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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 scrubland.

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 mid-western point, 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 foul water from the site. The drainage design from the previous phases of this development was sized to accommodate all three phases of the development. Foul water will be discharged into the private 150mm dia. Foul water sewer in Sandbrook Way, at an un-restricted rate of discharge.

Deep borehole falling head permeability tests prove the deeper natural sands and gravels to the northern area of the site are significantly permeable and suitable for deep borehole soakaways.

Further south the effectiveness of soakaways is diminished by the influence of the water table. Hence the discharge of surface water shall be via deep borehole soakaways located to the northern end of the site.

It should be noted that the Environment Agency's Flood Maps were updated on 28th January 2025, which resulted in a reduction to the risk of flooding in this area. The risk of flooding from Rivers and Sea has reduced from the 'Medium Risk' category to the 'Low Risk' category. Although this site is considered to have a low risk of flooding from the river, and the lowest area of the site is 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 at mid length 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.

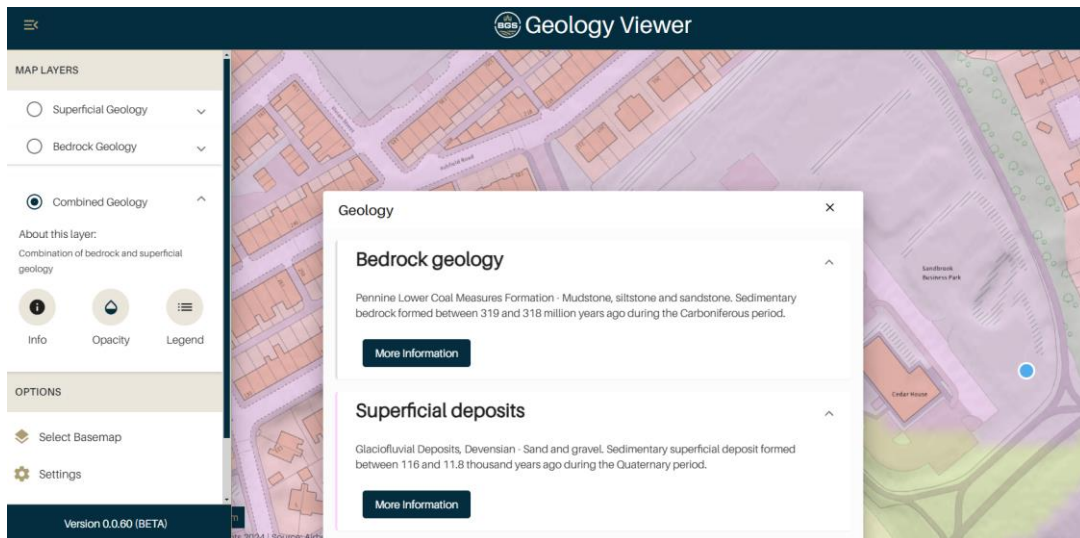


Figure 2: Geology Map

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.

3.5 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.

3.6 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).

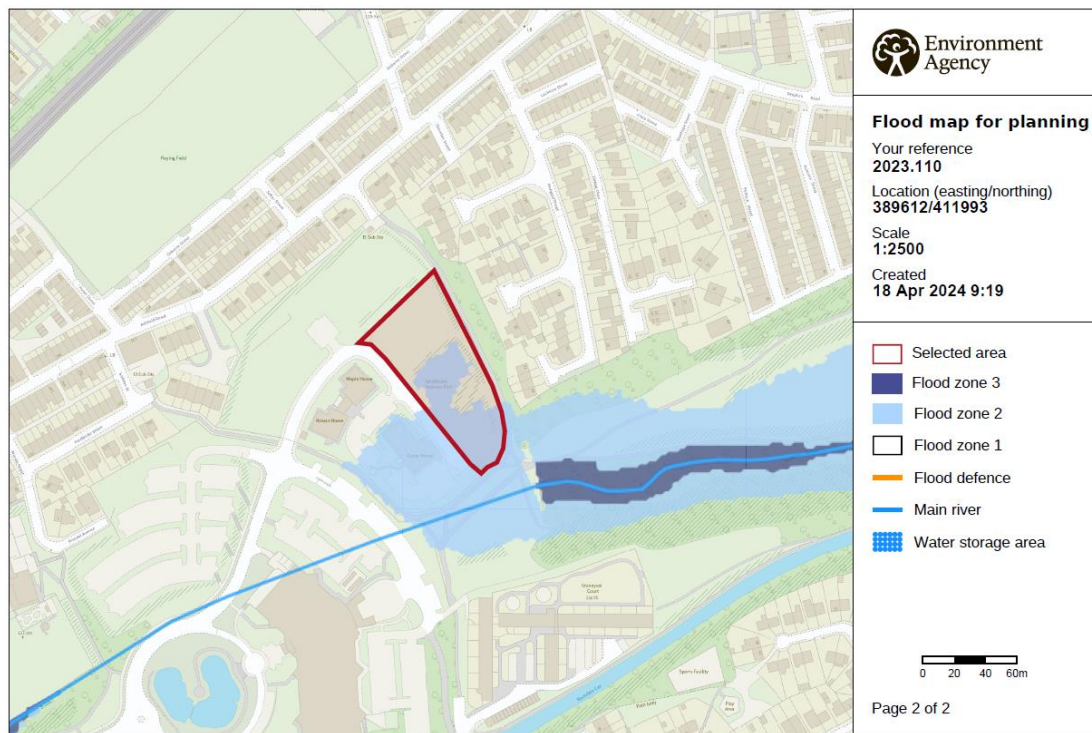


Figure 3: Flood Map for Planning

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.

3.7 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.

3.8 Flooding from Sewers

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

3.9 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.

3.10 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.

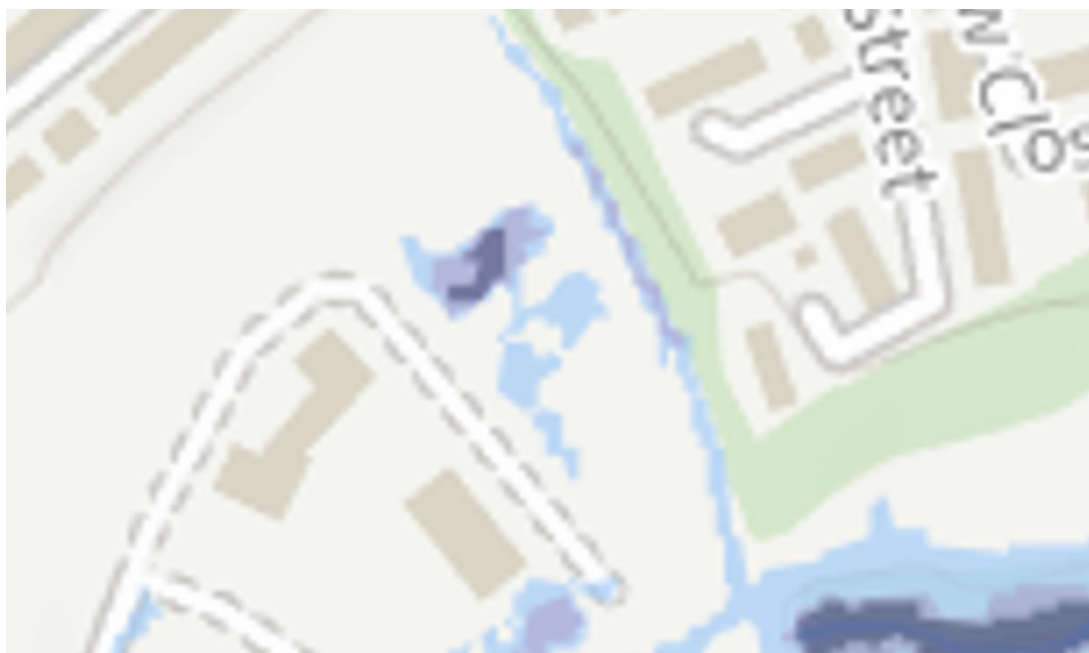


Figure 5: Surface Water Flood Map – Enlarged

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.

3.11 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.

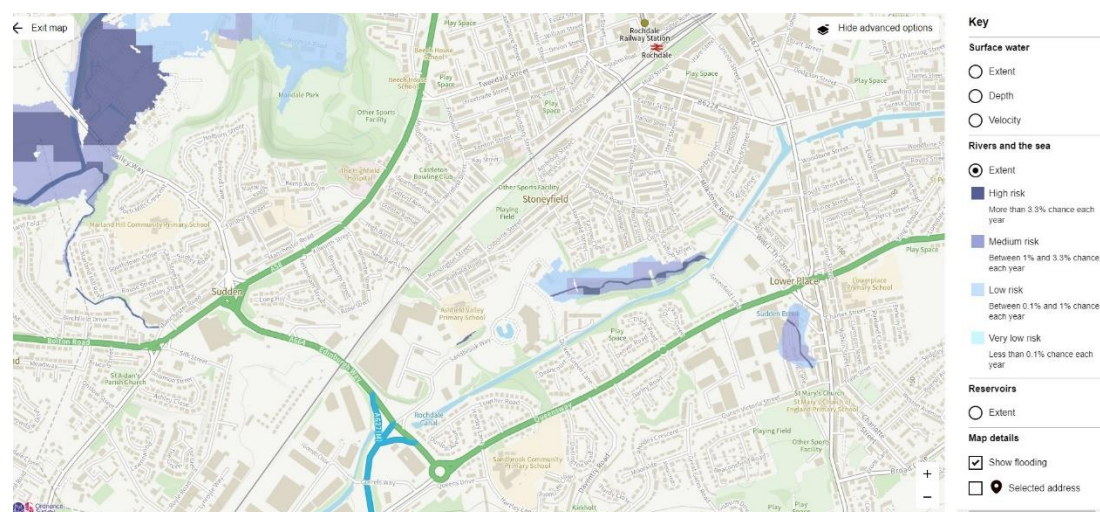


Figure 6: Extent of Flooding from Rivers or the Sea

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: 24053-PJA-00-ZZ-DR-A-1201, 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 scrubland, 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

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.

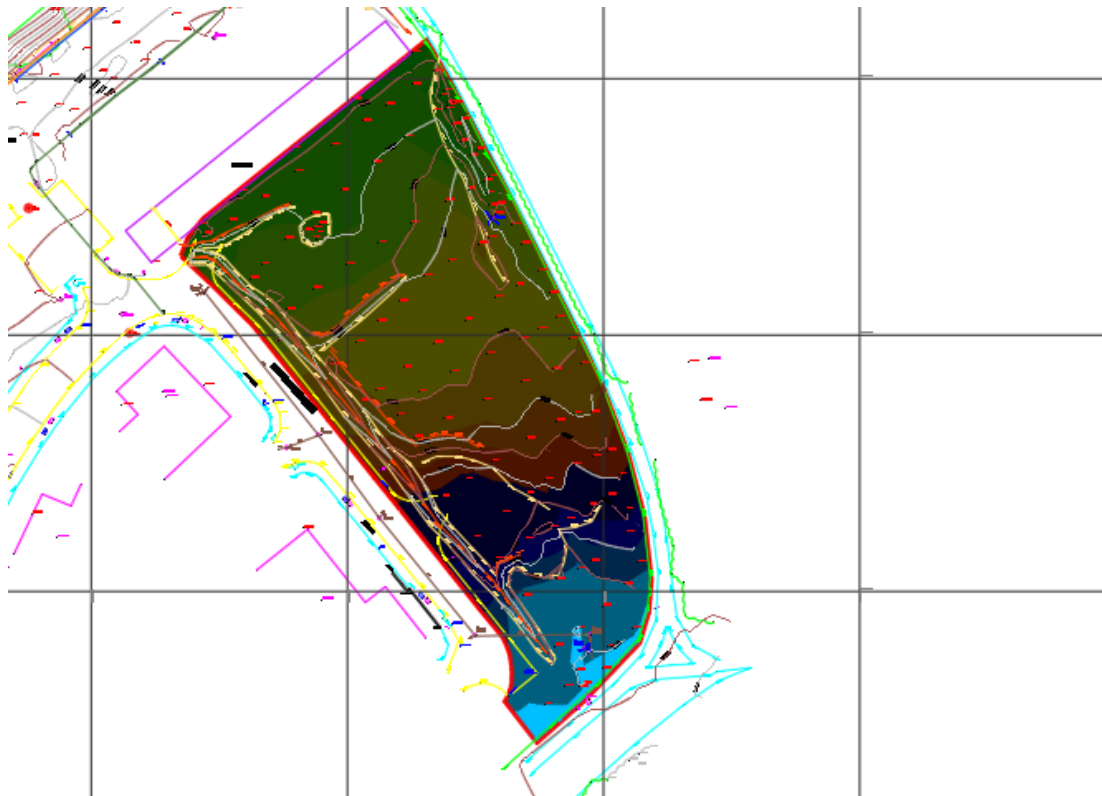


Figure 9: Flood Level Analysis using Topographic Survey – 133.500m AOD

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.

3.12 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.

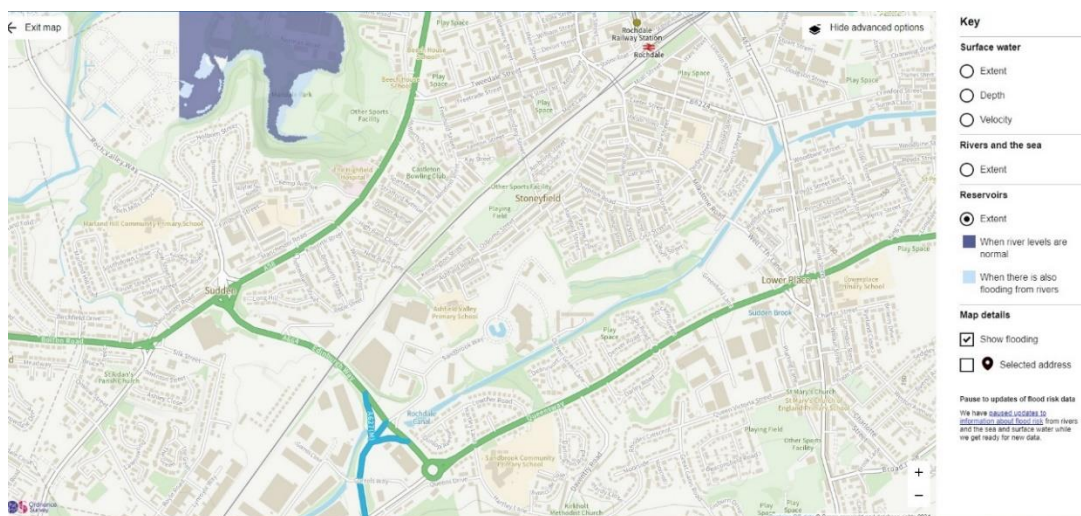


Figure 10: Extent of Flooding from Reservoirs

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.

3.13 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 45% and for peak rainfall is 30% and therefore, a 45% allowance for climate change will be applied to this development.

3.14 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 scrubland, 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.

At mid way of the western boundary there will be a second access point, 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 at approximately 2.2m. The results of these tests concluded that surface water disposal by infiltration was not feasible at this level.

In January 2025 2 no. falling head permeability tests were carried out in accordance with Test B of Section 4 – BS 5930 : 1999. The report is given in Appendix G. The results of the tests were conclusive to the surface water discharge was feasible by infiltration with the deeper natural sands and gravels. However, the mid to southern end of the site would not be as effective due to the influence of the natural water table. Hence, discharges of the surface water shall be directed to deep borehole soakaways located to the northern end of the site.

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).

In response to planning comments received from Rochdale Borough Council's, Highways and Engineering Services (11 December 2024), item 4 (shown below for convenience):

"In intrusive site investigation, including soakaway tests, has been undertaken in June 2024. The results, extract in Appendix G of the FRA, concluded that infiltration-based surface water discharge is not feasible. Tests indicated poor ground infiltration. However, it is unclear if there is any infiltration potential at depths below the made ground and the full report should be submitted."

Further intrusive ground investigations were carried out by CCG (Consulting Geoenvironmental and Geotechnical Engineers) in January 2025, in the form of Deep Boreholes, subjected to falling head permeability tests – the results are included in Appendix G, for information. The permeability tests identified the soil strata beneath the level of made ground to consist primarily of sands and

gravels, with the soil composition being sufficiently porous to support the use of deep-bored soakaways.

Borehole 1 (BH01), located in the Northern region of the site, identified made ground to a depth of 4.80m. Below this depth, the soil permeability value was determined as 1.14×10^{-3} m/s (4.104 m/hr), which is considered highly permeable.

Borehole 2 (BH02), located in the Southern region of the site, identified made ground to a depth of 5.20m. Below this depth, the soil permeability value was determined as 5.20×10^{-4} m/s (1.872 m/hr), which is also considered permeable. Although the permeability value in BH02 is considered suitable for infiltration, the soil in the Southern region of the site is not as porous as the soil in the Northern region. Given the proximity of Sudden Brook to the site, it has been assumed that this lower, Southern region, might not function at full capacity when water levels in Sudden Brook are particularly high. The proposed drainage layout has therefore been designed to support an overflow arrangement from the lower borehole (BH02) to a secondary borehole positioned in the Northern region of the site. This will ensure that during times of potentially elevated ground water levels, resultant from rising water levels in the nearby river, the surface water drainage from the Southern region of the site (which could at times be unable to permeate into the ground in the area of BH02), will overspill to a secondary manhole through a high level pipe, where the surface water flows will pass through a package pumping station to be over-pumped to the higher region of the site to the North. This overflow will discharge into a secondary borehole positioned in the Northern region of the site (in alignment with and at similar elevation to BH01), where the underlying soils are highly permeable and the groundwater is at a much greater depth.

All roof water from the site will discharge through a piped network and attenuation facilities, before passing directly into the boreholes. All surface water collected from roads and paved areas, will pass through oil interceptors to ensure the removal of contaminants and pollutants prior to discharge into the ground. The primary objective of all new drainage designs is to reduce the rate of surface water runoff into positive drainage systems such as rivers and sewers. Given that infiltration is feasible at lower depths within this site, the utilisation of deep-borehole soakaways will effectively re-direct rainwater directly into the ground, thereby significantly reducing the speed at which rainwater falling on this site enters Sudden Brook watercourse. Furthermore, a combination of soakaways discharging directly into the ground, supported by substantial surface water attenuation facilities, will ensure that all storms during a 1:30 years' flood event (including a 45% allowance for climate change), will be contained within the drainage network, below ground level. The geo-cellular attenuation crates will retain over 61m³ of surface water, with the remaining drainage network of manholes and pipework retaining just over 70m³ of surface water, providing a combined attenuation capacity in the region of 131m³. It should be noted that this volume of attenuation is greater than 123m³, as previously determined using H.R. Wallingford's, Surface Water Storage Estimation Tool.

Overland flooding will only occur during the critical 1:100 years' rainfall event (+45% climate change allowance), with overland floodwater being directed towards the lower, Southeastern corner of the site, by suitably positioned manholes and careful grading of the road, car parking area and surrounding landscaping works. Surface water which exceeds the retention capacity of the site will overspill from the site and pass through the applicants' own land to the Southeast of the site, before discharging into the open channelled section of Sudden Brook watercourse, in a similar area to which surface water naturally runs off the un-developed site. It should be reiterated that overland flooding will only occur during the most intense critical storms in a 1:100 years' rainfall event, including a 45% allowance for climate change.

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 45% 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 deep borehole soakaways located to the northern part of the site.

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.

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	Traffic 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
Elec	Electrical cut	WO	Wash cut
EP	Elec. pole	UTL	Unable to lift
ER	Earth rod	Fence	Fence annotation
PH	Fire Hydrant	B/W	Barbed wire
FT	Flagpole	C/B	Closed boarded
FT	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 bin	P/R	Post & rail
LP	Lamp post	P/W	Post & wire
MW	Utility marker	W/M	Wire mesh
MP	Mail post	W/N	Wire net
Level	Level prefix descriptions		
AL	Arch level		
BE	Bed level		
CL	Cover level		
EN	Entrance level		
FL	Floor level		
IL	Inset level		
IR	Roofridge level		
RL	Roof level		
SP	Sign post		
ST	Stop tap		
SB	Service Box		
SV	Stop valve		
TCS	Telephone call box		
TH	Thal Hole		

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 424988
EMAIL - peter.houston@jlpurveyors.com

PROJECT
Sandbrook Way
Rochdale

DRAWING TITLE

Topographical Land Survey

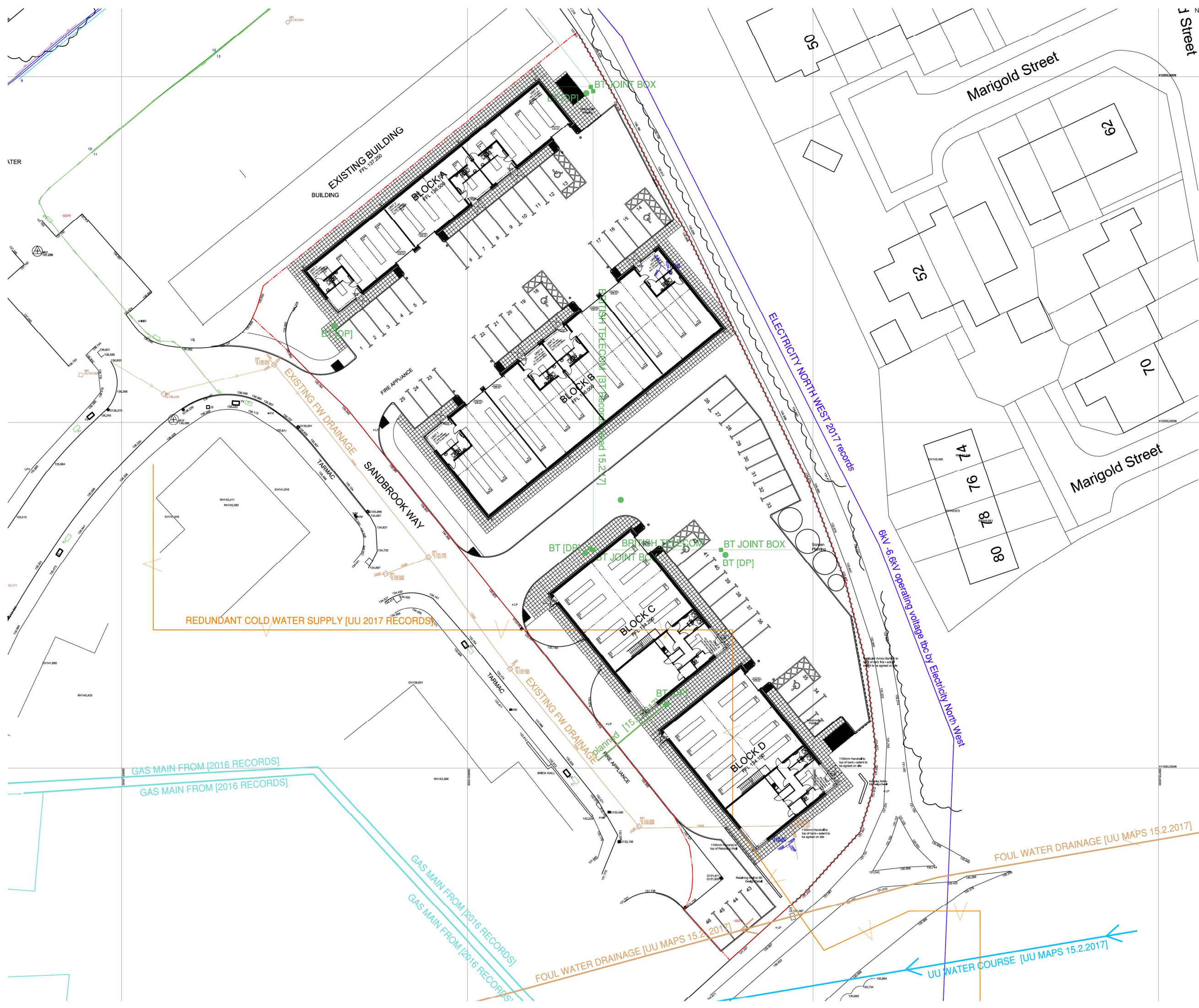
SCALE	SHEET SIZE	No. of SHEETS	DATE	REVISION
1:200	A0	1	11.10.18	E

DRAWING NUMBER

S18-889

Appendix B: -

Development Proposals – 24053-PJA-00-ZZ-DR-A-1201



Notes:

This Drawing is the copyright of Paddock Johnson Partnership Limited and may not be used without prior written consent.
Written dimensions to be taken in preference to scaled dimensions.
Due to inaccuracies of scanning, scanned images should not be scaled.

REV: DATE DESCRIPTION:

BY:

British Telecom

Northern Gas

Electricity Northwest

United Utilities Foulwater

UU redundant cold water main

Surface Water Public Sewer

Water Course

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CLIENT:

Northern Trust

PROJECT:

Sandbrook Park Phase 2
Rochdale
OL11 1RJ

DRAWING NUMBER:

24053-PJA-00-ZZ-DR-A-1201

DRAWING TITLE:

GA Site Layout
Constraints

STATUS:

Status

SCALE:

scale@A1

DATE:

date

BY:

XX

CHECKED:

XX

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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: N2AX65FUWH1

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

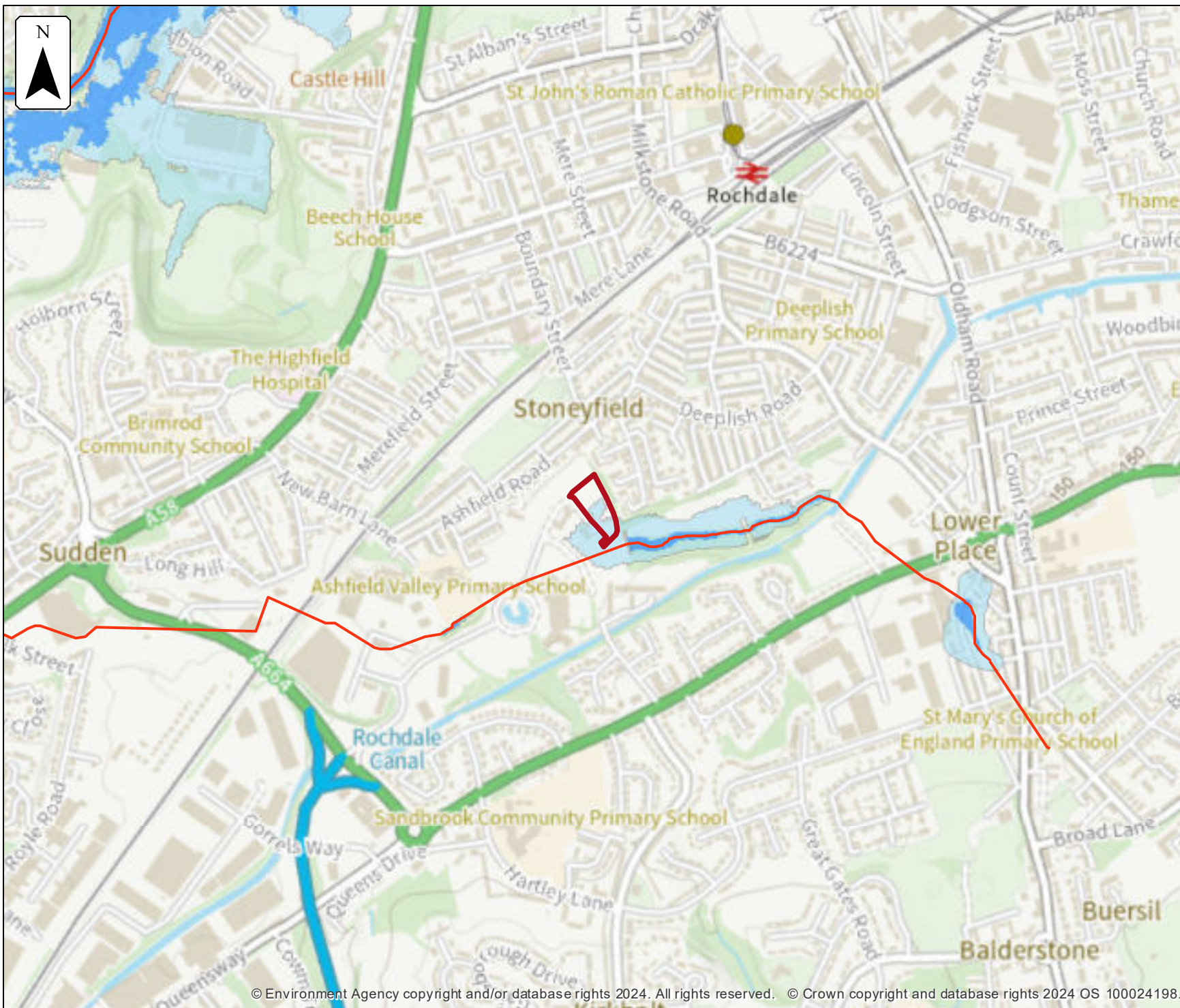
Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- 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.



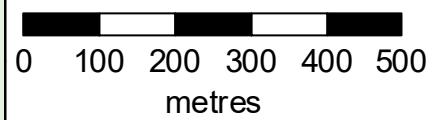
Flood map for planning

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

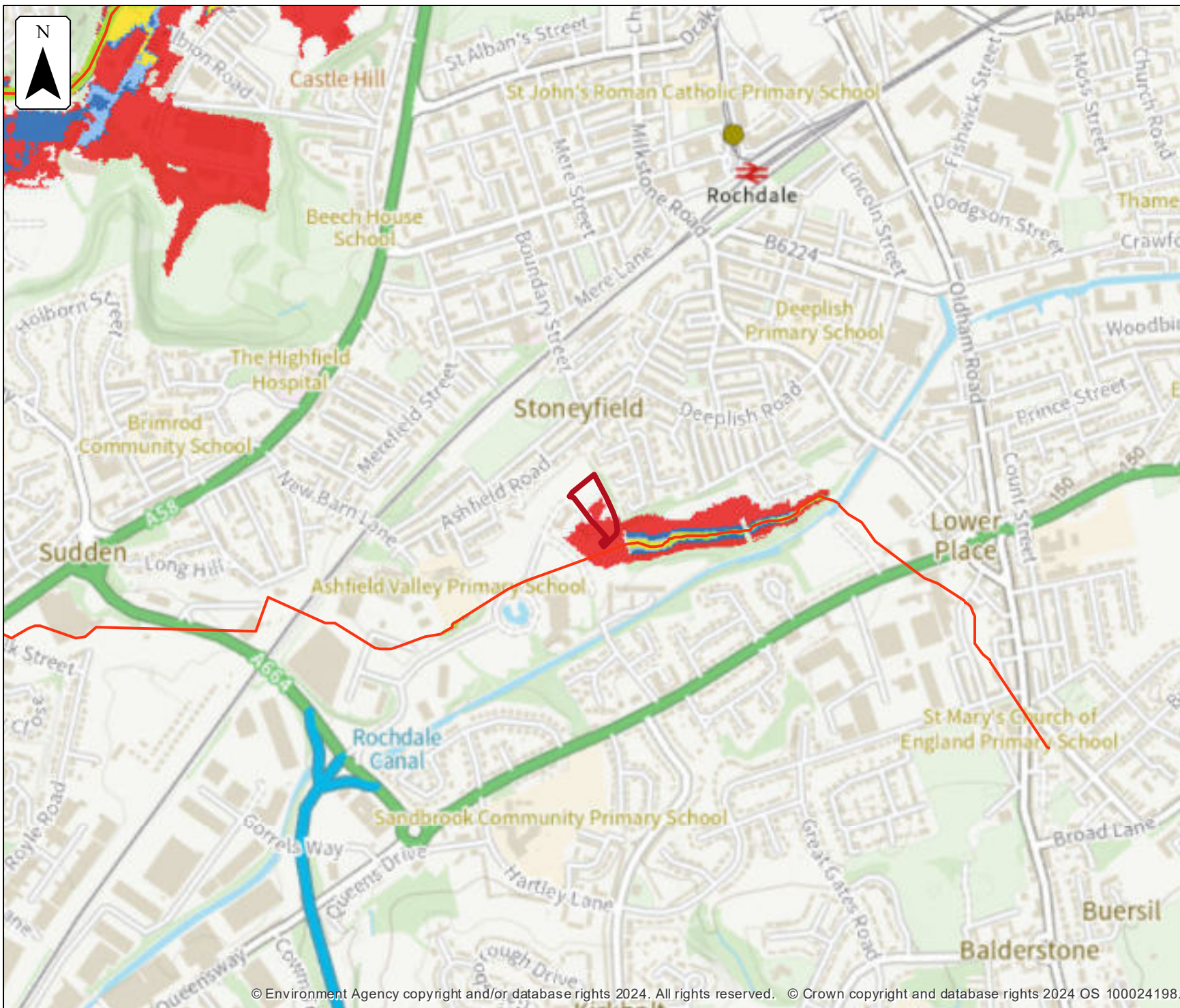
The climate change data included in the models may not include the latest [flood risk assessment climate change allowances](#). Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

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

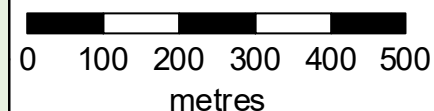
1.33% AEP

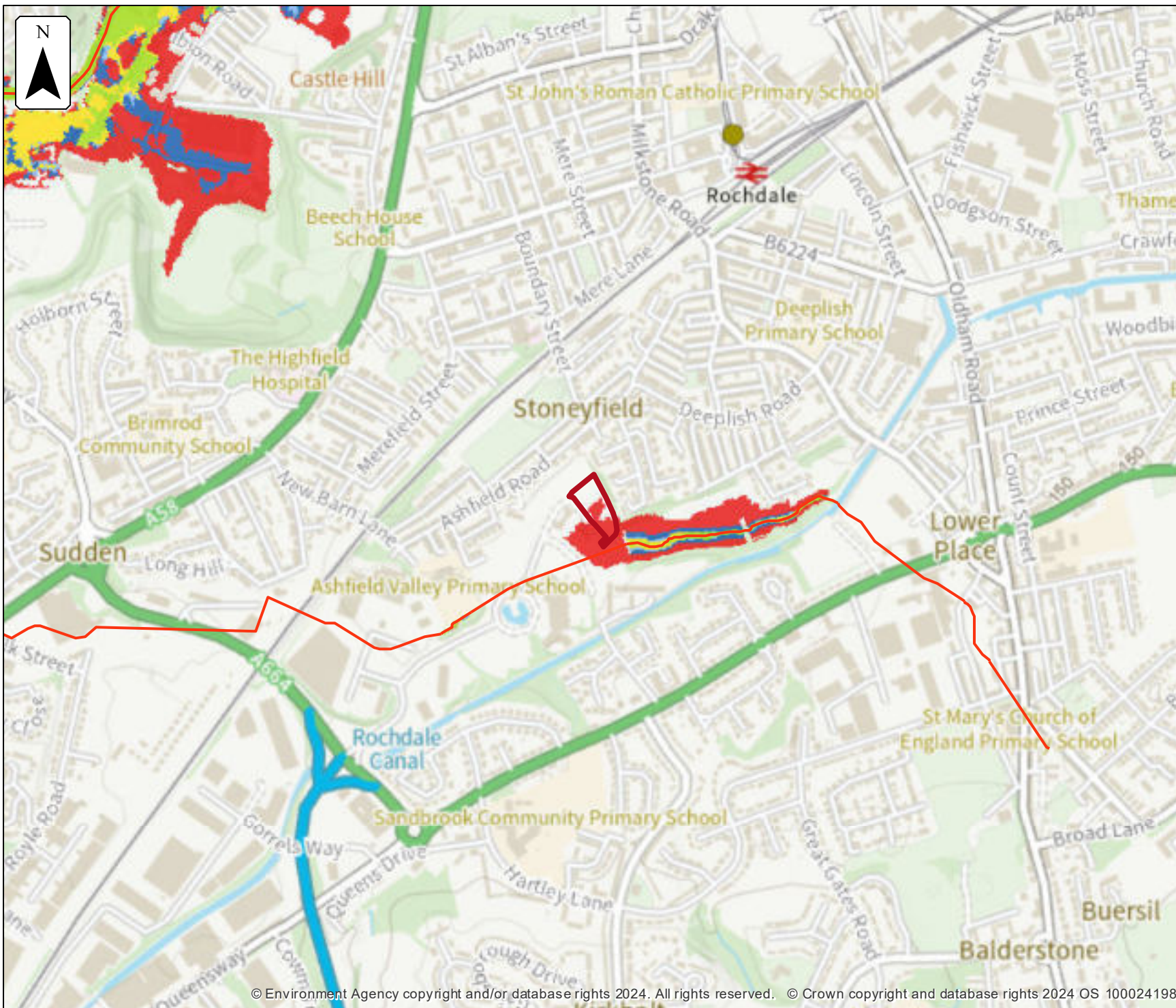
1% AEP

0.5% AEP

0.1% AEP

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





Defences removed modelled fluvial extent

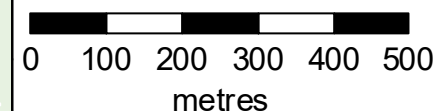
Location (easting/northing)
389619/411992

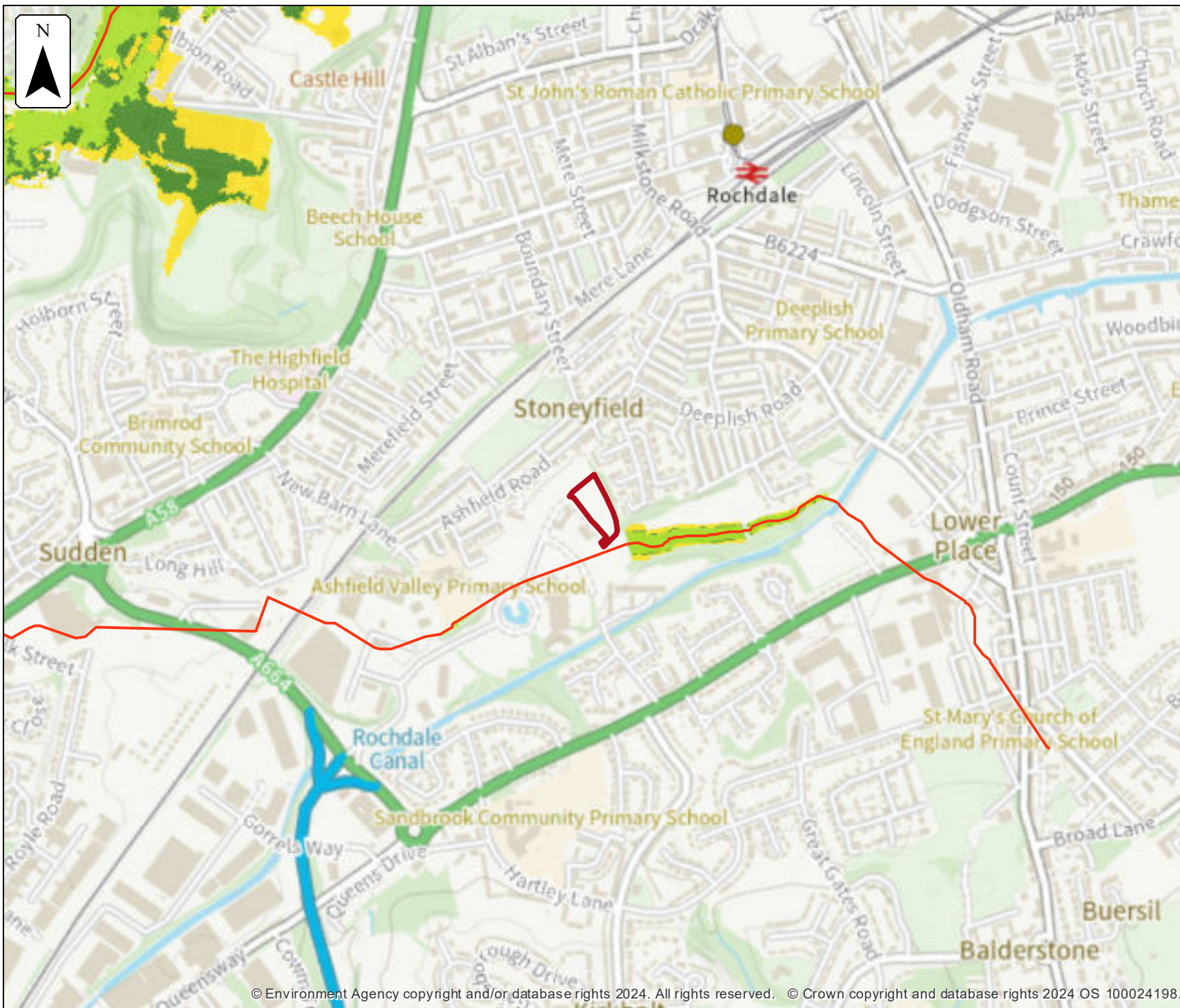
Scale Created
1:10,000 23 Apr 2024

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

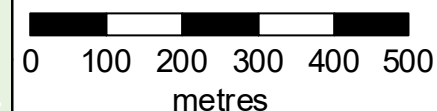
Location (easting/northing)
389619/411992

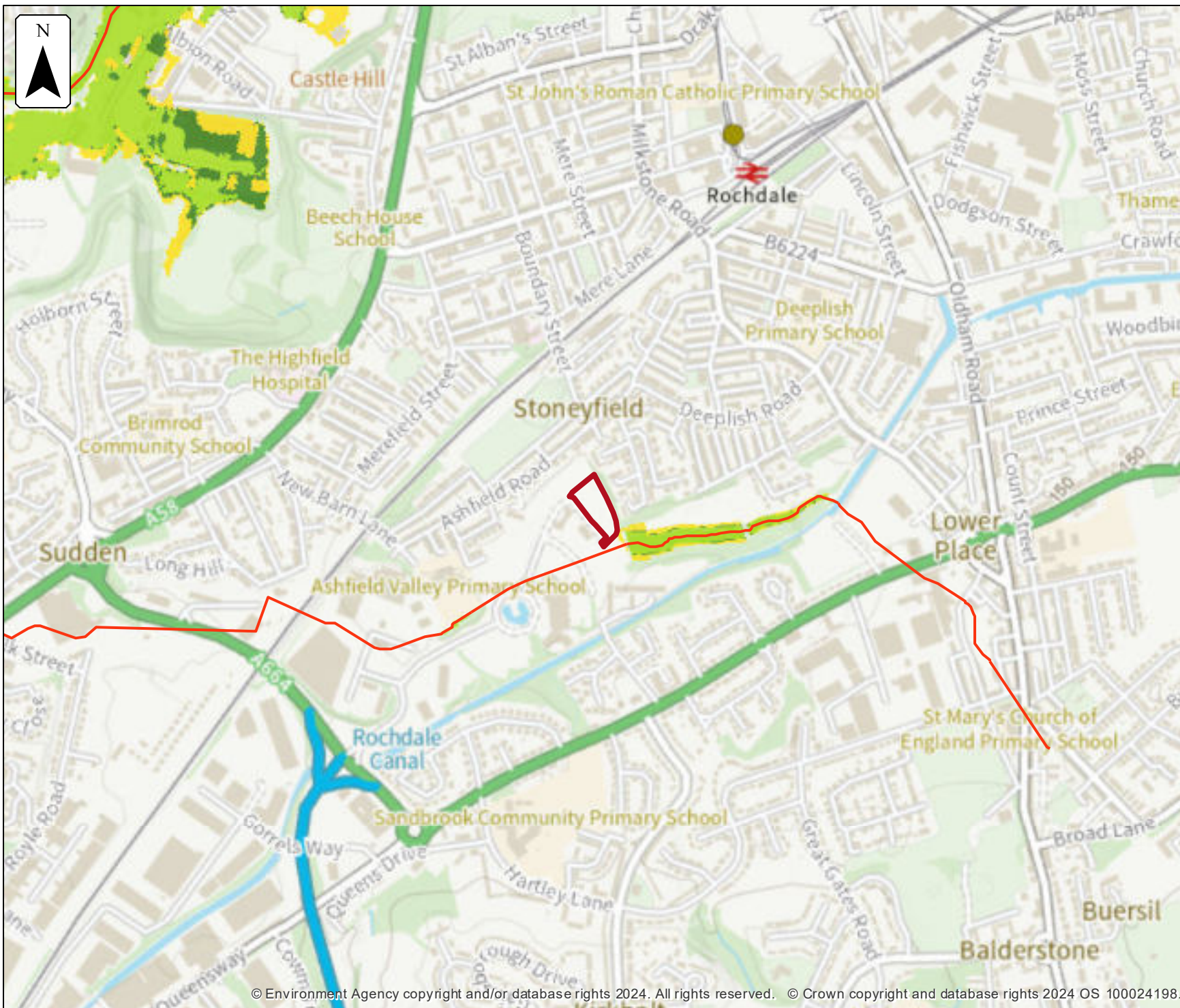
Scale Created
1:10,000 23 Apr 2024

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

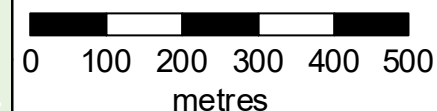
Location (easting/northing)
389619/411992

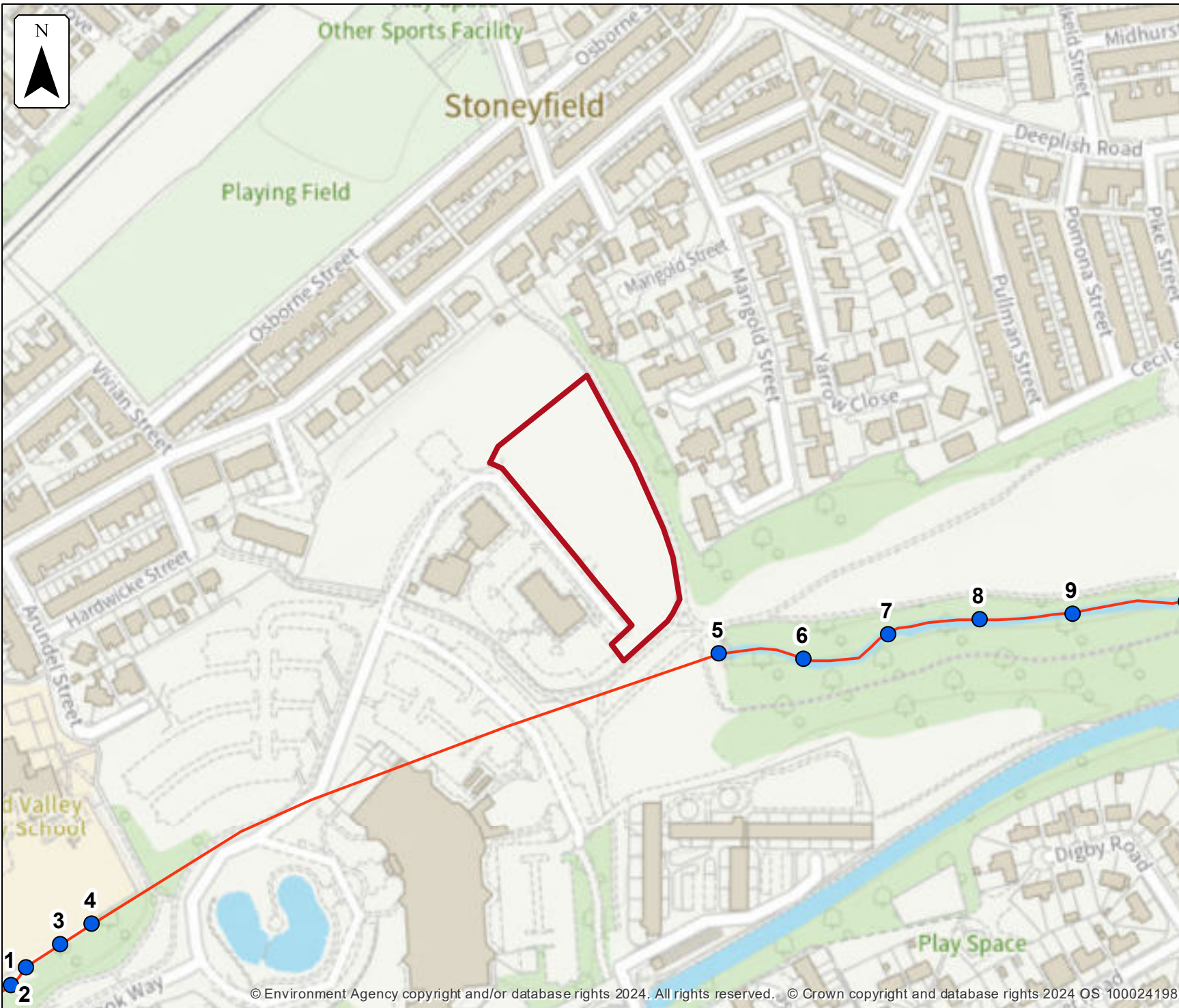
Scale Created
1:10,000 23 Apr 2024

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





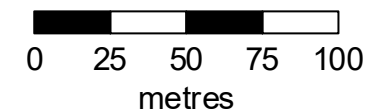
Defended modelled fluvial node locations

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

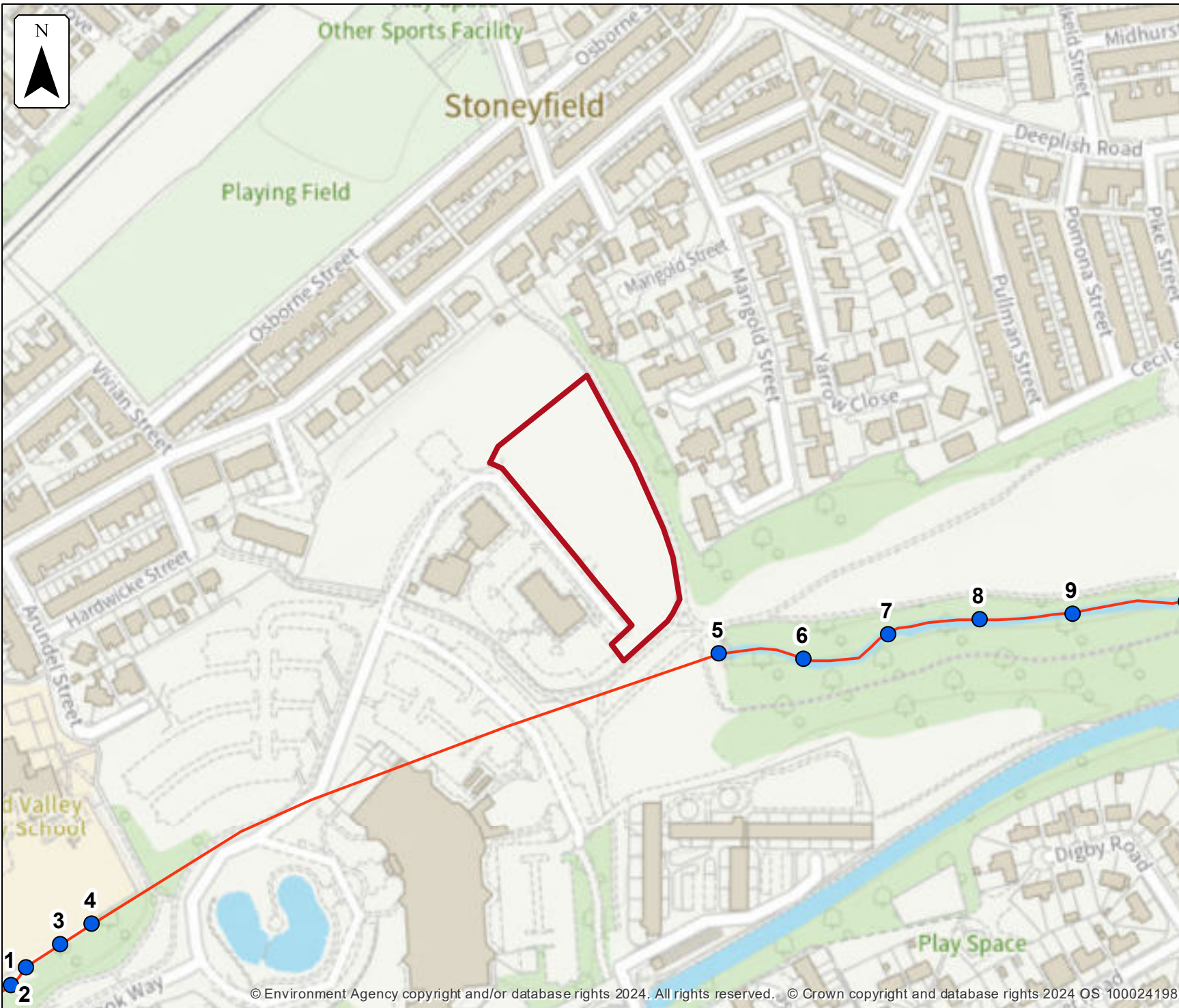
Defended

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.



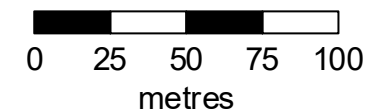
Defences removed modelled fluvial node locations

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

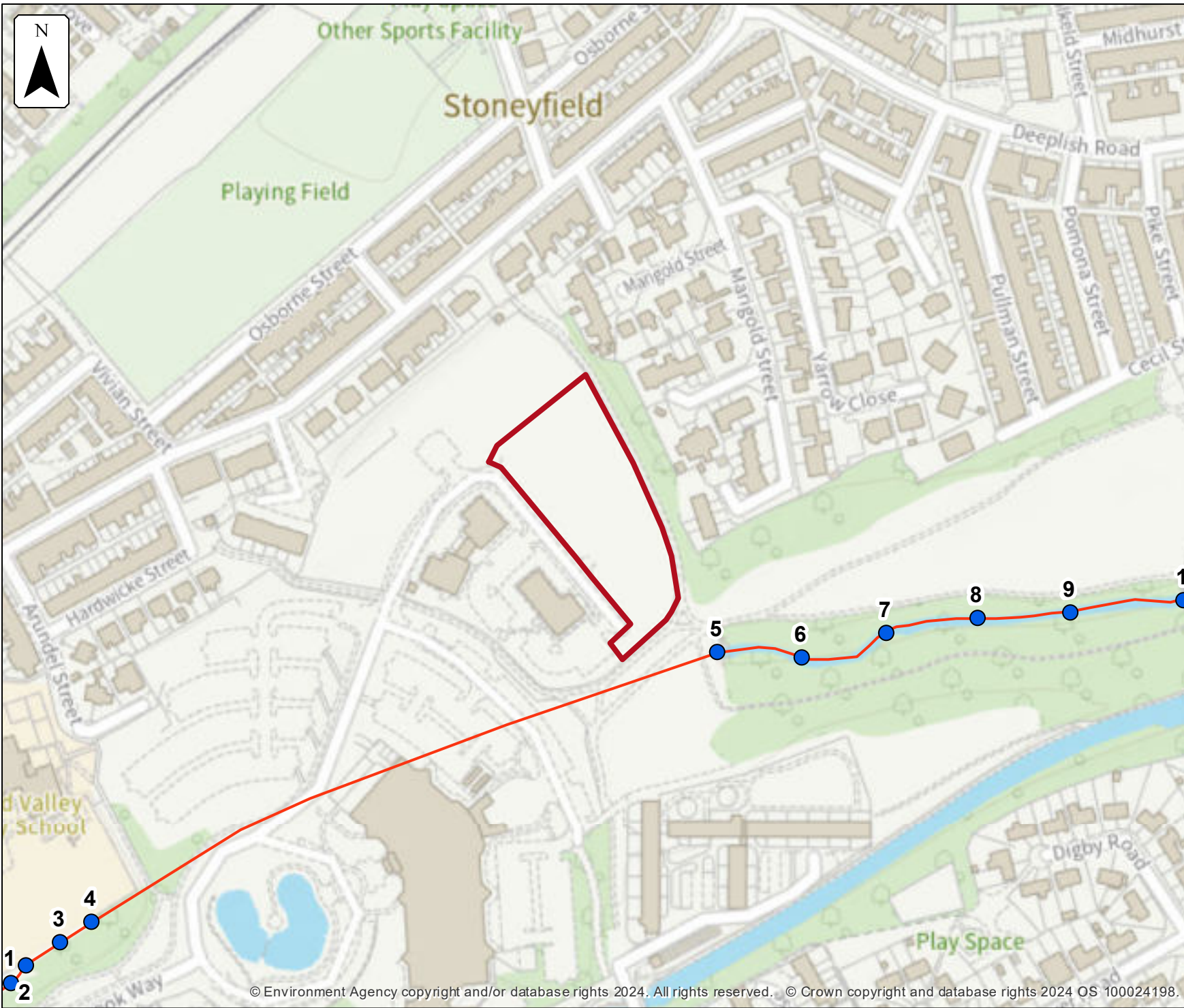
Defences removed

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.



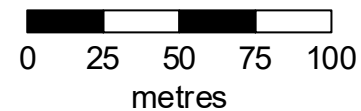
Defended climate change modelled fluvial node locations

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

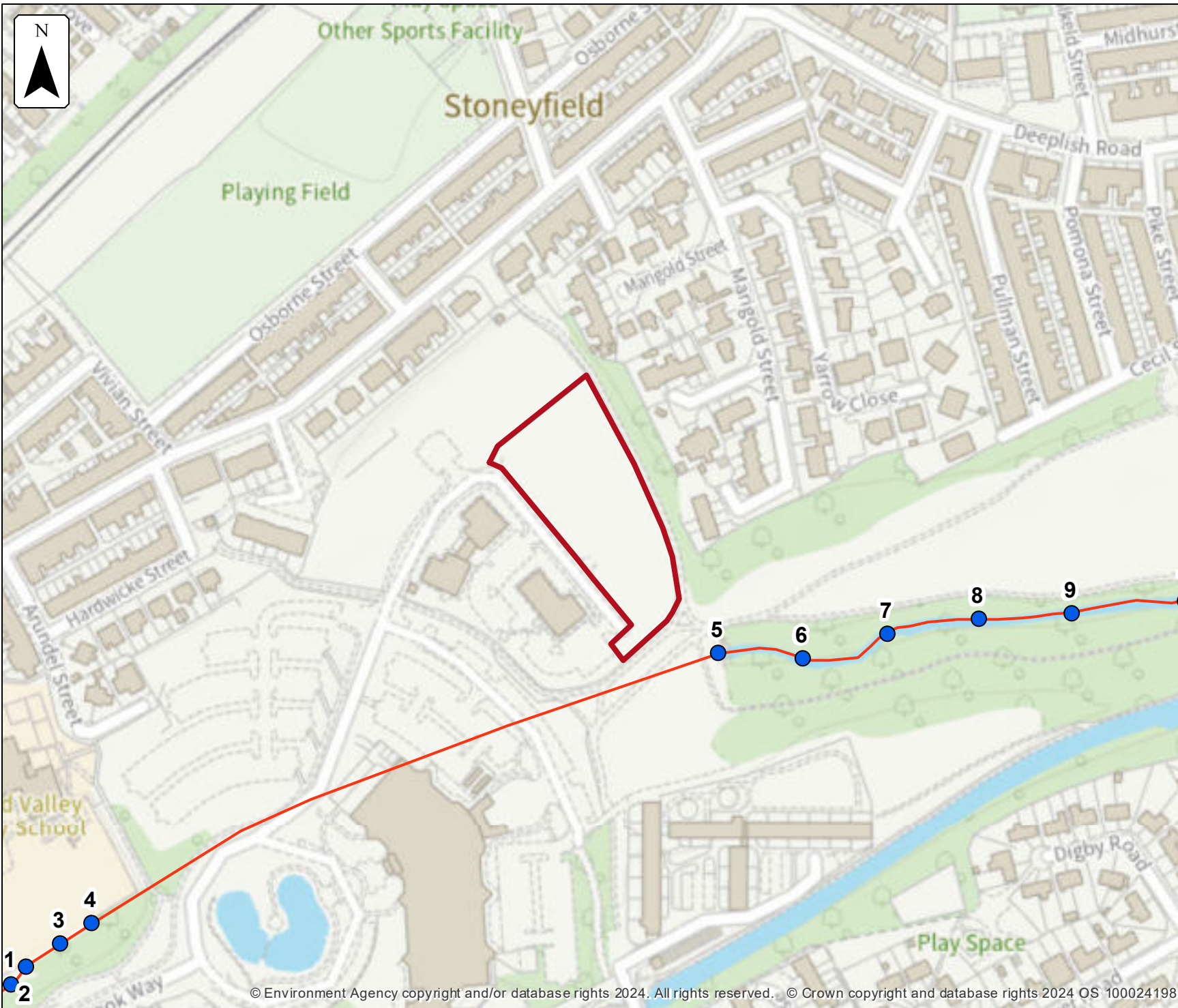
Defended climate change

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.



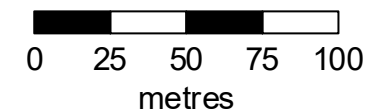
Defences removed climate change modelled fluvial node locations

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

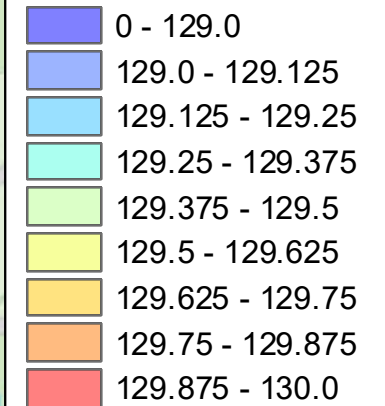
Scale Created
1:1,000 23 Apr 2024

Model name
**Rochdale and
Littleborough 2013**

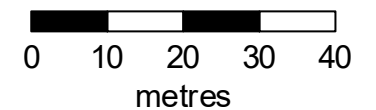
 Selected area

 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

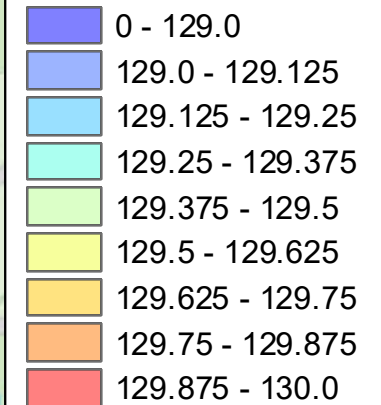
Model name
**Rochdale and
Littleborough 2013**

 Selected area

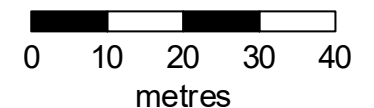
 Main river

Modelled 2D grid

Water level in mAOD



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

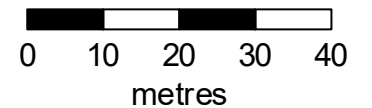
 Main river

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

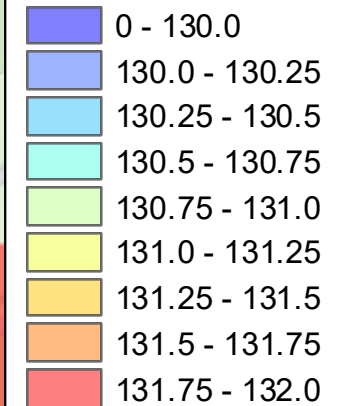
Model name
**Rochdale and
Littleborough 2013**

 Selected area

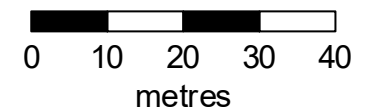
 Main river

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-C001C)



PIPEWORK NOTE:-
STORM WATER PIPE SIZING TO BE CONFIRMED AND SUBJECT TO FINAL DESIGN

STORAGE NOTE (STORM WATER SYSTEM):-
ATTENUATION TANK = 61m³
MANHOLES = 39m³
PIPEWORK = 31m³

- DRAINAGE NOTES:**
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE SPECIFICATION & ALL RELEVANT ENGINEERS & SUB-CONTRACTOR'S DRAWINGS.
 - DO NOT SCALE OFF THIS DRAWING, USE ONLY FIGURED DIMENSIONS & IF IN DOUBT ASK. ALL DIMENSIONS ARE IN MILLIMETRES.
 - THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ACCURACY OF ALL DIMENSIONS. & FOR CORRECT SETTING OUT ON SITE. SETTING OUT & WORKMANSHIP IS TO COMPLY WITH B.S.5606 : 1978.
 - SUB-BASE IS TO BE GSB1 STONE TO SPECIFICATION FOR HIGHWAYS WORK. CL, B03 OR APPROVED EQUIVALENT PLACED & COMPACTED IN LAYERS USING A VIBRATING ROLLER.
 - SERVICES TO BE LOCATED PRIOR TO WORK COMMENCING ON THE ROAD CROSSING. CARE TO BE TAKEN TO HAND DIG TRIAL HOLES TO LOCATE SERVICES & ALL SERVICES TO BE MARKED CLEARLY.
 - ALL MATERIALS SUPPLIED SHOULD HAVE THE RELEVANT TEST CERTIFICATES.
 - ALL WORKS TO BE UNDERTAKING IN CROSS OVER AREAS TO BE UNDER THE SUPERVISION OF L.A. HIGHWAY ENGINEERS.
 - ALL WORKS AND MATERIALS ETC. IN ACCORDANCE WITH DMRB VOLUME 7
 - ALL WORK TO COMPLY WITH THE RELEVANT CLAUSES OF B.S. EN 752: 1998 BUILDING DRAINAGE AND THE SEWERS FOR ADOPTION CURRENT EDITION.
 - ARRANGEMENT OF EXISTING DRAINAGE INDICATED HAS BEEN COMPILED FROM A LEVEL SURVEY UNDERTAKEN AT MANHOLE POSITIONS. REFER TO CCTV DRAINAGE SURVEY OF THE EXISTING DRAINAGE SYSTEM.
 - PRIOR TO COMMENCEMENT OF THE WORKS THE CONTRACTOR SHALL CONFIRM THE LOCATION AND LEVEL OF THE PROPOSED DRAINAGE OUTFALLS AND REPORT ANY DISCREPANCIES TO THE ENGINEER.
 - ALL PIPES BUILT INTO THE MANHOLE INVERTS SHALL BE INSTALLED WITH SOFFITS LEVEL UNLESS SHOWN OTHERWISE.
 - ALL MANHOLES AND CONNECTIONS PASSING THROUGH WALLS TO BE FITTED WITH ROCKER PIPES.
 - COVER LEVELS SHOWN ARE APPROXIMATE AND SHALL BE ADJUSTED ON SITE BY THE CONTRACTOR TO SUIT THE FINAL LEVELS. THE CONTRACTOR SHALL PROVIDE WRITTEN CONFIRMATION OF THE FINISHED COVER AND INVERT LEVELS OF ALL MANHOLES.

LEGEND:

- PROPOSED SURFACE WATER DRAINAGE
- PROPOSED FOUL WATER DRAINAGE
- EXISTING FOUL WATER DRAIN / SEWER
- EXISTING WATERCOURSE
- PROPOSED ATTENUATION STORAGE TANK
- PROPOSED FUEL SEPARATOR
- PROPOSED GULLY
- PROPOSED RWP (SEE ARCHITECT'S DRAWINGS FOR PRECISE LOCATIONS)
- PROPOSED SURFACE WATER MH OR PPIC
- PROPOSED PACKAGE PUMPING STATION MANHOLE
- PROPOSED SW RISING MAIN
- PROPOSED DEEP BOREHOLE SOAKAWAYS
- PROPOSED FOUL WATER MH OR PPIC
- PROPOSED LEVEL
- EXISTING LEVEL
- PROPOSED FALLS TO SURFACE
- SITE BOUNDARY

FOUL WATER MANHOLE SCHEDULE						
REF:	COVER LEVEL (M)	INVERT LEVEL (M)	DEPTH (M)	MINIMUM SIZE & CONSTRUCTION	COVER SLAB & COVER	COMMENTS
F1	136.378	135.178	1.200	1200Ø PCC RINGS	D400	150 CONCRETE SURROUND
F2	136.378	135.069	1.309	1200Ø PCC RINGS	D400	150 CONCRETE SURROUND
F3	136.378	134.448	1.930	1200Ø PCC RINGS	D400	150 CONCRETE SURROUND
EXTG	136.042	133.422 (134.228)	2.620	EXTG	EXTG	EXISTING FOUL WATER MANHOLE DETAILS TO BE VERIFIED BY SITE CHECK
F4	135.878	135.278	0.600	PPIC	D400	150 CONCRETE SURROUND
F5	135.878	134.846	1.032	PPIC	D400	150 CONCRETE SURROUND
F6	135.878	134.724	1.154	PPIC	D400	150 CONCRETE SURROUND
F7	135.878	134.444	1.434	PPIC	D400	150 CONCRETE SURROUND
F8	135.700	133.146 (134.000)	2.554	1200Ø PCC RINGS	B125	150 CONCRETE SURROUND
F9	134.100	131.860 (132.340) (132.340) (132.340)	1.940	1200Ø PCC RINGS	B125	150 CONCRETE SURROUND
F10	134.00	131.410 (132.340)	2.590	1200Ø PCC RINGS	B125	150 CONCRETE SURROUND
F11	134.00	131.330	2.670	1200Ø PCC RINGS	B125	150 CONCRETE SURROUND
EXTG	132.298	129.988 (131.100)	2.310	EXTG	EXTG	EXISTING FOUL WATER MANHOLE DETAILS TO BE VERIFIED BY SITE CHECK

SURFACE WATER MANHOLE SCHEDULE						
REF:	COVER LEVEL (M)	INVERT LEVEL (M)	DEPTH (M)	MINIMUM SIZE & CONSTRUCTION	COVER SLAB & COVER	COMMENTS
S01	136.350	134.869	1.454	1200Ø PCC RINGS	B125	150 CONCRETE SURROUND
S02	136.350	134.744	1.606	1200Ø PCC RINGS	B125	150 CONCRETE SURROUND
S03	135.850	134.950	0.900	1200Ø PCC RINGS	B125	150 CONCRETE SURROUND
S04	135.850	134.800	1.050	1200Ø PCC RINGS	B125	150 CONCRETE SURROUND
S05	136.250	134.695	1.555	1200Ø PCC RINGS	D400	150 CONCRETE SURROUND
S06	136.150	134.252 (SUMP DEPTH 300mm)	1.898	1200Ø PCC RINGS	D400	SILT TRAP 150 CONC. SURROUND
S07	135.760	134.260	1.500	1800Ø PCC RINGS	D400	150 CONCRETE SURROUND
S08	135.760	134.262	1.498	1800Ø PCC RINGS	D400	150 CONCRETE SURROUND
S09	135.760	133.892 (SUMP DEPTH 300mm)	1.868	1800Ø PCC RINGS	D400	SILT TRAP 150 CONC. SURROUND
S10	FUEL SEPARATOR					
S11	134.100	133.200	0.900	RODDING EYE	B125	RODDING EYE 150 CONCRETE SURR.
S12	134.000	133.400	0.600	RODDING EYE	B125	RODDING EYE 150 CONCRETE SURR.
S13	134.000	133.053	0.947	1200Ø PCC RINGS	B125	150 CONCRETE SURROUND
S14	134.100	133.200	0.900	RODDING EYE	D400	RODDING EYE 150 CONCRETE SURR.
S15	134.000	133.100	0.900	RODDING EYE	D400	RODDING EYE 150 CONCRETE SURR.
S16	134.000	132.876	1.124	600Ø PCC RINGS	D400	150 CONCRETE SURROUND
S17	133.800	132.352 (SUMP DEPTH 300mm)	1.448	1200Ø PCC RINGS	D400	SILT TRAP 150 CONC. SURROUND
S18	134.262	133.200	1.062	1000Ø PCC RINGS	D400	150 CONCRETE SURROUND
S19	133.870	132.720	1.150	1200Ø PCC RINGS	D400	150 CONCRETE SURROUND
S20	133.900	132.346 (SUMP DEPTH 300mm)	1.554	1200Ø PCC RINGS	D400	SILT TRAP 150 CONC. SURROUND
S21	FUEL SEPARATOR					
S22	134.965	132.336		PACKAGE PUMPING STATION		
S23	135.334	134.334	1.000	1200Ø PCC RINGS	D400	150 CONCRETE SURROUND

- DRAINAGE NOTES CONT'D.....**
- THE CONTRACTOR SHALL CONTROL ACCURATE LINE AND LEVEL OF PIPE LAYING BY USE OF AN OPTICAL LASER.
 - THE CONTRACTOR SHALL PROTECT THE PIPELINE FROM TEMPORARY CONSTRUCTION LOADS WHICH MAY BE IN EXCESS OF THE SERVICE LOADS.
 - PIPEWORK AND PIPE BEDDING SHALL COMPLY WITH THE DETAILS INDICATED ON THE DRAWINGS UNLESS OTHERWISE STATED:
 - 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.
 - TRENCHES IN AREAS RECEIVING VEHICULAR LOADING SHALL BE BACKFILLED WITH GF2 GRANULAR FILL.
 - 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.
 - SOFT SPOTS IN THE TRENCH FORMATION SHALL BE REMOVED AND REPLACED WITH GF2 IN LAYERS & COMPACTED IN LAYERS OF 150mm MAX.
 - 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
 - MANHOLE COVERS SHALL HAVE A BADGE TO INDICATE FOUL OR STORM WATER.
 - THE CONTRACTOR SHALL REGULATE EXISTING COVERS AND FRAMES TO THE PROPOSED LEVELS INDICATED.
 - TWO SETS OF MANHOLE LIFTING KEYS SHALL BE HANDED OVER TO THE CLIENT ON COMPLETION OF THE WORKS.
 - 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.

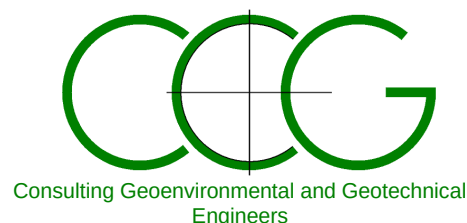
DESIGN CHANGED AND LAYOUT UPDATED DEEP BOREHOLE SOAKAWAYS ADDED BELMOUTH INDICATED TO ENTRANCE TO LOWER SITE, AS PER. UPDATED ARCHITECT'S PLAN	C	CS	CS	1:1.2.25
SOAK-AWAY OPTION OMITTED AND ATTENUATION INTRODUCED WITH DISCHARGE INTO WATERCOURSE; MH SCHEDULES REVISED; SITE LAYOUT TO SOUTH SIDE AMENDED AND GENERAL UPDATE TO LEGEND	A	CS	CS	1:1.1.24
DESCRIPTION		DRAWN	APPROVED	DATE
STATUS				
PLANNING				
GRAHAM SCHOFIELD ASSOCIATES Consulting Civil and Structural Engineers Suite 3 Balfour Court, Leyland PR25 2TE tel: (01772) 459383 email: reception@gsa72.co.uk				
GSA				
client:	NORTHERN TRUST CO. LTD.			
project:	SANDBROOK PARK, ROCHDALE PHASE 2			
title:	INDICATIVE DRAINAGE LAYOUT			
drawn SNG	checked GS	drawing number		
date 15.01.24	date	2023-110-C001		
scale 1:250 @ AO	A1	C		

Appendix G: -

Results of Falling Head Permeability Tests
(Deep Borehole Soakaways)

Unit 1
Deltic Way
Knowsley Industrial Estate
Liverpool
L33 7BA

Telephone: (0151) 545 2750
Fax: (0151) 548 7892
Email: enquiries@ccgeotechnical.co.uk
www.ccgeotechnical.co.uk



Northern Trust

Lynton House
Ackhurst Park
Foxhole Road
Chorley
Lancs
PR7 1NY

24th January 2025

FAO: Jim Moffat

Dear Jim,

Re: CCG-C-25-15148: Soil Infiltration Rate Determination on land located within the curtilage of Sandbrook Business Park, Rochdale, OL11 1LQ

CC GEOTECHNICAL LIMITED (CCG) was instructed by **Northern Trust** (the *Client*) to undertake soil permeability tests using the falling head test method at 2nr borehole positions on land located within the curtilage of Sandbrook Business Park, Rochdale, OL11 1LQ.

It is understood that the site is to be redeveloped for commercial use by the construction of 4nr steel framed commercial blocks (A-D) providing a combined total of 9nr self contained units with associated office space and welfare facilities, together with external hard paved off-road car parking and small areas of soft landscaping. It is proposed that each unit will be constructed in low-level dado brick walls with corrugated rain screen cladding above.

It is further understood that to prepare the area to development level, an advance preparatory earthworks contract will be undertaken, in which a "cut and fill" exercise will be undertaken to prepare the site levels to accommodate each unit and as such the blocks will be terraced. Access points will be formed at the north and south of the site, leading off Sandbrook Way.

The layout of the development is as shown on **NORTHERN TRUST** architectural drawings contained herein.

An intrusive ground investigation was undertaken by **CCG** in June 2024. The findings of which were reported under Report Reference No. CCG-C-24-14676, dated July 2024. The scope of works associated with this investigation comprised the sinking of 6nr boreholes using light dynamic sampling methods, and the undertaking of soil permeability tests at 3nr trial pit excavations in accordance with BRE Digest 365.

The ground conditions encountered during the June 2024 investigation were seen to comprise of grassed topsoil overlying beep made ground deposits generally comprising firm / soft reworked clay deposits and medium dense locally loose, very loose silty gravelly sands with low to medium cobble content to depths varying between 3.2mbgl - 5mbgl. The sequence thereafter continues in natural drift deposits comprising medium dense / loose silty fine and medium grained sands with very loose black / dark brown pseudo-fibrous peat deposits standing at 3.2mbgl > 4.5mbgl at borehole WS06.

To assess the permeability of the underlying soils, 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*. It was reported that the water levels at each trial pit failed to drop measurably (<300mm) over a 4-hour test period and therefore it was concluded that soakaways at these locations were not a practical proposition, and consequently alternative forms of attenuation would be required. In addition to this, the depth of made ground over the site was consistently in excess of 2.5m, thus precluding the formation of soakaways as required by the guidance contained in *BRE Digest 365*.

Taking into account the findings of the above soakaway tests, a supplementary scope of intrusive investigation was required to determine if borehole soakaways may be adopted at this site.

The determination was carried out at the locations as predetermined by the *Client* and are as annotated on **CCG** Drawing No. CCG-C-25-15148-1 contained herein.

To establish the soil infiltration rates of the underlying natural drift deposits, 2nr boreholes were sunk using cable percussive boring methods with associated 150mm dia. steel casings and tools.

Each borehole location was positioned clear of known buried and overhead services and was scanned using a CAT service scanner before and during hand excavation of a starter pit extending to 1.2mbgl.

Unit 1
Deltic Way
Knowsley Industrial Estate
Liverpool
L33 7BA

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www.ccgeotechnical.co.uk



Boring tools were decontaminated prior to commencement and on completion of each borehole.

Bulk disturbed samples were recovered upon encountering natural drift soils.

Logs of the boreholes are enclosed herein.

In summary, the ground conditions encountered comprised:

BH01

Made ground deposits comprising black / brown slightly silty clayey gravel with high cobble content extending to 4.8mbgl. The sequence thereafter continued in natural drift deposits comprising brown slightly silty sandy gravel, proven to 6mbgl.

BH02

Made ground deposits comprising brown very gravelly slightly silty sand with high cobble content extending to 5.2mbgl. The sequence thereafter continued in natural drift deposits comprising brown silty fine and medium grained sand, proven to 8.2mbgl.

Borehole recovery reported to be wet from c. 4.8mbgl.

On completion of boring works, each borehole was utilised for the undertaking of soil permeability tests using falling head tests methods in accordance with *Test B of Section 4 - BS 5930:1999*; the results of which are discussed hereunder.

Determinations of particle size distribution testing was undertaken on natural granular soils recovered from each borehole position. A soil classification report associated with these tests is enclosed herein.

At BH01 charging the borehole casings with water via a mains hose supply failed to induce any rise up the casing, thus confirming the underlying natural drift strata to be significantly permeable. For the particle size distribution envelope for the natural granular soils recovered at 5.5mbgl, when assessed by adopting the Hazen Model for soil permeability ($k=10^{-2} D_{10}^2$ (m/s)), a soil permeability value of 1.14×10^{-3} m/s, was calculated – a high permeability consistent with the water charging observations

With regards borehole BH02 a falling head test was attempted at 4.8mbgl which confirmed a soil permeability value of 4.44×10^{-6} m/s. When adopting the Hazen formula for particle size distribution for soils at 5mbgl, a value 5.2×10^{-4} m/s is calculated.

Additional soil permeability tests were attempted at BH02, at 6mbgl, and 8.2mbgl depths. The water levels at each test depth failed to drop measurably (<200mm) over a 2-hr test period and hence it was concluded that soakaways will not function in the ground conditions prevailing at this borehole position.

Taking into account the above observations, there is strong evidence that borehole soakaways will be effective in the area of BH01, but less effective in other areas. Borehole soakaways should be constructed as 150mm dia. slotted HDPE wrapped in a geotextile and set in a non-limestone gravel surround. At ground level, they should be set in a manhole with the pipe projected above the manhole base, and protected by a suitable strainer / filter, preventing debris entering the pipe.

It must be borne in mind that the discussions presented above must be read in conjunction with **CCG** Report Reference No. CCG-C-24-14676, dated July 2024

If you have questions regarding the above, please do not hesitate to contact the undersigned.

Yours sincerely

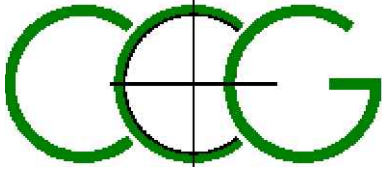
A handwritten signature in black ink, appearing to read 'A Gerrard', is written over a light blue circular stamp that contains the text 'Link-up' and 'Qualified via Audit'.

A Gerrard BSc (Hons) MSc FGS

Enc: CCG Drawing No. CCG-C-25-15148-1, falling head tests results + Soil classification results

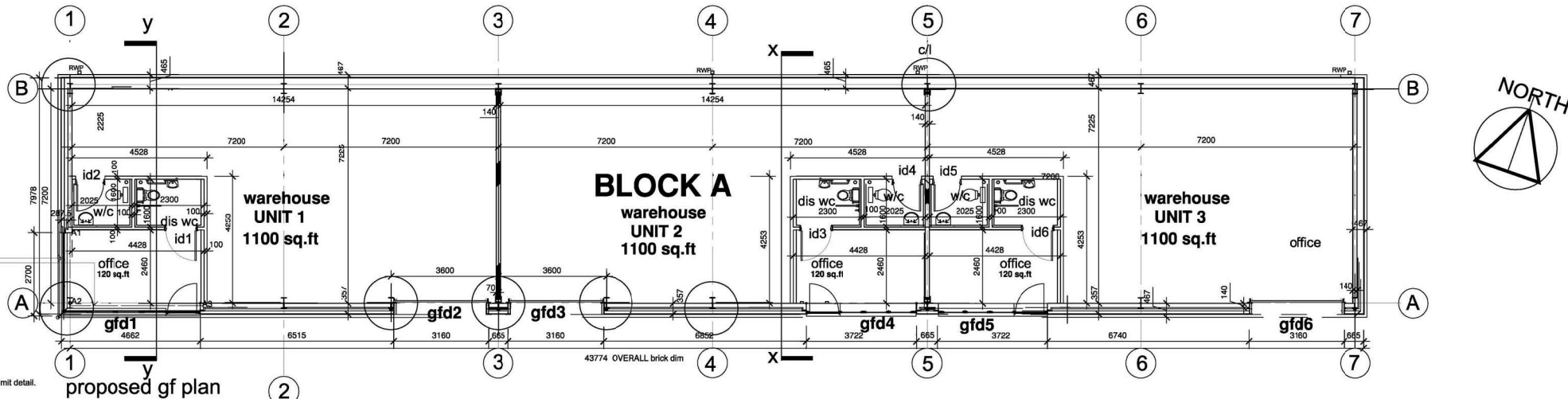


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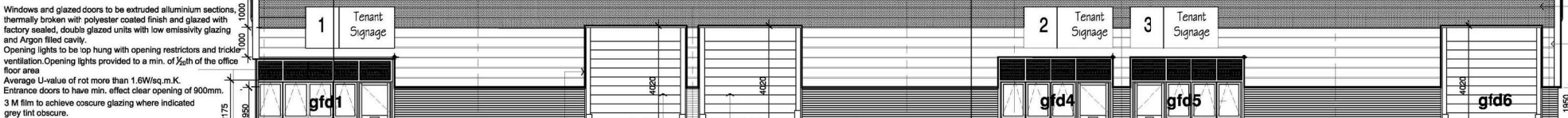
CC GEOTECHNICAL LTD
Units 1&2
Deltic Way
Knowsley Industrial Estate
L33 7BA
Tel: (0151) 545 2750
Fax: (0151) 548 7892
enquiries@ccgeotechnical.co.uk
www.ccgeotechnical.co.uk

Client	Northern Trust				
Site	Sandbrook Business Park, Sandbrook Way, Rochdale, OL11				
Drawing	Ground Investigation Layout				
Job No.	Dwg. No.	Rev. No.	Scale@A3	Date	
25-15148	1	0	1:2500	Jan 2025	

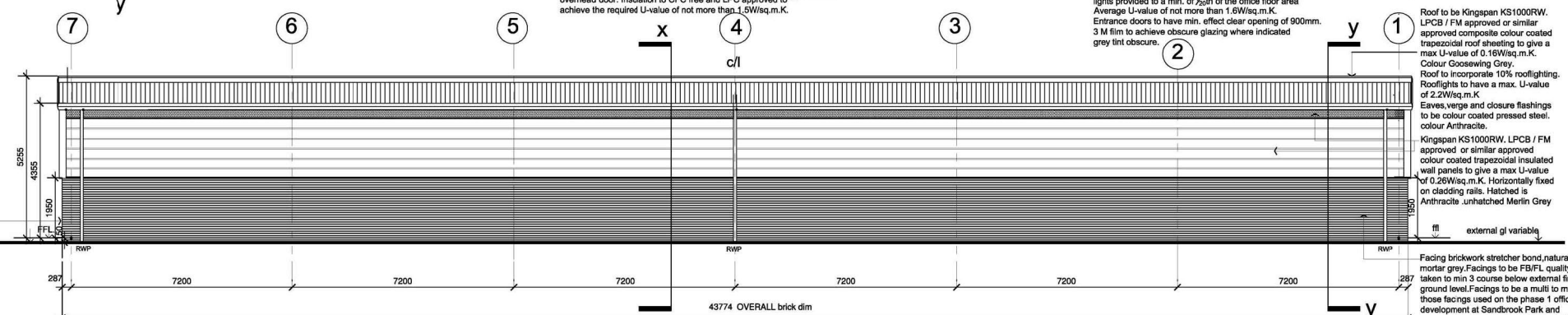


curtain wall wrap dictates internal plan of office to ensure w's behind masonry wall. NB. Fenestration wrap this gable only as a 'feature gable'.
* See section 'YY' below for additional steel trimmer requirement A1,A2,A3 behind curtain walling for permit detail.

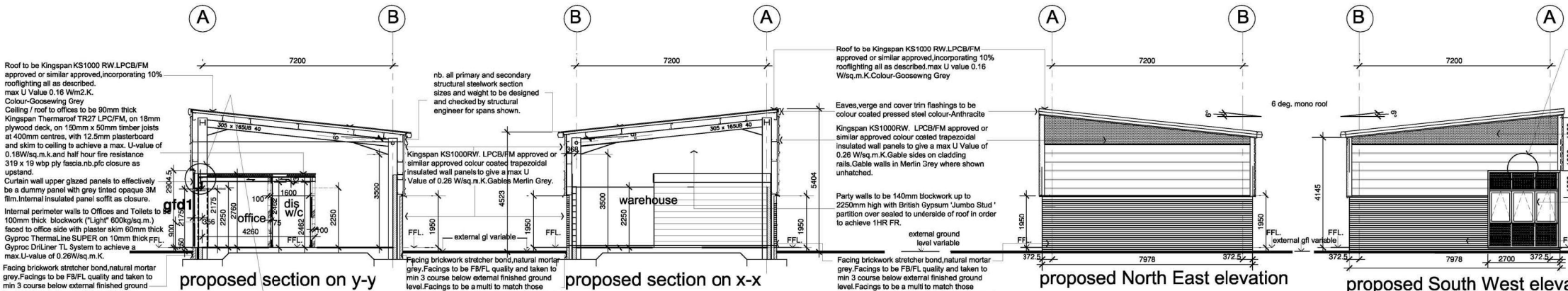
proposed gf plan



proposed SE elevation [front elevation]



proposed NW elevation [rear elevation]



proposed section on y-y

proposed section on x-x

proposed North East elevation

proposed South West elevation

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 Northern Trust and copyright is reserved by them. The drawing is not to be copied or used without their prior written consent.

Notes

All insulation to be CFC/HFC - free with zero Ozone Depletion Potential.

All Cladding details to comply with Kingspan Enhance details.

MATERIAL/COLOUR KEY

- Steel paintwork - Merlin Grey
- Roof cladding - Kingspan KS1000RW Insulated Roof Panel (LPCB/FM Approved) or equal - Coosewing Grey
- Gutters, Fascias & Verges - Anthracite
- Rainwater pipes - Colour to match cladding
- Kingspan KS1000RW Insulated Wall Panel (LPCB/FM Approved) or equal - Anthracite where shown hatched / Merlin Grey where shown unhatched. Flashings to match panel colour.
- Brickwork - Northern Brick Ref-TN06 65mm County Multi Dragfaced.
- Loading doors - Anthracite
- Personnel doors - Anthracite
- Escape doors - Anthracite
- Windows - Extruded Aluminium window sections - Colour Graphite Grey
- Glazing tint - Colour Grey

Hatched areas denote contrasting colours, actual locations of horizontal panels / rear doors may vary slightly to suit setting-out of panels.

CRITICAL DOOR DIMENSIONS

Internal Doors - Minimum effective clear width 800mm
Entrance Doors - Minimum effective clear width 900mm for one leaf
Fire Exit Doors - Minimum effective clear width 850mm

All vision panels to have minimum zones of visibility between 500mm to 800mm and 1150mm to 1500mm.

REQUIRED U VALUES

'Warm Roof' Construction-0.16 W/sq.m.K

External Wall Construction-0.26 W/sq.m.K

Ground Floor Construction-0.18 W/sq.m.K
[Only applies under heated spaces ie. w's and offices].

Windows- 1.6W/sq.m.K

Rooflights-2.2 W/sq.m.K

Personnel Doors-1.6W/sq.m.K

Vehicle Access and Similar Large Doors- 1.3 W/sq.m.K

NB. offices and toilets are to be space heated. walls to these spaces max U Value-0.26W/sqm K, roof- 0.16 W/sqmK, floor 0.18 W/sq.m K. The warehouses are to remain unheated so the ground bearing slab under the warehouse space does not need to be insulated.

Rev. Date Details Drawn/Checked

Issued for: PLANNING

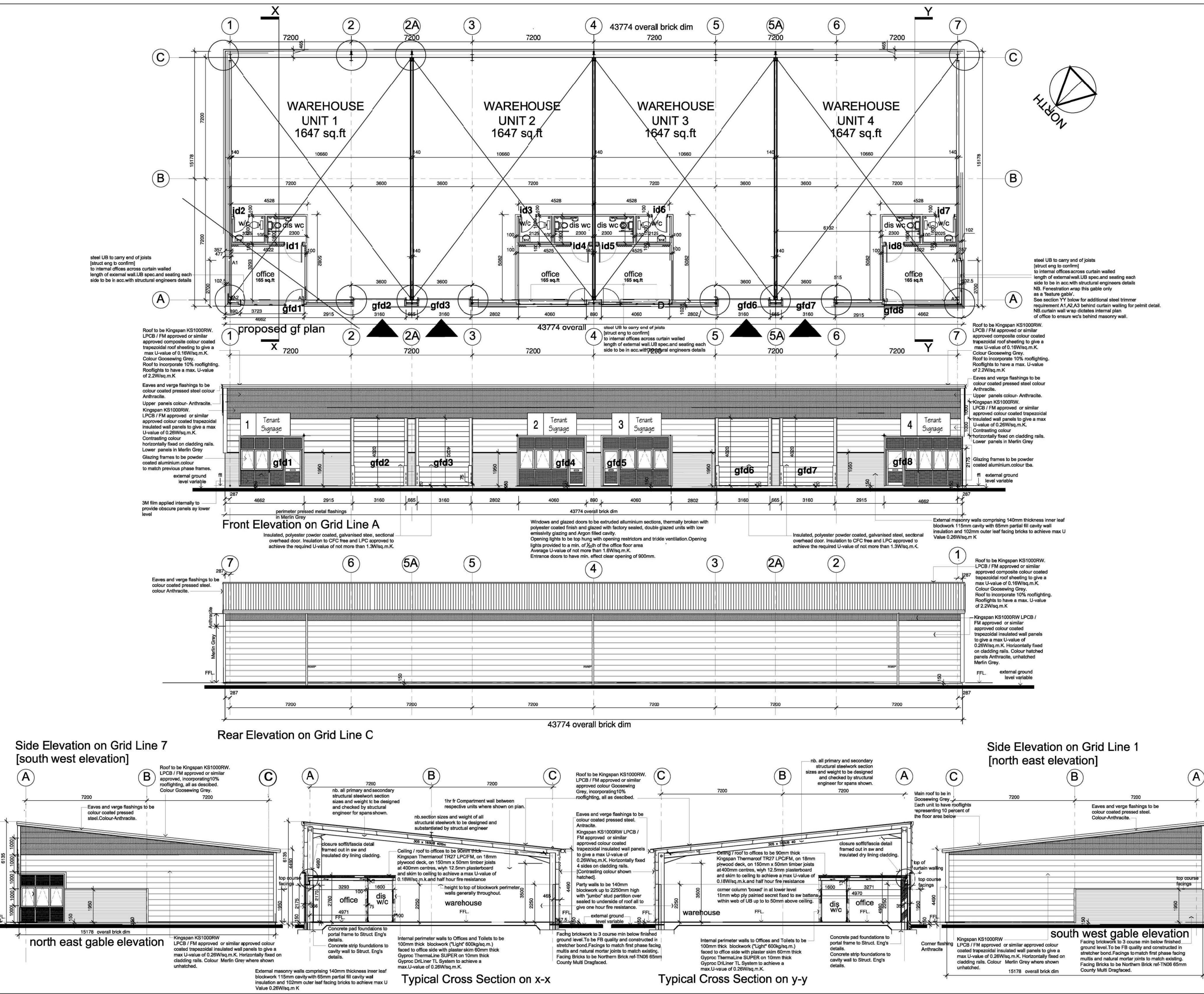
NT
NORTHERN TRUST
INVESTMENT / DEVELOPMENT / REGENERATION
NORTHERN TRUST
LYNCH HOUSE, ACKHURST PARK, CHORLEY PR7 1NY.
Tel: 01257 238 555 Fax: 01257 238 556
Email: info@northerntrust.co.uk

Client: Northern Trust

Project: SANDBROOK PARK
ROCHDALE OL11 1RY
INDUSTRIAL BLOCK A

Drawing: Block A [Alternative]
Plans, Elevations, Section
[higher plynth] Corner glazed

Drawn By	DE	Date	25.5.23	Drawing No.		Rev.	
Checked By	DE	Date	25.5.23		WJ-204-0019		
Scale	1/100			@A1			



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 Northern Trust and copyright is reserved by them. The drawing is not to be copied or used without their prior written consent.

Notes

All insulation to be CFC/HFC-free with zero Ozone Depletion Potential.

All Cladding details to comply with Kingspan Enhanced details.

MATERIAL/COLOUR KEY

- Steel paintwork - Merlin Grey
- Roof cladding - Kingspan KS1000RW Insulated Roof Panel (LPCB Approved) or equal - Anthracite
- Gutters, Fascias & Verges - Anthracite
- Rainwater pipes - Colour to match cladding
- Kingspan KS1000RW Insulated Wall Panel (LPCB/FM Approved) or equal - Anthracite where shown hatched, Merlin Grey where shown unhatched.
- Flashings to match panel colour.
- Brickwork - Northern Brick ref-TN06, 65mm County, Multi Dragface.
- Loading doors - Anthracite
- Personnel doors - Anthracite
- Escape doors - Anthracite
- Windows - Extruded Aluminium window sections - Colour Graphite Grey.
- Glazing tint - Colour Grey

Hatched areas denote contrasting colours, actual locations of horizontal panels / rear doors may vary slightly to suit setting-out of panels.

CRITICAL DOOR DIMENSIONS

Internal Doors - Minimum effective clear width 800mm
Entrance Doors - Minimum effective clear width 900mm for one leaf
Fire Exit Doors - Minimum effective clear width 850mm

All vision panels to have minimum zones of visibility between 500mm to 800mm and 1150mm to 1500mm.

REQUIRED U VALUES

'Warm Roof' Construction-0.16 W/sq.m.K

External Wall Construction-0.26 W/sq.m.K

Ground Floor Construction-0.18 W/sq.m.K
[Only applies under heated spaces ie. wc's and offices].

Windows, Rooflights-2.2 W/sq.m.K

Personnel Doors-1.6 W/sq.m.K

Vehicle Access and Similar Large Doors-1.3 W/sq.m.K

NB. offices and toilets are to be space heated. walls to these spaces-0.26W/sq.m.K, roof- 0.16 W/sq.m.K, floor 0.13 W/sq.m.K. The warehouses are to remain unheated so the ground bearing slab under the warehouse space does not need to be insulated.

A 16.8.23 Corner return glazing removed from NE elevation

Rev.	Date	Details	de	de
			Drawn	Checked

Issued for: **PLANNING**

NORTHERN TRUST
INVESTMENT / DEVELOPMENT / REGENERATION
LYNTON HOUSE, ACKHURST PARK, CHORLEY PR7 1NY.
Tel: 01257 238 555 Fax: 01257 238 556 Email: info@northerntrust.co.uk

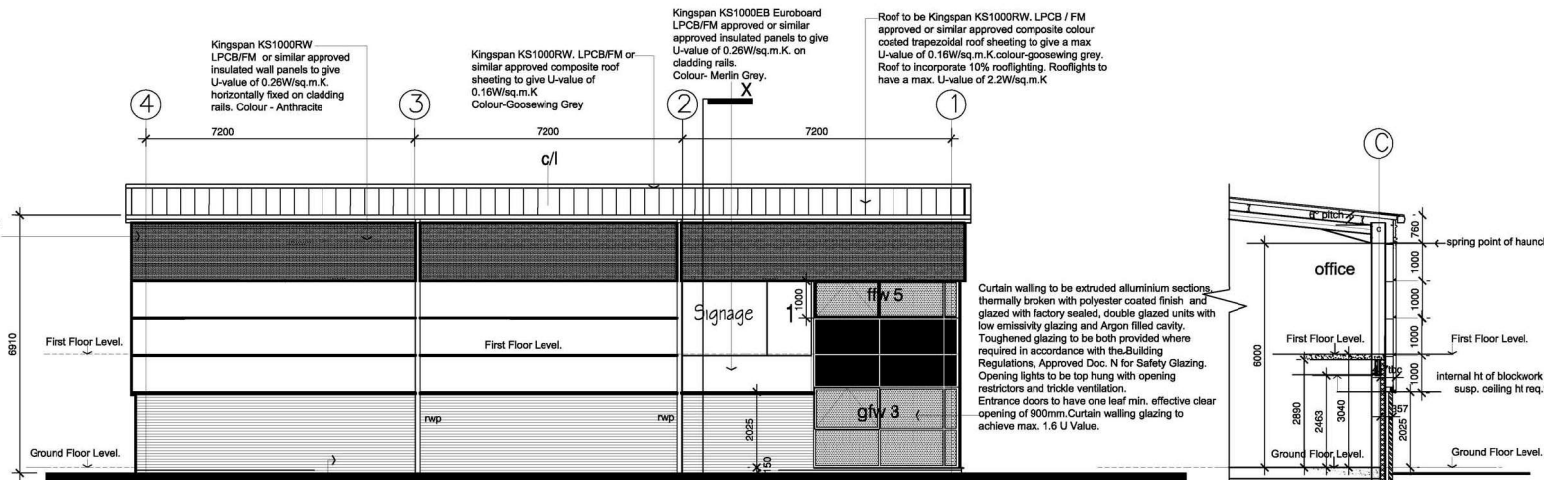
Client: **Northern Trust**

Project: **SANDBROOK PARK [PHASE 2] ROCHDALE OL11 1RY INDUSTRIAL UNIT B**

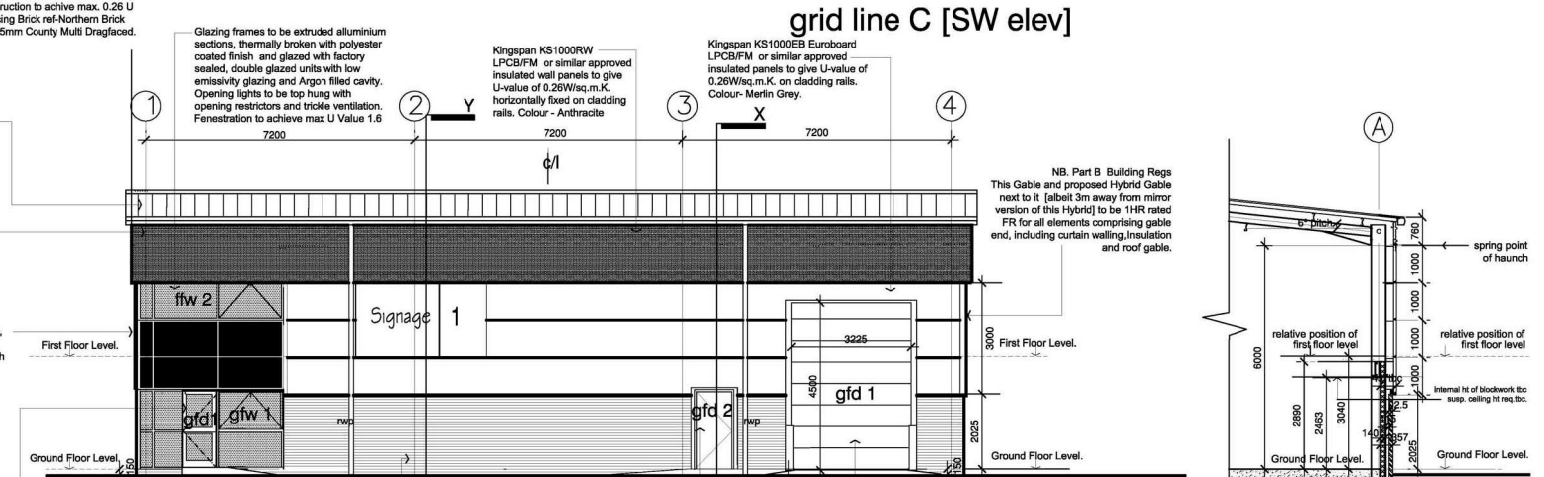
Drawing: **Block B Plans, Elevations, Section [High Level Plynth] [2 corner wraps shown]**

Drawn By	Date	16.5.23	Drawing No.	WJ-204-0021	Rev.	A
Checked By	Date	16.5.23				
Scale	1/100	@A1				

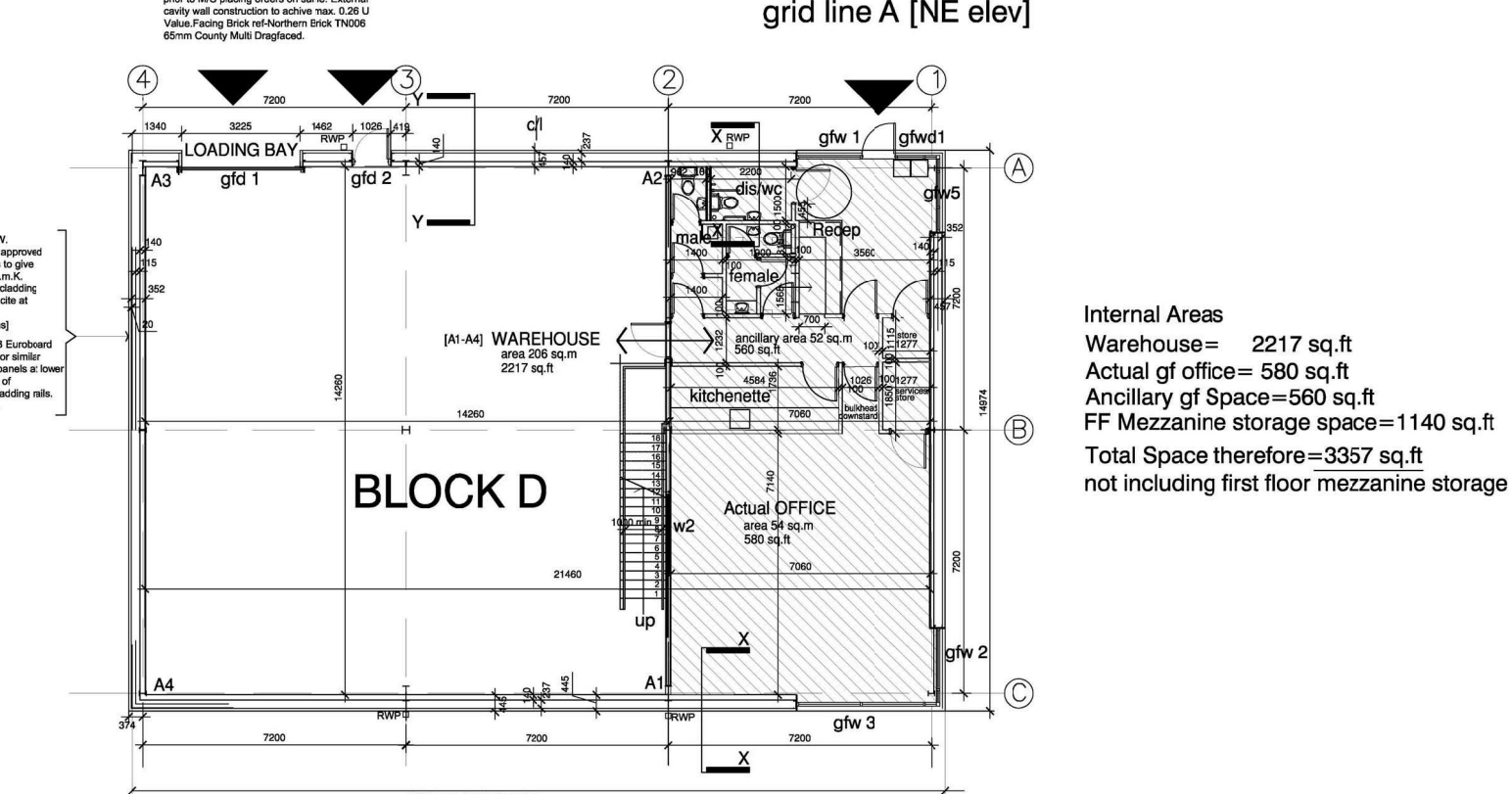
electronic path to this drawing-WJ 204/current dwg



Side Elevation
grid line 1 [South East Elevation]

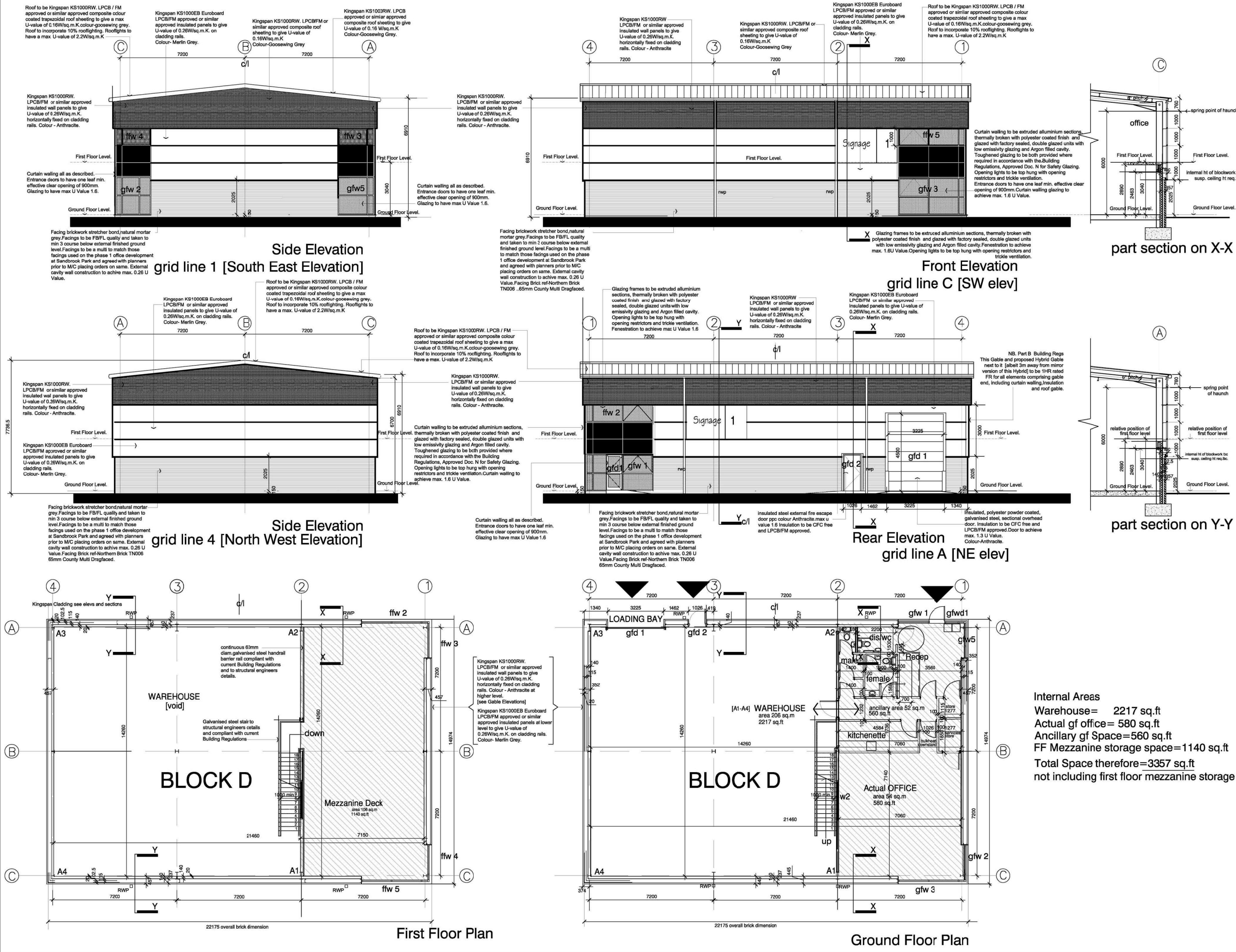


Side Elevation
grid line 4 [North West Elevation]



Ground Floor Plan

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 Whittle Jones and copyright is reserved by them. The drawing is not to be copied or used without their prior written consent.			
Notes			
All insulation to be CFC/HCF-free with zero Ozone Depletion Potential.			
All Cladding details to comply with Kingspan Enhanced details.			
MATERIAL/COLOUR KEY			
• Steel panwork - Merlin Grey • Roof cladding - Kingspan KS1000RW Insulated Roof Panel (LPCB/FM Approved) or - equal - Gossweing Grey. • Gutters, Fascias & Verges - Colour Anthracite • Rainwater pipes - Colour-Anthracite • Kingspan KS1000RW Insulated Wall Panel (LPCB/FM or similar Approved) - Anthracite. Flashings to match panel colour. [Anthracite panels shown hatched] • Kingspan KS1000EB Euroboard Ipcb/fm or similar approved Insulated wall panels to achieve a U Value of 0.26 w/sq.m.K • on cladding rails. Colour Merlin Grey • Brickwork - To match Facings used on phase 1.TBC • Northern Brick ref-TN006 65mm County Multi Draglaced. • Loadings doors - colour Anthracite • Personnel doors - Escape doors - colour Anthracite • Windows - Extruded Aluminium window sections - Colour Merlin Grey. • Glazing int - Colour Grey			
CRITICAL DOOR DIMENSIONS			
Internal Doors - Minimum effective clear width 800mm Entrance Doors - Minimum effective clear width 900mm for one leaf Fire Exit Doors - Minimum effective clear width 850mm			
All vision panels to have minimum zones of visibility between 500mm to 800mm and 1150mm to 1500mm.			
CRITICAL STAIR DIMENSIONS			
Width between walls to be 1225mm [1200 between plaster faces] Risers 18 No. @ at 168.4mm max. Goings 250mm landings 1200mm Handrail clearance to walls/steel to be 60mm Handrails shall project past the first/last riser 300mm. Handrails shall be between 45 and 45mm in diameter. Handrails shall be between 90mm and 100mm above pitch line of stairs and between 300mm and 1100mm at start and end of stairs			
REQUIRED U VALUES			
'Warm Roof' Construction-0.16 W/sq.m.K			
External Wall Construction-0.26 W/sq.m.K			
Ground Floor Construction-0.18 W/sq.m.K			
[Only applies under heated spaces i.e. wc's and offices].			
Windows-1.6 W/sq.m.K			
Rooflights-2.2 W/sq.m.K			
Personnel Doors-1.6W/sq.m.K			
Vehicle Access and Similar Large Doors-1.3W/sq.m.K			
NB. offices and toilets are to be space heated. walls to these spaces-0.26W/sqm K, roof- 0.16 W/sqmK,floor 0.18 W/sq.m.K. The warehouses are to remain unheated so the ground bearing slab under the warehouse space does not need to be insulated.			
			
C 25.4.24 resolution reduction req. by planners B 23.8.23 1 corner curtain walling omitted A 16.8.23 Reduced Hybrid for site fit.			
Rev.	Date	Details	de Drawn de Checked
Issued for: PLANNING			
			
NORTHERN TRUST INVESTMENT / DEVELOPMENT / REGENERATION NORTHERN TRUST LYNTOHOUSE, ACRHURIST PARK, CHORLEY PR7 1NY. Tel: 01257 228 555 Fax: 01257 233 556 Email: info@northerntrust.co.uk			
Client: Northern Trust			
Project: SANDBROOK PARK ROCHDALE [phase 2] OL11 1RY REDUCED HYBRID TYPE A1 Office/Industrial Unit			
Drawing: REDUCED HYBRID TYPE A1 Plans,Elevations,Section higher plynth. BLOCK D			
Drawn By DE	Date 6.7.23	Drawing No. WJ204-025	Rev. C
Checked By DE	Date 6.7.23		
Scale 1/100	@A1		



All site dimensions shall be verified by the contractor on site prior to work commencing.

Do not scale from this drawing.

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Notes

- All insulation to be GFC/HCFC-free with zero Ozone Depletion Potential.
- All Cladding details to comply with Kingspan Enhanced details.

MATERIAL COLOUR KEY

- Steel paintwork - Merlin Grey
- Roof cladding - Kingspan KS1000RW Insulated Roof Panel (LPCB/FM Approved) or equal - Goosewing Grey.
- Gutters, Fascias & Verges - Colour Anthracite
- Rainwater pipes - Colour Anthracite
- Kingspan KS1000RW Insulated Wall Panel (LPCB/FM or similar Approved) - Anthracite. Flashings to match panel colour (Anthracite panels shown hatched)
- Kingspan KS1000EB Euroboard (LPCB/FM or similar approved) insulated wall panels to achieve a U Value of 0.26 W/sq.m.K on cladding rails. Colour Merlin Grey.
- Brickwork - To match Facings used on phase 1. TBC Northern Brick ref-TN006 65mm County Multi Dragfaced.
- Loading doors - colour Anthracite
- Personnel doors - Escape doors - colour Anthracite
- Windows - Extruded Aluminium window sections - Colour Merlin Grey.
- Glazing tint - Colour Grey

CRITICAL DOOR DIMENSIONS

Internal Doors - Minimum effective clear width 800mm

Entrance Doors - Minimum effective clear width 900mm for one leaf

Fire Exit Doors - Minimum effective clear width 850mm

All vision panels to have minimum zones of visibility between 500mm and 800mm and 1150mm to 1500mm.

CRITICAL STAIR DIMENSIONS

Width between walls to be 1225mm (1200 between plaster faces)

Risers 18 No. @ 168.4mm max.

Goings 250mm

Landings 1200mm

Handrail clearance to walls/steel to be 60mm

Handrails shall project past the first/last riser 300mm.

Handrails shall be between 45 and 65mm in diameter.

Handrails shall be between 90mm and 100mm above pitch line of stairs and between 900mm and 1100mm at start and end of stairs

REQUIRED U VALUES

'Warm Roof' Construction-0.16 W/sq.m.K

External Wall Construction-0.26 W/sq.m.K

Ground Floor Construction-0.16 W/sq.m.K
[Only applies under heated spaces ie. wc's and offices].

Windows-1.6 W/sq.m.K

Rooflights-2.2 W/sq.m.K

Personnel Doors-1.6W/sq.m.K

Vehicle Access and Similar Large Doors-1.3W/sq.m.K

NB. offices and toilets are to be space heated. walls to these spaces-0.26W/sq.m.K, roof-0.16 W/sq.m.K, floor 0.18 W/sq.m.K.

The warehouses are to be remain unheated so the ground bearing slab under the warehouse space does not need to be insulated.

North

C 25.4.24 resolution reduction req. by planners

B 23.8.23 1 corner curtain walling omitted

A 16.8.23 Reduced Hybrid for site fit.

Rev. Date Details

Issued for: **PLANNING**

NT

NORTHERN TRUST

INVESTMENT / DEVELOPMENT / REGENERATION

NORTHERN TRUST
LYNCH HOUSE, ACKHURST PARK, CHORLEY PR7 1NY.
Tel: 01257 228 555 Fax: 01257 228 556
Email: info@northerntrust.co.uk

Client: Northern Trust

Project: **SANDBROOK PARK**
ROCHDALE [phase 2] OL11 1RY
REDUCED HYBRID TYPE A1
Office/Industrial Unit

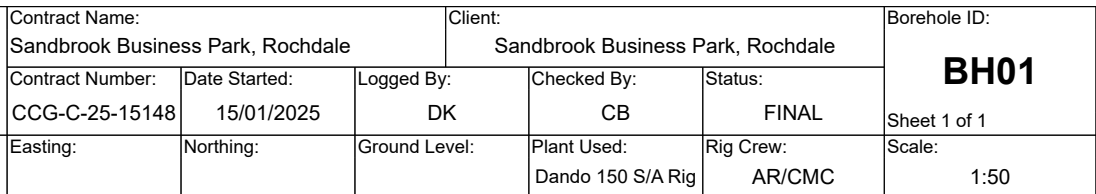
Drawing: **REDUCED HYBRID TYPE A1**
Plans, Elevations, Section
higher plynth. BLOCK D

Drawn By: DE Date: 6.7.23 Drawing No. WJ204-025 Rev. C

Checked By: DE Date: 6.7.23

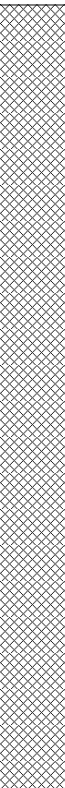
Scale: 1/100 @A1

[FINAL CHECKED DE J]
electronic path to this drawing-WJ204/current dwg



Samples & In Situ Testing	Strata Details	Groundwater
---------------------------	----------------	-------------

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks: 1 hour hand excavating 1.20mbgl service avoidance pit					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)						
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
CC GEOTECHNICAL LTD 0151 545 2750 www.ccgeotechnical.co.uk														

	Contract Name: Sandbrook Business Park, Rochdale				Client: Sandbrook Business Park, Rochdale				Borehole ID: BH02				
	Contract Number: CCG-C-25-15148		Date Started: 16/01/2025		Logged By:		Checked By: CB		Status: FINAL				
	Easting:		Northing:		Ground Level:		Plant Used: Dando 150 S/A Rig		Rig Crew: AR/CMcG				
Cable Percussion Borehole Log										Sheet 1 of 1			
Weather:				Termination:				Scale: 1:50					
Samples & In Situ Testing				Strata Details						Groundwater			
Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description				Water Strike	Backfill/ Installation		
5.00	B			(5.20)		Brown very gravelly slightly silty fine to coarse SAND. Gravel is fine to coarse subangular to subrounded limestone, sandstone, mudstone, brick. (MADE GROUND)				1			
										2			
										3			
										4			
										5			
7.00	B			(3.00)		Brown silty fine to medium SAND				6			
										7			
										8			
8.00	B			8.20		End of Borehole at 8.20m				9			
										10			
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:				
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	1 hour hand excavating 1.20mbgl service avoidance pit				
Chiselling					Installation				Water Strikes				
From (m)	To (m)	Duration	Remarks	Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
								4.80	4.80		0		Recovery WET
CC GEOTECHNICAL LTD 0151 545 2750 www.ccgeotechnical.co.uk													

CCG-C-25-15148: Sandbrook
Way, Rochdale - Test 01

FALLING HEAD TEST



Details of test Section	Situation B - BS5930	Ground Level (mAOD)	
Height of standpipe	N/A	Filter Length	N/A
Depth below top of standpipe to response zone	N/A	Casing Elevation (mAOD)	
Initial depth to water (mbgl)	0.000	Borehole Diameter (m)	0.150
Depth of Casing (mbgl)	4.900	Standpipe Diameter:	N/A
		Casing Diameter	150mm

Ref: BS5930:2015

Strata: GL-4.8mbgl: Made Ground comprising dark brown cobbly locally clayey SAND & GRAVEL
4.8m - 4.9mbgl: Made Ground comprising brown silty gravelly SAND (Very Wet)

Time Elapsed t (mins)	Depth at Time t From top of casing (m)	Head at Time t	Head Ratio (H/Ho)
0	0.000	4.900	1.000
1	0.130	4.770	0.973
2	0.230	4.670	0.953
3	0.351	4.549	0.928
4	0.448	4.452	0.909
5	0.503	4.397	0.897
10	0.760	4.140	0.845
15	0.942	3.958	0.808
20	1.204	3.696	0.754
30	1.760	3.140	0.641
40	1.990	2.910	0.594
50	2.230	2.670	0.545
60	2.490	2.410	0.492
70	2.750	2.150	0.439
80	3.010	1.890	0.386
90	3.270	1.630	0.333
100	3.530	1.370	0.280
110	3.790	1.110	0.227
120	4.050	0.850	0.173
130	4.310	0.590	0.120
140	4.570	0.330	0.067
150	4.800	0.100	0.020
160	4.900	0.000	0.000

Permeability:

$$K = A/FT$$

$$K = 4.44E-06 \text{ m/s}$$

Where:

$$A = \text{Cross sectional area of BH02 (m}^2\text{)}$$

$$0.0176$$

$$F = \text{Intake Factor (m) see BS5930}$$

$$0.4125$$

$$T = \text{Basic time Lag (s)}$$

$$9600$$

*Test extrapolated from 60mins

Notes:

Test carried out under Test B of Section 4 - BS 5930:2015

Client: Northern Trust

Calcs by: TG Checked by: CB Job Number: 25-15148

Units 1 & 2
Deltic Place
Deltic Way
Knowsley Industrial Estate
Liverpool
L33 7BU

Telephone: (0151) 545 2750
Fax: (0151) 548 7892
Email: enquiries@ccgeotechnical.com
www.ccgeotechnical.com



LABORATORY REPORT

CONTRACT NUMBER: CCG-C-25-15148

CONTRACT TITLE: SANDBROOK WAY

CLIENT: NORTHERN TRUST

DATE RECEIVED: 16/01/25
DATE COMMENCED: 16/01/25
DATE COMPLETED: 20/01/25
REPORT DATE: 21/01/25

Test Description	Qty
Particle Size Distribution BS 1377-2:1990 (a)	4

Notes: Observations and interpretations are not accredited by UKAS
All testing undertaken at laboratory permanent facilities
denotes non-accredited test
a denotes UKAS accredited test
s denotes test undertaken by approved subcontractor
Test results only relate to the samples tested

This report is issued in accordance with the requirements of the United Kingdom Accreditation Services and EN ISO/IEC 17025:2017. The results reported herein relate only to the material supplied to the laboratory. This report shall not be reproduced except in full, without the prior written approval of the laboratory.

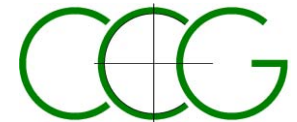
Approved Signatories: Chris Bolan (Managing Director) – Daniel Kerfoot (Laboratory Manager)

SUMMARY OF LABORATORY SOIL TEST RESULTS

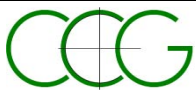
BH / TP / WS Number	Sample Type	Depth From (m)	Depth To (m)	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Shear Strength (kN/m ²)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 0.425mm (%)	Soil Classification	UKAS accredited test (Y/N)	Description / Test Method Samples described in accordance with BS EN ISO 14688-2 2004
BH1	B	5.50	5.50	-	-	-	-	-	-	-	-	-	Y	Brown very sandy slightly silty GRAVEL. Gravel is fine to coarse subangular to rounded sandstone, mudstone, quartz. (BS1377Pt2:9.2)
BH2	B	5.00	5.00	-	-	-	-	-	-	-	-	-	Y	Brown very gravelly slightly silty fine to coarse SAND. Gravel is fine to coarse subangular to subrounded limestone, sandstone, mudstone, brick. (MADE GROUND) (BS1377Pt2:9.2)
BH2	B	7.00	7.00	-	-	-	-	-	-	-	-	-	Y	Brown very sandy silty GRAVEL. Gravel is fine to coarse subangular to subrounded sandstone and mudstone. (BS1377Pt2:9.2)
BH2	B	8.00	8.00	-	-	-	-	-	-	-	-	-	Y	Brown silty fine to medium SAND. (BS1377Pt2:9.2)

SITE: SANDBROOK WAY (CCG-C-25-15148)
 CLIENT: NORTHERN TRUST

DATE: 21.01.25



Key:- BD = Bulk Disturbed; SD = Small Disturbed; U100 = Undisturbed 100mm; WS = Window Sample
 CL = Low Plasticity; CI = Intermediate; CH = High; CV = Very high; CE = Extremely high; NP = Non-plastic
 (* Denotes Hand Shear Vane test result)
 Sample description not accredited by UKAS



CC Geotechnical Ltd
Tel: 0151 545 2750
e: lab@ccgeotechnical.com

PARTICLE SIZE DISTRIBUTION

Job Ref

CCG-C-25-15148

Borehole/Pit No.

BH1

Site Name

SANDBROOK WAY

Sample No.

1

Specimen
Description

Brown very sandy slightly silty GRAVEL

Depth, m

5.50

Specimen
Reference

Specimen
Depth

m

Sample Type

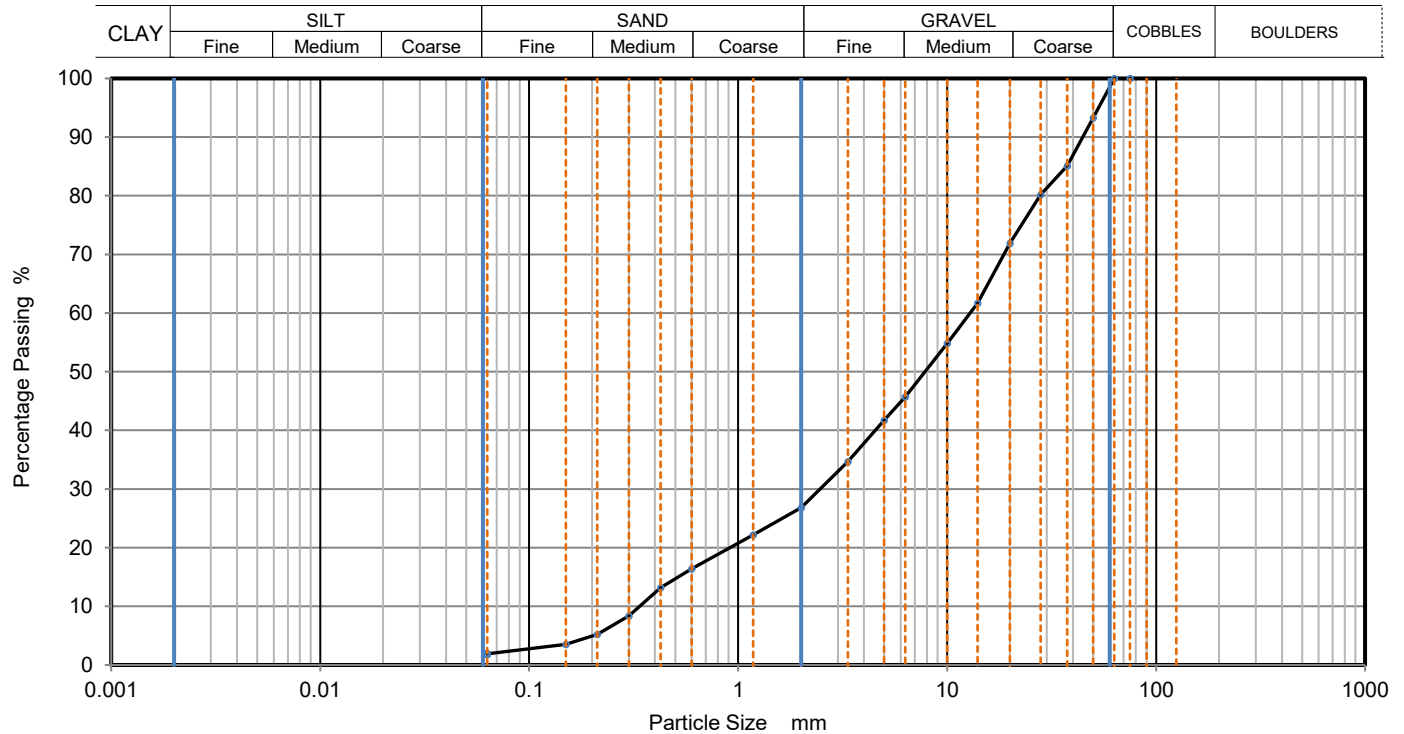
B

Test Method

BS1377:Part 2:1990, clause 9.2

KeyLAB ID

CCGL2025012122



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
63	100		
50	93		
37.5	85		
28	80		
20	72		
14	62		
10	55		
6.3	46		
5	42		
3.35	35		
2	27		
1.18	22		
0.6	16		
0.425	13		
0.3	8		
0.212	5		
0.15	4		
0.063	2		

Dry Mass of sample, g

Sample Proportions	% dry mass
Very coarse	0
Gravel	73
Sand	25
Fines <0.063mm	2

Grading Analysis		
D100	mm	
D60	mm	12.9
D30	mm	2.47
D10	mm	0.338
Uniformity Coefficient		38
Curvature Coefficient		1.4

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator

Checked

Approved

Sheet printed

Fig 1

21/01/2025 15:37

Sheet



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e: lab@ccgeotechnical.com

PARTICLE SIZE DISTRIBUTION

Job Ref

CCG-C-25-15148

Borehole/Pit No.

BH2

Site Name

SANDBROOK WAY

Sample No.

1

Specimen
Description

Brown very gravelly slightly silty fine to coarse SAND

Depth, m

5.00

Specimen
Reference

Specimen
Depth

m

Sample Type

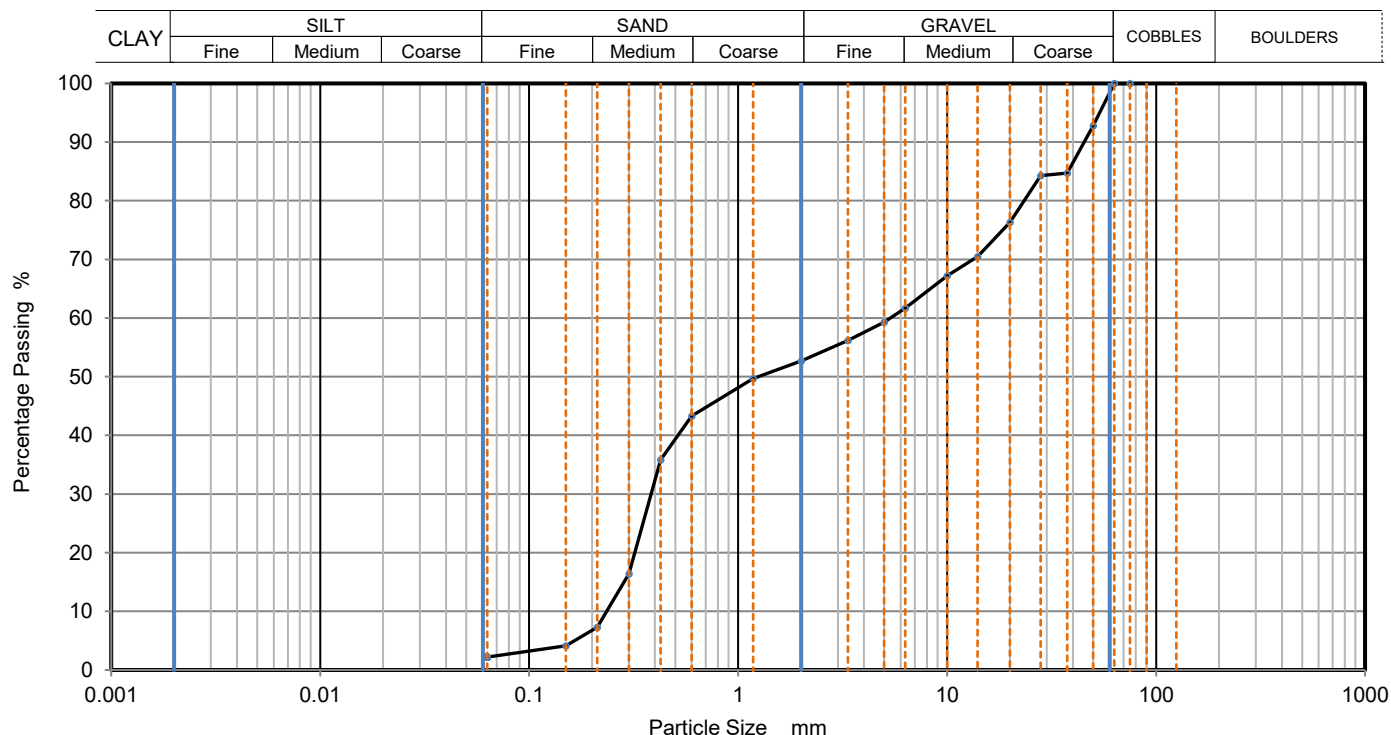
B

Test Method

BS1377:Part 2:1990, clause 9.2

KeyLAB ID

CCGL2025012123



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
63	100		
50	93		
37.5	85		
28	84		
20	76		
14	71		
10	67		
6.3	62		
5	59		
3.35	56		
2	53		
1.18	50		
0.6	43		
0.425	36		
0.3	16		
0.212	7		
0.15	4		
0.063	2		

Dry Mass of sample, g

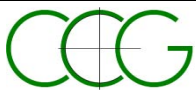
Sample Proportions	% dry mass
Very coarse	0
Gravel	47
Sand	51
Fines <0.063mm	2

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	23
Curvature Coefficient	0.12

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	Fig 1 Sheet
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PARTICLE SIZE DISTRIBUTION

Job Ref

CCG-C-25-15148

Borehole/Pit No.

BH2

Site Name

SANDBROOK WAY

Sample No.

1

Specimen
Description

Brown very sandy silty GRAVEL

Depth, m

7.00

Specimen
Reference

Specimen
Depth

m

Sample Type

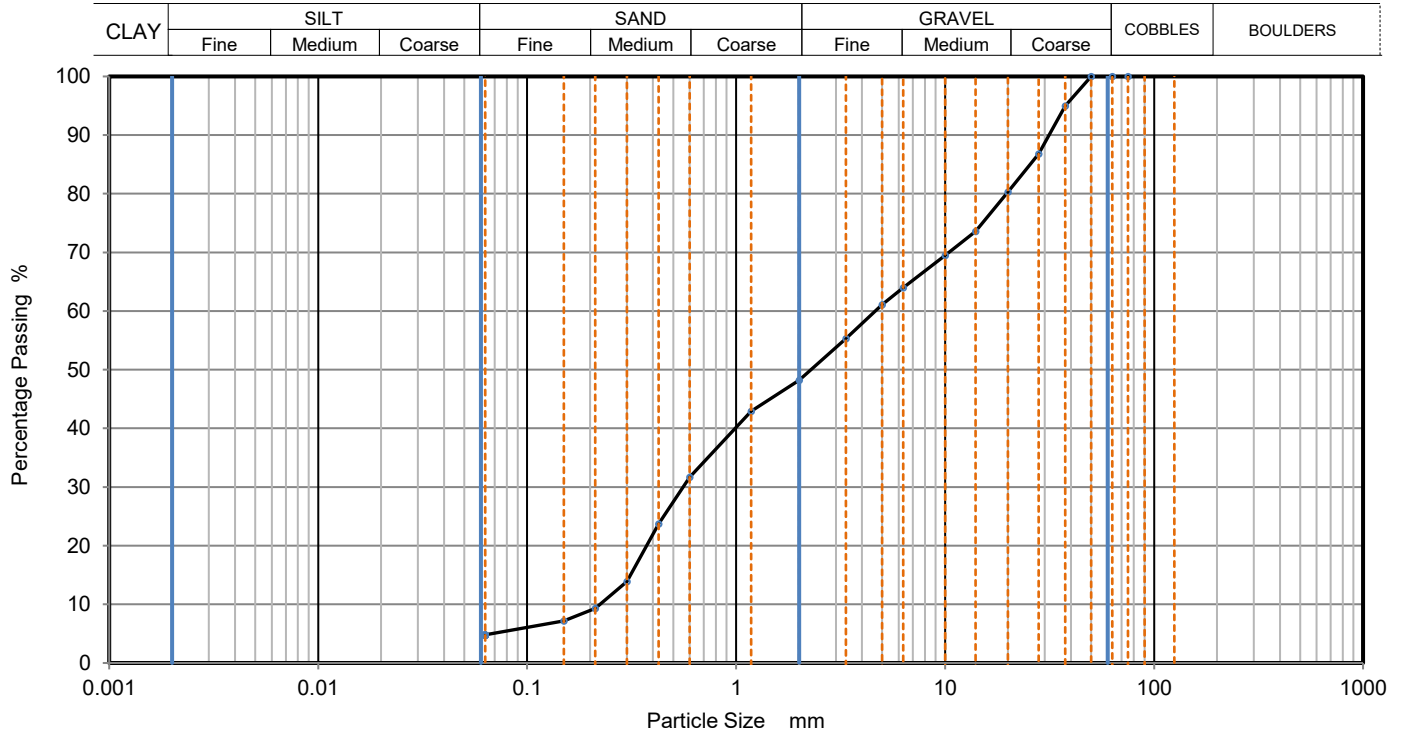
B

Test Method

BS1377:Part 2:1990, clause 9.2

KeyLAB ID

CCGL2025012124



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
63	100		
50	100		
37.5	95		
28	87		
20	80		
14	74		
10	70		
6.3	64		
5	61		
3.35	55		
2	48		
1.18	43		
0.6	32		
0.425	24		
0.3	14		
0.212	9		
0.15	7		
0.063	5		

Dry Mass of sample, g

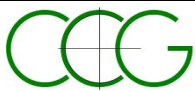
Sample Proportions	% dry mass
Very coarse	0
Gravel	52
Sand	43
Fines <0.063mm	5

Grading Analysis		
D100	mm	
D60	mm	4.62
D30	mm	0.557
D10	mm	0.223
Uniformity Coefficient		21
Curvature Coefficient		0.3

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	Fig 1 Sheet
JE	DK	DK	21/01/2025 15:37	



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PARTICLE SIZE DISTRIBUTION

Job Ref

CCG-C-25-15148

Borehole/Pit No.

BH2

Site Name

SANDBROOK WAY

Sample No.

1

Specimen
Description

Brown silty fine to medium SAND

Depth, m

8.00

Specimen
Reference

Specimen
Depth

m

Sample Type

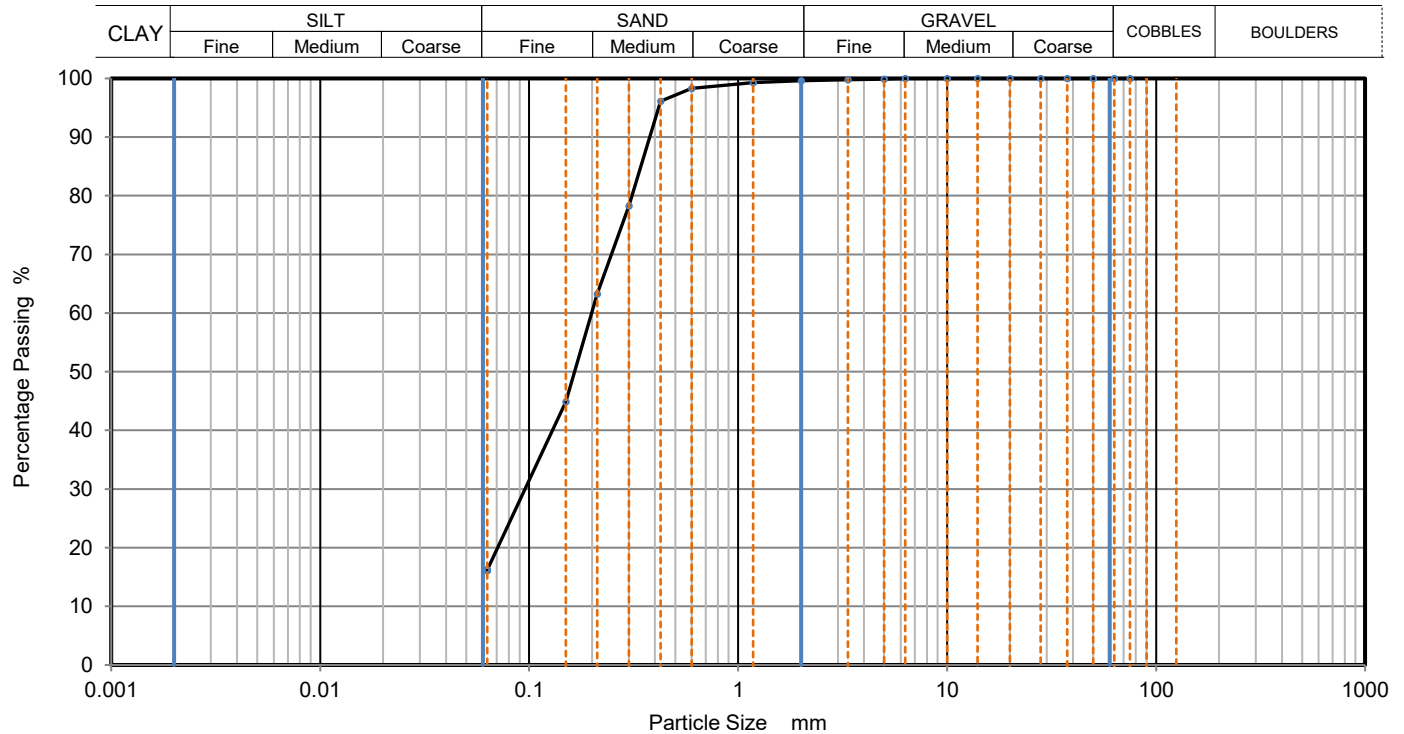
B

Test Method

BS1377:Part 2:1990, clause 9.2

KeyLAB ID

CCGL2025012125



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	98		
0.425	96		
0.3	78		
0.212	63		
0.15	45		
0.063	16		

Dry Mass of sample, g

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	84
Fines <0.063mm	16

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	Fig 1 Sheet
JE	DK	DK	21/01/2025 15:37	

Appendix H: -
InfoDrainage Hydraulic Analysis

2023.110: Sandbrook Park Rochdale OL11 1RY	Date: 14/02/0024		
	Designed by: L.Edwards	Checked by: G.Schofield	Approved By: G.Schofield
Report Details: Type: Junctions Storm Phase: Phase	Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF		



Outlets			
Junction	Outlet Name	Outgoing Connection	Outlet Type
S02	Outlet	1.002	Free Discharge
S01	Outlet	1.001	Free Discharge
S04	Outlet	1.004	Free Discharge
S05	Outlet	1.005	Free Discharge
S08	Outlet	1.008	Free Discharge
S09 (Silt Trap)	Outlet	1.009	Free Discharge
S07	Outlet	1.007	Free Discharge
S12	Outlet	2.002	Free Discharge
S13	Outlet	2.003	Free Discharge
S15	Outlet	2.005	Free Discharge
S16	Outlet	2.006	Free Discharge
S19	Outlet	2.009	Free Discharge
S11	Outlet	2.001	Free Discharge
S14	Outlet	2.004	Free Discharge
S17 (SILT-TRAP)	Outlet	2.007	Free Discharge
S20 (Silt Trap)	Outlet	2.010	Free Discharge
S06 (SILT-TRAP)	Outlet (1)	1.006	Free Discharge
S18	Outlet	2.008	Free Discharge
S22 PUMP CHAMBER	Outlet	RISING-MAIN	Level Controlled Pump
	Invert Level (m)	132.636	
	Cut In Height (m)	0.950	
	Cut Out Height (m)	0.150	
	Depth (m)	Outflow (L/s)	
	0.212	5.0	
S23	Outlet	Overflow to SA3-B	Free Discharge
S03	Outlet	1.003	Free Discharge
S21 (Oil Separator)	Outlet	2.010.A	Free Discharge
S10 (OIL SEPARATOR)	Outlet (1)	1.010	Free Discharge
SA3-MH	Outlet	2.011.A	Free Discharge
	Outlet (1)	2.012	Orifice
	Diameter (m)	0.150	
	Coefficient of Discharge	0.600	
	Invert Level (m)	133.000	

2023.110: Sandbrook Park Rochdale OL11 1RY	Date: 14/02/0024		
	Designed by: L.Edwards	Checked by: G.Schofield	Approved By: G.Schofield
Report Details: Type: Stormwater Controls Storm Phase: Phase	Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF		



SA3-A

Type : Soakaway

Dimensions

Exceedance Level (m)	134.420
Depth (m)	7.584
Base Level (m)	126.836
Freeboard (mm)	150
Soakaway Shape	Circular
Diameter / Width (m)	0.150
Porosity (%)	100
Ineffective Storage Depth (m)	0.300
Number of Soakaways	1
Base Infiltration Rate (m/hr)	1.872
Side Infiltration Rate (m/hr)	1.872
Safety Factor	2.0
Total Volume (m³)	0.129



SA1

Type : Soakaway

Dimensions

Exceedance Level (m)	135.920
Depth (m)	7.432
Base Level (m)	128.488
Freeboard (mm)	300
Soakaway Shape	Circular
Diameter / Width (m)	0.150
Porosity (%)	100
Ineffective Storage Depth (m)	0.150
Number of Soakaways	1
Base Infiltration Rate (m/hr)	4.104
Side Infiltration Rate (m/hr)	4.104
Safety Factor	2.0
Total Volume (m³)	0.126



SA2

Type : Soakaway

Dimensions

Exceedance Level (m)	135.920
Depth (m)	7.432
Base Level (m)	128.488
Freeboard (mm)	300
Soakaway Shape	Circular
Diameter / Width (m)	0.150
Porosity (%)	100
Ineffective Storage Depth (m)	0.150
Number of Soakaways	1
Base Infiltration Rate (m/hr)	4.104
Side Infiltration Rate (m/hr)	4.104
Safety Factor	2.0
Total Volume (m³)	0.126

2023.110: Sandbrook Park Rochdale OL11 1RY	Date: 14/02/0024		
	Designed by: L.Edwards	Checked by: G.Schofield	Approved By: G.Schofield
Report Details: Type: Stormwater Controls Storm Phase: Phase	Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF		



SA3-B

Type : Soakaway

Dimensions

Exceedance Level (m)	135.920
Depth (m)	7.432
Base Level (m)	128.488
Freeboard (mm)	300
Soakaway Shape	Circular
Diameter / Width (m)	0.150
Porosity (%)	100
Ineffective Storage Depth (m)	0.150
Number of Soakaways	1
Base Infiltration Rate (m/hr)	4.104
Side Infiltration Rate (m/hr)	4.104
Safety Factor	2.0
Total Volume (m³)	0.126

2023.110: Sandbrook Park Rochdale OL11 1RY	Date: 14/02/0024		
	Designed by: L.Edwards	Checked by: G.Schofield	Approved By: G.Schofield
Report Details: Type: Stormwater Controls Storm Phase: Phase	Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF		



Geo-Cellular Storage

Type : Cellular Storage

Dimensions	
Exceedance Level (m)	133.800
Depth (m)	0.400
Base Level (m)	132.600
Number of Crates Long	32
Number of Crates Wide	10
Number of Crates High	1
Porosity (%)	95
Crate Length (m)	1
Crate Width (m)	0.5
Crate Height (m)	0.4
Total Volume (m³)	61.600

2023.110: Sandbrook Park Rochdale OL11 1RY	Date: 14/02/0024		
	Designed by: L.Edwards	Checked by: G.Schofield	Approved By: G.Schofield
Report Title: Rainfall Analysis Criteria	Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF		




Runoff Type	Dynamic
Output Interval (mins)	2
Time Step	Shortest
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Prefill Manhole Sumps	☐
Perform No Discharge Analysis	☐

Rainfall

FSR

Type: FSR

Region	England And Wales
M5-60 (mm)	20.0
Ratio R	0.300
Summer	☒
Winter	☒

Return Period

Return Period (years)	Increase Rainfall (%)
1.0	0.000
2.0	0.000
30.0	45.000
100.0	45.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
180	360
240	480
360	720
480	960
600	1200
720	1440
960	1920
1440	2880

2023.110: Sandbrook Park Rochdale OL11 1RY	Date: 14/02/0024		
	Designed by: L.Edwards	Checked by: G.Schofield	Approved By: G.Schofield
Report Title: UK and Ireland Rural Runoff Calculator	Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF		





ICP SUDS / IH 124

Details

Method	ICP SUDS
Area (ha)	0.521
SAAR (mm)	1119.0
Soil	0.47
Region	Region 10
Urban	0
Return Period (years)	30

Results

Region	QBAR Rural (L/s)	QBAR Urban (L/s)	Q 30 (years) (L/s)	Q 1 (years) (L/s)	Q 30 (years) (L/s)	Q 100 (years) (L/s)
Region 10	4.4	4.4	7.4	3.8	7.4	9.1

Greenfield Volume

FSR

Details

Region	England And Wales
M5-60 (mm)	20.0
Ratio R	0.3
Area (ha)	0.521
SAAR (mm)	1119.0
CWI	123.631
Urban 1990	0
Areal Reduction Factor	1.00
SPR	0.47
Storm Duration (mins)	1440
Return Period (years)	30

Results

PR%	6.11
Greenfield Runoff Volume (m³)	25.569

2023.110: Sandbrook Park Rochdale OL11 1RY	Date: 14/02/0024		
	Designed by: L.Edwards	Checked by: G.Schofield	Approved By: G.Schofield
Report Details: Type: Inflows Summary Storm Phase: Phase	Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF		



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m³)
ROOF-A1	FSR: 1 years: +0 %: 15 mins: Summer	0.02	2.5	0.987
ROOF-B1	FSR: 1 years: +0 %: 15 mins: Summer	0.03	4.8	1.859
ROOF-C2	FSR: 1 years: +0 %: 15 mins: Summer	0.01	1.2	0.474
ROOF-D2	FSR: 1 years: +0 %: 15 mins: Summer	0.01	1.2	0.475
ROOF-BICYCLES	FSR: 1 years: +0 %: 15 mins: Summer	0.00	0.1	0.050
ROOF-A2	FSR: 1 years: +0 %: 15 mins: Summer	0.02	2.5	0.985
ROOF-B2	FSR: 1 years: +0 %: 15 mins: Summer	0.03	4.8	1.853
ROOF-C4	FSR: 1 years: +0 %: 15 mins: Summer	0.01	1.2	0.474
ROOF-D4	FSR: 1 years: +0 %: 15 mins: Summer	0.01	1.2	0.475
ROOF-C3	FSR: 1 years: +0 %: 15 mins: Summer	0.01	1.2	0.474
ROOF-D3	FSR: 1 years: +0 %: 15 mins: Summer	0.01	1.2	0.475
ROOF-C1	FSR: 1 years: +0 %: 15 mins: Summer	0.01	1.2	0.474
ROOF-D1	FSR: 1 years: +0 %: 15 mins: Summer	0.01	1.2	0.475
FLAGS-A1	FSR: 1 years: +0 %: 15 mins: Summer	0.01	1.6	0.624
FLAGS-B1	FSR: 1 years: +0 %: 15 mins: Summer	0.02	2.0	0.772
FLAGS-A2	FSR: 1 years: +0 %: 15 mins: Summer	0.00	0.5	0.197
FLAGS-B2	FSR: 1 years: +0 %: 15 mins: Summer	0.00	0.3	0.132
FLAGS-C1	FSR: 1 years: +0 %: 15 mins: Summer	0.01	1.8	0.701
PATHS-A3	FSR: 1 years: +0 %: 15 mins: Summer	0.00	0.3	0.132

2023.110: Sandbrook Park Rochdale OL11 1RY		Date: 14/02/0024			
		Designed by: L.Edwards	Checked by: G.Schofield		Approved By: G.Schofield
Report Details: Type: Inflows Summary Storm Phase: Phase		Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF			

PATHS-B3	FSR: 1 years: +0 %: 15 mins: Summer	0.01	0.9	0.340
GRASS-01	FSR: 1 years: +0 %: 15 mins: Summer	0.00	0.1	0.037
GRASS-07	FSR: 1 years: +0 %: 15 mins: Summer	0.02	0.4	0.158
GRASS-08	FSR: 1 years: +0 %: 15 mins: Summer	0.02	0.5	0.188
GRASS-09	FSR: 1 years: +0 %: 15 mins: Summer	0.00	0.1	0.047
GRASS-04	FSR: 1 years: +0 %: 15 mins: Summer	0.00	0.0	0.018
GRASS-06	FSR: 1 years: +0 %: 15 mins: Summer	0.02	0.5	0.190
GRASS-02	FSR: 1 years: +0 %: 15 mins: Summer	0.01	0.2	0.073
GRASS-05	FSR: 1 years: +0 %: 15 mins: Summer	0.01	0.3	0.128
ROAD-SOUTH-1	FSR: 1 years: +0 %: 15 mins: Summer	0.05	5.9	2.304
ROAD-BC3	FSR: 1 years: +0 %: 15 mins: Summer	0.02	2.1	0.803
ROAD-NORTH-1	FSR: 1 years: +0 %: 15 mins: Summer	0.04	4.6	1.785
ROAD-NORTH-2	FSR: 1 years: +0 %: 15 mins: Summer	0.05	6.0	2.322
ROAD-SOUTH-2	FSR: 1 years: +0 %: 15 mins: Summer	0.05	5.1	2.007
FLAGS-C2	FSR: 1 years: +0 %: 15 mins: Summer	0.01	1.7	0.656
ROAD-NORTH-3	FSR: 1 years: +0 %: 15 mins: Summer	0.01	0.7	0.258
GRASS-03	FSR: 1 years: +0 %: 15 mins: Summer	0.01	0.1	0.056

2023.110: Sandbrook Park Rochdale OL11 1RY	Date: 14/02/0024		
	Designed by: L.Edwards	Checked by: G.Schofield	Approved By: G.Schofield
Report Details: Type: Inflows Summary Storm Phase: Phase	Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF		



FSR: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m³)
ROOF-A1	FSR: 2 years: +0 %: 15 mins: Summer	0.02	3.3	1.279
ROOF-B1	FSR: 2 years: +0 %: 15 mins: Summer	0.03	6.2	2.406
ROOF-C2	FSR: 2 years: +0 %: 15 mins: Summer	0.01	1.6	0.613
ROOF-D2	FSR: 2 years: +0 %: 15 mins: Summer	0.01	1.6	0.613
ROOF-BICYCLES	FSR: 2 years: +0 %: 15 mins: Summer	0.00	0.2	0.066
ROOF-A2	FSR: 2 years: +0 %: 15 mins: Summer	0.02	3.3	1.274
ROOF-B2	FSR: 2 years: +0 %: 15 mins: Summer	0.03	6.2	2.399
ROOF-C4	FSR: 2 years: +0 %: 15 mins: Summer	0.01	1.6	0.613
ROOF-D4	FSR: 2 years: +0 %: 15 mins: Summer	0.01	1.6	0.616
ROOF-C3	FSR: 2 years: +0 %: 15 mins: Summer	0.01	1.6	0.613
ROOF-D3	FSR: 2 years: +0 %: 15 mins: Summer	0.01	1.6	0.616
ROOF-C1	FSR: 2 years: +0 %: 15 mins: Summer	0.01	1.6	0.613
ROOF-D1	FSR: 2 years: +0 %: 15 mins: Summer	0.01	1.6	0.613
FLAGS-A1	FSR: 2 years: +0 %: 15 mins: Summer	0.01	2.1	0.808
FLAGS-B1	FSR: 2 years: +0 %: 15 mins: Summer	0.02	2.6	0.999
FLAGS-A2	FSR: 2 years: +0 %: 15 mins: Summer	0.00	0.6	0.253
FLAGS-B2	FSR: 2 years: +0 %: 15 mins: Summer	0.00	0.4	0.170
FLAGS-C1	FSR: 2 years: +0 %: 15 mins: Summer	0.01	2.3	0.905
PATHS-A3	FSR: 2 years: +0 %: 15 mins: Summer	0.00	0.4	0.172

2023.110: Sandbrook Park Rochdale OL11 1RY		Date: 14/02/0024			
		Designed by: L.Edwards	Checked by: G.Schofield		Approved By: G.Schofield
Report Details: Type: Inflows Summary Storm Phase: Phase		Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF			

PATHS-B3	FSR: 2 years: +0 %: 15 mins: Summer	0.01	1.1	0.439
GRASS-01	FSR: 2 years: +0 %: 15 mins: Summer	0.00	0.1	0.047
GRASS-07	FSR: 2 years: +0 %: 15 mins: Summer	0.02	0.5	0.205
GRASS-08	FSR: 2 years: +0 %: 15 mins: Summer	0.02	0.6	0.245
GRASS-09	FSR: 2 years: +0 %: 15 mins: Summer	0.00	0.2	0.062
GRASS-04	FSR: 2 years: +0 %: 15 mins: Summer	0.00	0.1	0.023
GRASS-06	FSR: 2 years: +0 %: 15 mins: Summer	0.02	0.6	0.245
GRASS-02	FSR: 2 years: +0 %: 15 mins: Summer	0.01	0.2	0.094
GRASS-05	FSR: 2 years: +0 %: 15 mins: Summer	0.01	0.4	0.166
ROAD-SOUTH-1	FSR: 2 years: +0 %: 15 mins: Summer	0.05	7.6	2.979
ROAD-BC3	FSR: 2 years: +0 %: 15 mins: Summer	0.02	2.7	1.039
ROAD-NORTH-1	FSR: 2 years: +0 %: 15 mins: Summer	0.04	5.9	2.310
ROAD-NORTH-2	FSR: 2 years: +0 %: 15 mins: Summer	0.05	7.7	3.002
ROAD-SOUTH-2	FSR: 2 years: +0 %: 15 mins: Summer	0.05	6.7	2.597
FLAGS-C2	FSR: 2 years: +0 %: 15 mins: Summer	0.01	2.2	0.847
ROAD-NORTH-3	FSR: 2 years: +0 %: 15 mins: Summer	0.01	0.9	0.335
GRASS-03	FSR: 2 years: +0 %: 15 mins: Summer	0.01	0.2	0.072

2023.110: Sandbrook Park Rochdale OL11 1RY	Date: 14/02/0024		
	Designed by: L.Edwards	Checked by: G.Schofield	Approved By: G.Schofield
Report Details: Type: Inflows Summary Storm Phase: Phase	Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF		



FSR: 30 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m³)
ROOF-A1	FSR: 30 years: +45 %: 15 mins: Summer	0.02	9.0	3.509
ROOF-B1	FSR: 30 years: +45 %: 15 mins: Summer	0.03	16.9	6.605
ROOF-C2	FSR: 30 years: +45 %: 15 mins: Summer	0.01	4.3	1.682
ROOF-D2	FSR: 30 years: +45 %: 15 mins: Summer	0.01	4.3	1.684
ROOF-BICYCLES	FSR: 30 years: +45 %: 15 mins: Summer	0.00	0.5	0.181
ROOF-A2	FSR: 30 years: +45 %: 15 mins: Summer	0.02	9.0	3.501
ROOF-B2	FSR: 30 years: +45 %: 15 mins: Summer	0.03	16.9	6.587
ROOF-C4	FSR: 30 years: +45 %: 15 mins: Summer	0.01	4.3	1.682
ROOF-D4	FSR: 30 years: +45 %: 15 mins: Summer	0.01	4.3	1.688
ROOF-C3	FSR: 30 years: +45 %: 15 mins: Summer	0.01	4.3	1.682
ROOF-D3	FSR: 30 years: +45 %: 15 mins: Summer	0.01	4.3	1.688
ROOF-C1	FSR: 30 years: +45 %: 15 mins: Summer	0.01	4.3	1.682
ROOF-D1	FSR: 30 years: +45 %: 15 mins: Summer	0.01	4.3	1.684
FLAGS-A1	FSR: 30 years: +45 %: 15 mins: Summer	0.01	5.7	2.212

2023.110: Sandbrook Park Rochdale OL11 1RY	Date: 14/02/0024		
	Designed by: L.Edwards	Checked by: G.Schofield	Approved By: G.Schofield
Report Details: Type: Inflows Summary Storm Phase: Phase	Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF		

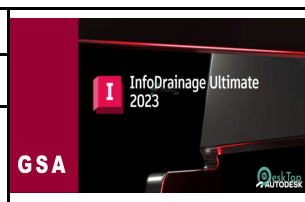


FLAGS-B1	FSR: 30 years: +45 %: 15 mins: Summer	0.02	7.0	2.747
FLAGS-A2	FSR: 30 years: +45 %: 15 mins: Summer	0.00	1.8	0.698
FLAGS-B2	FSR: 30 years: +45 %: 15 mins: Summer	0.00	1.2	0.470
FLAGS-C1	FSR: 30 years: +45 %: 15 mins: Summer	0.01	6.4	2.486
PATHS-A3	FSR: 30 years: +45 %: 15 mins: Summer	0.00	1.2	0.475
PATHS-B3	FSR: 30 years: +45 %: 15 mins: Summer	0.01	3.1	1.205
GRASS-01	FSR: 30 years: +45 %: 15 mins: Summer	0.00	0.3	0.130
GRASS-07	FSR: 30 years: +45 %: 15 mins: Summer	0.02	1.4	0.565
GRASS-08	FSR: 30 years: +45 %: 15 mins: Summer	0.02	1.7	0.670
GRASS-09	FSR: 30 years: +45 %: 15 mins: Summer	0.00	0.4	0.167
GRASS-04	FSR: 30 years: +45 %: 15 mins: Summer	0.00	0.2	0.062
GRASS-06	FSR: 30 years: +45 %: 15 mins: Summer	0.02	1.7	0.673
GRASS-02	FSR: 30 years: +45 %: 15 mins: Summer	0.01	0.7	0.259
GRASS-05	FSR: 30 years: +45 %: 15 mins: Summer	0.01	1.2	0.455
ROAD-SOUTH-1	FSR: 30 years: +45 %: 15 mins: Summer	0.05	21.0	8.177
ROAD-BC3	FSR: 30 years: +45 %: 15 mins: Summer	0.02	7.3	2.852
ROAD-NORTH-1	FSR: 30 years: +45 %: 15 mins: Summer	0.04	16.3	6.340

2023.110: Sandbrook Park Rochdale OL11 1RY		Date: 14/02/0024			
		Designed by: L.Edwards	Checked by: G.Schofield		Approved By: G.Schofield
Report Details: Type: Inflows Summary Storm Phase: Phase		Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF			

ROAD-NORTH-2	FSR: 30 years: +45 %: 15 mins: Summer	0.05	21.1	8.243
ROAD-SOUTH-2	FSR: 30 years: +45 %: 15 mins: Summer	0.05	18.3	7.132
FLAGS-C2	FSR: 30 years: +45 %: 15 mins: Summer	0.01	6.0	2.327
ROAD-NORTH-3	FSR: 30 years: +45 %: 15 mins: Summer	0.01	2.3	0.918
GRASS-03	FSR: 30 years: +45 %: 15 mins: Summer	0.01	0.5	0.199

2023.110: Sandbrook Park Rochdale OL11 1RY	Date: 14/02/0024		
	Designed by: L.Edwards	Checked by: G.Schofield	Approved By: G.Schofield
Report Details: Type: Inflows Summary Storm Phase: Phase	Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF		



FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m³)
ROOF-A1	FSR: 100 years: +45 %: 15 mins: Summer	0.02	11.6	4.538
ROOF-B1	FSR: 100 years: +45 %: 15 mins: Summer	0.03	21.9	8.542
ROOF-C2	FSR: 100 years: +45 %: 15 mins: Summer	0.01	5.6	2.174
ROOF-D2	FSR: 100 years: +45 %: 15 mins: Summer	0.01	5.6	2.178
ROOF-BICYCLES	FSR: 100 years: +45 %: 15 mins: Summer	0.00	0.6	0.234
ROOF-A2	FSR: 100 years: +45 %: 15 mins: Summer	0.02	11.6	4.527
ROOF-B2	FSR: 100 years: +45 %: 15 mins: Summer	0.03	21.8	8.520
ROOF-C4	FSR: 100 years: +45 %: 15 mins: Summer	0.01	5.6	2.174
ROOF-D4	FSR: 100 years: +45 %: 15 mins: Summer	0.01	5.6	2.181
ROOF-C3	FSR: 100 years: +45 %: 15 mins: Summer	0.01	5.6	2.174
ROOF-D3	FSR: 100 years: +45 %: 15 mins: Summer	0.01	5.6	2.181
ROOF-C1	FSR: 100 years: +45 %: 15 mins: Summer	0.01	5.6	2.174
ROOF-D1	FSR: 100 years: +45 %: 15 mins: Summer	0.01	5.6	2.178
FLAGS-A1	FSR: 100 years: +45 %: 15 mins: Summer	0.01	7.3	2.864

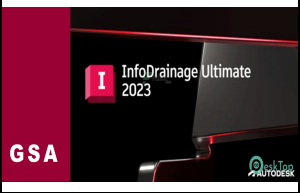
2023.110: Sandbrook Park Rochdale OL11 1RY	Date: 14/02/0024		
	Designed by: L.Edwards	Checked by: G.Schofield	Approved By: G.Schofield
Report Details: Type: Inflows Summary Storm Phase: Phase	Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF		



FLAGS-B1	FSR: 100 years: +45 %: 15 mins: Summer	0.02	9.1	3.549
FLAGS-A2	FSR: 100 years: +45 %: 15 mins: Summer	0.00	2.3	0.900
FLAGS-B2	FSR: 100 years: +45 %: 15 mins: Summer	0.00	1.6	0.610
FLAGS-C1	FSR: 100 years: +45 %: 15 mins: Summer	0.01	8.2	3.216
PATHS-A3	FSR: 100 years: +45 %: 15 mins: Summer	0.00	1.6	0.613
PATHS-B3	FSR: 100 years: +45 %: 15 mins: Summer	0.01	4.0	1.559
GRASS-01	FSR: 100 years: +45 %: 15 mins: Summer	0.00	0.4	0.167
GRASS-07	FSR: 100 years: +45 %: 15 mins: Summer	0.02	1.9	0.732
GRASS-08	FSR: 100 years: +45 %: 15 mins: Summer	0.02	2.2	0.865
GRASS-09	FSR: 100 years: +45 %: 15 mins: Summer	0.00	0.5	0.216
GRASS-04	FSR: 100 years: +45 %: 15 mins: Summer	0.00	0.2	0.082
GRASS-06	FSR: 100 years: +45 %: 15 mins: Summer	0.02	2.2	0.868
GRASS-02	FSR: 100 years: +45 %: 15 mins: Summer	0.01	0.9	0.336
GRASS-05	FSR: 100 years: +45 %: 15 mins: Summer	0.01	1.5	0.588
ROAD-SOUTH-1	FSR: 100 years: +45 %: 15 mins: Summer	0.05	27.1	10.576
ROAD-BC3	FSR: 100 years: +45 %: 15 mins: Summer	0.02	9.5	3.687
ROAD-NORTH-1	FSR: 100 years: +45 %: 15 mins: Summer	0.04	21.0	8.202

2023.110: Sandbrook Park Rochdale OL11 1RY		Date: 14/02/0024		
		Designed by: L.Edwards	Checked by: G.Schofield	
		Approved By: G.Schofield		
Report Details: Type: Inflows Summary Storm Phase: Phase		Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF		

ROAD-NORTH-2	FSR: 100 years: +45 %: 15 mins: Summer	0.05	27.3	10.661
ROAD-SOUTH-2	FSR: 100 years: +45 %: 15 mins: Summer	0.05	23.7	9.222
FLAGS-C2	FSR: 100 years: +45 %: 15 mins: Summer	0.01	7.7	3.009
ROAD-NORTH-3	FSR: 100 years: +45 %: 15 mins: Summer	0.01	3.0	1.187
GRASS-03	FSR: 100 years: +45 %: 15 mins: Summer	0.01	0.7	0.258

2023.110: Sandbrook Park Rochdale OL11 1RY		Date: 14/02/0024		
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: L.Edwards	Checked by: G.Schofield	
		Approved By: G.Schofield		
		Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF		



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flooded Volume

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
S02	FSR: 1 years: +0 %: 15 mins: Summer	136.3 50	134.7 44	134.79 7	0.053	5.0	0.060	0.000	4.5	2.014	OK
S01	FSR: 1 years: +0 %: 15 mins: Summer	136.3 50	134.8 96	134.93 6	0.040	2.7	0.045	0.000	2.4	1.037	OK
S04	FSR: 1 years: +0 %: 15 mins: Summer	135.8 50	134.8 00	134.87 4	0.074	9.2	0.084	0.000	8.4	3.707	OK
S05	FSR: 1 years: +0 %: 15 mins: Summer	136.2 50	134.6 95	134.78 2	0.087	12.9	0.098	0.000	12.0	5.543	OK
S08	FSR: 1 years: +0 %: 15 mins: Summer	135.7 60	134.2 62	134.31 6	0.054	6.6	0.139	0.000	6.0	2.508	OK
S09 (Silt Trap)	FSR: 1 years: +0 %: 15 mins: Summer	135.7 60	133.8 92	134.31 4	0.422	12.3	1.075	0.000	8.9	4.948	OK
S07	FSR: 1 years: +0 %: 15 mins: Summer	135.7 60	134.2 60	134.31 3	0.053	2.2	0.134	0.000	1.6	0.750	OK
S12	FSR: 1 years: +0 %: 15 mins: Summer	134.0 00	133.4 00	133.42 2	0.022	1.2	0.000	0.000	1.2	0.474	OK
S13	FSR: 1 years: +0 %: 15 mins: Summer	134.0 00	133.0 53	133.09 8	0.045	4.8	0.051	0.000	4.6	1.890	OK
S15	FSR: 1 years: +0 %: 15 mins: Summer	134.0 00	133.1 00	133.12 8	0.028	1.2	0.001	0.000	1.2	0.473	OK
S16	FSR: 1 years: +0 %: 15 mins: Summer	134.0 00	132.8 76	132.92 9	0.053	9.4	0.015	0.000	9.3	3.768	OK
S19	FSR: 1 years: +0 %: 15 mins: Summer	133.8 70	132.7 20	132.80 0	0.080	8.9	0.091	0.000	8.7	3.431	OK
S11	FSR: 1 years: +0 %: 15 mins: Summer	134.1 00	133.2 00	133.22 9	0.029	1.2	0.001	0.000	1.2	0.472	OK
S14	FSR: 1 years: +0 %: 15 mins: Summer	134.1 00	133.2 00	133.22 6	0.026	1.2	0.000	0.000	1.2	0.472	OK
S17 (SILT-TRAP)	FSR: 1 years: +0 %: 15 mins: Summer	133.8 00	132.3 52	132.71 2	0.360	9.3	0.407	0.000	9.2	3.418	OK
S20 (Silt Trap)	FSR: 1 years: +0 %: 15 mins: Summer	133.9 00	132.3 46	132.74 0	0.394	16.3	0.446	0.000	15.8	6.085	OK
S06 (SILT-TRAP)	FSR: 1 years: +0 %: 15 mins: Summer	136.1 50	134.2 52	134.75 4	0.502	13.0	0.567	0.000	9.3	6.069	Surcharged
S18	FSR: 1 years: +0 %: 15 mins: Summer	134.2 62	133.2 00	133.24 8	0.048	7.7	0.037	0.000	7.6	2.982	OK
S22 PUMP CHAMBER	FSR: 1 years: +0 %: 15 mins: Summer	134.9 65	132.3 36	132.33 6	0.000	0.0	0.000	0.000	0.0	0.000	OK
S23	FSR: 1 years: +0 %: 15 mins: Summer	135.3 34	134.3 34	134.33 4	0.000	0.0	0.000	0.000	0.0	0.000	OK
S03	FSR: 1 years: +0 %: 15 mins: Summer	135.8 50	134.9 50	135.00 3	0.053	4.8	0.060	0.000	4.5	1.860	OK
S21 (Oil Separator)	FSR: 1 years: +0 %: 15 mins: Summer	133.8 28	132.3 21	132.70 6	0.385	15.8	0.436	0.000	15.6	5.695	OK
S10 (OIL SEPARATOR)	FSR: 1 years: +0 %: 15 mins: Summer	135.8 68	133.8 85	134.31 2	0.427	8.9	0.483	0.000	9.6	4.577	OK
SA3-MH	FSR: 1 years: +0 %: 15 mins: Summer	134.3 94	132.5 68	132.65 6	0.088	1.4	0.099	0.000	0.2	0.200	OK

2023.110: Sandbrook Park Rochdale OL11 1RY		Date: 14/02/0024		
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: L.Edwards	Checked by: G.Schofield	
		Approved By: G.Schofield		
		Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF		



FSR: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flooded Volume

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
S02	FSR: 2 years: +0 %: 15 mins: Summer	136.3 50	134.7 44	134.81 8	0.074	6.5	0.083	0.000	5.2	2.611	OK
S01	FSR: 2 years: +0 %: 15 mins: Summer	136.3 50	134.8 96	134.94 1	0.045	3.4	0.051	0.000	3.2	1.353	OK
S04	FSR: 2 years: +0 %: 15 mins: Summer	135.8 50	134.8 00	134.88 5	0.086	12.0	0.097	0.000	11.0	4.811	OK
S05	FSR: 2 years: +0 %: 15 mins: Summer	136.2 50	134.6 95	134.81 4	0.119	16.2	0.134	0.000	14.3	7.235	OK
S08	FSR: 2 years: +0 %: 15 mins: Summer	135.7 60	134.2 62	134.35 0	0.088	8.5	0.224	0.000	6.6	3.267	OK
S09 (Silt Trap)	FSR: 2 years: +0 %: 15 mins: Summer	135.7 60	133.8 92	134.35 0	0.458	14.8	1.166	0.000	9.5	6.675	OK
S07	FSR: 2 years: +0 %: 15 mins: Summer	135.7 60	134.2 60	134.35 1	0.091	3.0	0.232	0.000	1.7	1.014	OK
S12	FSR: 2 years: +0 %: 15 mins: Summer	134.0 00	133.4 00	133.42 5	0.025	1.6	0.000	0.000	1.5	0.612	OK
S13	FSR: 2 years: +0 %: 15 mins: Summer	134.0 00	133.0 53	133.10 5	0.052	6.2	0.058	0.000	6.0	2.444	OK
S15	FSR: 2 years: +0 %: 15 mins: Summer	134.0 00	133.1 00	133.13 2	0.032	1.6	0.001	0.000	1.5	0.614	OK
S16	FSR: 2 years: +0 %: 15 mins: Summer	134.0 00	132.8 76	132.93 7	0.061	12.2	0.017	0.000	12.0	4.882	OK
S19	FSR: 2 years: +0 %: 15 mins: Summer	133.8 70	132.7 20	132.81 4	0.094	11.5	0.106	0.000	11.2	4.445	OK
S11	FSR: 2 years: +0 %: 15 mins: Summer	134.1 00	133.2 00	133.23 3	0.033	1.6	0.001	0.000	1.5	0.611	OK
S14	FSR: 2 years: +0 %: 15 mins: Summer	134.1 00	133.2 00	133.23 0	0.030	1.6	0.001	0.000	1.5	0.612	OK
S17 (SILT-TRAP)	FSR: 2 years: +0 %: 15 mins: Summer	133.8 00	132.3 52	132.72 1	0.369	12.0	0.418	0.000	11.9	4.499	OK
S20 (Silt Trap)	FSR: 2 years: +0 %: 15 mins: Summer	133.9 00	132.3 46	132.75 5	0.409	21.1	0.463	0.000	20.5	7.918	OK
S06 (SILT-TRAP)	FSR: 2 years: +0 %: 15 mins: Summer	136.1 50	134.2 52	134.80 7	0.555	17.0	0.628	0.000	12.8	7.985	Surcharged
S18	FSR: 2 years: +0 %: 15 mins: Summer	134.2 62	133.2 00	133.25 4	0.054	10.0	0.043	0.000	9.8	3.861	OK
S22 PUMP CHAMBER	FSR: 2 years: +0 %: 15 mins: Summer	134.9 65	132.3 36	132.33 6	0.000	0.0	0.000	0.000	0.0	0.000	OK
S23	FSR: 2 years: +0 %: 15 mins: Summer	135.3 34	134.3 34	134.33 4	0.000	0.0	0.000	0.000	0.0	0.000	OK
S03	FSR: 2 years: +0 %: 15 mins: Summer	135.8 50	134.9 50	135.01 1	0.061	6.2	0.069	0.000	5.8	2.407	OK
S21 (Oil Separator)	FSR: 2 years: +0 %: 15 mins: Summer	133.8 28	132.3 21	132.71 9	0.398	20.5	0.450	0.000	20.3	7.497	OK
S10 (OIL SEPARATOR)	FSR: 2 years: +0 %: 15 mins: Summer	135.8 68	133.8 85	134.34 8	0.463	9.5	0.524	0.000	9.0	6.250	Surcharged
SA3-MH	FSR: 2 years: +0 %: 15 mins: Summer	134.3 94	132.5 68	132.67 4	0.106	0.6	0.119	0.000	0.2	0.225	OK

2023.110: Sandbrook Park Rochdale OL11 1RY	Date: 14/02/0024		
	Designed by: L.Edwards	Checked by: G.Schofield	Approved By: G.Schofield
Report Details: Type: Junctions Summary Storm Phase: Phase	Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF		



FSR: 30 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Flooded Volume

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
S02	FSR: 30 years: +45 %: 15 mins: Summer	136.3 50	134.7 44	135.22 3	0.479	14.7	0.541	0.000	10.5	6.232	Surcharged
S01	FSR: 30 years: +45 %: 15 mins: Summer	136.3 50	134.8 96	135.23 7	0.341	9.5	0.386	0.000	6.3	3.903	Surcharged
S04	FSR: 30 years: +45 %: 15 mins: Summer	135.8 50	134.8 00	135.21 4	0.414	33.3	0.468	0.000	19.3	11.815	Surcharged
S05	FSR: 30 years: +45 %: 15 mins: Summer	136.2 50	134.6 95	135.22 1	0.526	29.2	0.595	0.000	21.4	14.107	Surcharged
S08	FSR: 30 years: +45 %: 15 mins: Summer	135.7 60	134.2 62	134.66 9	0.407	23.3	1.035	0.000	12.3	7.617	OK
S09 (Silt Trap)	FSR: 30 years: +45 %: 15 mins: Summer	135.7 60	133.8 92	134.66 8	0.776	34.6	1.976	0.000	10.4	14.689	Surcharged
S07	FSR: 30 years: +45 %: 15 mins: Summer	135.7 60	134.2 60	134.66 9	0.409	10.8	1.040	0.000	2.3	2.244	OK
S12	FSR: 30 years: +45 %: 15 mins: Summer	134.0 00	133.4 00	133.44 1	0.041	4.3	0.001	0.000	4.3	1.682	OK
S13	FSR: 30 years: +45 %: 15 mins: Summer	134.0 00	133.0 53	133.14 5	0.092	17.2	0.104	0.000	16.7	6.722	OK
S15	FSR: 30 years: +45 %: 15 mins: Summer	134.0 00	133.1 00	133.15 4	0.054	4.3	0.001	0.000	4.2	1.687	OK
S16	FSR: 30 years: +45 %: 15 mins: Summer	134.0 00	132.8 76	132.98 9	0.113	33.7	0.032	0.000	33.3	13.445	OK
S19	FSR: 30 years: +45 %: 15 mins: Summer	133.8 70	132.7 20	132.91 7	0.197	31.6	0.223	0.000	30.8	12.090	OK
S11	FSR: 30 years: +45 %: 15 mins: Summer	134.1 00	133.2 00	133.25 5	0.055	4.3	0.001	0.000	4.2	1.681	OK
S14	FSR: 30 years: +45 %: 15 mins: Summer	134.1 00	133.2 00	133.25 1	0.051	4.3	0.001	0.000	4.2	1.681	OK
S17 (SILT-TRAP)	FSR: 30 years: +45 %: 15 mins: Summer	133.8 00	132.3 52	132.80 6	0.454	33.3	0.513	0.000	33.1	12.797	OK
S20 (Silt Trap)	FSR: 30 years: +45 %: 15 mins: Summer	133.9 00	132.3 46	132.84 7	0.501	57.9	0.567	0.000	56.8	21.656	OK
S06 (SILT-TRAP)	FSR: 30 years: +45 %: 15 mins: Summer	136.1 50	134.2 52	135.22 5	0.973	27.6	1.100	0.000	9.8	13.817	Surcharged
S18	FSR: 30 years: +45 %: 15 mins: Summer	134.2 62	133.2 00	133.29 2	0.092	27.3	0.072	0.000	27.1	10.643	OK
S22 PUMP CHAMBER	FSR: 30 years: +45 %: 15 mins: Summer	134.9 65	132.3 36	132.33 6	0.000	0.0	0.000	0.000	0.0	0.000	OK

2023.110: Sandbrook Park Rochdale OL11 1RY		Date: 14/02/0024		
		Designed by: L.Edwards	Checked by: G.Schofield	Approved By: G.Schofield
Report Details: Type: Junctions Summary Storm Phase: Phase		Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF		





S23	FSR: 30 years: +45 %: 15 mins: Summer	135.3 34	134.3 34	134.33 4	0.000	0.0	0.000	0.000	0.0	0.000	OK
S03	FSR: 30 years: +45 %: 15 mins: Summer	135.8 50	134.9 50	135.20 1	0.251	16.9	0.284	0.000	16.4	6.804	OK
S21 (Oil Separator)	FSR: 30 years: +45 %: 15 mins: Summer	133.8 28	132.3 21	132.80 5	0.484	56.8	0.548	0.000	56.4	20.987	OK
S10 (OIL SEPARATO R)	FSR: 30 years: +45 %: 15 mins: Summer	135.8 68	133.8 85	134.66 8	0.783	10.4	0.885	0.000	9.0	12.858	Surcharged
SA3-MH	FSR: 30 years: +45 %: 15 mins: Summer	134.3 94	132.5 68	132.80 6	0.238	1.2	0.269	0.000	0.6	0.602	Surcharged

2023.110: Sandbrook Park Rochdale OL11 1RY	Date: 14/02/0024		
	Designed by: L.Edwards	Checked by: G.Schofield	Approved By: G.Schofield
Report Details: Type: Junctions Summary Storm Phase: Phase	Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF		



FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Flooded Volume

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
S02	FSR: 100 years: +45 %: 15 mins: Summer	136.350	134.744	135.839	1.095	26.1	1.238	0.000	10.4	7.207	Surcharged
S01	FSR: 100 years: +45 %: 15 mins: Summer	136.350	134.896	135.832	0.936	23.6	1.058	0.000	10.0	4.421	Surcharged
S04	FSR: 100 years: +45 %: 60 mins: Summer	135.850	134.800	135.852	1.052	25.7	3.307	2.120	15.4	31.465	Flood
S05	FSR: 100 years: +45 %: 15 mins: Summer	136.250	134.695	135.836	1.141	35.0	1.290	0.000	15.4	16.279	Surcharged
S08	FSR: 100 years: +45 %: 15 mins: Summer	135.760	134.262	134.944	0.682	30.1	1.734	0.000	14.7	8.875	Surcharged
S09 (Silt Trap)	FSR: 100 years: +45 %: 15 mins: Summer	135.760	133.892	134.944	1.052	43.6	2.676	0.000	11.2	16.227	Surcharged
S07	FSR: 100 years: +45 %: 15 mins: Summer	135.760	134.260	134.944	0.684	14.4	1.740	0.000	2.7	2.334	Surcharged
S12	FSR: 100 years: +45 %: 15 mins: Summer	134.000	133.400	133.447	0.047	5.6	0.001	0.000	5.5	2.177	OK
S13	FSR: 100 years: +45 %: 15 mins: Summer	134.000	133.053	133.161	0.108	22.2	0.123	0.000	21.6	8.694	OK
S15	FSR: 100 years: +45 %: 15 mins: Summer	134.000	133.100	133.163	0.063	5.6	0.001	0.000	5.5	2.173	OK
S16	FSR: 100 years: +45 %: 15 mins: Summer	134.000	132.876	133.011	0.135	43.7	0.038	0.000	42.9	17.377	OK
S19	FSR: 100 years: +45 %: 15 mins: Summer	133.870	132.720	133.014	0.294	40.8	0.333	0.000	40.0	15.475	Surcharged
S11	FSR: 100 years: +45 %: 15 mins: Summer	134.100	133.200	133.264	0.064	5.6	0.001	0.000	5.5	2.173	OK
S14	FSR: 100 years: +45 %: 15 mins: Summer	134.100	133.200	133.259	0.059	5.6	0.001	0.000	5.5	2.165	OK
S17 (SILT-TRAP)	FSR: 100 years: +45 %: 480 mins: Summer	133.800	132.352	133.813	1.461	9.4	14.488	12.850	6.7	60.992	Flood
S20 (Silt Trap)	FSR: 100 years: +45 %: 15 mins: Summer	133.900	132.346	132.894	0.548	75.0	0.619	0.000	74.0	27.803	OK
S06 (SILT-TRAP)	FSR: 100 years: +45 %: 15 mins: Summer	136.150	134.252	135.819	1.567	21.9	1.772	0.000	16.5	16.383	Surcharged
S18	FSR: 100 years: +45 %: 15 mins: Summer	134.262	133.200	133.306	0.106	35.4	0.083	0.000	35.1	13.767	OK
S22 PUMP CHAMBER	FSR: 100 years: +45 %: 15 mins: Summer	134.965	132.336	132.336	0.000	0.0	0.000	0.000	0.0	0.000	OK

2023.110: Sandbrook Park Rochdale OL11 1RY		Date: 14/02/0024		
		Designed by: L.Edwards	Checked by: G.Schofield	Approved By: G.Schofield
Report Details: Type: Junctions Summary Storm Phase: Phase		Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF		





S23	FSR: 100 years: +45 %: 15 mins: Summer	135.3 34	134.3 34	134.33 4	0.000	0.0	0.000	0.000	0.0	0.000	OK
S03	FSR: 100 years: +45 %: 60 mins: Summer	135.8 50	134.9 50	135.85 2	0.902	15.6	3.267	2.249	12.5	15.726	Flood
S21 (Oil Separator)	FSR: 100 years: +45 %: 15 mins: Summer	133.8 28	132.3 21	132.86 6	0.545	74.0	0.617	0.000	73.6	27.012	OK
S10 (OIL SEPARATO R)	FSR: 100 years: +45 %: 15 mins: Summer	135.8 68	133.8 85	134.94 3	1.058	11.2	1.197	0.000	11.4	13.502	Surcharged
SA3-MH	FSR: 100 years: +45 %: 15 mins: Summer	134.3 94	132.5 68	132.86 6	0.298	1.9	0.337	0.000	0.8	0.931	Surcharged

2023.110: Sandbrook Park Rochdale OL11 1RY		Date: 14/02/0024		
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Designed by: L.Edwards	Checked by: G.Schofield	
		Approved By: G.Schofield		
		Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF		



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Geo-Cellular Storage	FSR: 1 years: +0 %: 1440 mins: Summer	132.826	132.826	0.226	0.226	2.7	34.302	0.000	0.000	1.9	86.829	44.315	OK
SA3-A	FSR: 1 years: +0 %: 1440 mins: Summer	132.826	132.826	5.990	5.990	0.8	0.106	0.000	125.406	0.0	0.000	17.662	OK
SA1	FSR: 1 years: +0 %: 60 mins: Summer	134.792	134.792	6.304	6.304	9.0	0.112	0.000	1.955	7.5	9.586	11.503	OK
SA2	FSR: 1 years: +0 %: 30 mins: Summer	134.365	134.365	5.877	5.877	10.6	0.104	0.000	1.174	7.0	5.502	17.506	OK
SA3-B	FSR: 1 years: +0 %: 15 mins: Summer	128.488	128.488	0.000	0.000	0.0	0.000	0.000	0.000	0.0	0.000	100.000	OK

2023.110: Sandbrook Park Rochdale OL11 1RY	Date: 14/02/0024		
	Designed by: L.Edwards	Checked by: G.Schofield	Approved By: G.Schofield
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF		



FSR: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Geo-Cellular Storage	FSR: 2 years: +0 %: 1440 mins: Summer	132.862	132.862	0.262	0.262	3.5	39.835	0.000	0.000	1.8	110.187	35.332	OK
SA3-A	FSR: 2 years: +0 %: 1440 mins: Summer	132.863	132.863	6.027	6.027	0.8	0.107	0.000	125.757	0.1	0.616	17.163	OK
SA1	FSR: 2 years: +0 %: 30 mins: Summer	134.795	134.795	6.307	6.307	9.2	0.112	0.000	1.988	7.5	9.128	11.464	OK
SA2	FSR: 2 years: +0 %: 30 mins: Winter	134.372	134.372	5.884	5.884	10.0	0.104	0.000	1.604	7.0	7.334	17.408	OK
SA3-B	FSR: 2 years: +0 %: 15 mins: Summer	128.488	128.488	0.000	0.000	0.0	0.000	0.000	0.000	0.0	0.000	100.000	OK

2023.110: Sandbrook Park Rochdale OL11 1RY		Date: 14/02/0024		
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Designed by: L.Edwards	Checked by: G.Schofield	
		Approved By: G.Schofield		
		Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF		



FSR: 30 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Geo-Cellular Storage	FSR: 30 years: +45 %: 600 mins: Summer	133.685	133.685	1.085	1.085	16.8	61.505	0.000	0.000	12.8	146.771	0.154	OK
SA3-A	FSR: 30 years: +45 %: 600 mins: Summer	133.674	133.674	6.838	6.838	1.9	0.121	0.000	54.335	1.1	24.895	6.018	OK
SA1	FSR: 30 years: +45 %: 60 mins: Summer	135.548	135.548	7.060	7.060	10.2	0.125	0.000	7.595	8.3	33.643	0.899	OK
SA2	FSR: 30 years: +45 %: 60 mins: Summer	134.744	134.744	6.256	6.256	9.1	0.111	0.000	6.472	7.4	28.827	12.192	OK
SA3-B	FSR: 30 years: +45 %: 180 mins: Summer	131.747	131.747	3.259	3.259	5.0	0.058	0.000	2.433	4.1	11.318	54.249	OK

2023.110: Sandbrook Park Rochdale OL11 1RY		Date: 14/02/0024		
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Designed by: L.Edwards	Checked by: G.Schofield	
		Approved By: G.Schofield		
		Graham Schofield Associates: Suite 3 Balfour Court off Hough Lane Leyland PR25 2TF		



FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Geo-Cellular Storage	FSR: 100 years: +45 %: 480 mins: Summer	133.813	133.813	1.213	1.213	18.8	63.446	1.832	0.000	12.3	164.227	-2.997	Flood
SA3-A	FSR: 100 years: +45 %: 600 mins: Summer	133.802	133.802	6.966	6.966	2.1	0.123	0.000	54.883	1.2	28.514	4.263	OK
SA1	FSR: 100 years: +45 %: 60 mins: Summer	532.396	532.396	403.908	403.908	19.5	7.142	7.014	8.761	8.6	38.668	-5566.965	Flood
SA2	FSR: 100 years: +45 %: 60 mins: Summer	135.425	135.425	6.937	6.937	10.8	0.123	0.000	8.614	8.2	38.165	2.618	OK
SA3-B	FSR: 100 years: +45 %: 60 mins: Summer	131.747	131.747	3.259	3.259	5.0	0.058	0.000	1.791	4.1	8.345	54.249	OK

Appendix I: -

Drainage Details (Sheet 1 of 3) – 2023.110.C002.A

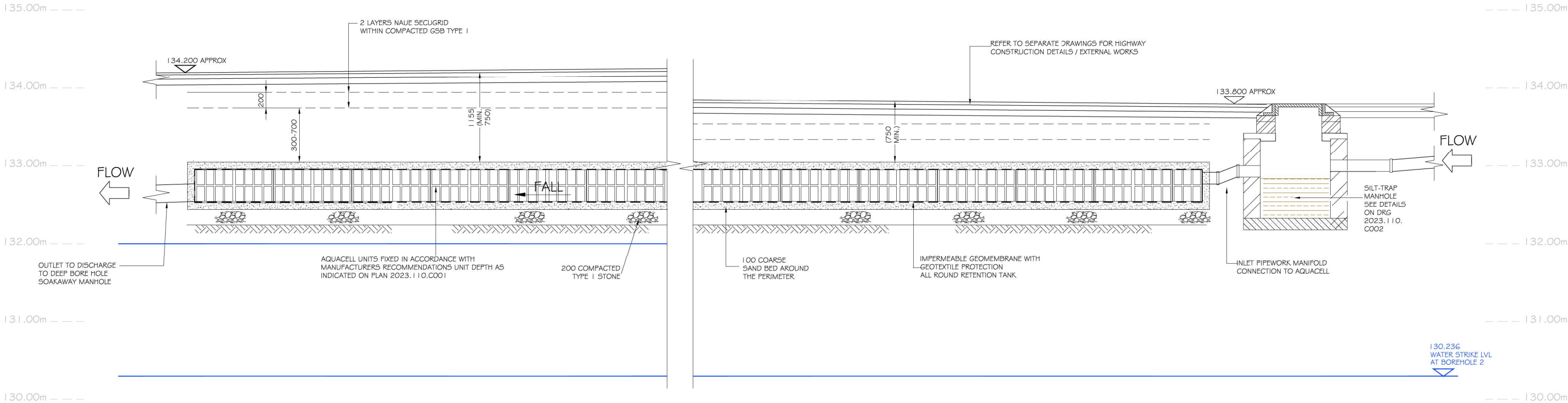
Appendix J: -

Drainage Details (Sheet 2 of 3) – 2023.110.C007

NOTES

- TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS & SUBCONTRACTORS DRAWINGS AND SPECIFICATIONS
- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED. DO NOT SCALE OFF THIS DRAWING USE ONLY FIGURED DIMENSIONS AND IF IN DOUBT ASK.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ACCURACY OF ALL DIMENSIONS & FOR CORRECT SETTING OUT ON SITE. SETTING OUT & WORKMANSHIP IS TO COMPLY WITH THE LATEST VERSION OF BS.5606. UNLESS OTHERWISE AGREED, THE MAIN CONTRACTOR WILL BE RESPONSIBLE FOR LOCATING, MARKING AND PROTECTING ANY EXISTING DRAINS / SERVICES CROSSING OR IN THE IMMEDIATE VICINITY OF THIS SITE, PRIOR TO COMMENCEMENT OF THE WORKS.

NOTES ON LOAD RESTRICTIONS OVER AQUACELL:-
CONSTRUCTION :- MIN 500mm COVER REQUIRED EXCAVATORS MUST NOT EXCEED 14 TONNES - NO HGV'S
BACKFILLING :- ONLY LIGHT COMPACTION TO SIDES TYPE 1 MATERIAL - FIRST LAYER. 300mm BEFORE COMPACTION MAXIMUM ROLLER SIZE 2, 300KG/m WIDTH THEREAFTER

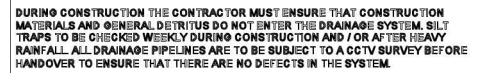


INDICATIVE SECTION THROUGH SILT-TRAP, GEO-CELLULAR STORAGE (ATTENUATION), LEADING TO DEEP BORE HOLE SOAKAWAY MANHOLE 1:25

REV.	DESCRIPTION	DRAWN	APPROVED
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			
title DRAINAGE DETAILS SHEET 2 OF 3			
drawn CJS	checked GS	drawing number	
date FEB '25	date	2023-110-C007	
scale A5 NOTED	A1		

Appendix K: -

Drainage Details (Sheet 3 of 3) – 2023.110.C008



drawn CJS	checked GS	drawing number 2023 - 110 - C008	
date FEB '25	date FEB '25		
scale 1:20	AI		