocks A-D), comprising 9 individual business units, each with an office space and toilet facilities. The combined area of the four proposed buildings is approximately 1,662m², which equates to around 29% of the total site area. The development is classified as 'Less Vulnerable', given the industrial nature of the proposals.

The proposed development includes two access roads off Sandbrook Way, with one to the Northwest of the site (to serve Blocks A & B) and the other access to the Southwest of the site (to serve Blocks C & D). Pedestrian footpaths will be provided alongside both access roads and around the buildings, with car parking areas for staff and visitors, adjacent to each of the business units. It is intended to retain as much porous grassland as possible, around the perimeter of the site.

The latest government guidance on Flood Risk and Coastal Change, states that a Flood Risk Assessment is required for any site located within a Flood Zone 1 area and greater than 1 hectare in size, or where it is proposed to have more than 1,000m² in internal floor area(s). Flood Risk Assessments are also required for any proposals for new development (including minor development and change of use) in flood zones 2 and 3, or in areas which lie within flood zone 1 and identified to have critical drainage problems, as notified by the Local Planning Authority (LPA), Lead Local Flood Authority (LLFA), or the Environment Agency (EA).

According to the Environment Agency's published flood maps, the southern area of this site lies within a Flood zone 2 area and therefore, has a medium probability of flooding from rivers or the sea, with 0.1%-1.0% chance of flooding from rivers and 0.1%-0.5% chance of flooding from the sea. The entire site is only 0.57 hectares in area, which is less than 1 hectare, but the combined buildings will cover a floor area of approximately 1,662m² which is greater than 1,000m² and as such, this development is classified as a "Major Development". Furthermore, the site also lies within 20m of a main river watercourse which reinforces the need for a Flood Risk Assessment.

This report is intended to cover all forms of flood risk, emergency procedures and surface water drainage matters, in accordance with the most recent revision of the National Planning Policy Framework (NPPF), July 2021 and the

relevant Planning Practice Guidance (PPG) on Flood Risk and Coastal Change. Furthermore, this report is also intended to fulfil the requirements of the Local Planning Authority (LPA) – Rochdale Borough Council, the Lead Local Flood Authority (LLFA) – also Rochdale Borough Council, the local sewerage undertaker – United Utilities and the Environment Agency (EA).

2.1 Limitations

The opinions expressed within this review are based upon sourced documentation available. Graham Schofield Associates Ltd have not undertaken any quantitative assessments or special investigations as part of this assessment.

This report is based upon current guidance and may therefore require revision, to incorporate any future changes in guidance or legislation.

3.0 EXISTING SITE AND FLOOD RISK

3.1 Site Location

The site is located at National Grid Reference 389623 (E), 411991 (N) and is presently an un-developed brownfield site, located within an existing and well-established commercial and industrial estate known as Sandbrook Business Park, accessible off Sandbrook Way, Rochdale. Industrial and commercial premises are located directly to the North and West of the site, with residential housing to the East and a woodland area to the South and Southeast of the site.

The site is irregular in shape, as shown below in Figure 1: Site Location Plan.



Figure 1: Site Location Plan

3.2 Site Description and Topography

There are currently no buildings present on this site, although industrial units lie directly adjacent to the North of the site, with commercial units adjacent to the West of the site. Along the Eastern boundary lies an adopted public cycle route and footpath, which front residential properties to the East, and the Southern boundary adjoins the public access area of Sandbrook Park.

These proposals will complete the final phase of a larger business development on land owned by Northern Trust Company Ltd, within this existing and well-established commercial and industrial estate, thereby promoting additional employment opportunities within the local area. The proposals involve construction of four industrial buildings with associated access for large delivery vehicles, staff / visitor parking areas and landscaping, and will be accessible off Sandbrook Way, Rochdale.

The site is currently un-developed brownfield land and ranges in elevation from 137.25mAOD at its highest point in the Northeastern corner, to 131.04mAOD and its lowest point in the Southwestern corner, giving rise to around 6.2m fall across the entire site, in a South-westerly direction. This suggests that rainwater currently falling on the site will naturally discharge overland and across the site towards the Southwestern corner and is likely to join Sudden Brook Main River, to the South of the site.

Sudden Brook is the nearest watercourse, which is classified as a main river and lies within 20m of the site, with the nearest section of the main river being located approximately 13m to the South of the site. It should be noted that this section of Sudden Brook is in the form of a culvert and therefore not visible at ground level. The open channel of the main river lies upstream of the culvert inlet (over 30m Southeast of the site) and downstream of the culvert outfall (over 300m Southwest-west of the site). The nearest canal to the site is Rochdale Canal, which lies over 150m South of the site. There are no open water bodies within the nearby vicinity of this site and the sea lies almost 30km to the West and is therefore inconsequential to this development.

A topographical land survey was supplied by JLP Surveying Consultants Ltd in October 2018, Drawing No. S18-889 Rev E, a copy of which has been provided in Appendix A – Topographical Survey, for information.

3.3 Geological Considerations

Study of the British Geological Survey (BGS) maps for the area indicate the underlying bedrock for the site to be comprised of Mudstone, Siltstone, and Sandstone, which suggests it could be somewhat permeable. The superficial deposits for the site are identified as Sand and Gravel, which is also typically permeable and therefore, this site could potentially be favourable for soakaways. Furthermore, the previous phases of this development, to the North and West of the site, utilised soakaways for the disposal of surface water by infiltration into the ground. Figure 2 below shows the BGS Geology Map for the area and identifies the same Geological ground strata as the previously developed sites to the North and West of this development.

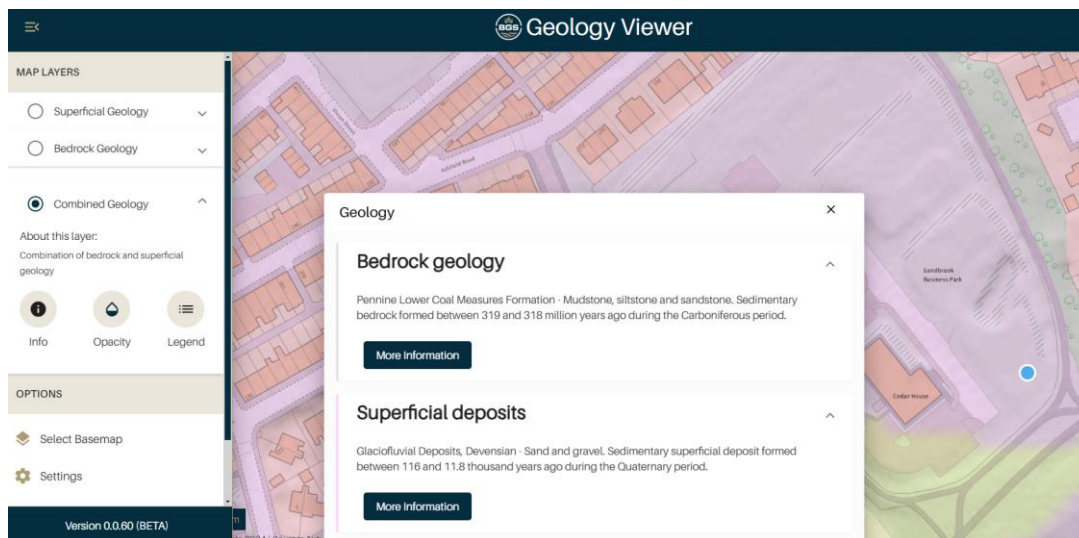


Figure 2: Geology Map

3.4 Hydrological Considerations

The groundwater source protection zones mapping has been consulted and this indicates the nearest groundwater source protection zone to be a Source Protection Zone 3 (SPZ-3) area, but this lies over 2.1km to the East of the site. An SPZ-3 area is an area around a water supply source within which all the groundwater ends up at the abstraction point (the point where the water is taken from – an ‘SPZ-1’ area). Therefore, this site is considered to have no risk to groundwater in the area.

Existing Site Drainage

There are no known culverts or watercourses within the site itself, although a main river culvert, Sudden Brook, passes within 20m of the site, approximately 13m to the South. The natural topography of the site, suggests that all rainfall currently landing on this site, will discharge to the South and ultimately into Sudden Brook main river.

The sites directly to the North and West of this development, are previous phases of a larger development and both these sites benefit from a surface water drainage system, which discharges surface water into the ground via infiltration. There have been no reports of system failure since either of these sites were constructed, with the earliest being in 2004. In addition, there have been no instances of flooding occurring in the nearby vicinity of the site.

3.5 Existing Flood Risk

The following Flood Risk Assessment and Drainage Strategy has been carried out in accordance with the NPPF (National Planning Policy Framework) and the associated Technical Guidance. The broad aim of the guidance is to reduce the number of properties at risk of flooding, within the natural and built

environment. To achieve this aim, planning authorities are required to ensure that flood risk is properly assessed during the initial planning stages of any development.

Responsibility for this assessment lies with the developers and they must demonstrate:

- Whether the proposed development is likely to be affected by flooding.
- Whether the proposed development will increase flood risk in other parts of the hydrological catchment.
- That the proposed measures for dealing with any flood risk are appropriate and sustainable.

The Environment Agency's Flood Map for Planning has been reviewed to assess the level of flood risk for the area – see Figure 3: Flood Map for Planning, shown below for information. The flood map indicates areas that are at risk of flooding in a 1% (1 in 100 year) fluvial or a 0.5% (1 in 200 year) tidal and a 0.1% (1 in 1000 year) Annual Exceedance Probability (AEP).

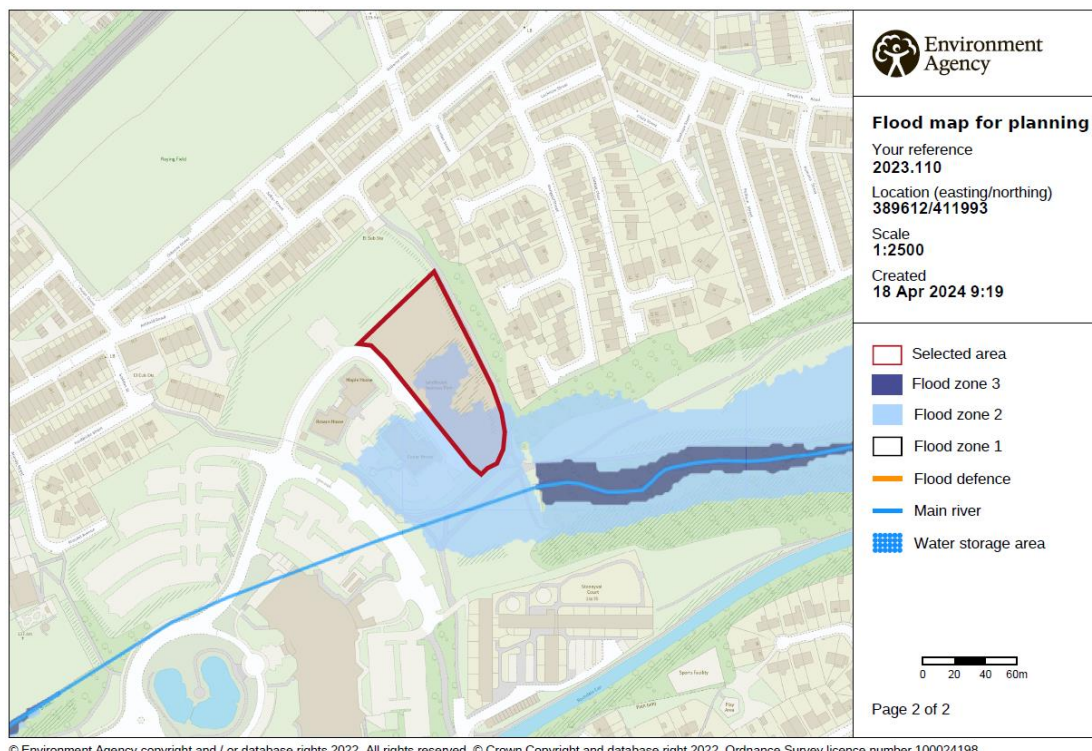


Figure 3: Flood Map for Planning

This information identifies the site to lie within an area defined as Flood Zone 2, which sits in the "Medium Probability" envelope, and is assessed as having between 0.1% and 1.0% annual probability of flooding from rivers, and between 0.1% and 0.5% annual probability of flooding from the sea, by reference to the National Planning Policy Framework (NPPF).

This site lies on steeply sloping land, with falls of around 6m from North to South over its length of around 130m, giving rise to a natural gradient in the region of 1 in 22. To the South of the site lies a main river watercourse, and this site is

identified on the Environment Agency flood maps to be at risk of fluvial flooding within the site, from the main river. However, given that this site is so steep, and the lowest area of the site is over 4m higher than the main river, it is highly unlikely that this site would ever flood from this fluvial source.

3.6 Historic Flooding

In the first instance, it should be determined whether the general area surrounding this specific development has any history of flooding, as this could be relevant to any future drainage proposals intended for the development area. This could be historic flooding of the site itself, flooding of lower-lying land which may have originated from the site, or flooding of higher-lying land which could potentially have impacts on the site itself.

Rochdale Borough Council is the Lead Local Flood Authority (LLFA) for the area and their Flood Risk Management Strategy (FRMS) considers fluvial flood risk from main rivers and ordinary watercourses, in addition to flood risk from other sources, including coastal waters, reservoirs, groundwater and surface water runoff. The FRMS assesses the likelihood of flooding within the Borough of Rochdale, both now and in the future. There is no mention of this site, the immediate surrounding area, or Sudden Brook main river, in 'Rochdale Borough's Strategy for Flood Risk Management 2014-2024', neither is this area identified in 'Rochdale Metropolitan Borough Council's, Preliminary Flood Risk Assessment 2011'. A response to an enquiry was received from Rochdale Borough Council's, Drainage Team in April 2024 which states, *"In the last 6 years no-one has reported any flooding issues at this location, so I don't have any records of flooding in this area"*.

Sudden Brook main river is mentioned in 'Bury, Rochdale and Oldham's, Strategic Flood Risk Assessment', as one of the smaller watercourses in the Bury, Rochdale and Oldham areas. According to 'Greater Manchester's sub-regional Strategic Flood Risk Assessment', *"the Irwell catchment and its tributaries tend to respond quickly to rainfall, due to the narrow, steep valleys in the upper catchment and the limited permeability of the geology"*. It should be noted therefore, that the previous two phases of this development (to the North and West of the site), currently benefit from soakaways which have proved to be effective over several years and therefore, the localised ground strata in the immediate area are typically permeable. Furthermore, the site directly to the West of this site is also identified to lie within this flood zone 2 area and since its construction in 2004, there have been no occurrences of flooding in the area.

According to the Environment Agency's historic flooding dataset, the nearest location of historic flooding is identified approximately 1.4km North of this site and is therefore considered inconsequential to this development. Furthermore, this site is not identified to lie within a critical drainage area, as notified by the Environment Agency.

3.7 Flooding from Sewers

There are no reports of flooding from any sewers in this area.

3.8 Flooding from Groundwater

There are no recorded occurrences of groundwater flooding in this area and there is no evidence of any groundwater issues on or nearby this site.

3.9 Flooding from Surface Water

The Environment Agency predicts the extent of flooding associated with each probability scenario. Figure 4: Surface Water Flooding – Extent of Flooding, shown below, indicates the extent of surface water flooding associated with this site.



Figure 4: Surface Water Flood Map – Extent of Flooding

The Environment Agency's surface water flood map indicates that there is a risk of flooding from surface water within the site, and adjacent to the Eastern boundary of the site, along the public footpath. According to the depth of flooding map, most of the surface water lies within the shallowest depth range, which is below 300mm, whilst a small area is identified within the middle depth range, between 300mm and 900mm. According to the velocity flood map, most of the water is identified to travel at the lowest velocity, which is less than 0.25 m/sec, with only a thin sliver identified to travel faster than this, at velocities greater than 0.25 m/sec.

All flooding identified directly adjacent to the site does not appear to encroach within the site itself, but rather appears to be confined to the public footpath, to the East of the site. The velocity flood map indicates velocities greater than 0.25 m/sec and the depth of flooding flood map, indicates the maximum flood depths to lie within the lowest range of less than 300mm deep.

Figure 5: Surface Water Flood Map – Enlarged, shown below, indicates the extent of surface water flooding identified within the site and directly to the East of the site, along the public footpath.



Figure 5: Surface Water Flood Map – Enlarged

It should be noted that the area which is identified to be at risk of flooding from surface water, was identified using LiDAR (Light Detection and Ranging) data, and the identified area lies within the higher-lying land to the North of the site. The topographical survey indicates that the land slopes steeply to the South, with no identifiable natural depressions found in the upper reaches of land.

3.10 Flooding from Rivers and Sea

The long-term flood risk for this site has been checked on the Government's website, and this states there is a 'Medium Risk' of flooding to the site, from Rivers and the Sea. However, the extent of flooding 'from rivers and the sea' map, identifies all floodwater within the site to be low-risk (0.1% - 1.0%).

Figure 6 below, shows the Extent of Flooding from Rivers and the Sea.

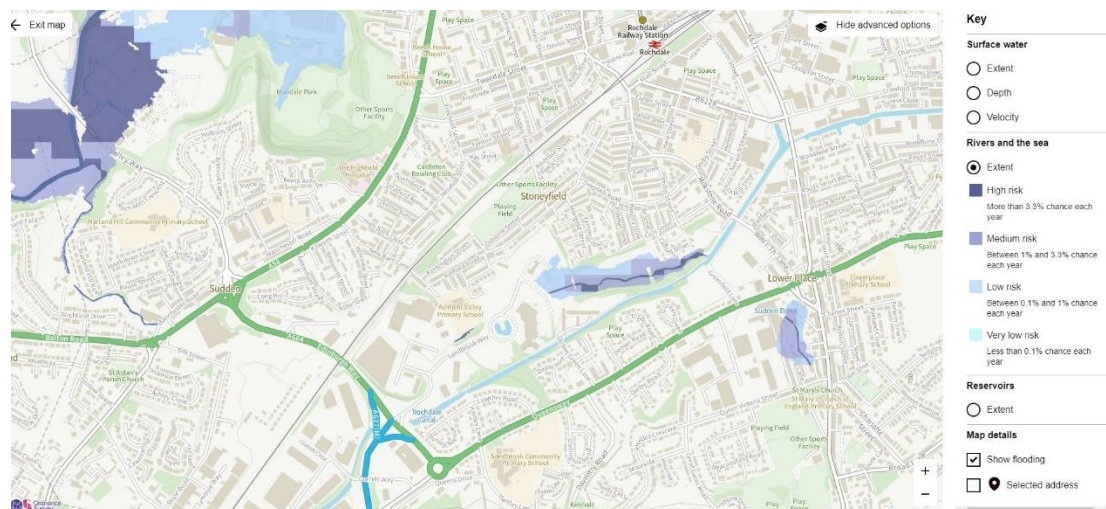


Figure 6: Extent of Flooding from Rivers or the Sea

Figure 7 below, shows an extent of the indicative flood extents (from rivers and the sea) and has been enlarged with the site boundary added, for clarity.



Figure 7: Extent of Flood from Rivers – Enlarged

To determine the potential elevation of flooding from the river, the flood extents above have been reproduced using 3-dimensional analysis of the LiDAR data for the site and is shown below in Figure 8.



Figure 8: Flood Level Analysis using LiDAR – 133.500m AOD

The blue areas shown in Figure 8 above, identify all existing ground levels within the site, which are below an elevation of 133.500m AOD. It is apparent that the blue areas shown above, are almost identical to the extent of flooding identified in Figures 6 & 7. It should be noted that the site directly to the West also lies within this flood zone area, but since the site was developed in 2004, there have been no occurrences of flooding in the vicinity.

With a view to determining the accuracy of the online flood map, a comparative analysis has been carried out using LiDAR (Light Detection and Ranging) land height data, compared to the land height data obtained from the topographical survey. Figure 9 below, also shows the existing ground levels within the site below 133.500m AOD, but these land heights were recorded by topographical survey and are therefore more accurate.

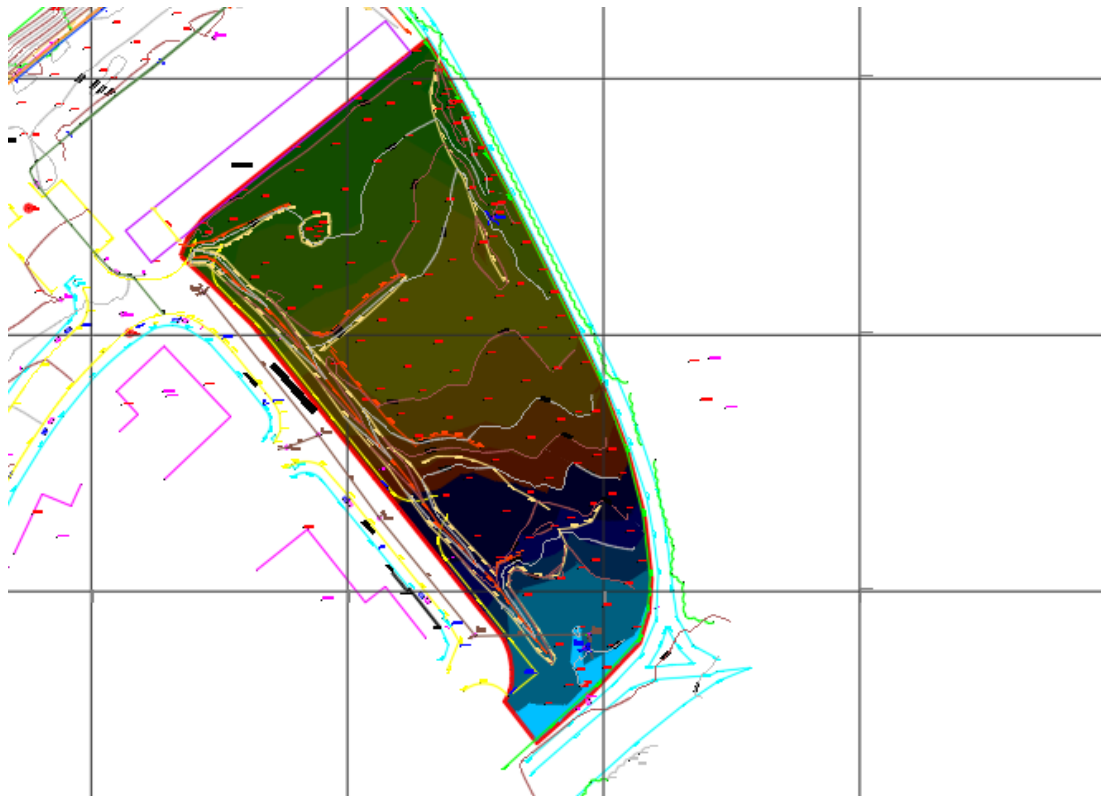


Figure 9: Flood Level Analysis using Topographic Survey – 133.500m AOD

It is apparent that using the same flood elevation, the extent of flooding identified within the site covers much less of the site than the area identified on the Government's flood maps. In addition, the flooded area appears to be constrained to the lowest region of the site, towards the Southern end. Topographically surveyed land height data is considered far more reliable than indicative LiDAR land height data and is therefore more accurate, in terms of the real-life flood extents.

It should be noted, that although parts of this site are identified in 'Greater Manchester's, Level 1 Strategic Flood Risk Assessment' as being located within the Functional Floodplain (Flood Zone 3b), the area previously identified is from older data and relative to a more generalised assessment, which was part of a much larger area – Greater Manchester. Additionally, this earlier assessment

was prepared in March 2019, some five years prior to this application. The latest Government flood maps, 'Flood Map for Planning', were last updated on 1st November 2023 and the risk of flooding from rivers and sea maps, were last updated on 6th December 2023, both of which are therefore based on more recent, detailed, and accurate data, incorporating the use of emulation to extend observational records of flood risk loading events, in addition to the combination of probabilistic and deterministic flood modelling.

To confirm the site currently lies within a Flood Zone 2 area and is not within the functional floodplain (Flood Zone 3b), the latest Flood Risk Assessment data for the site was requested from the Environment Agency in April 2024 and their response is included in Appendix E, for information. The response confirms that the site is within flood zone 2 and that there are no flood defences in the vicinity – they also have no record of flooding in this area. In addition, the flood maps included in their response confirm the flood zone 2 area identified within the site has a 1:1000 (0.1%) chance of flooding in any given year and even based on the climate change modelled fluvial extent and height model, with defences removed (page 28 of their response – Appendix E), the highest level of flooding anticipated is 132.0mAOD – some 1.75m below the lowest finished floor level proposed for Block D (133.750mAOD). It should also be noted that all nodes marked up within the site have no associated flood depths or heights and the nearest node identified with any flood depth is Node 5 (which is beyond the South-eastern boundary of the site), and this node has an elevation of 130.64mAOD and a flood depth of only 40mm.

Therefore, this site is not considered to be at risk of flooding from the river, including the allowance for climate change, as adopted in Rochdale and Littleborough's 2013 flood model.

3.11 Flooding from Reservoirs, Canals, and Other Artificial Sources

The Environment Agency's, Flooding from Reservoirs Map, has also been consulted and is shown below in Figure 10: Extent of Flooding from Reservoirs, for information. There is no identified risk of flooding from reservoirs to this site, or to any neighbouring land in the nearby vicinity of this site.

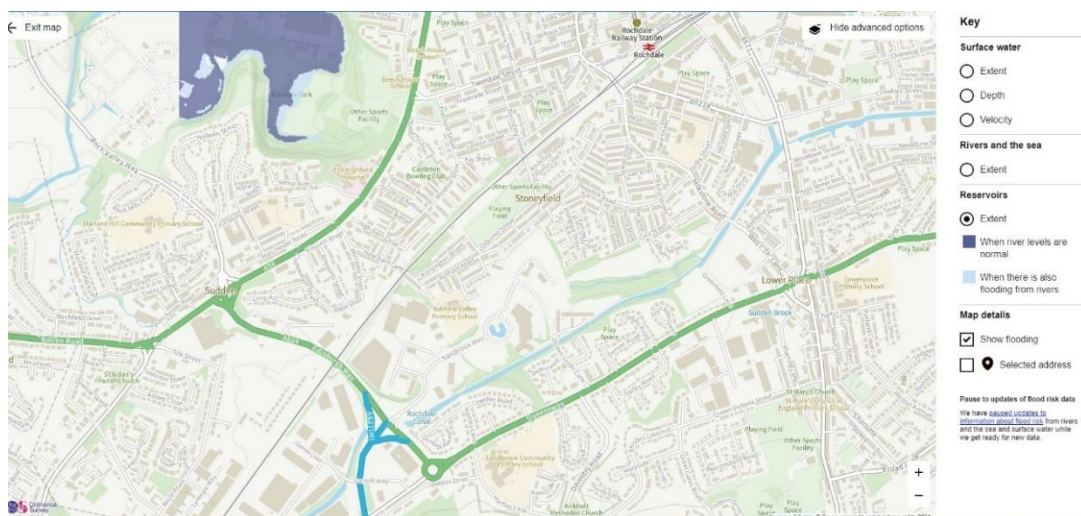


Figure 10: Extent of Flooding from Reservoirs

The nearest canal to the site is around 150m Southeast of the site and is therefore considered inconsequential to this development. This site is not considered to be at any risk of flooding from this lower-lying canal.

3.12 Flooding from Climate Change

Projections of future climate change indicate that short duration, high intensity rainfall events will become much more frequent. There will also be an increase in the less intense, but longer duration rainfall events and the level of the sea is expected to continue to rise. Over the next few decades therefore, these changes are expected to have a major impact on tidal flooding, fluvial flooding, and flash flood events, which will all continue to rise in both frequency and severity.

As a result, developers will see many more challenging aspects of flood prevention, in relation to the flooding of newly constructed sites and the potential flooding of lower-lying land, from these newly constructed sites. Given the design life of new developments is several decades, the impact of flooding from climate change must be an implicit consideration within all new developments. Although the true impact of climate change is almost impossible to predict, recommendations have been included in the Technical Guidance to the National Planning Policy Framework (NPPF). These recommendations will be adhered to throughout the development process, with particular focus being placed on the features of site drainage, and by adopting an anticipated increase in rainfall intensity of up to 50%, for all rainfall events with an Annual Exceedance Probability (AEP) of 1% (1:100 years).

According to DEFRA's data services platform, this site lies within the Irwell Management Catchment area. The climate change allowance to be applied to less vulnerable developments in a Flood Zone 2 area, is the central allowance and this is based on the 50th percentile, which means that half of the possible scenarios will fall below it and half will fall above it.

The central allowance for peak river flow in the Irwell Catchment is 35% and for peak rainfall is 30% and therefore, a 35% allowance for climate change will be applied to this development.

3.13 Future Flood Risk

This site is identified on the Environment Agency Flood Map for Planning (Rivers and Sea), as being located within a Flood Zone 2 area, and is therefore considered to have a medium risk of flooding from rivers or the sea, groundwater, and reservoirs. Although the surface water flood maps do indicate some surface water flooding within the site, this is likely to be the result of natural depressions present within the land, as identified using LiDAR data. However, the topographical survey does not identify such depressions in the land and therefore, surface water from this site, which is not able to soak into the ground, will likely discharge overland and towards the South, ultimately draining into Sudden Brook main river, to the South of the site.

Given the existing site to the North is at a higher elevation than this site and currently benefits from infiltration, added to the fact that there have been no occurrences of flooding to this site from the land above, or from adjacent sites, this site is not considered to be at any risk of flooding from adjacent land, either now or in the future.

Furthermore, as this site naturally slopes towards the South and the lowest elevation within the site is around 4m higher than the main river, it is not anticipated that the level of the river would increase by 4m, within the lifetime of this development.

4.0 DEVELOPMENT PROPOSALS

The proposals for this scheme are for the development of a previously developed brownfield site, situated within an established business estate.

Given the difference in elevation across the site is around 6m, the site has effectively been separated into two sections, with two buildings (Blocks A & B) proposed at the Northern end of the site and two buildings (Blocks C & D) proposed at the Southern end of the site. As Block D will be situated in the identified flood-area (South-western corner), ground levels will be modified to ensure the building is raised in comparison to the access road and parking area, which will ensure any build-up of flood water within the site, would be contained within the road and parking areas, rather than the area surrounding the proposed building.

There will be two access roads off Sandbrook Way leading into the site, with one serving the Northern area and the second serving the Southern area. There will be parking areas for both staff and visitors to the site adjacent to each of the buildings, in addition to HGV (Heavy Goods Vehicle) access to loading bays provided in each of the four industrial units. It is also proposed to construct a bicycle shelter adjacent to Block A, in the North-eastern corner of the site.

A copy of the Development Proposals provided by Northern Trust, drawing number WJ-204-0016 Rev. G, dated 19 September 2024, has been provided in Appendix B, for information.

4.1 Proposed Works

It is proposed to develop this existing brownfield site, from its current use as grassland, to that of a small industrial area housing four separate industrial buildings, consisting of 9 individual business units, with 3 units provided in Block A, four units in Block B, and one unit each in Blocks C & D.

There will be a 6m wide vehicular access point positioned at the North-western end of the development (Blocks A & B), with an access junction being created off Sandbrook Way. Block A will support an internal floor space of 311m², while Block B will be 612m² providing 922m² of usable internal building space in the Northern half of the site. There will be flagged pedestrian areas around both

buildings and car parking spaces fronting each of the buildings, with a bicycle shelter adjacent to Block A.

To the South-west of the development will be a 12m access point, with another access junction off Sandbrook Way, sufficiently wide to enable traffic to enter and exit the Southern end of the site simultaneously. Blocks B & C will both support internal floor spaces of 312m², providing up to 624m² of usable internal building space in the Southern half of the site. There will be flagged pedestrian areas around both buildings with car parking spaces fronting the buildings, in addition to additional car parking spaces along the Eastern boundary.

The whole development will therefore support approximately 1,547m² of usable internal industrial floor space, supported by up to 50 car parking spaces and a bicycle shelter.

- The combined roof areas will equate to approximately 1,547m².
- The combined hard-standing floor areas will equate to 3,662m².
- The remaining grassland and vegetation will account for the remainder of the site, covering a floor area in the region of 480m².

As this is a proposed commercial development, changing from use as a brownfield site to that of industrial facilities, it is classified under the National Planning Policy Framework as a 'Less Vulnerable' development. Furthermore, given the site is situated in a Flood Zone 2 area, this type of development is considered acceptable.

4.2 Drainage Strategy

In accordance with the National Planning Policy Framework and Building Regulations, the site should ideally be drained on separate systems for foul and surface water.

This development represents the final phase of construction within a larger development site, on which the first phase (to the West) was carried out in 2004 and the second phase (to the North) was carried out in 2022. The first phase of the development installed a foul water drainage network with the capacity to cater for the later phases of development. Surface water for both phases of this development was disposed of via soakaways and there have been no instances of flooding since their installation in 2004 and 2022.

The nearest watercourse to the site is Sudden Brook main river, which lies approximately 13m South of the site.

4.3 Foul Water

The existing foul water drainage system was designed for a fully developed site for commercial use throughout. As such, the change of use to industrial will reduce the discharge rate. It is therefore proposed to discharge all foul water flows from the development, directly into the existing privately owned foul water drainage system, which is within the developers' ownership and eventually outfalls to the public sewer.

The latest edition, 'Sewerage Sector Guidance v2.1', approved 25th May 2021, indicates that for gravity sewers serving industrial and commercial developments, the design flows can contain two elements – domestic flows (from toilets and kitchens) and trade effluent flows (wastewater from industrial processes). Given the proposals are for that of industrial units, there are no known processes which will produce any trade effluent flows to be discharged from this development and therefore, only the domestic design flows have been determined. The domestic design flows should be calculated in accordance with BS EN 12056-2 System II, or in the absence of appropriate information, 0.6 litres/second/hectare of developable land.

The foul water flows from this development have been determined as 3.22 l/sec and are shown below for information.

Frequency Factor (K)	0.5	Intermittent use, e.g. In dwelling, guesthouse, office.	
Unit A1	DU	No.	Sub Total
WC with 4.0 l cistern	1.8	2	3.6
Wash basin bidet	0.5	2	1
Total DU			4.6
Unit A2	DU	No.	Sub Total
WC with 4.0 l cistern	1.8	2	3.6
Wash basin bidet	0.5	2	1
Total DU			4.6
Unit A3	DU	No.	Sub Total
WC with 4.0 l cistern	1.8	2	3.6
Wash basin bidet	0.5	2	1
Total DU			4.6
Unit B1	DU	No.	Sub Total
WC with 4.0 l cistern	1.8	2	3.6
Wash basin bidet	0.5	2	1
Total DU			4.6
Unit B2	DU	No.	Sub Total
WC with 4.0 l cistern	1.8	2	3.6
Wash basin bidet	0.5	2	1
Total DU			4.6
Unit B3	DU	No.	Sub Total
WC with 4.0 l cistern	1.8	2	3.6
Wash basin bidet	0.5	2	1
Total DU			4.6

Unit B4	DU	No.	Sub Total
WC with 4.0 l cistern	1.8	2	3.6
Wash basin bidet	0.5	2	1
Total DU			4.6

Block C	DU	No.	Sub Total
WC with 4.0 l cistern	1.8	2	3.6
Wash basin bidet	0.5	2	1
Total DU			4.6

Block D	DU	No.	Sub Total
WC with 4.0 l cistern	1.8	2	3.6
Wash basin bidet	0.5	2	1
Total DU			4.6

Total for all Units SUM DU 41.4

$$Q_{ww} = K\sqrt{\sum DU}$$

where:

Q_{ww} = Waste water flowrate (l/s)
 K = Frequency factor
 $\sum DU$ = Sum of discharge units

Total Wastewater flowrate (Q_{ww}) l/s 3.22 l/s

All foul water flows from this development are to be discharged into the 150mm dia., private foul water sewer in Sandbrook Way, to the West of the development, at an un-restricted rate of discharge.

4.4 Surface Water

Following the drainage hierarchy as presented in Paragraph 80 of the National Planning Policy Guidance, the options for surface water management / discharge, must be considered in the following order:

1. Infiltration (percolation) through the soil/sub strata
2. Discharge to a Surface Water Body (pond, ditch, stream, river)
3. Discharge to a Surface Water Sewer or Highway Drain
4. Discharge to a Combined Water Sewer

In the first instance, the ground conditions of the site should be investigated to assess the potential for surface water disposal by methods of infiltration. According to BGS online maps, the superficial ground strata and underlying geology identified on this site are potentially permeable. Furthermore, the previous two phases of this development (directly to the North and West of this site), utilised soakaways for the disposal of surface water into the ground via

infiltration. Since construction of the first soakaway system in 2004 (West) there have been no reports of any system failures or any occurrences of flooding in the area. It has been assumed therefore, that soakaway tests to be carried out on this site will prove favourable.

An intrusive site investigation was carried out in June 2024 which included soakaway tests. The results of the tests concluded that surface water discharge by infiltration was not feasible.

4.5 Surface Water Management

The Greenfield Runoff Estimation has been assessed for this site using HR Wallingford's – Greenfield runoff estimation for sites, and is shown in Appendix C, for information. The Environment Agency will normally require that for the range of annual flowrate probabilities, up to and including the 1% annual probability (1 in 100 years event), that the developed rate of surface water runoff into a watercourse should be no greater than the undeveloped rate of runoff for the same event, based on the calculation of Q_{BAR} , the mean annual flood flow. According to HR Wallingford's Greenfield runoff estimation for sites, the Q_{BAR} runoff rate for this site is equal to 4.76 l/sec.

The surface water discharge will be restricted to the equivalent greenfield runoff rate (Q_{BAR}) of 4.76 l/sec.

HRW's Surface Water Storage Estimation Tool has also been utilised to determine the likely attenuation requirements for this site. No Long-Term storage requirements have been identified for the site, but the surface water storage estimate is 123m³ (123,000 litres).

The required surface water attenuation will be provided using a combination of underground storage, oversized pipes, and manholes.

5.0 SUMMARY

A review of the relevant guidance documents and various types of data collected at the site has enabled a full assessment of the flood risks to be quantified. The site is partially located within Flood Zone 2 and therefore, industrial land use is considered appropriate within this flood risk zone.

This assessment has investigated the possibility of flooding from all sources at the site. It is considered that there will be a low risk of flooding from surface water and a low risk of flooding from rivers and the sea. Flooding from groundwater, reservoirs or any other open water bodies is considered unlikely in this area. Although surface water flooding is shown on the Environment Agency's flood maps, this appears to be the result of localised ponding due to natural depressions in the ground, determined from LiDAR data. According to the topographical survey, there are no such depressions in the landscape and the land typically falls Southwards. Furthermore, landscaping works required to accommodate the development, will ensure that any floodwater above ground, will be contained within the site in the lower South-eastern reaches of the site and away from the proposed buildings.

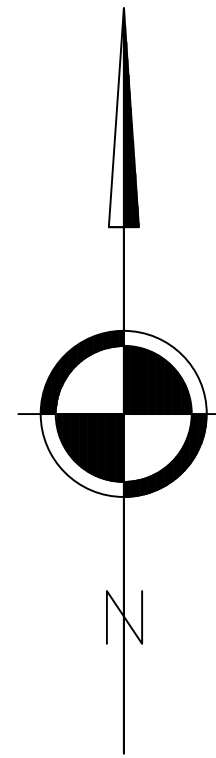
The surface water drainage design takes account of a 1:100 years rainfall event, with a 35% allowance for climate change, in-line with the latest Government guidance. Attenuation of surface water will be provided by the installation of oversized pipes and manholes and supplemented by underground storage prior to discharge into Sudden Brook via a flow control device.

Foul water from the development will be disposed of into the existing 150mm dia. private foul water sewer, which was installed during the previous two phases of this development.

Development of this site is not considered to represent an increased flood risk to this site, or anywhere in the immediate vicinity of this site. The discharge of surface water shall mimic the existing greenfield flow rate into the nearby Sudden Brook. An application to the E.A. will be made for a consent to discharge at a restricted flow rate.

Appendix A: -

Topographical Survey – JLP Surveying (S18-889)



SURVEY ORIENTATED TO REAL TIME GPS

NOTES AND AMENDMENTS

ONLY MANHOLES AND SERVICES VISIBLE AT TIME OF SURVEY SHOWN
DRAINAGE INFORMATION MUST BE CHECKED AND VERIFIED WITH LOCAL AUTHORITY RECORDS
PRIOR TO WORK COMMENCING
Levels defining edge of carriageway are observed at channel (bottom of kerb). Unless otherwise stated.
TREE SPREADS ARE SYMBOLIC ONLY AND ARE REPRESENTATIVE OF THE THE AVERAGE SPREAD.
THE DRIP LINE LAYER DENOTES THE TREES EXTREMITY

REVISIONS

REV.	DESCRIPTION	SURVEY	DRAWN	DATE
A	UTILITIES ADDED	CH	JC	12.10.2018
B	UTILITIES ADDED	MG	PSH	25.03.2021
C	BT TRACED WHILST SETTING OUT	MG	PSH	12.07.2021
D	EXPOSED CABLES SURVEYED	JR	JC	30.07.2021
E	UPDATED AREA	MG	ES	13.12.2022

Topographical Survey Legend

BIn	Litter bin	TL	Tie line
BH	Bore Hole	TP	Telegraph pole
Bol	Bollard	TPS	Traffle paving slabs
BS	Bus stop	TS	Traffic signal light
BT	British Telecom ic	TV	Television cover
CPS	Concrete paving slabs	VP	Vent pipe
DR	Drain	WM	Water meter
Elac	Electrical ic	WO	Wash Out
EP	Elec. pole	UTL	Unable to lift
ER	Earth rod	Fence	Fence annotation
FH	Fire Hydrant	B/W	Barbed wire
FP	Flagpole	C/B	Closed boarded
F.T	Floodlight	C/I	Corrugated iron
G	Gully	C/L	Chain link
GP	Gate post	C/P	Concrete panel
GV	Gas valve	H/R	Hand rail
IC	Inspection cover	I/R	Iron railings
JB	Junction box	O/B	Open boarded
KO	Kerb outlet	P/C	Post & chain
LB	Litter box	P/R	Post & rail
LP	Lamp post	P/W	Post & wire
MV	Utility marker	W/M	Wire mesh
MP	Mail post	Level	Level profile descriptions
MW	Monitoring Well	AL	Arch level
NF	Name plate	BL	Bed level
P	Post	CL	Cover level
PM	Parking meter	EH	Eaves level
RE	Rodding eye	FL	Floor level
RS	Road sign	IL	Invert level
rwp	Rain water pipe	Parapet	Parapet level
SIP	Sign post	RH	Roofridge level
ST	Stop sign	SL	Soffit level
SB	Service Box	Spr	Arch springing level
SV	Stop valve	Top	Top of pipe/schvert
TCD	Telephone call box	WH	Wall height
TH	Thru Hole	WL	Water level

BENCH MARK INFORMATION

All levels relate to OSBM Newlyn
Datum Generated by VRS GPS

SURVEY STATIONS

STN1	389537.7920	412024.7400	137.236
STN2	389557.4630	412000.4030	136.388
STN2A	389592.1540	411990.2970	134.910

JLP Surveying

JLP Surveying Consultants Ltd.
Suite 25 Rodney House,
King Street,
Wigan
WN1 1BT
Tel - 01942 243313
Fax - 01942 492230
Mobile - 07710 428498
EMAIL - peterhouson@jlpurveyors.com

PROJECT
Sandbrook Way
Rochdale

DRAWING TITLE

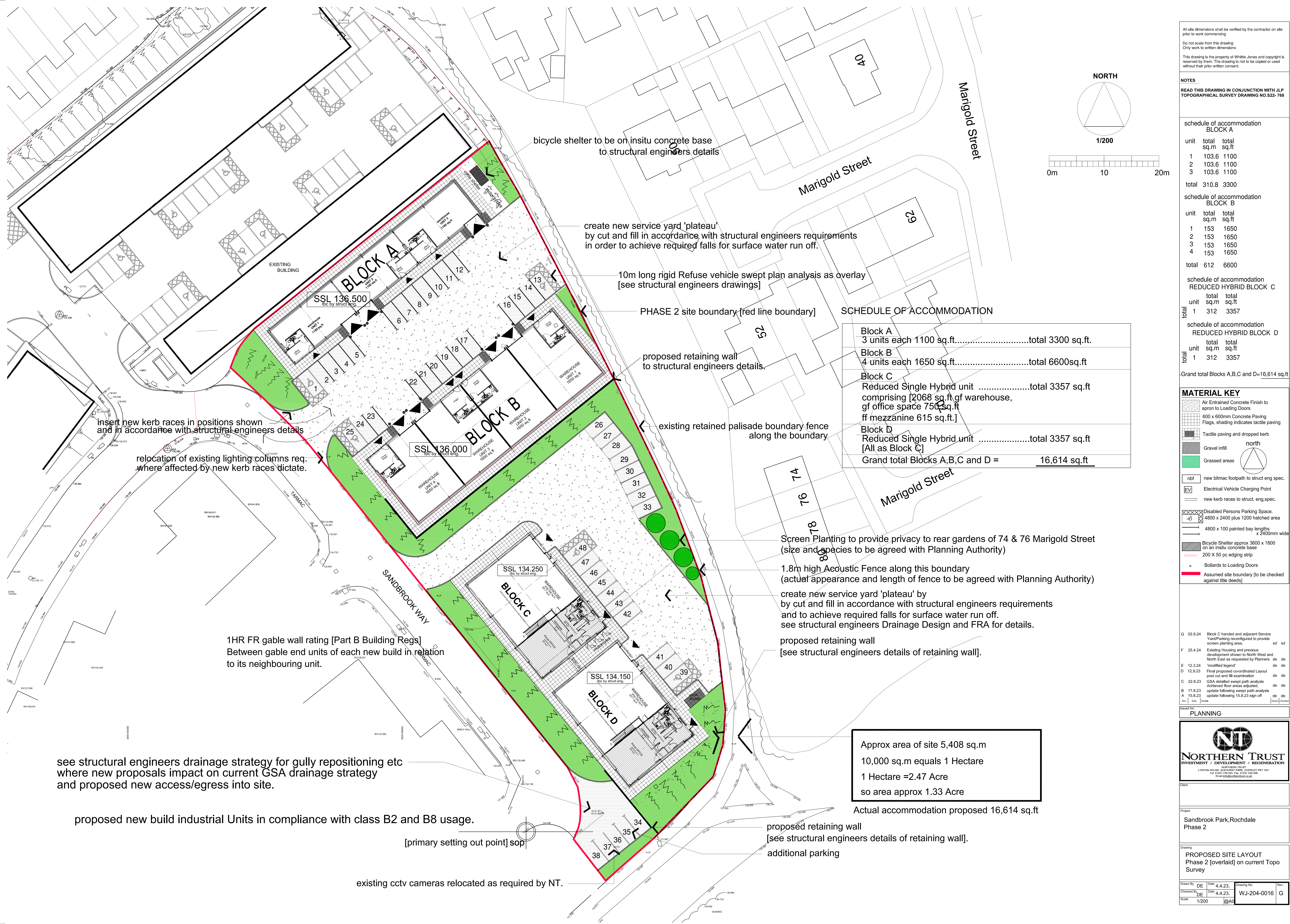
Topographical Land Survey

SCALE	SHEET SIZE	No. of SHEETS	DATE	REVISION
1:200	A0	1	11.10.18	E

DRAWING NUMBER

S18-889

Appendix B: -
Development Proposals – WJ-204-0016-G



All site dimensions shall be verified by the contractor on site prior to work commencing.
Do not scale from this drawing.
Only work to written dimensions.
This drawing is the property of White Jones and copyright is reserved by them. The drawing is not to be copied or used without their prior written consent.

NOTES
READ THIS DRAWING IN CONJUNCTION WITH JLP TOPOGRAPHICAL SURVEY DRAWING NO.S22-768

schedule of accommodation BLOCK A			
unit	total sq.m	total sq.ft	
1	103.6	1100	
2	103.6	1100	
3	103.6	1100	
total	310.8	3300	

schedule of accommodation BLOCK B			
unit	total sq.m	total sq.ft	
1	153	1650	
2	153	1650	
3	153	1650	
4	153	1650	
total	612	6600	

schedule of accommodation REDUCED HYBRID BLOCK C			
unit	total sq.m	total sq.ft	
1	312	3357	

schedule of accommodation REDUCED HYBRID BLOCK D			
unit	total sq.m	total sq.ft	
1	312	3357	

Grand total Blocks A,B,C and D=16,614 sq.ft

MATERIAL KEY	
	Air Entrained Concrete Finish to apron to Loading Doors
	600 x 600mm Concrete Paving
	Flags, shading indicates tactile paving
	Tactile paving and dropped kerb
	Gravel infill
	Grassed areas
	north
	nbf new bitmac footpath to struct eng spec.
	EV Electrical Vehicle Charging Point
	new kerb races to struct. eng.spec.
	Disabled Persons Parking Space.
	4800 x 2400 plus 1200 hatched area
	4800 x 100 painted bay lengths x 2400mm wide
	Bicycle Shelter approx 3600 x 1800 on an insitu concrete base
	200 X 50 pc edging strip
	Bollards to Loading Doors
	Assumed site boundary (to be checked against title deeds)

G	02.8.24	Block C handed and adjacent Service Yard/Parking reconfigured to provide screen planting area.	sd	sd
F	25.4.24	Existing Housing and previous development shown to North West and North East as requested by Planners	de	de
E	12.3.24	'modified legend'	de	de
D	12.9.23	Final proposed co-ordinated Layout post cut and fill examination	de	de
C	22.8.23	GSA detailed swept path analysis Achieved floor areas adjusted.	de	de
B	17.8.23	update following swept path analysis	de	de
A	15.8.23	update following 15.8.23 sign off	de	de

Issued for: **PLANNING**



Client:

Project:
Sandbrook Park,Rochdale
Phase 2

Drawing:
PROPOSED SITE LAYOUT
Phase 2 [overlay] on current Topo
Survey

Drawn By	DE	Date	4.4.23	Drawing No.	
Checked By	DE	Date	4.4.23		WJ-204-0016
Scale	1/200			@AO	G

see structural engineers drainage strategy for gully repositioning etc where new proposals impact on current GSA drainage strategy and proposed new access/egress into site.

proposed new build industrial Units in compliance with class B2 and B8 usage.

[primary setting out point] sop

existing cctv cameras relocated as required by NT.

bicycle shelter to be on insitu concrete base to structural engineers details

create new service yard 'plateau' by cut and fill in accordance with structural engineers requirements in order to achieve required falls for surface water run off.

10m long rigid Refuse vehicle swept plan analysis as overlay [see structural engineers drawings]

PHASE 2 site boundary [red line boundary]

proposed retaining wall to structural engineers details.

existing retained palisade boundary fence along the boundary

Screen Planting to provide privacy to rear gardens of 74 & 76 Marigold Street (size and species to be agreed with Planning Authority)

1.8m high Acoustic Fence along this boundary (actual appearance and length of fence to be agreed with Planning Authority)

create new service yard 'plateau' by by cut and fill in accordance with structural engineers requirements and to achieve required falls for surface water run off. see structural engineers Drainage Design and FRA for details.

proposed retaining wall [see structural engineers details of retaining wall].

proposed retaining wall [see structural engineers details of retaining wall].

additional parking

SCHEDULE OF ACCOMMODATION	
Block A	3 units each 1100 sq.ft.....total 3300 sq.ft.
Block B	4 units each 1650 sq.ft.....total 6600sq.ft
Block C	Reduced Single Hybrid unittotal 3357 sq.ft comprising [2068 sq.ft of warehouse, gf office space 750 sq.ft ff mezzanine 615 sq.ft.]
Block D	Reduced Single Hybrid unittotal 3357 sq.ft [All as Block C]
Grand total Blocks A,B,C and D =	<u>16,614 sq.ft</u>

Approx area of site 5,408 sq.m
10,000 sq.m equals 1 Hectare
1 Hectare =2.47 Acre
so area approx 1.33 Acre

Actual accommodation proposed 16,614 sq.ft

Appendix C: -

HR Wallingford – Greenfield Runoff Estimation Rate

Calculated by: Luke Edwards

Site name: 2023.110

Site location: Sandbrook Park

Site Details

Latitude: 53.60435° N

Longitude: 2.15822° W

Reference: 2013196985

Date: Jan 15 2024 15:56

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 0.5689

Methodology

Q_{BAR} estimation method: Calculate from SPR and SAAR

SPR estimation method: Calculate from SOIL type

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

Hydrological characteristics

	Default	Edited
SAAR (mm):	1119	1119
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
-------------------------	---------	--------

Q_{BAR} (l/s):	4.76	4.76
1 in 1 year (l/s):	4.14	4.14
1 in 30 years (l/s):	8.08	8.08
1 in 100 year (l/s):	9.89	9.89
1 in 200 years (l/s):	11.27	11.27

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

Appendix D: -

HR Wallingford – Surface Water Storage Estimation

Calculated by:	Luke Edwards
Site name:	2023.110
Site location:	Sandbrook Park

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the design of the drainage scheme.

Site Details

Latitude:	53.60436° N
Longitude:	2.15822° W
Reference:	2753919484
Date:	Jan 15 2024 16:28

Site characteristics

Total site area (ha):	0.5689
Significant public open space (ha):	0
Area positively drained (ha):	0.5689
Impermeable area (ha):	0.5209
Percentage of drained area that is impermeable (%):	92
Impervious area drained via infiltration (ha):	0.5209
Return period for infiltration system design (year):	10
Impervious area drained to rainwater harvesting (ha):	0
Return period for rainwater harvesting system (year):	10
Compliance factor for rainwater harvesting system (%):	66
Net site area for storage volume design (ha):	0.35
Net impermeable area for storage volume design (ha):	0.18
Pervious area contribution to runoff (%):	30

* where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50% of the 'area positively drained', the 'net site area' and the estimates of Q_{BAR} and other flow rates will have been reduced accordingly.

Methodology

esti	IH124
Q _{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

SOIL type:	Default	Edited
	4	4
SPR:	0.47	0.47

Hydrological characteristics

	Default	Edited
Rainfall 100 yrs 6 hrs:	--	70
Rainfall 100 yrs 12 hrs:	--	94.08
FEH / FSR conversion factor:	1.12	1.12
SAAR (mm):	1119	1119
M5-60 Rainfall Depth (mm):	20	20
'r' Ratio M5-60/M5-2 day:	0.3	0.3
Hydological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 10 year:	1.38	1.38
Growth curve factor 30 year:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Q _{BAR} for total site area (l/s):	4.76	4.76
Q _{BAR} for net site area (l/s):	2.93	2.93

Design criteria

Climate change allowance factor:	1.4
Urban creep allowance factor:	1.1
Volume control approach	Use long term storage
Interception rainfall depth (mm):	5
Minimum flow rate (l/s):	2

Site discharge rates

1 in 1 year (l/s):

1 in 30 years (l/s):

1 in 100 year (l/s):

Default	Edited
2.5	2.5
5	5
6.1	6.1

Estimated storage volumes

Attenuation storage 1/100 years (m³):

Long term storage 1/100 years (m³):

Total storage 1/100 years (m³):

Default	Edited
123	123
0	0
123	123

This report was produced using the storage estimation tool developed by HRWallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at <http://uksuds.com/terms-and-conditions.htm>. The outputs from this tool have been used to estimate storage volume requirements. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Appendix E: -

Flood Risk Assessment Data (Product 4) – Environment Agency

Flood risk assessment data

Location of site: 389619 / 411992 (shown as easting and northing coordinates)

Document created on: 23 April 2024

This information was previously known as a product 4.

Customer reference number: N2AX65FUVWH1

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:

- historic flooding
- flood defences and attributes

We do not have historic 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 flooding 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

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

About the models used

Model name: Rochdale and Littleborough 2013

Scenario(s): Defended fluvial, defences removed fluvial, defended climate change fluvial, defences removed climate change fluvial

Date: 1 June 2013

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 occurring 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 2.

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

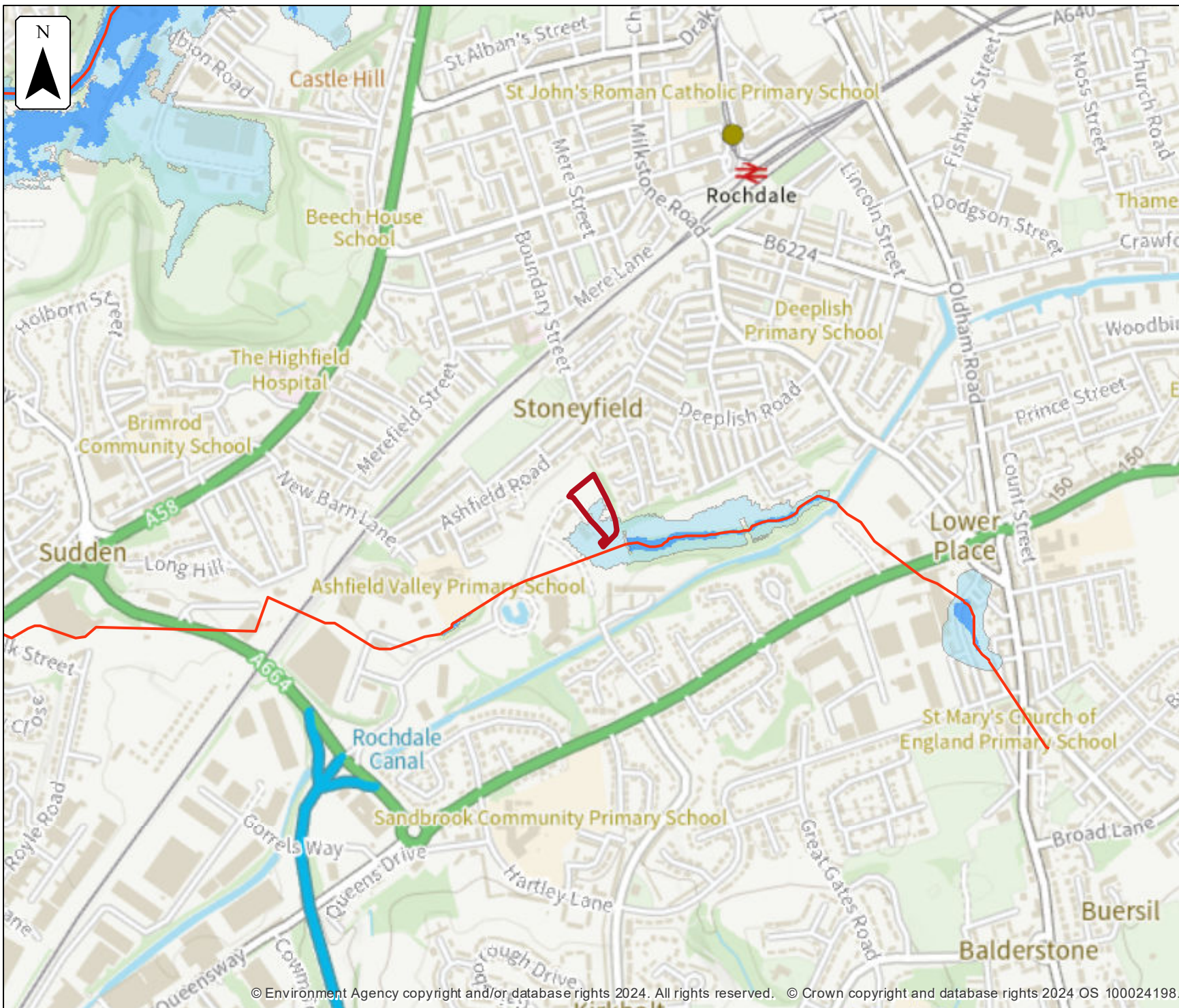
Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- 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.



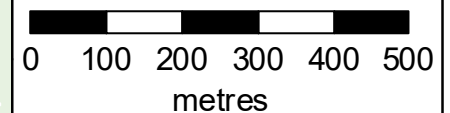
Flood map for planning

Location (easting/northing)
389619/411992

Scale
1:10,000

Created
23 Apr 2024

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



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

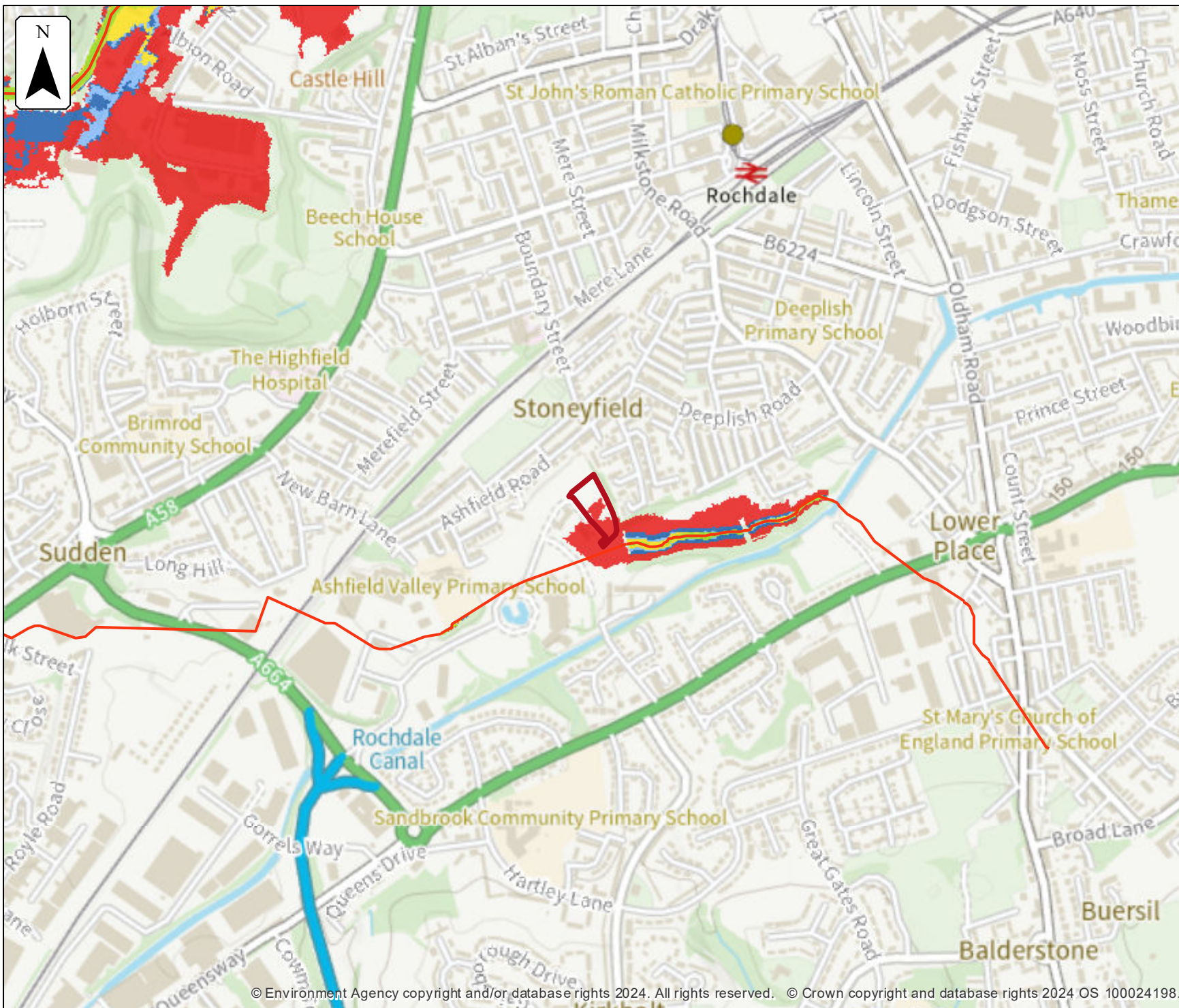
The climate change data included in the models may not include the latest [flood risk assessment climate change allowances](#). Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

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



Defended modelled fluvial extent

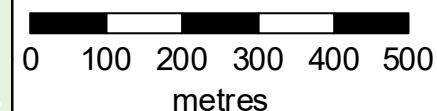
Location (easting/northing)
389619/411992

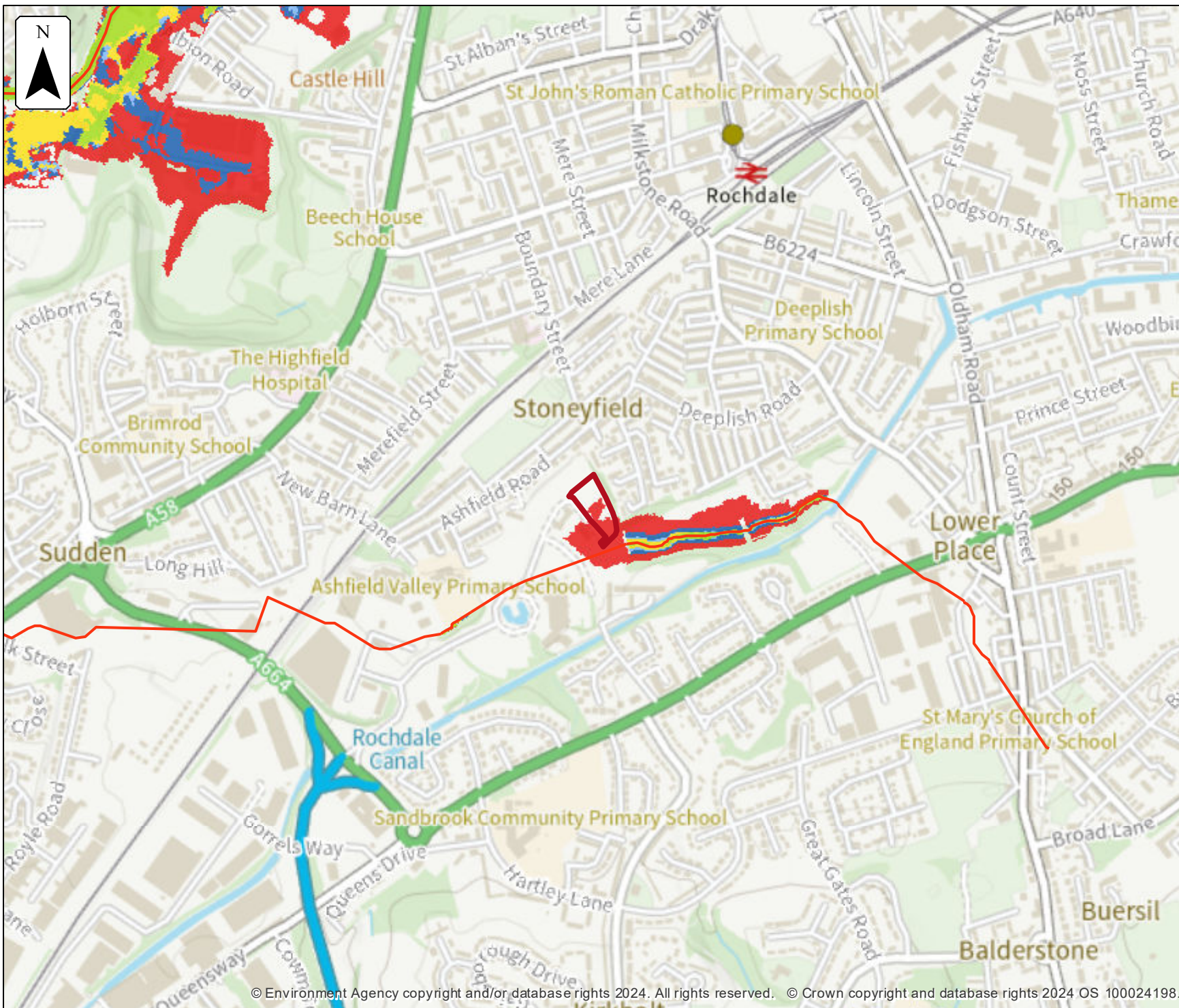
Scale Created
1:10,000 23 Apr 2024

Model name
Rochdale and Littleborough 2013

- Selected area
- Main river
- Modelled flood extent
 - 5% AEP
 - 1.33% AEP
 - 1% AEP
 - 0.5% AEP
 - 0.1% AEP

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





Defences removed modelled fluvial extent

Location (easting/northing)
389619/411992

Scale Created
1:10,000 23 Apr 2024

Model name
**Rochdale and
Littleborough 2013**

 Selected area

 Main river

Modelled flood extent

 5% AEP

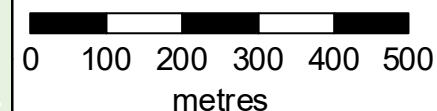
 1.33% AEP

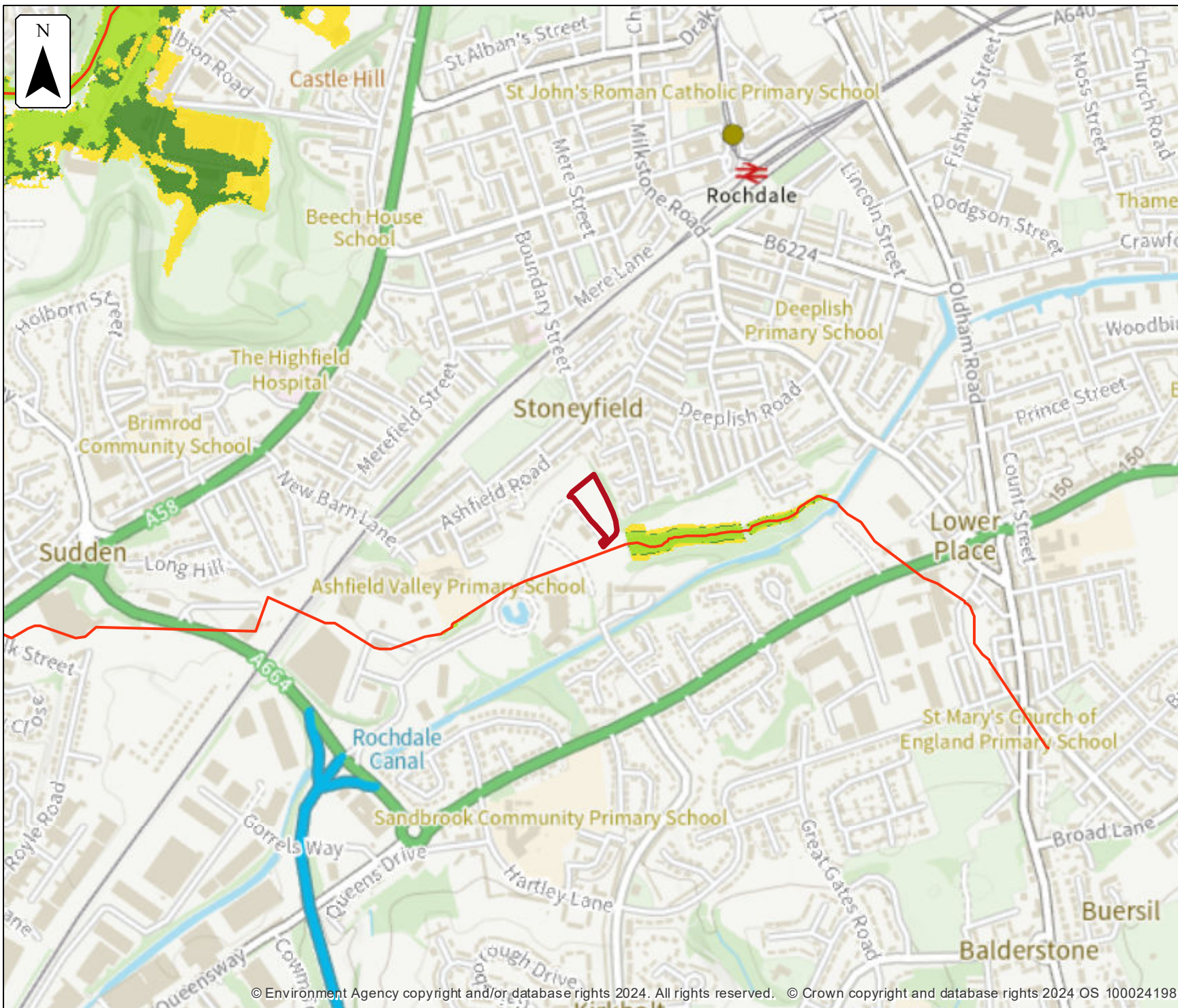
 1% AEP

 0.5% AEP

 0.1% AEP

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





Defended climate change modelled fluvial extent

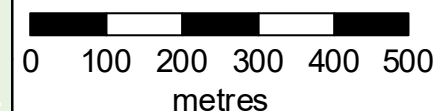
Location (easting/northing)
389619/411992

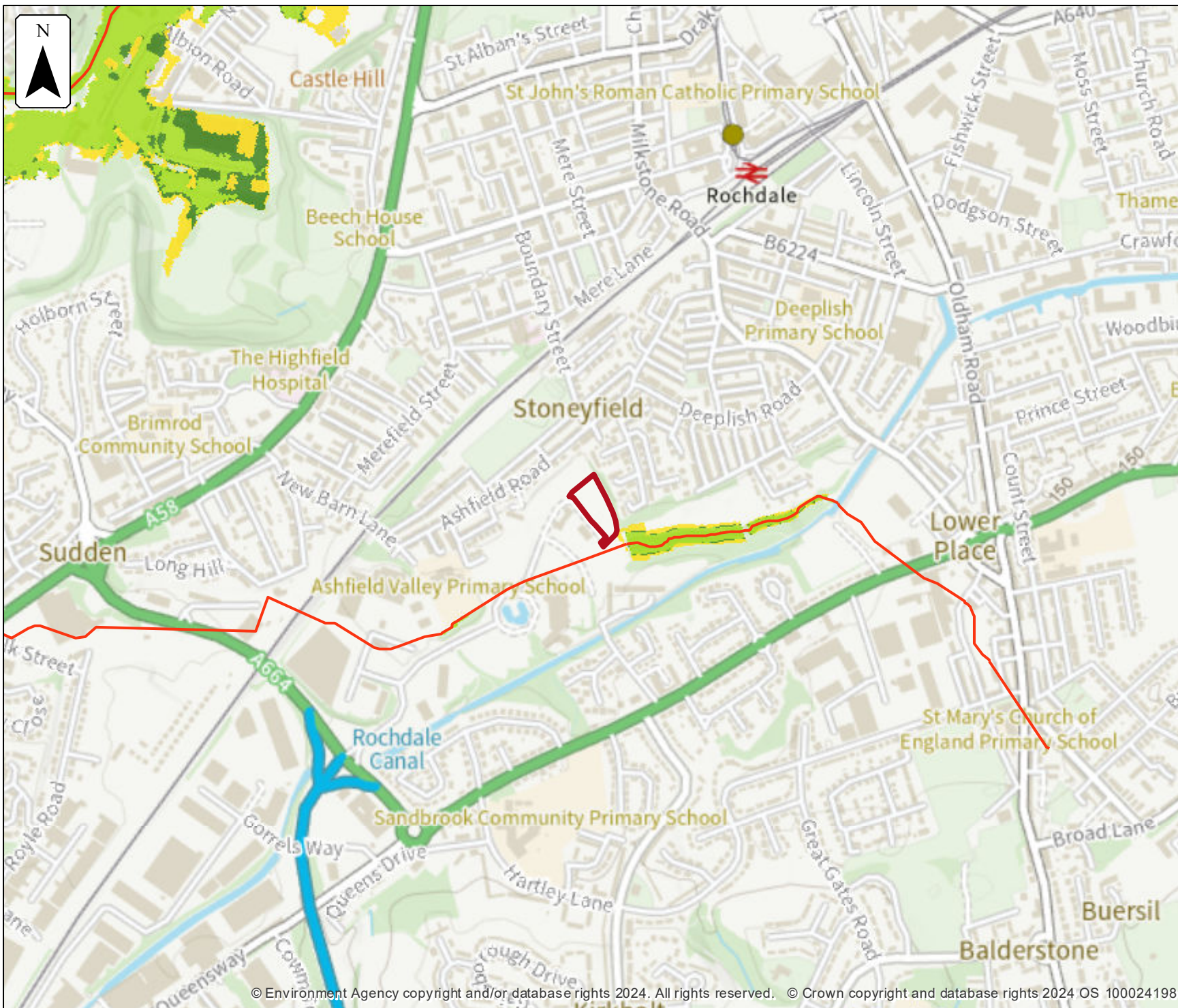
Scale Created
1:10,000 23 Apr 2024

Model name
**Rochdale and
Littleborough 2013**

-  Selected area
-  Main river
- Modelled flood extent
 -  1.0% AEP (+20%)
 -  1.0% AEP (+35%)
 -  1.0% AEP (+70%)

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





Defences removed climate change modelled fluvial extent

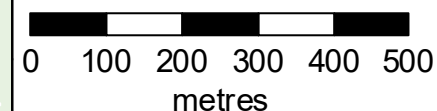
Location (easting/northing)
389619/411992

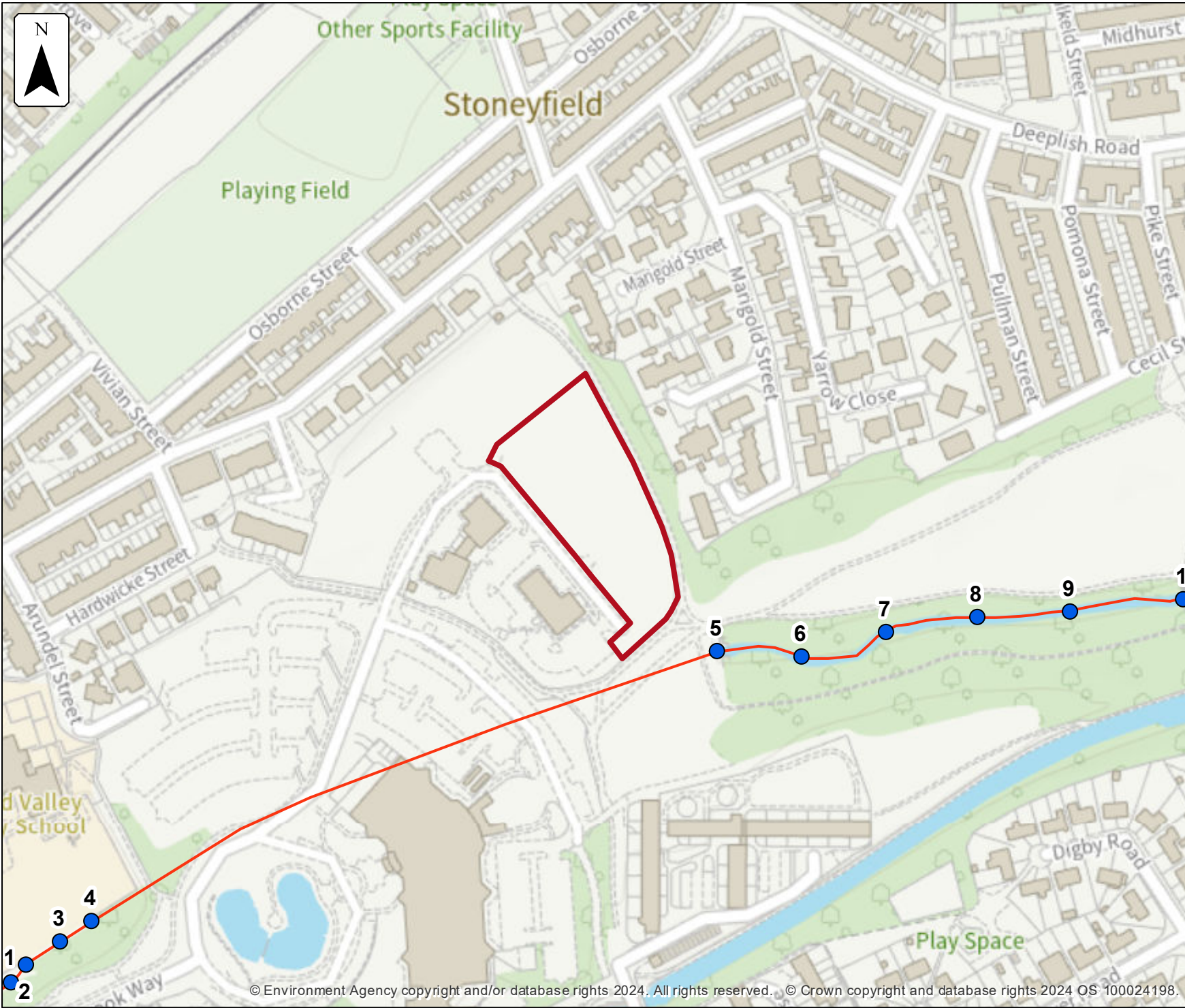
Scale Created
1:10,000 23 Apr 2024

Model name
**Rochdale and
Littleborough 2013**

-  Selected area
-  Main river
- Modelled flood extent
 -  1.0% AEP (+20%)
 -  1.0% AEP (+35%)
 -  1.0% AEP (+70%)

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





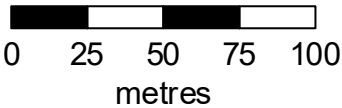
**Defended modelled
fluvial
node locations**

Location (easting/northing)
389619/411992

Scale Created
1:2,500 23 Apr 2024

Model name
**Rochdale and
Littleborough 2013**

-  Selected area
-  Modelled location
-  Main river



Modelled node locations data

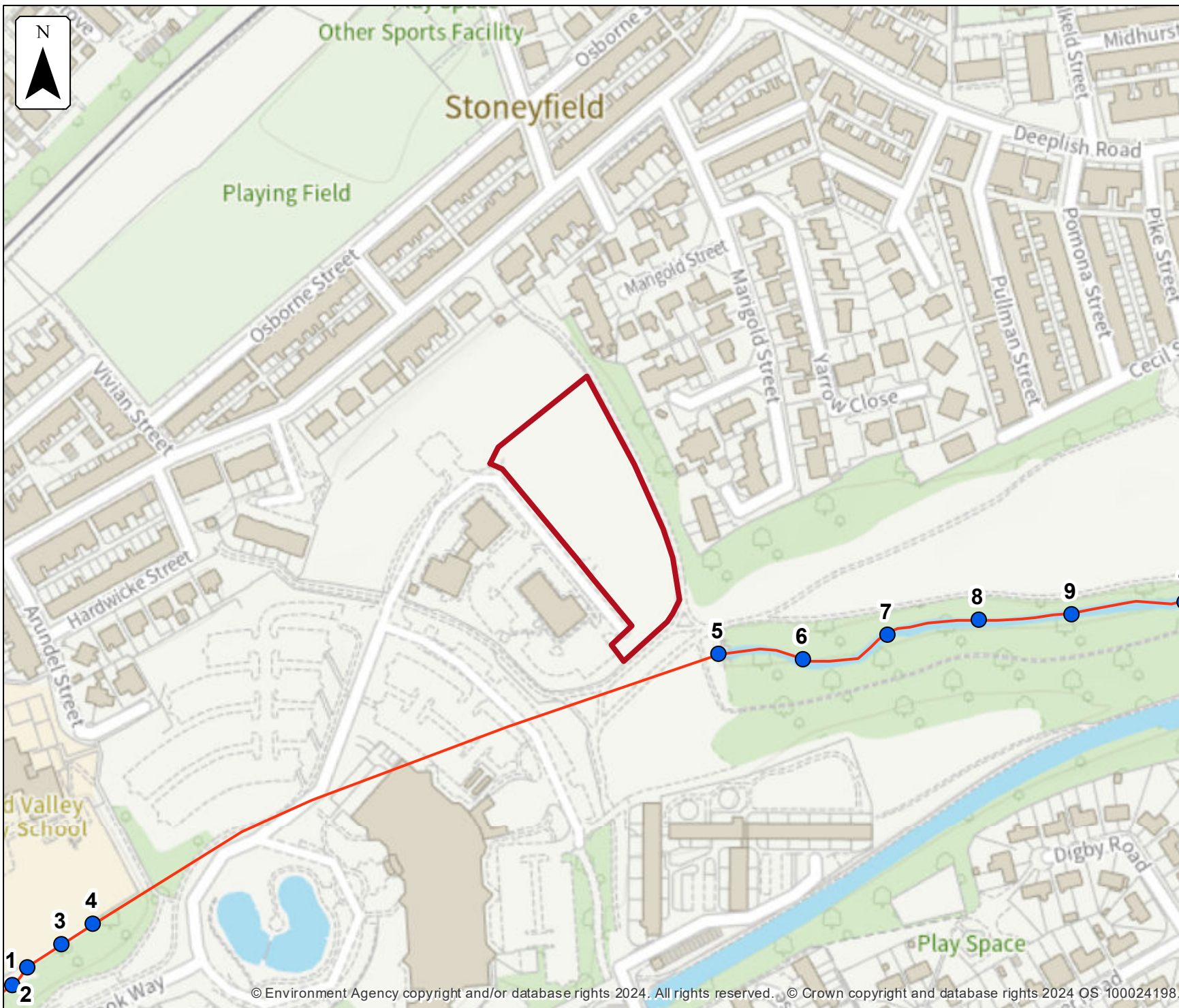
Defended

Label	Modelled location ID	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
				Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow
1	176851	389336	411760	124.63	3.67			124.98	5.97	125.07	6.46	125.24	7.44	125.64	9.80
2	277493	389344	411768	124.83	3.65			125.12	5.94	125.18	6.43	125.31	7.34	125.64	9.11
3	300586	389360	411780	125.36	3.62			125.61	5.89	125.66	6.38	125.75	7.34	125.96	9.56
4	111152	389375	411790	125.59	3.60			125.85	5.86	125.91	6.34	126.01	7.29	126.23	9.51
5	352002	389679	411921	128.02	3.60			129.12	5.86	129.60	6.34	130.69	7.29	133.78	9.52
6	125079	389720	411918	128.03	3.55			129.15	5.80	129.62	6.28	130.69	7.27	133.78	12.03
7	294806	389761	411930	128.58	3.47			129.18	5.77	129.63	6.29	130.69	7.35	133.78	11.82
8	34140	389805	411937	128.94	3.39			129.25	5.73	129.65	6.30	130.69	7.46	133.78	11.58
9	231801	389850	411940	129.12	3.32			129.35	5.62	129.67	6.28	130.70	7.52	133.78	11.31
10	75918	389905	411946	129.33	3.22			129.53	5.45	129.72	6.15	130.70	7.51	133.78	10.97

Data in this table comes from the Rochdale and Littleborough 2013 model.

Level values are shown in mAOD, and flow values are shown in cubic metres per second.

Any blank cells show where a particular scenario has not been modelled for this location.



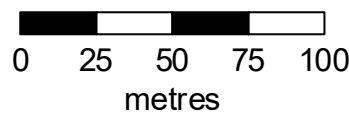
**Defences removed
modelled fluvial
node locations**

Location (easting/northing)
389619/411992

Scale Created
1:2,500 23 Apr 2024

Model name
**Rochdale and
Littleborough 2013**

-  Selected area
-  Modelled location
-  Main river



Modelled node locations data

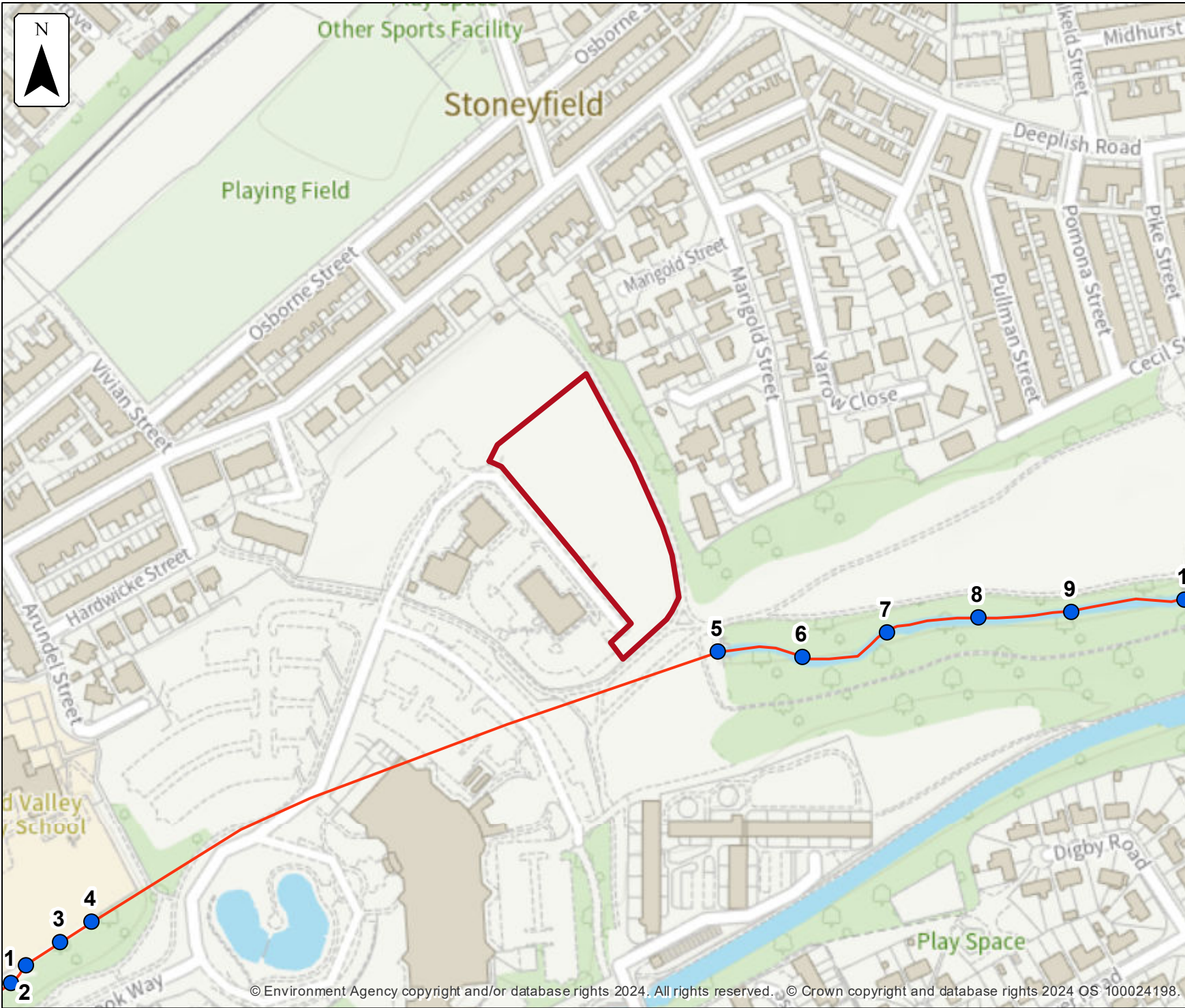
Defences removed

Label	Modelled location ID	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
				Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow
1	176851	389336	411760	124.63	3.67			124.98	5.97	125.07	6.46	125.24	7.44	125.64	9.79
2	277493	389344	411768	124.83	3.65			125.12	5.94	125.18	6.43	125.31	7.34	125.64	9.10
3	300586	389360	411780	125.36	3.62			125.61	5.89	125.66	6.38	125.75	7.34	125.96	9.55
4	111152	389375	411790	125.59	3.60			125.85	5.86	125.91	6.34	126.01	7.29	126.23	9.50
5	352002	389679	411921	128.02	3.60			129.12	5.86	129.60	6.34	130.69	7.29	133.76	9.51
6	125079	389720	411918	128.03	3.55			129.15	5.80	129.62	6.28	130.69	7.26	133.76	12.01
7	294806	389761	411930	128.58	3.47			129.18	5.77	129.63	6.29	130.69	7.35	133.76	11.81
8	34140	389805	411937	128.94	3.39			129.25	5.73	129.65	6.30	130.69	7.46	133.76	11.57
9	231801	389850	411940	129.12	3.32			129.35	5.62	129.67	6.28	130.70	7.52	133.76	11.30
10	75918	389905	411946	129.33	3.22			129.53	5.46	129.72	6.15	130.70	7.51	133.76	10.97

Data in this table comes from the Rochdale and Littleborough 2013 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.



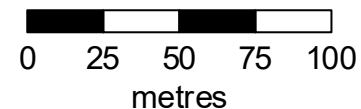
Defended climate change modelled fluvial node locations

Location (easting/northing)
389619/411992

Scale Created
1:2,500 23 Apr 2024

Model name
**Rochdale and
Littleborough 2013**

-  Selected area
-  Modelled location
-  Main river



Modelled node locations data

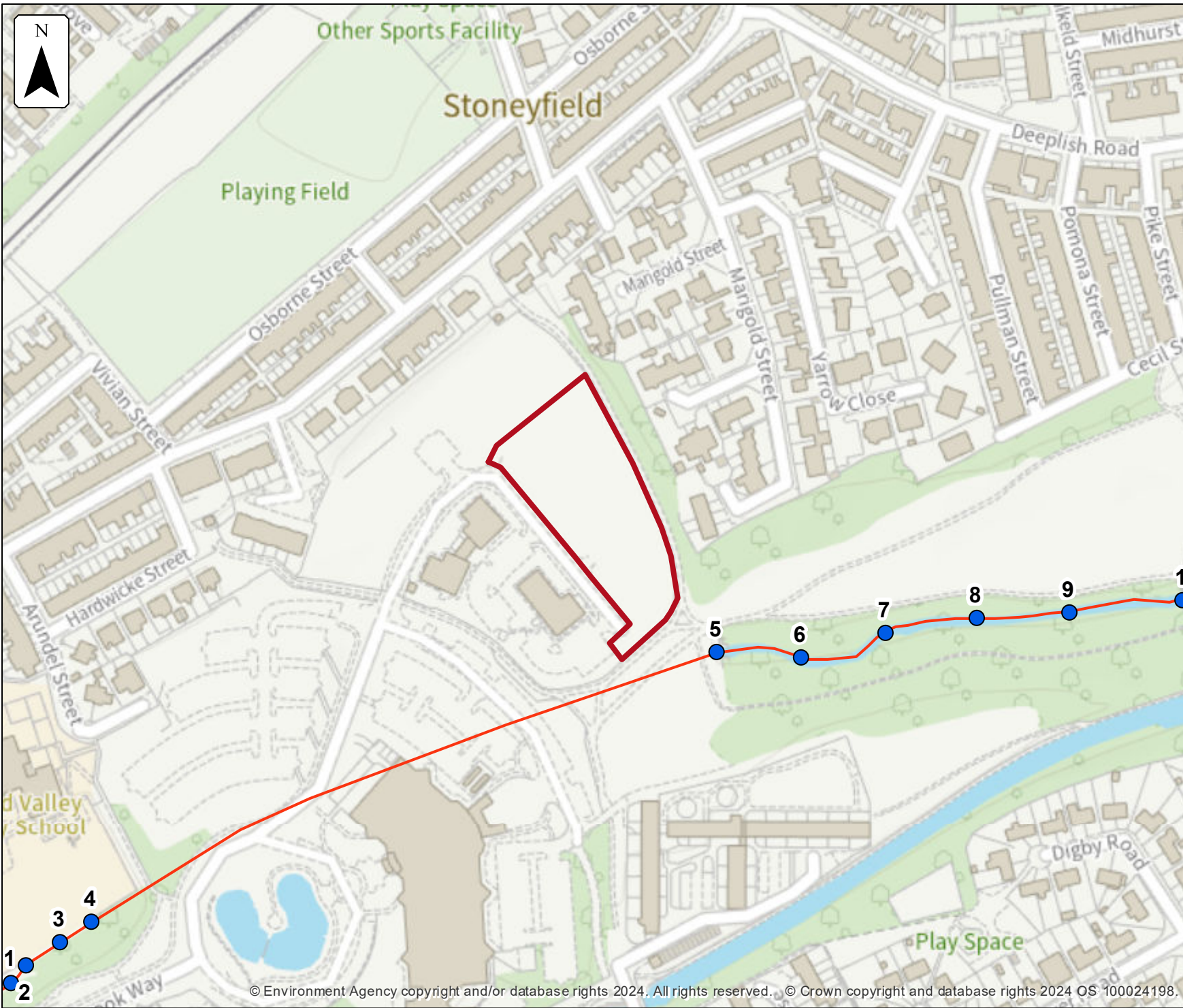
Defended climate change

Label	Modelled location ID	Easting	Northing	1.0% AEP (+20%)		1.0% AEP (+35%)		1.0% AEP (+70%)	
				Level	Flow	Level	Flow	Level	Flow
1	176851	389336	411760	125.24	7.43	125.27	7.61	125.41	8.44
2	277493	389344	411768	125.30	7.34	125.33	7.49	125.44	8.03
3	300586	389360	411780	125.75	7.33	125.77	7.50	125.82	8.32
4	111152	389375	411790	126.0	7.29	126.02	7.46	126.09	8.27
5	352002	389679	411921	130.68	7.28	130.88	7.46	131.91	8.27
6	125079	389720	411918	130.68	7.27	130.89	7.47	131.91	8.30
7	294806	389761	411930	130.68	7.30	130.89	7.49	131.91	8.38
8	34140	389805	411937	130.69	7.40	130.89	7.50	131.91	8.44
9	231801	389850	411940	130.69	7.46	130.89	7.53	131.91	8.49
10	75918	389905	411946	130.69	7.45	130.89	7.53	131.91	8.54

Data in this table comes from the Rochdale and Littleborough 2013 model.

Level values are shown in mAOD, and flow values are shown in cubic metres per second.

Any blank cells show where a particular scenario has not been modelled for this location.



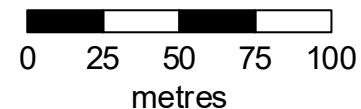
Defences removed climate change modelled fluvial node locations

Location (easting/northing)
389619/411992

Scale Created
1:2,500 23 Apr 2024

Model name
**Rochdale and
Littleborough 2013**

-  Selected area
-  Modelled location
-  Main river



Modelled node locations data

Defences removed climate change

Label	Modelled location ID	Easting	Northing	1.0% AEP (+20%)		1.0% AEP (+35%)		1.0% AEP (+70%)	
				Level	Flow	Level	Flow	Level	Flow
1	176851	389336	411760	125.24	7.43	125.27	7.61	125.41	8.46
2	277493	389344	411768	125.30	7.33	125.33	7.49	125.44	8.04
3	300586	389360	411780	125.75	7.34	125.77	7.50	125.82	8.34
4	111152	389375	411790	126.01	7.28	126.02	7.46	126.09	8.29
5	352002	389679	411921	130.68	7.28	130.88	7.46	131.94	8.29
6	125079	389720	411918	130.68	7.27	130.88	7.46	131.94	8.32
7	294806	389761	411930	130.68	7.30	130.88	7.49	131.94	8.41
8	34140	389805	411937	130.69	7.40	130.89	7.50	131.94	8.46
9	231801	389850	411940	130.69	7.45	130.89	7.52	131.94	8.49
10	75918	389905	411946	130.69	7.45	130.89	7.53	131.94	8.55

Data in this table comes from the Rochdale and Littleborough 2013 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.



Defended modelled fluvial extent and height

Location (easting/northing)
389619/411992

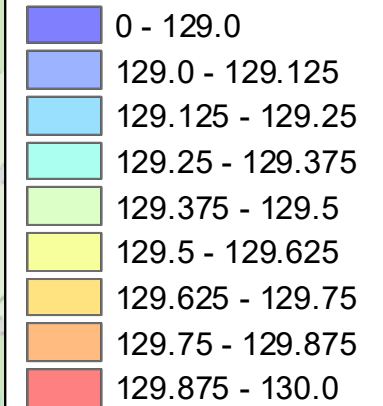
Scale Created
1:1,000 23 Apr 2024

Model name
**Rochdale and
Littleborough 2013**

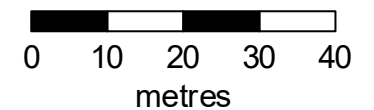
 Selected area

 Main river

Modelled 2D grid
Water level in mAOD



This map shows the
1.33% AEP height data



Sample point data

Defended

Label	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height
1	389626	411913	NoData	NoData			NoData	NoData						
2	389647	411913	NoData	NoData			NoData	NoData						
3	389626	411934	NoData	NoData			NoData	NoData						
4	389647	411934	NoData	NoData			NoData	NoData						
5	389668	411934	NoData	NoData			NoData	NoData						
6	389605	411955	NoData	NoData			NoData	NoData						
7	389626	411955	NoData	NoData			NoData	NoData						
8	389647	411955	NoData	NoData			NoData	NoData						
9	389668	411955	NoData	NoData			NoData	NoData						
10	389584	411976	NoData	NoData			NoData	NoData						
11	389605	411976	NoData	NoData			NoData	NoData						
12	389626	411976	NoData	NoData			NoData	NoData						
13	389647	411976	NoData	NoData			NoData	NoData						
14	389668	411976	NoData	NoData			NoData	NoData						
15	389584	411997	NoData	NoData			NoData	NoData						
16	389605	411997	NoData	NoData			NoData	NoData						

Label	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height
17	389626	411997	NoData	NoData			NoData	NoData						
18	389647	411997	NoData	NoData			NoData	NoData						
19	389563	412018	NoData	NoData			NoData	NoData						
20	389584	412018	NoData	NoData			NoData	NoData						
21	389605	412018	NoData	NoData			NoData	NoData						
22	389626	412018	NoData	NoData			NoData	NoData						
23	389647	412018	NoData	NoData			NoData	NoData						
24	389584	412039	NoData	NoData			NoData	NoData						
25	389605	412039	NoData	NoData			NoData	NoData						
26	389626	412039	NoData	NoData			NoData	NoData						
27	389605	412060	NoData	NoData			NoData	NoData						
28	389626	412060	NoData	NoData			NoData	NoData						

Data in this table comes from the Rochdale and Littleborough 2013 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.



Defences removed modelled fluvial extent and height

Location (easting/northing)
389619/411992

Scale Created
1:1,000 23 Apr 2024

Model name
**Rochdale and
Littleborough 2013**

 Selected area

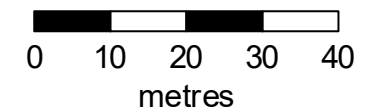
 Main river

Modelled 2D grid

Water level in mAOD

	0 - 129.0
	129.0 - 129.125
	129.125 - 129.25
	129.25 - 129.375
	129.375 - 129.5
	129.5 - 129.625
	129.625 - 129.75
	129.75 - 129.875
	129.875 - 130.0

This map shows the
1.33% AEP height data



Sample point data

Defences removed

Label	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height
1	389626	411913	NoData	NoData			NoData	NoData						
2	389647	411913	NoData	NoData			NoData	NoData						
3	389626	411934	NoData	NoData			NoData	NoData						
4	389647	411934	NoData	NoData			NoData	NoData						
5	389668	411934	NoData	NoData			NoData	NoData						
6	389605	411955	NoData	NoData			NoData	NoData						
7	389626	411955	NoData	NoData			NoData	NoData						
8	389647	411955	NoData	NoData			NoData	NoData						
9	389668	411955	NoData	NoData			NoData	NoData						
10	389584	411976	NoData	NoData			NoData	NoData						
11	389605	411976	NoData	NoData			NoData	NoData						
12	389626	411976	NoData	NoData			NoData	NoData						
13	389647	411976	NoData	NoData			NoData	NoData						
14	389668	411976	NoData	NoData			NoData	NoData						
15	389584	411997	NoData	NoData			NoData	NoData						
16	389605	411997	NoData	NoData			NoData	NoData						

Label	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height
17	389626	411997	NoData	NoData			NoData	NoData						
18	389647	411997	NoData	NoData			NoData	NoData						
19	389563	412018	NoData	NoData			NoData	NoData						
20	389584	412018	NoData	NoData			NoData	NoData						
21	389605	412018	NoData	NoData			NoData	NoData						
22	389626	412018	NoData	NoData			NoData	NoData						
23	389647	412018	NoData	NoData			NoData	NoData						
24	389584	412039	NoData	NoData			NoData	NoData						
25	389605	412039	NoData	NoData			NoData	NoData						
26	389626	412039	NoData	NoData			NoData	NoData						
27	389605	412060	NoData	NoData			NoData	NoData						
28	389626	412060	NoData	NoData			NoData	NoData						

Data in this table comes from the Rochdale and Littleborough 2013 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.



Defended climate change modelled fluvial extent and height

Location (easting/northing)
389619/411992

Scale Created
1:1,000 23 Apr 2024

Model name
**Rochdale and
Littleborough 2013**

 Selected area

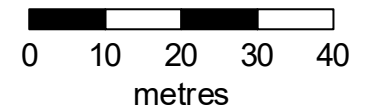
 Main river

Modelled 2D grid

Water level in mAOD

-  0 - 131.0
-  131.0 - 131.125
-  131.125 - 131.25
-  131.25 - 131.375
-  131.375 - 131.5
-  131.5 - 131.625
-  131.625 - 131.75
-  131.75 - 131.875
-  131.875 - 132.0

This map shows the
1.0% AEP +70% height data



Sample point data

Defended climate change

Label	Easting	Northing	1% AEP (+35%)		1% AEP (+70%)	
			Depth	Height	Depth	Height
1	389626	411913	NoData	NoData	NoData	NoData
2	389647	411913	NoData	NoData	NoData	NoData
3	389626	411934	NoData	NoData	NoData	NoData
4	389647	411934	NoData	NoData	NoData	NoData
5	389668	411934	NoData	NoData	NoData	NoData
6	389605	411955	NoData	NoData	NoData	NoData
7	389626	411955	NoData	NoData	NoData	NoData
8	389647	411955	NoData	NoData	NoData	NoData
9	389668	411955	NoData	NoData	NoData	NoData
10	389584	411976	NoData	NoData	NoData	NoData
11	389605	411976	NoData	NoData	NoData	NoData
12	389626	411976	NoData	NoData	NoData	NoData
13	389647	411976	NoData	NoData	NoData	NoData
14	389668	411976	NoData	NoData	NoData	NoData
15	389584	411997	NoData	NoData	NoData	NoData
16	389605	411997	NoData	NoData	NoData	NoData

Label	Easting	Northing	1% AEP (+35%)		1% AEP (+70%)	
			Depth	Height	Depth	Height
17	389626	411997	NoData	NoData	NoData	NoData
18	389647	411997	NoData	NoData	NoData	NoData
19	389563	412018	NoData	NoData	NoData	NoData
20	389584	412018	NoData	NoData	NoData	NoData
21	389605	412018	NoData	NoData	NoData	NoData
22	389626	412018	NoData	NoData	NoData	NoData
23	389647	412018	NoData	NoData	NoData	NoData
24	389584	412039	NoData	NoData	NoData	NoData
25	389605	412039	NoData	NoData	NoData	NoData
26	389626	412039	NoData	NoData	NoData	NoData
27	389605	412060	NoData	NoData	NoData	NoData
28	389626	412060	NoData	NoData	NoData	NoData

Data in this table comes from the Rochdale and Littleborough 2013 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.



**Defences removed
climate change
modelled fluvial
extent and height**

Location (easting/northing)
389619/411992

Scale Created
1:1,000 23 Apr 2024

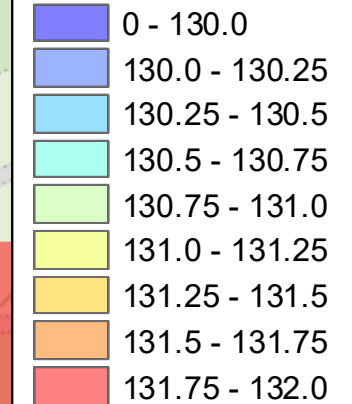
Model name
**Rochdale and
Littleborough 2013**

 Selected area

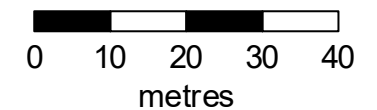
 Main river

Modelled 2D grid

Water level in mAOD



This map shows the
1.0% AEP +70% height data



Sample point data

Defences removed climate change

Label	Easting	Northing	1% AEP (+35%)		1% AEP (+70%)	
			Depth	Height	Depth	Height
1	389626	411913	NoData	NoData	NoData	NoData
2	389647	411913	NoData	NoData	NoData	NoData
3	389626	411934	NoData	NoData	NoData	NoData
4	389647	411934	NoData	NoData	NoData	NoData
5	389668	411934	NoData	NoData	0.04	130.64
6	389605	411955	NoData	NoData	NoData	NoData
7	389626	411955	NoData	NoData	NoData	NoData
8	389647	411955	NoData	NoData	NoData	NoData
9	389668	411955	NoData	NoData	NoData	NoData
10	389584	411976	NoData	NoData	NoData	NoData
11	389605	411976	NoData	NoData	NoData	NoData
12	389626	411976	NoData	NoData	NoData	NoData
13	389647	411976	NoData	NoData	NoData	NoData
14	389668	411976	NoData	NoData	NoData	NoData
15	389584	411997	NoData	NoData	NoData	NoData
16	389605	411997	NoData	NoData	NoData	NoData

Label	Easting	Northing	1% AEP (+35%)		1% AEP (+70%)	
			Depth	Height	Depth	Height
17	389626	411997	NoData	NoData	NoData	NoData
18	389647	411997	NoData	NoData	NoData	NoData
19	389563	412018	NoData	NoData	NoData	NoData
20	389584	412018	NoData	NoData	NoData	NoData
21	389605	412018	NoData	NoData	NoData	NoData
22	389626	412018	NoData	NoData	NoData	NoData
23	389647	412018	NoData	NoData	NoData	NoData
24	389584	412039	NoData	NoData	NoData	NoData
25	389605	412039	NoData	NoData	NoData	NoData
26	389626	412039	NoData	NoData	NoData	NoData
27	389605	412060	NoData	NoData	NoData	NoData
28	389626	412060	NoData	NoData	NoData	NoData

Data in this table comes from the Rochdale and Littleborough 2013 model.

Height values are shown in mAOD, and depth values are shown in metres.

Any blank cells show where a particular scenario has not been modelled for this location.

Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.

Strategic flood risk assessments

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

This should give you information about:

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

About this data

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

Flood risk activity permits

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

[Find out more about flood risk activity permits](#)

Help and advice

Contact the Greater Manchester Merseyside and Cheshire Environment Agency team at inforequests.gmmc@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 F: -
Indicative Drainage Layout (2023-110-C001)



SURFACE WATER PIPE SIZING
TO BE CONFIRMED AND
SUBJECT TO FINAL DESIGN

15. THE CONTRACTOR SHALL CONTROL ACCURATE LINE AND LEVEL OF PIPE LAYING BY USE OF AN OPTICAL LASER.

16. THE CONTRACTOR SHALL PROTECT THE PIPELINE FROM TEMPORARY CONSTRUCTION LOADS WHICH MAY BE IN EXCESS OF THE SERVICE LOADS.

17. PIPEWORK AND PIPE BEDDING SHALL COMPLY WITH THE DETAILS INDICATED ON THE DRAWINGS UNLESS OTHERWISE STATED:

18. PIPEWORK WITH LESS THAN 600mm COVER FROM FINISHED LEVEL, IN AREAS OF VEHICULAR LOADING, SHALL BE PROTECTED WITH A 150mm C20 CONCRETE SURROUND. FLEXIBLE JOINTS SHALL BE MAINTAINED AT EACH PIPE JOINT BY THE USE OF COMPRESSIVE SHEET CUT TO FIT THE PIPE PROFILE.

19. TRENCHES IN AREAS RECEIVING VEHICULAR LOADING SHALL BE BACKFILLED WITH GF2 GRANULAR FILL.

20. TRENCHES WITHIN 1m OF LOAD BEARING WALLS SHOULD BE FILLED WITH CONCRETE AT LEAST TO THE LEVEL OF THE UNDERSIDE OF THE FOUNDATION. WHERE THE DISTANCE IS MORE THAN 1m FROM THE WALL, THE CONCRETE FILL SHOULD BE TO A LEVEL BELOW THE UNDERSIDE OF THE FOUNDATION EQUAL TO THE DISTANCE FROM THE WALL TO THE NEAR SIDE OF THE TRENCH LESS 150mm.

21. SOFT SPOTS IN THE TRENCH FORMATION SHALL BE REMOVED AND REPLACED WITH GF2 IN LAYERS & COMPACTED IN LAYERS OF 150mm MAX.

22. UNLESS NOTED OTHERWISE MANHOLE COVERS, CHANNEL GRATINGS AND ROAD GRATINGS SHALL BE DUCTILE IRON TO BSEN 124 BLACK COATED AS FOLLOWS: -
HIGHWAYS CLASS D400
CAR PARKS CLASS C250
LANDSCAPED AREAS CLASS B125 OR A15

23. MANHOLE COVERS SHALL HAVE A BADGE TO INDICATE FOUL OR STORM WATER.

24. THE CONTRACTOR SHALL REGULATE EXISTING COVERS AND FRAMES TO THE PROPOSED LEVELS INDICATED.

25. TWO SETS OF MANHOLE LIFTING KEYS SHALL BE HANDED OVER TO THE CLIENT ON COMPLETION OF THE WORKS.

26. LATERAL CONNECTIONS IN BETWEEN MANHOLE RUNS SHALL BE FORMED BY USING PURPOSE MADE JUNCTION FITTINGS. BEND FITTINGS SHALL BE PROVIDED WHERE APPROPRIATE TO DIRECT THE FLOW INTO MAIN RUNS.

A	SOAK-A-WAY OPTION ADDED AND ATTENUATION INTRODUCED WITH DISCHARGE INTO WATERCOURSE. MH SCHEDULES REVISED; SITE LAYOUT TO SOUTH SIDE AMENDED AND GENERAL UPDATE TO LEGEND	CL5	GS	7.10.24
REV.	DESCRIPTION	DRAWN	APPROVED	DATE

STATUS

PLANNING

GRAHAM SCHOFIELD ASSOCIATES
Consulting Civil and Structural Engineers
 Suite 3 Balfour Court,
 Leyland
 PR25 2TF
 tel: (01772) 459383
 email: reception@gsa72.co.uk

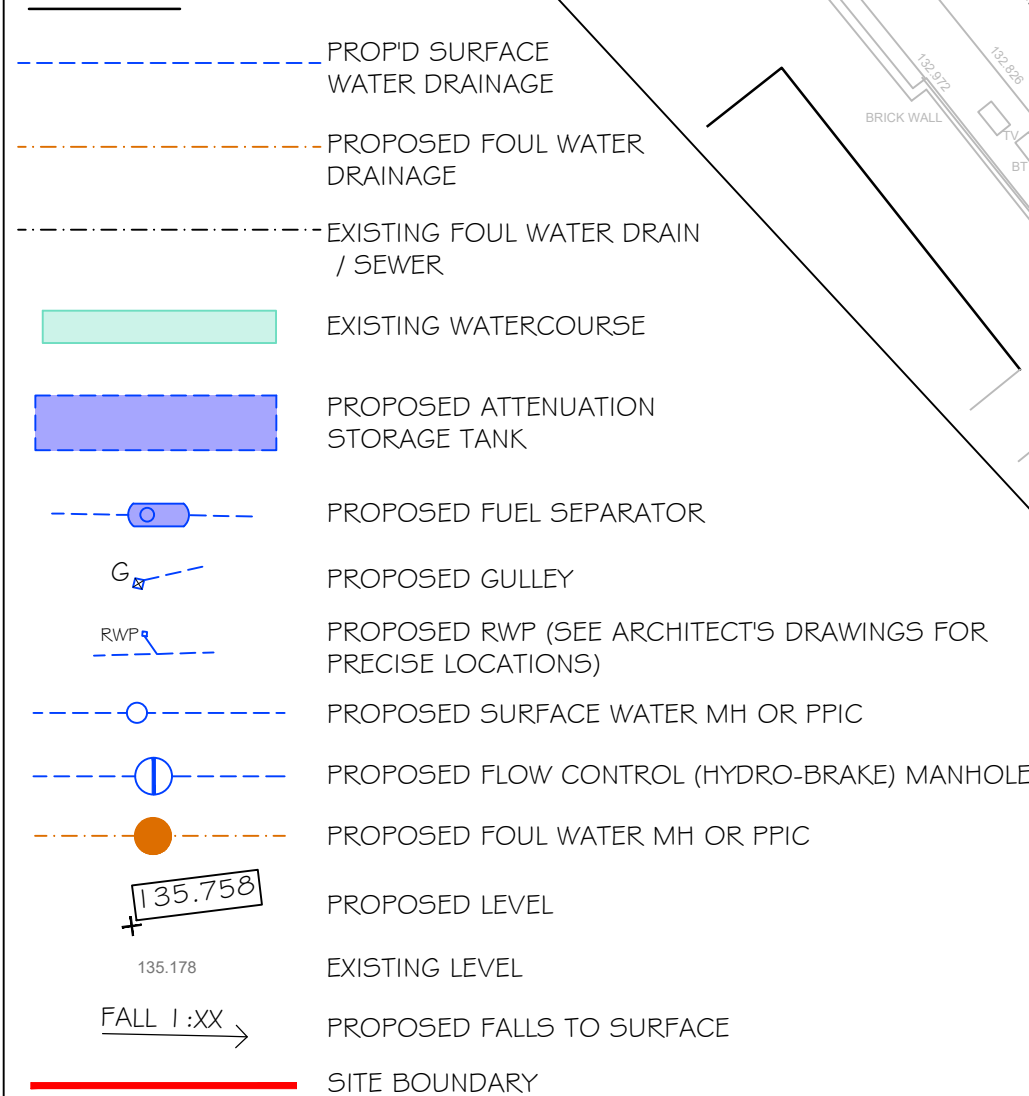
GSA

client
NORTHERN TRUST CO. LTD.

project
SANDBROOK PARK, ROCHDALE
PHASE 2

INDICATIVE DRAINAGE LAYOUT

drawn SNG	checked GS	drawing number 2023-110-C001	A
date 15.01.24	date		
scale 1:250 @ AO	AI		



SURFACE WATER
DISCHARGE RATE
INTO SUDDEN
BROOK TO BE
RESTRICTED TO
4.76 l/s

SW TO DISCHARGE
INTO " SUDDEN
BROOK " VIA,
NEW OUTFALL
STRUCTURE

Appendix G:-
Results of Soakaway Tests

With regards proposed groundworks and the presence of ACMs,' it is incumbent on the contractor to develop method statements designed to minimise risks to construction workers and the general public.

As a priority, it is essential that dust releases be effectively eliminated during groundworks, to ensure there are no risk of releases of airborne fibres, and to this end contractors engaged in works involving disturbance of the ground must develop an Asbestos Management Plan. This plan may be based on the guidance contained in CIRIA C733 "*Asbestos in soil and made ground: a guide to understanding and managing risks*". This provides a basis for the contractor to develop good working practice.

Contractors may obtain further guidance from CL:AIRE which has published the Joint Industry Working Group Asbestos in Soil and Construction & Demolition (C&D) Materials guidance titled "*Control of Asbestos Regulations 2012: Interpretation for Managing and Working with Asbestos in Soil and Construction & Demolition Materials: Industry Guidance* (shortened name CAR-SOIL™)".

This authoritative document has been prepared with the support of the Health and Safety Executive and presents the definitive explanation of how the legal requirements of the Control of Asbestos Regulations 2012 (CAR 2012 or the Regulations) have been interpreted to apply to work with asbestos contaminated soil and construction & demolition materials.

As a precautionary measure, wagons carting spoil offsite must be sheeted and must pass through a wheel wash before leaving the site.

It should also be noted that as with all brownfield developments, disturbance of the ground may uncover unanticipated features which may give rise to considerations of contamination *insofar* as the exposed conditions may have the potential to impact on receptors including *inter alia* humans, animals, controlled waters, or the fabric of buildings. Any such encounters will require the contractor to halt work, isolate the risk area, and summon **CCG** to site to determine the nature of the exposure and to determine an appropriate course of action. Any such incidents will be fully documented in a detailed site Remediation Report.

21.7 Soakaways

3nr trial pits were mechanically excavated to a maximum depth of 2.2mbgl. On completion of excavation works each trial pit was charged with water and the initial depth to the surface of the water was recorded. Further readings of depth to water were recorded at regular time intervals in accordance with *BRE Digest 365*. The water levels at each trial pit failed to drop measurably (<300mm) over a 4-hour test period and hence it was concluded that soak-a-ways at these locations are not a practical proposition and therefore alternative forms of attenuation will be required. Furthermore, the depth of made ground over the site is consistently in excess of 2.5m, thus precluding the formation of soakaways as required by the guidance contained in *BRE Digest 365*.

21.8 Groundwater Management

Groundwater ingress recorded within positions located towards the southern section of the site with monitored standing water levels being in the order of 0.9m > 3.88bgl during the initial rounds of gas – groundwater monitoring.

Taking into account the above groundwater observations, a prudent contractor would allow for pumping to maintain dry working conditions during foundation construction / service installations particularly during heavy and/or prolonged periods of precipitation.

22.0 CONCLUSIONS & RECOMMENDATIONS

The conclusions and recommendations hereunder are based on the salient sections of the report and should not be referred to in isolation of the relevant sections of the text. All recommendations are subject to Regulatory Authority review.

Table 24: Conclusions & Recommendations

Soil Contamination

Asbestos containing materials (ACM's) in the form of Chrysotile and Amosite (loose fibres and debris) were identified in soils recovered from 4nr sampling positions (WS02 > WS05). Hence a potential risk to human health is indicated.

Quantification tests undertaken on 4nr asbestos detections confirm the presence of <0.001 - 0.001% ACMs'.