

# Hopwood Hall College St Mary's Gate, Rochdale Flood Risk Assessment and Drainage Strategy Report

Prepared by: Nirodha Perera MEng GMICE  
Reviewed by: Jonathon Taylor (Senior Engineer)  
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| Acronyms |                                                            |
|----------|------------------------------------------------------------|
| AEP      | Annual Exceedance Probability                              |
| AOD      | Above Ordnance Datum                                       |
| CIRIA    | Construction Industry Research and Information Association |
| DCG      | Design and Construction Guidance                           |
| DEFRA    | Department for Environment, Food and Rural Affairs         |
| EA       | Environment Agency                                         |
| FEPP     | Flood Emergency and Evacuation Plan                        |
| FRA      | Flood Risk Assessment                                      |
| LLFA     | Lead Local Flood Authority                                 |
| NPPF     | National Planning Policy Framework                         |
| PPG      | Planning Practice Guidance                                 |
| SFRA     | Strategic Flood Risk Assessment                            |
| SWMP     | Surface Water Management Plan                              |
| UU       | United Utilities                                           |

## 1.0 Introduction

Roscoe have been commissioned to undertake a Flood Risk Assessment (FRA) for the proposed development at Hopwood Hall College, Rochdale, OL12 6RY. This statement will be used to support the planning application for the proposed development.

The national Planning Policy Framework (NPPF) states that an appropriate FRA will be required for all development proposals of 1ha or greater in Flood Zone 1 and for any development within Flood Zone 2 or 3.

The EA's Flood Map for Planning indicates that the site lies within Flood Zone 2. However, following further discussions with the EA, the site will be considered as Flood Zone 3 according to their most recent Product 4 data. Consequently, this assessment will focus on the flood risk to the site from nearby watercourses.

This report will also outline the proposed drainage strategy for the site including a detailed SUDS assessment.

## 1.1 Relevant Policy

This FRA has been carried out in accordance with the NPPF and the accompanying Planning Practice Guidance (PPG) "Flood Risk and Coastal Change". This FRA also incorporates advice and guidance from the Environment Agency (EA), Manchester City, Salford city and Trafford Councils Strategic Flood Risk Assessment (SFRA) 2011 and CIRIA documents.

The surface water drainage strategy is in accordance with:

- The Department for Environment, Food and Rural Affairs (DEFRA) "Non-Statutory Technical Standards for Sustainable Drainage Systems".
- The Lead Local Flood Authority (LLFA), Rochdale Borough Council, guidance document on SUDS/Drainage.
- Building Regulations Part H

## 2.0 Site Description and Location

The site is located off Saint Marys Gate (A58), Rochdale. The postcode of the site is OL12 6RY, and can be further identified by grid reference 389339, 413366. The site area is approximately 2ha. The site is roughly rectangular with maximum plan dimensions of ~200m by ~195m. The site generally slopes gently southwards from the northern site boundary and lowest point of elevation at 117.40m AOD along the southern site boundary, the highest elevation on site is approx. 120.80m AOD. There are residential developments to the north and a neighbouring further education facility to the south.

Current use:

The site is currently a college with associated car parking, outdoor leisure area and soft play area. A public restaurant and hair salon are also present and part of the Block B building. There are three existing buildings present on site including two multi-storey buildings associated with the college. Most of the site is hard standing with the northern part of the site covered by asphalt and concrete for the existing college buildings and associated car park area. The southern area of the site bordering the river has undergone soft landscaping.



Figure 1.1: Existing site, showing site boundary- Existing Drainage- Google Earth 2025

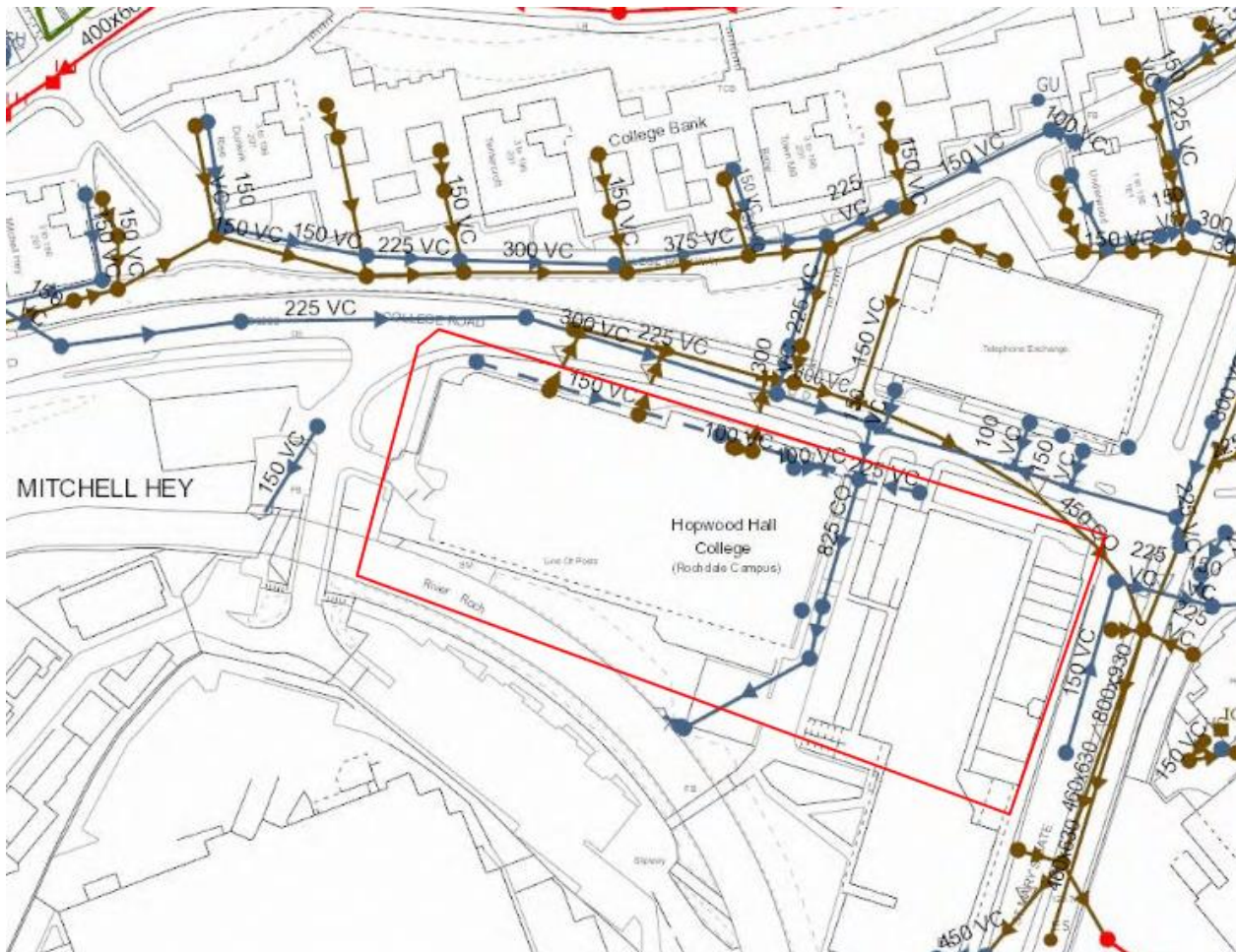


Figure 1.2: United Utilities Asset Location Map 2021

The sewer records were obtained from United Utilities and show that there is a 900mm surface water pipe that runs through the north of the site at College Road and runs south discharging into the River Roch. There are three discharge points at the River Roch, two are assumed as private and the other at surface water discharge for United Utilities.

A drainage CCTV survey was carried out on site by Survey and Engineering Projects on the 9<sup>th</sup> of September 2024. The survey detailed the conditions of the runs and provided videos and photographic evidence. Controlled discharge was not evident on site as concluded by the CCTV survey.

Information regarding the existing sewers have been gathered by various topographical surveys and United Utilities records and they have confirmed that:

- A existing 825mm UU surface water sewer to the north of the site at College Road, the downstream location of the surface water sewer is the River Roch.
- A existing 225mm UU foul water sewer that is located towards the north of the site at the car parks opposite College Road.

Additional surface water and foul water drainage systems are located in this area. The public surface water sewer that runs across the north of the car park is to be abandoned following an accepted S116 application.

As the site is currently classified as brownfield comprising existing college buildings and a car park, the existing drainage connections within the proposed construction area have been identified and will be re-utilised where feasible. Any on site sewers that become redundant following the completion of demolition works are expected to be decommissioned and removed.

## 2.1 Development Proposal

The proposal involves the demolition of the existing Block B building including the basement and the construction of a new four-storey block intended for teaching purposes. The development is to be situated in the northern section of the site, opposite College Road, on land currently occupied by car parking spaces.

The levels to the south of the site are not expected to change and will remain the same as the existing. The levels around the proposed school building vary between 119.770m AOD and 120.650m AOD with the Finished Floor Level of the proposed school set at 120.830m AOD. A full site drawing comparing the existing levels to the proposed site levels have been drawn and attached and attached as Appendix A. The proposals involve none of the existing levels to be lowered.

Associated works will include the reconfiguration of existing car parking areas, access roads, and both soft and hard landscaping in support of the new building. The red line boundary and proposed layout is detailed in Figure 2.1. The proposed works will be outside of the Riparian Zone, this has been displayed in Appendix I. To confirm that the highest level of the overland flood water would not reach the building, Roscoe have produced drawings 'FE0012-ROS-XX-XX-D-C-0540' and 'FE0012-ROS-XX-XX-D-X-0541'.

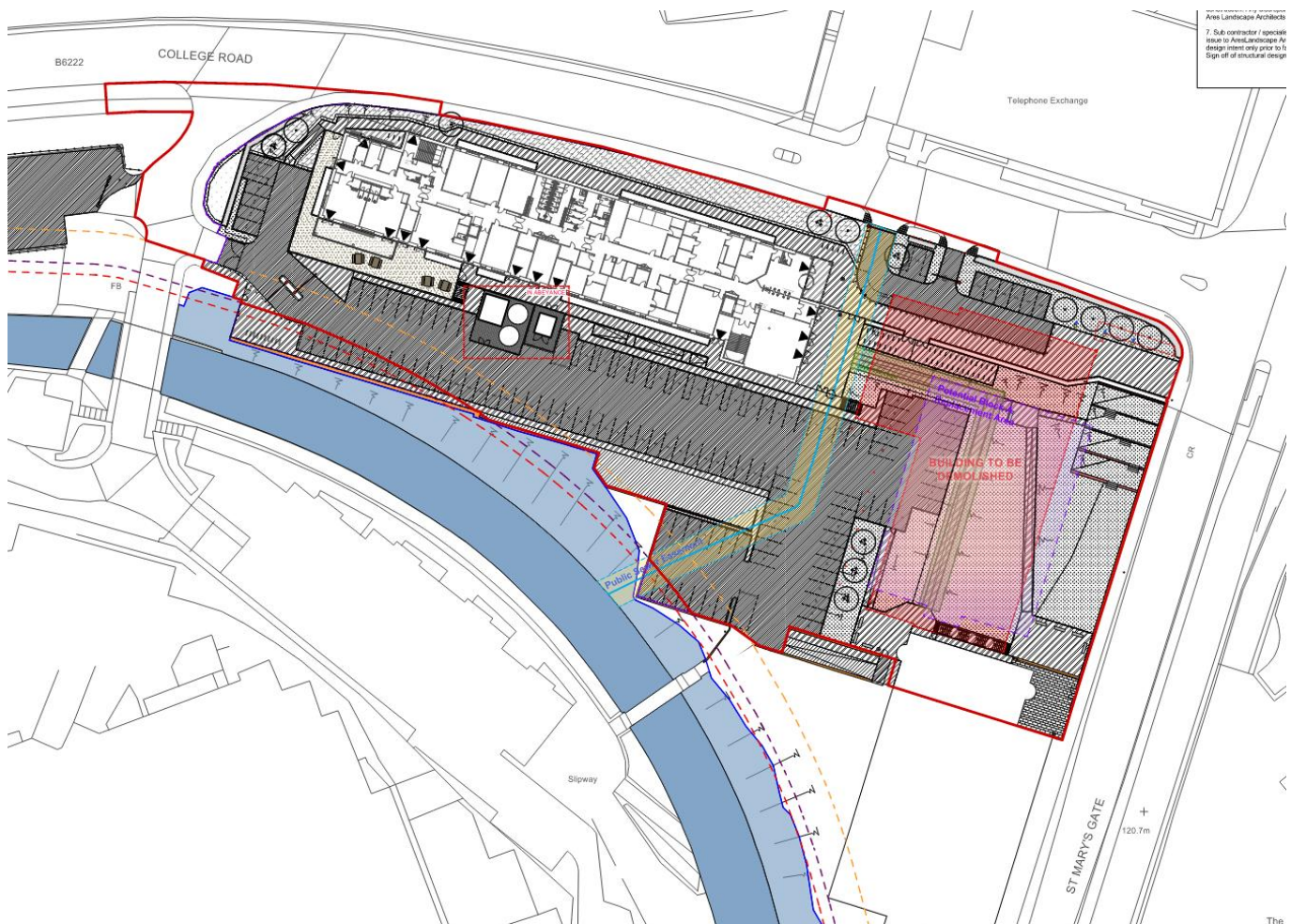


Figure 2.3: Proposed layout Ares Landscape Architects (dated 29/04/25)

## 3.0 Flood Risk Assessment

### 3.1 Flood Risk from Watercourses

The EA's flood map for planning shows that the site is located in Flood Zone 2/3 and is at risk of flooding from the River Roch. The river Roch is located directly south of the site. It continues westward as a minor watercourse, running along the southern boundary of the site. Land in this flood zone is assessed as having annual probability of river flooding greater than 1%. The EA's maps suggests that the site is not located in an area which benefits from flood defences however the EA's website also states that not all defences are shown on the map.

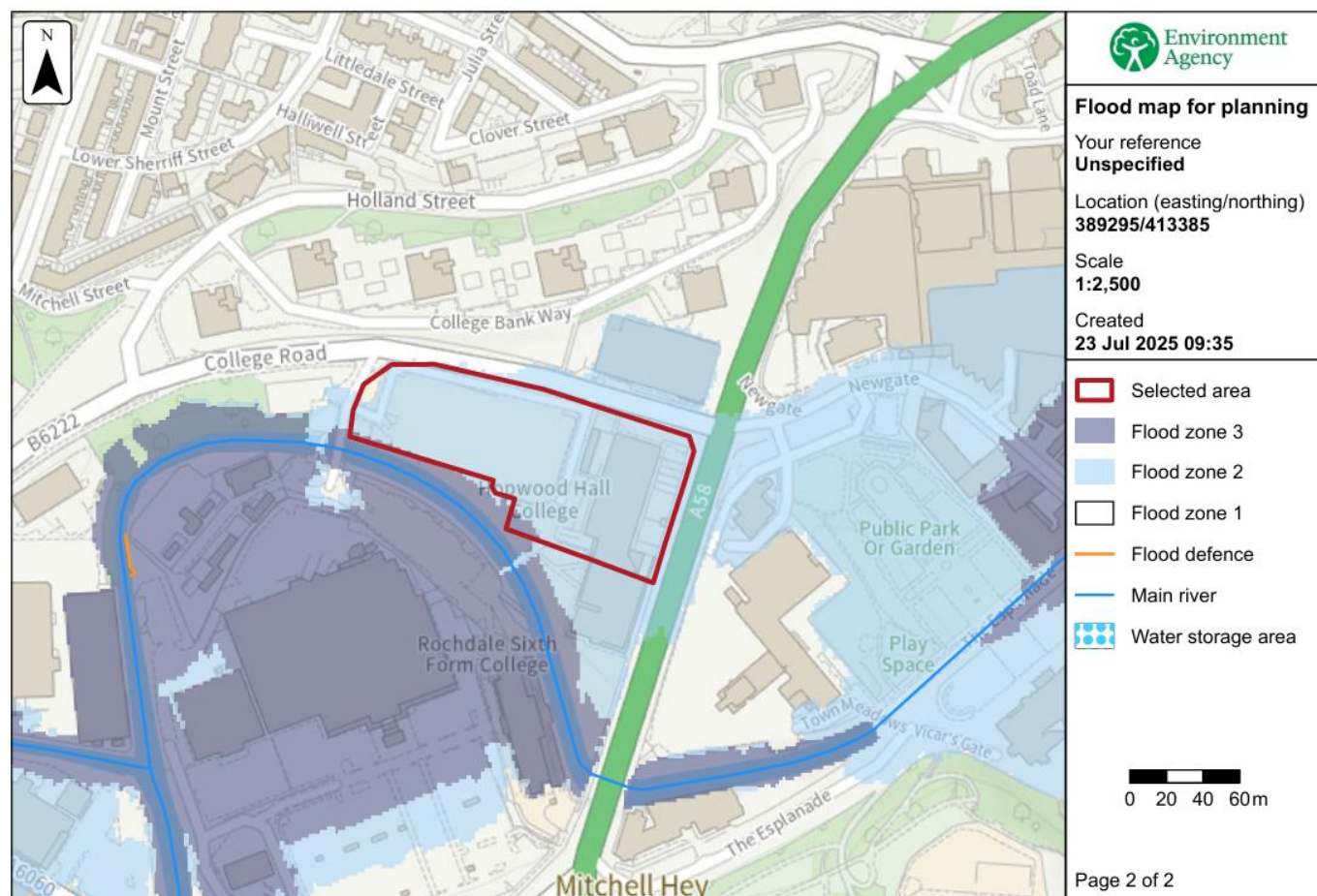


Figure 3.1: from EA Flood Map for Planning 2025

To further evaluate the fluvial flood risk associated with the River Roch, and to understand the potential extent and depth of flooding at the proposed development site, Roscoe contacted the Environment Agency (EA) to obtain site-specific Product 4 flood data. While the Lead Local Flood Authority (LLFA) confirmed that there are no recorded flood outlines directly affecting the site, they did provide details of historic flooding in the wider surrounding area (see Figure 3.2).

It is noted that the historic flood outlines:

- Do not include flooding from surface water, drainage exceedance, or overland runoff caused by rainfall; and
- Do not capture artificial flooding related to failure of water-bearing infrastructure such as sewers, pipelines, or treatment works.

From product 4 data provided and correspondence with the EA, it is proposed that the flood level is 120.23m AOD, shown at node 18 for the 1% AEP (+70%). This node has been selected as it is the highest flood point recorded, for the worst-case storm event, that is within the building footprint.

This node had additionally been selected, as opposed to the highest node within the development boundary, as the flood level is produced by overland flow for the East of the development and not a flat flood level is produced by the River Roch

overflowing. The overland flow is at a highest level within the public park space adjacent to Newgate and drops considerable as it crosses St Mary's Gate and approaches the development, it continues to drop in level until it intercepts with the River Roch flood level of 119.35m. This means that the higher flood levels shown within the development boundary, on the Eastern section of the scheme, will never extend to where the proposed building is positioned.

To confirm that the highest level of the overland flood water would not reach the building Roscoe have produced drawings 'FE0012-ROS-XX-XX-D-C-0540' and 'FE0012-ROS-XX-XX-D-C-0541'.

FE0012-ROS-XX-XX-D-C-0540 is the overland flood route map of the existing development. This demonstrates that there is a clear path for overland flood water to enter the site from the North and discharge directly into the river Roch, with the existing development never being used as a storage plan or experiencing the overland flood water.

FE0012-ROS-XX-XX-D-C-0541 is the overland flood route map of the proposed development. This demonstrates that there is a clear path for the overland flood water to enter the site from the North and discharge directly into the River Roch as the existing development did. It also highlights there is a significant level difference between the level at which the overland flood water enters the site and passes to the River Roch and the proposed building level.

For the proposed development, a portion of the overland flow will be directed towards the depression to East of the scheme. There is a slot drain serving this area which is suitable for the site runoff but will exceed capacity if overland flows are introduced. This is acceptable to allow this area to fill and store overland flood water, till it overflows at the low level of the car park and meet the River Roch water.

Both drawings also include site specific flow routes for the rainwater, to show that rainwater / flood water would not have previously sat stagnant within the development and that it still will not within the proposed development. As there is no flood water sat within the development for major collection points, the attenuation will function as designed to collect and accommodate for water falling within the boundary.

Whilst we believe the existing scheme did not store flood water within the development boundary as part of the 1% AEP 70% storm event, due to the clear overland flow paths towards the River Roch, Roscoe have ensured that there is no reduction in overall flood storage potential within the development.

Drawing 'FE0012-ROS-XX-XX-D-C-0640' is an analysis of the proposed finished levels against the topographical levels on the scheme. There has been 3,400m<sup>3</sup> of potential storage lost as part of the building being lifted approx. 1m from the existing car park level and 3,850m<sup>3</sup> of potential storage gained as part of the existing building being demolished and a depression left in the area that builds to tie-into the car park. This constitutes a net 450m<sup>3</sup> gain in the overall potential flood storage for the scheme.

The current proposed building level is 120.80m AOD, this is 570mm above the maximum flood level of 120.23 identified on the product 4 data. It is proposed to raise the building by an additional 30mm, to a finished flood level of 120.83m AOD, to account for a 600mm clearance from the flood level in line with standard EA practice.

A precautionary approach will continue through the detailed design and construction phases, including:

- Avoiding development in the most flood-prone areas of the site;
- Designing finished floor levels and critical infrastructure to be resilient to predicted future flood levels;
- Integrating SuDS to manage surface water sustainably; and
- Registering the site with the EA flood warning service and establishing safe access and egress routes, which have been identified and mapped with reference to the 1% AEP +70% climate change flood level.

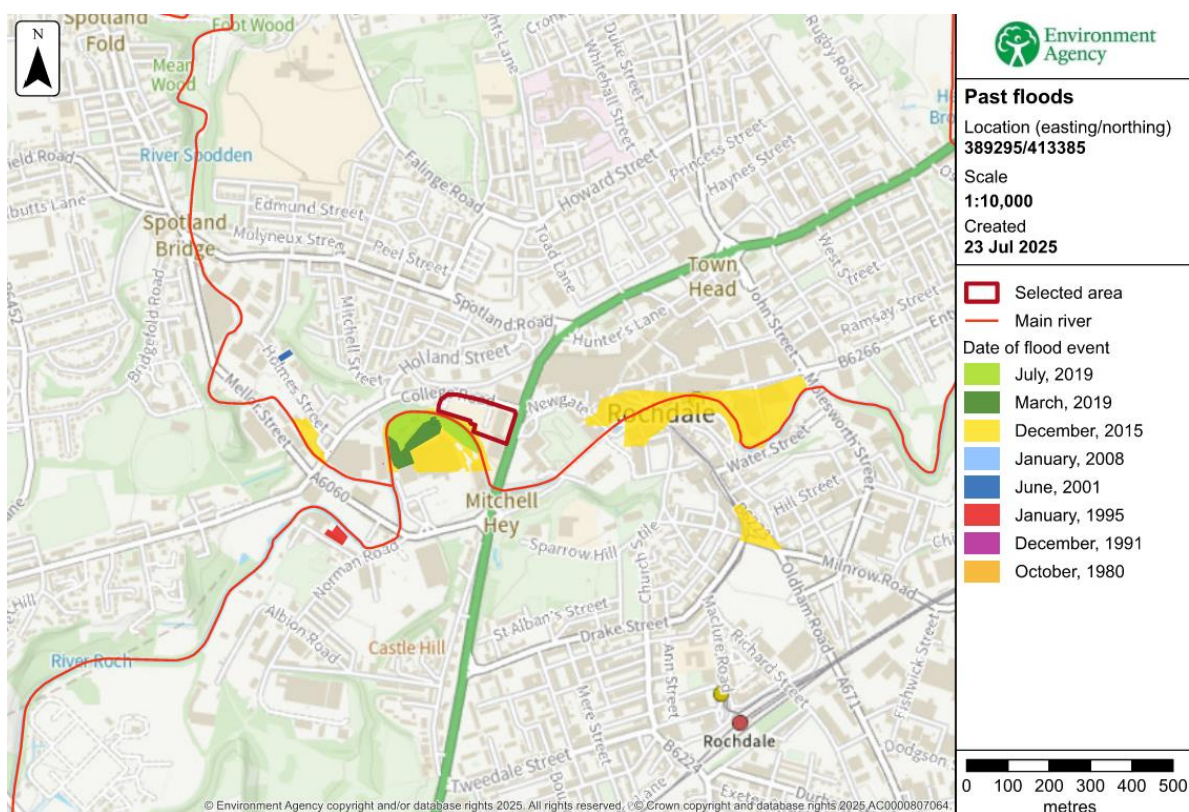


Figure 3.2: EA Historic Flooding Map

## 3.2 Sequential and Exception Tests

### 3.2.1 Sequential Test

In accordance with the NPPF, before planning permission can be granted the risk-based Sequential Test should be applied and accepted. This needs to be done for those developments in Zone 2 or 3, and for all but minor developments. The test's aim is to steer new development to areas at the lowest probability of flooding; Zone 1. Development should not be permitted if there are reasonably available sites to accommodate the proposed development in areas with a lower probability of flooding.

This development has a vulnerability classification of More Vulnerable, under the PPG and so as can be seen from Table 3.2 it is appropriate in Flood Zone 3 and the exception test will be required.

| Flood Risk Vulnerability Classification                                      |                               | Essential Infrastructure | Water Compatible | Highly Vulnerable       | More Vulnerable         | Less Vulnerable |
|------------------------------------------------------------------------------|-------------------------------|--------------------------|------------------|-------------------------|-------------------------|-----------------|
| Flood Zone                                                                   | Zone 1                        | ✓                        | ✓                | ✓                       | ✓                       | ✓               |
|                                                                              | Zone 2                        | ✓                        | ✓                | Exception test required | ✓                       | ✓               |
|                                                                              | Zone 3a                       | Exception test required  | ✓                | ×                       | Exception test required | ✓               |
|                                                                              | Zone 3b Functional Floodplain | Exception test required  | ✓                | ×                       | ×                       | ×               |
| Key: ✓ Development is appropriate.<br>× Development should not be permitted. |                               |                          |                  |                         |                         |                 |

Table 3.2 Flood Risk Vulnerability and Flood Zone Compatibility from PPG "Flood Risk and Coastal Change" Table 3

### 3.2.2 Exception Test

In accordance with the NPPF clause 102, both the following elements must be demonstrated to pass the Exception Test:

“The proposed development provides wider sustainability benefits to the community that outweigh [the] flood risk”; and  
“a site-specific FRA has been carried out and can demonstrate that the development will be safe for its lifetime, taking account of the vulnerability of its users, without increasing [the] flood risk elsewhere”.

Given the nature of the development, it is considered unlikely that suitable alternative sites would be available in the local area which could support construction of a new school. The proposed school building is to be situated in an area of the site where flood risk is the lowest.

Based on the expected flow paths and the general flood map for planning, the lowest risk area of the site is anticipated to be in the northern side of site. This area is designated as flood zone 2 on the current flood map for planning, indicating the lowest flood risk and shallowest flood depths across all scenarios.

The following FRA has been carried out to satisfy the second condition.

### 3.3 Flood Risk from Groundwater

Groundwater flooding occurs when water rises to the surface from underlying permeable strata, often following prolonged periods of rainfall or elevated water tables.

The nearest British Geological Survey (BGS) borehole records, located adjacent to the southeastern boundary of the site, indicate the presence of Made Ground to depths of approximately 1.7 m below ground level (bgl), comprising a mixture of clay, brick, silt, and ash. Beneath this, natural granular deposits including fine to coarse sands and gravels extend to depths of approximately 3.7 m to 4.8 m bgl. Groundwater strikes were recorded at varying depths across the area, ranging from ground level to 4.0 m bgl.

These conditions suggest that the site may be susceptible to groundwater emergence under certain circumstances, particularly during extended periods of wet weather. However, the proposed development:

- Does not include any basement construction or deep excavations likely to intercept the water table;
- Proposes finished floor levels that are elevated above potential groundwater emergence zones;
- Retains overall site topography, avoiding significant alterations that could affect groundwater flow paths.

Based on the available ground investigation data and the nature of the proposed development, the risk of groundwater flooding is considered to be low. No significant dewatering or groundwater mitigation measures are anticipated as part of the construction phase.

Nevertheless, appropriate design precautions, such as ensuring service ducts are sealed, and that drainage infrastructure accounts for potential groundwater ingress, will be incorporated where necessary to maintain resilience.

### 3.4 Flood Risk from pluvial flooding

Pluvial flooding occurs when rainfall exceeds the capacity of surface water drainage systems, resulting in overland flow and ponding—particularly in low-lying areas or where infrastructure is inadequate. This type of flooding typically arises during intense or prolonged rainfall events.

Based on the Environment Agency’s online surface water flood mapping (see Figure 3.3), parts of the site are identified as being at low to medium risk of surface water flooding, particularly during 1 in 100-year (1% AEP) and 1 in 30-year (3.33% AEP) rainfall events. The site’s topography, as confirmed by LiDAR data, shows a general slope from north to south, with higher ground along College Road to the north and the A58 to the south. This creates a potential overland flow path through the site during periods of heavy rainfall.

Surface water risk is also present on surrounding roads—particularly to the north and east—where flood mapping indicates the possibility of localised ponding and flow routes toward the site. Overland flow paths have been identified from St Mary’s Gate to the east and along the western boundary, both of which could contribute to surface water entering the site during extreme weather events.

However, a number of flood mitigation measures are already in place to reduce the site's vulnerability to surface water flooding:

- The site is currently served by a positive surface water drainage system, which efficiently collects and discharges runoff, minimising the risk of surface water accumulation on-site.
- Following significant flooding incidents in December 2017 and 2019, a series of improvements were implemented, including:
  - Installation of internal flood barriers and external flood walls to reduce the risk of water ingress;
  - Fitting of non-return valves (June 2020) to prevent surcharging from the adjacent river into the drainage network;
  - Upgrades to the site's pump station, improving the ability to manage excess surface water, particularly in the undercroft area (noting that asset location records are limited).

These existing measures mitigate both fluvial and pluvial flood risk and ensure effective management of surface water runoff. As part of the proposed development, additional Sustainable Drainage Systems (SuDS) features—such as rain gardens and swales—will be incorporated to provide further attenuation, improve water quality, and manage peak discharge rates in line with the greenfield runoff rates calculated using the IH124 method.

With the existing infrastructure and proposed SuDS strategy, the residual risk of pluvial flooding is considered low, and surface water will be managed in accordance with best practice guidance and LLFA expectations.

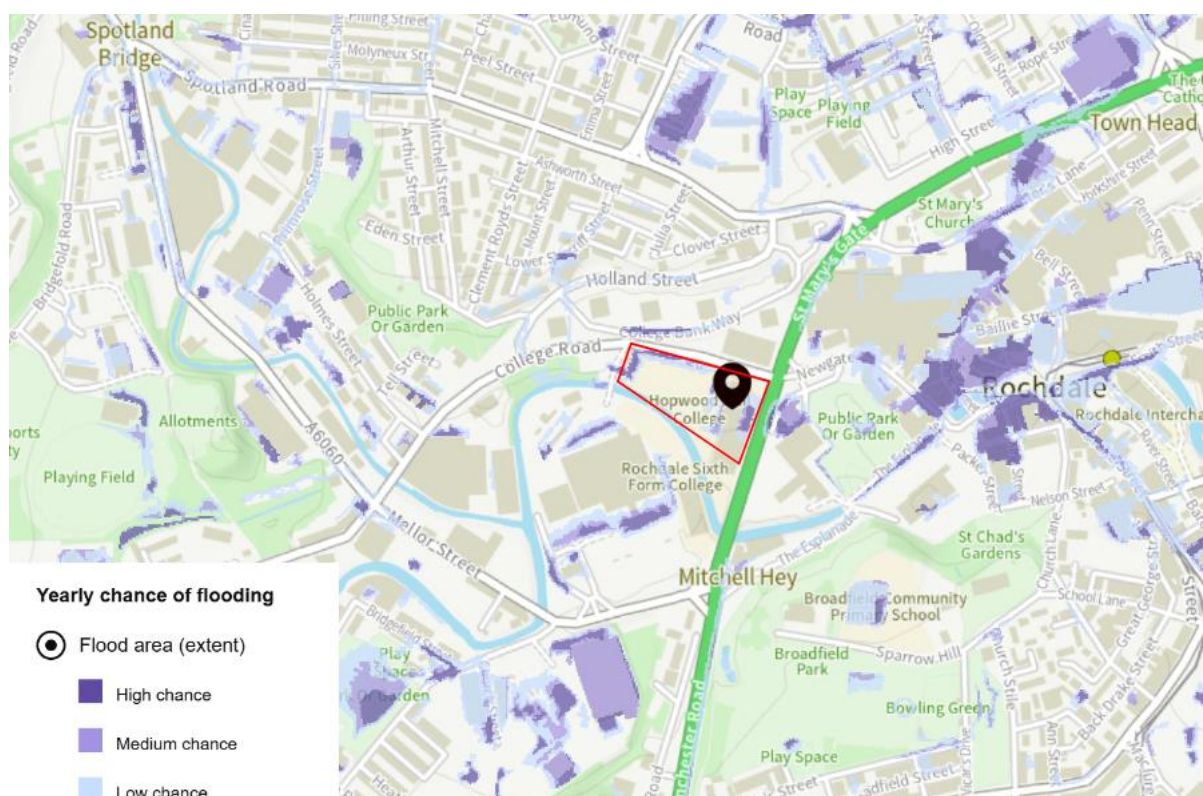


Figure 3.3 Environment Agency Surface Water Flood Risk Map

### 3.5 Flood Risk from Reservoirs

Overland flow occurs when surface water from adjacent land or infrastructure flows across the ground surface, often as a result of extreme rainfall events that exceed the capacity of existing drainage systems or due to blockages. Local topography plays a key role in directing such flows, with water generally moving toward lower-lying areas.

A review of topographic data and the surrounding urban environment has identified potential overland flow routes that could direct water toward the site, particularly from nearby roads and developed areas. One notable flow route is associated with College Bank Way, where exceedance or failure of the highway drainage infrastructure could lead to surface water

running onto the site. These flows are expected to be shallow and relatively low in volume, and in most scenarios, any overland flow reaching the site would continue southwards toward the River Roch, following the site's natural gradient.

As illustrated in Figure 3.4, these overland flow paths are limited to small areas along the site boundary. The proposed development has been designed with due consideration to these flow routes:

- No significant changes to ground levels are proposed that would obstruct or redirect natural flows.
- All finished floor levels will be set above the surrounding ground to mitigate potential surface water entry.
- Additional SuDS features, including swales, will be used to intercept, slow, and attenuate any overland flow across the site.
- The site layout has been developed to avoid placing sensitive receptors (e.g. entrances, plant rooms) in areas susceptible to surface water accumulation.

With these measures in place and given the relatively shallow depth and volume of predicted overland flows, the residual risk from overland flow is considered low and can be effectively managed through site design and surface water drainage infrastructure.

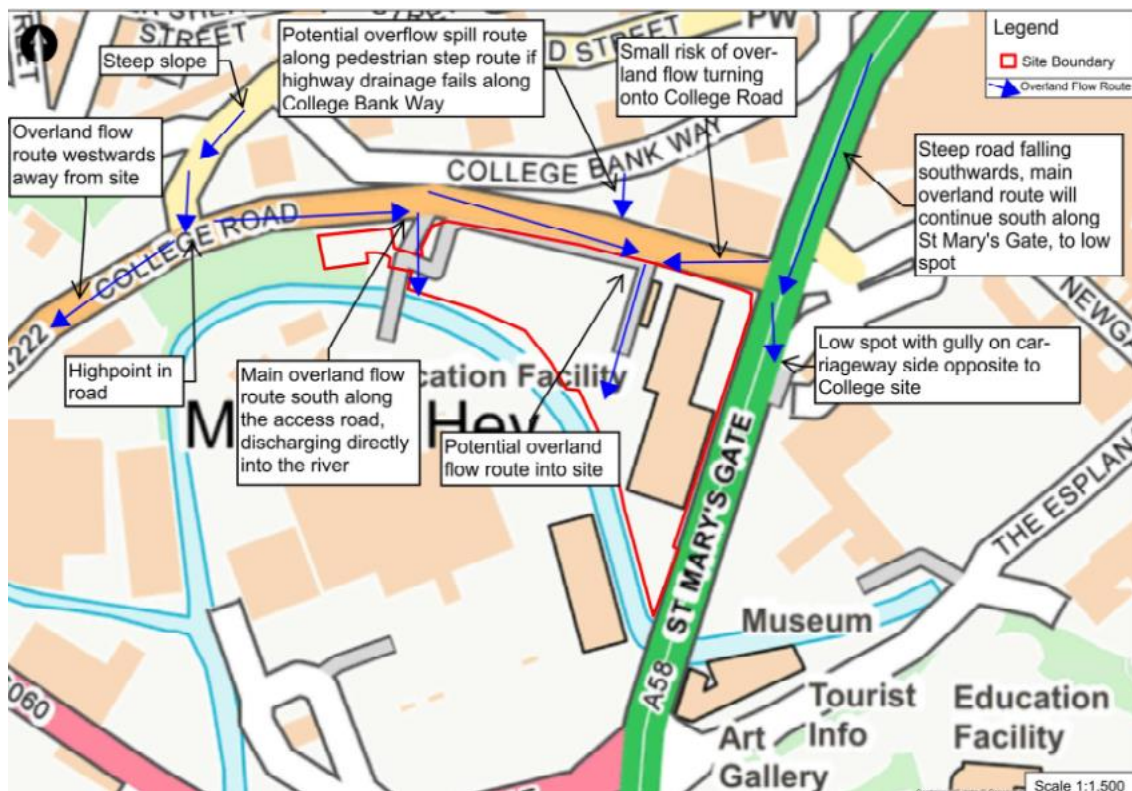


Figure 3.4 Environment Agency Risk of Reservoir Flooding Map

The EA's information states that reservoir flooding is extremely unlikely to happen and there has been no loss of life in the UK from reservoir flooding since 1925. The Reservoir Act of 1975 ensures that reservoirs are inspected regularly, and essential safety work is carried out.

#### Mitigation Measures for Surface Water and Overland Flows

The site's SuDS strategy includes swales; designed in accordance with the Non-Statutory Technical Standards for SuDS and local guidance from Rochdale Council and the Lead Local Flood Authority. The system has been designed to accommodate the 1 in 100-year rainfall event plus a 45% allowance for climate change, ensuring adequate on-site storage even during extreme events.

With these design measures in place, including flow control, storage, and backflow prevention, the development is considered to be at low risk of sewer flooding, and it will not increase risk elsewhere in the network.

### 3.6 Flood Risk from Sewers

Sewer flooding can occur when the capacity of the public sewer network is exceeded due to intense rainfall events, blockages, or hydraulic restrictions. According to publicly available records from Rochdale Borough Council, there have been historic incidents of sewer flooding within the wider Rochdale area, including locations near the proposed development site, see Figure 4.8. These records indicate a need for careful management of sewer-related flood risks, particularly as climate change increases the frequency and intensity of storm events.

The proposed development is a school, which is considered a more vulnerable land use in flood risk terms. Foul water and surface water from the site will discharge to the public foul sewer network, subject to approval by United Utilities. Surface water will additionally, be managed independently through a Sustainable Drainage System (SuDS), significantly reducing both flow rates and volumes discharging to the public network. This mitigates the potential to contribute to downstream sewer surcharge or flooding.

To address the potential flood risk from sewer surcharge, a key mitigation measure will be incorporated into the drainage design. Non-return valves will be installed on critical manholes and outfalls within the proposed surface water drainage system. These valves will prevent backflow from the public or downstream sewer network during high rainfall or surcharge conditions, ensuring that water cannot re-enter the site's drainage system from overloaded sewers. This is particularly important given the surcharged conditions modelled at the system outfall. The installation of non-return valves is a recognised and effective means of improving flood resistance, reducing the risk of internal and external flooding during exceedance events, and safeguarding property and infrastructure.

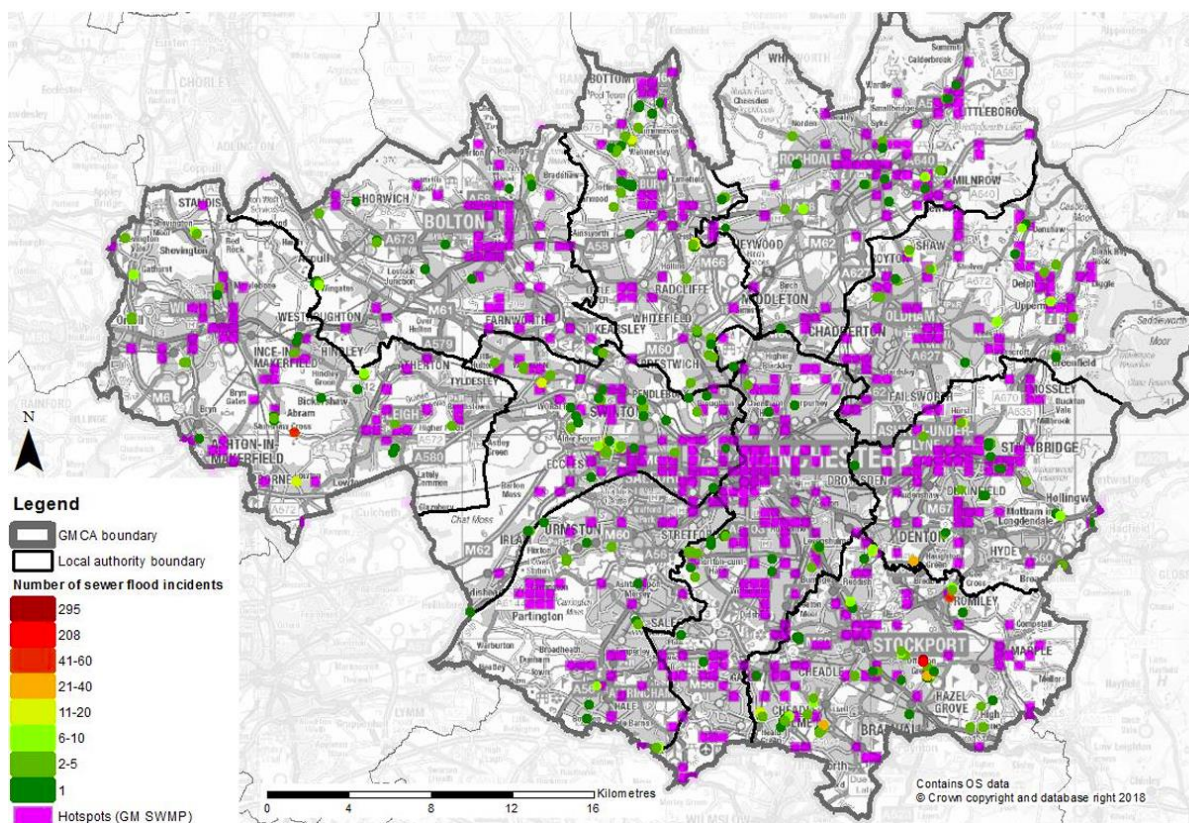


Figure 3.5 Rochdale Borough Council Sewer flooding Map

### 3.7 Climate Change

In accordance with the National Planning Policy Framework (NPPF) and Planning Practice Guidance (PPG), this Flood Risk Assessment considers the potential future impacts of climate change, including both central and upper-end allowances, despite the temporary nature of the proposed enabling works.

The proposed development has been designed with a Finished Floor Level (FFL) of 120.830 m AOD, which provides a freeboard of approximately 600mm above the peak climate change flood level. This exceeds minimum recommended allowances for freeboard and ensures an appropriate level of resilience against future fluvial flood risk. A site-wide levels plan

comparing proposed site levels and key development areas is included in Appendix A, confirming that the finished levels across the site support safe operation under future flood scenarios.

Additionally, the proposed external ground levels across the development site will remain unchanged or will match existing contours and will not be lowered as part of the works. This approach helps to preserve overland flow routes and ensures that the development will not result in any loss of floodplain storage or displacement of floodwater.

In summary, the development has appropriately accounted for the impacts of climate change through the use of flood data, elevated finished floor levels, and preservation of existing landform. The proposals meet the requirements of the NPPF and PPG and demonstrate resilience to future fluvial flood risk.

## 4.0 Flood Risk Assessment Safe Access, Warning and Evacuation Plan

In accordance with the Planning Practice Guidance (PPG), safe access and egress must be provided for all developments to ensure that occupants can safely enter and exit the site during flood events, including those influenced by climate change over the lifetime of the development.

The proposed development lies within an area of known flood risk, including fluvial, surface water (pluvial), and residual reservoir flood risk. While the development will not introduce basement levels or highly vulnerable uses, appropriate measures must be incorporated to manage the safety of occupants and emergency responders in the event of a flood.

To demonstrate safe access and egress, a Site-Specific Safe Access and Egress Plan has been prepared as part of this FRA. This plan identifies designated access routes that remain above the modelled flood level of 120.23 m AOD, which corresponds to the 1% Annual Exceedance Probability (AEP) event with a +70% climate change allowance. Key considerations include:

- Finished floor levels of the proposed buildings are set at 120.83 m AOD, well above the modelled flood level;
- Access routes across the site have been reviewed in relation to predicted flood extents to ensure dry escape routes are available;
- The site layout allows for safe refuge areas above flood levels;
- A full Flood Emergency and Evacuation Plan (FEEP) will be developed and implemented as part of the site's operational flood risk management strategy.

Figure 4.1 A Safe Access and Egress Plan has been prepared to support this FRA, which identifies designated access routes across the site relative to the modelled flood level of 120.23 m AOD (1% AEP event with +70% climate change allowance). The drawing clearly illustrates the areas of the site that remain above this flood level, ensuring that dry routes are available for site operatives during a flood event. This plan demonstrates that, even under extreme flood scenarios, safe refuge and evacuation routes can be maintained, in accordance with NPPF and EA guidance.

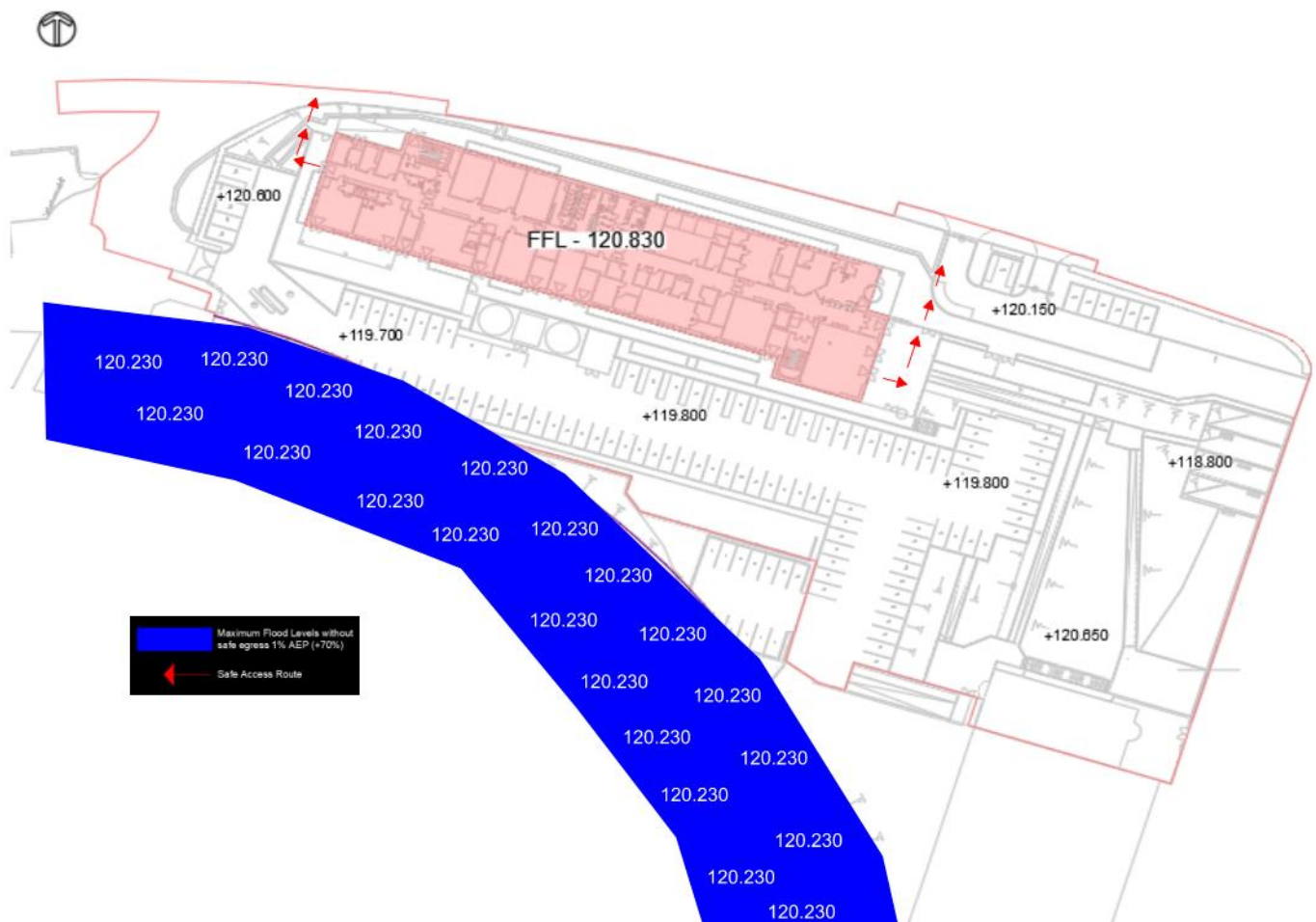


Figure 4.1 Safe Access and Egress Route

The Environment Agency (EA) monitors river and weather conditions and issues flood alerts and warnings through a national four-stage coded warning system. This system is designed to provide advance notice of potential flooding and allow individuals and organisations to take timely and appropriate action. The different stages and their recommended responses are outlined in Table 4.1 of this report. As the development will be used by school staff, students, and visitors, a site-specific Flood Warning and Evacuation Plan (FWEP) will be implemented as part of the school's emergency procedures.

All relevant staff will be registered with the EA's Flood Warning Service and trained in the actions required at each alert level. Flood response measures will not rely solely on EA alerts. On-site monitoring, such as observations of rising river levels or extreme rainfall, will also trigger emergency procedures to ensure a proactive response. Evacuation routes will be clearly identified and maintained throughout the lifetime of the school, with dry, safe access and egress routes available even under extreme flood scenarios.

Welfare facilities, key infrastructure, and critical teaching areas are located in parts of the site least vulnerable to flooding as seen in Figure 4.1. Regular training and drills will be undertaken so that staff and pupils are familiar with evacuation protocols, ensuring the school community is well-prepared and resilient in the event of a flood.

Table 4.1: Environment Agency Flood Warning System

| Flood Alert - Prepare: Flooding is possible. Be prepared                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p>Is used from two hours to twelve hours in advance of flooding.</p>   | <p><b>Following Actions:</b></p> <ul style="list-style-type: none"> <li>Check your flood risk</li> <li>Sign up for flood warnings</li> <li>Keep up to date with the latest situation - call Floodline on 0345 988 1188</li> <li>Be ready to follow your flood plan</li> <li>Have insurance documents and any medications ready</li> <li>Avoid walking, cycling or driving through any flood water</li> <li>Move any livestock and farming equipment away from areas likely to flood</li> </ul>                     |
| Flood Warning - Act: Flooding is expected. Immediate action is required                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|  <p>Is used from half an hour to two hours in advance of flooding.</p> | <p><b>Following Actions:</b></p> <ul style="list-style-type: none"> <li>As with Flood Alert plus;</li> <li>Protect yourself and your loved ones</li> <li>Move your loved ones, pets and valuables to a safe place</li> <li>Move to higher ground or the upper floor of a building</li> <li>Turn off the gas, electricity and water in your home if it's safe</li> <li>Put flood protection equipment in place</li> <li>Do as the emergency services tell you</li> <li>Help others if it's safe to do so</li> </ul> |
| Severe Flood Warning - Survive: Severe flooding. Danger to life                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|  <p>issued when flooding threatens life and communities</p>            | <p><b>Following Actions:</b></p> <ul style="list-style-type: none"> <li>As with Flood Warning plus;</li> <li>Stay in a safe place</li> <li>Be ready to evacuate your home</li> <li>Do as the emergency services tell you</li> <li>Call 999 if you are in immediate danger</li> <li>If you are caught in a flash flood move to higher ground or the upper floor of a building if it's safe.</li> </ul>                                                                                                              |

## 5.0 Surface Water Run-off Assessment

### 5.1 Existing Run-off

The total site area is approximately 1.2ha, as described in Section 1, the site currently drains to a surface water drainage network on site.

The existing peak run-off rate into the current surface water drainage network for the design storm event was estimated by modelling the existing drainage network on MicroDrainage for a 2-year storm event and a 100-year storm event. The calculations and assumed parameters are included in Appendix C.

Table 5.1: Discharge Rate Summary

| Storm Event | Discharge Rate<br>(l/s) |
|-------------|-------------------------|
| 2 Year      | 151.3                   |
| 100 Year    | 360                     |

### 5.2 Proposed Runoff

Given that the development is for a school, it is classified as “more vulnerable” under the National Planning Policy Framework (NPPF) vulnerability classifications. The anticipated design life of the development is 60 years, extending to approximately 2085. In line with the environment Agency guidance (March 2023), the 2070s epoch is most appropriate for the climate change allowance.

For this epoch, the peak river flow allowances range from:

- 30% (central allowance)
- 45% (upper end allowance)

For surface water drainage, the peak rainfall intensity allowance has been based on the most recent Environment Agency climate change guidance. The upper end uplift of 45% has been applied to the design of the surface water drainage strategy to account for increased rainfall intensity over the lifespan of the development. Sustainable Drainage Systems (SuDS), such as swales, will be implemented to manage runoff volumes where practicable.

By incorporating these allowances, the proposed development demonstrates compliance with national planning policy and provides a robust level of resilience to future flood risks associated with climate change.

The proposed surface water drainage strategy has been developed using detailed hydraulic modelling carried out in InfoDrainage, based on the 1 in 100-year rainfall event plus 45% climate change allowance. The system design is site specific, incorporating measured impermeable areas, site gradients and drainage infrastructure in accordance with current best practice and national guidance. The calculations and assumed parameters for the proposed case, modelled in InfoDrainage are included in Appendix D.

Roscoe proposes a 50% betterment on the 2-year storm discharge rate, aligning with the requirements set out by the Local Lead Flood Authority (LLFA). This results in a restricted flow rate of 75 litres per second (l/s) for the 2-year event. A 50% reduction at this return period is considered particularly beneficial, as it targets the more frequent rainfall events that typically place the greatest strain on existing surface water drainage systems. By reducing runoff from these regular storm events, the proposed strategy provides practical and measurable improvements to local surface water management.

The total discharge rate of 75 l/s will be distributed across two drainage outlets on the site—45 l/s to the western side and 30 l/s to the eastern side. To achieve these flow rates, two separate attenuation tanks will be provided, with storage volumes of approximately 185 m<sup>3</sup> and 72 m<sup>3</sup>, respectively. A depression storage area has also been modelled to show the overland flood water being stored within it up to a storm duration of 13.5hrs. The full proposed drainage layout can be seen in Appendix E.

As the surface water drainage system is to remain under private ownership, it will not be subject to adoption under Sewers for Adoption or the Design and Construction Guidance (DCG). A volumetric runoff coefficient (Cv) of 1.0 has been applied in accordance with the CIRIA SuDS Manual (C753). This conservative approach assumes that all catchment areas are fully

impermeable, ensuring a robust and precautionary design. However, it is acknowledged that the inclusion of SuDS features, such as soft landscaping, will reduce runoff during certain rainfall events by promoting infiltration and surface water attenuation. The InfoDrainage inputs and results for the proposed case have been attached as Appendix D with the catchment areas attached in Appendix F.

### 5.3 Surface Water SUDS Strategy

In accordance with EA guidelines and CIRIA documents, surface water runoff should be managed as close to its source as possible. The NPPF states that the following drainage hierarchy should be used to determine runoff destination.

#### 5.3.1 Infiltration Into the Ground

Soakaways and other methods of infiltrating into the ground may not be feasible on the site due to the local geology being predominantly made up of cohesive soils. In accordance with best practice and to assess the viability of infiltration-based drainage solutions, BRE Digest 365 infiltration testing was carried out on the site.

A ground investigation report was conducted by TIER Consult Group on the 3<sup>rd</sup> of March 2025, which included the results of the infiltration test. Infiltration testing was conducted at a soakaway pit, SA01, to a depth of 1.98m bgl on site. The location and result of the soakaway and failing head tests are included within Appendix G. Due to the significant depth of made ground and the poor infiltration test results, soakaways are not likely to be a viable form of surface water drainage.

These findings demonstrate that infiltration is not a viable option for surface water management on this site. As such, a positively drained system with controlled discharge to the receiving sewer or watercourse is proposed, in line with national and local design standards.

#### 5.3.2 To a Surface Water Body

The River Roch runs directly along the southern boundary of the site and currently receives surface water runoff via three outfalls, two private and one public, which ultimately discharge into the river. While the river is an available receptor, direct discharge into it is not considered feasible for the proposed development. Constructing a new outfall or headwall would require works within the river corridor, potentially disrupting the watercourse and triggering the need for additional regulatory approvals such as an Environmental Permit. To avoid unnecessary disturbance to the river and to make use of existing infrastructure, the proposed surface water drainage strategy will discharge into the River Roch via the existing surface water sewer connections already present on site.

#### 5.3.3 To a Surface Water Sewer, Highway Drain, or Another Drainage System

Where direct discharge to a watercourse is not feasible, the next preferable option under the SuDS hierarchy is discharge to a surface water sewer. On this site, there is an existing public surface water sewer that conveys runoff directly to the River Roch, as well as two private outfalls. The proposed drainage strategy maintains this arrangement by discharging surface water runoff to the existing surface water network, which in turn discharges to the River Roch. While this technically involves the use of a surface water sewer, the final outfall remains a nearby open watercourse, and the route is considered appropriate given the urban setting and existing drainage infrastructure. Discharge to the surface water sewer will be controlled through attenuation and flow restriction in line with the greenfield runoff rate targets and LLFA guidance. This connection will be indirect and will require a Section 106 agreement from United Utilities.

#### 5.3.4 To a Combined Sewer

According to United Utilities asset survey, there is not a combined water sewer present on site, therefore this runoff destination will not be considered.

### 5.4 Proposed Discharge Rates and Attenuation Volume

Communications with United Utilities have been initiated with the intention to discharge surface water via gravity to their surface water drainage network located running through the site. The proposed discharge rates and attenuation volumes have been included in Section 5.2.

### 5.5 Water Quality

SuDS have the potential to provide water quality benefits to runoff entering the environment. The SuDS Manual states that SuDS should be designed to treat runoff to reduce the risk of environmental pollution. Chapter 26 of The SuDS Manual sets out the 'simple index approach' to water quality risk management. This approach has been used to quantify the benefits of the proposed SuDS scheme on water quality.

Step 1 of the simple index approach is to identify the pollution hazard indices for the proposed land use. As the site is a school, the CIRIA SuDS Manual (C753) categorises it under:

"Non-residential car parking with infrequent change" if you're considering areas like school car parks with less than 300 traffic movements per day.

Therefore, the proposed school development is considered to have a 'low' pollution hazard level and Table 5.2 below shows the associated pollution hazard index:

| Land Use                                                                                                                                                            | Pollution Hazard Level | Total Suspended Solids (TSS) | Metals | Hydrocarbons |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------------|--------|--------------|
| Residential roofs                                                                                                                                                   | Very Low               | 0.2                          | 0.2    | 0.05         |
| Other roofs                                                                                                                                                         | Low                    | 0.3                          | 0.2    | 0.05         |
| Individual property driveways, residential car parks, low traffic roads and non-residential car parking with infrequent change                                      | Low                    | 0.5                          | 0.4    | 0.4          |
| Commercial yard and delivery areas, non-residential car parking with frequent change, all roads except low traffic roads and trunk roads/motorways                  | Medium                 | 0.7                          | 0.6    | 0.7          |
| Sites with heavy pollution, sites where chemicals and fuels are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways | High                   | 0.8                          | 0.8    | 0.8          |

Table 5.2: Pollution Hazard Indices, taken from Table 26.2 of The SuDS Manual (CIRIA, 2015)

The principal destination of the runoff is to surface water sewer, but small amounts of infiltration may occur from unlined components. Therefore, the surface water pollution mitigation indices should be used for the main surface water discharge, and the groundwater pollution mitigation indices used for the discharge to groundwater.

The indicative surface water pollution mitigation indices for a swale is shown in Table 5.3 below:

| Type of SuDS Component | TSS | Metals | Hydrocarbons |
|------------------------|-----|--------|--------------|
| Swale                  | 0.5 | 0.6    | 0.6          |

Table 5.3 Surface Water Pollution Mitigation Indices, taken from Table 26.3 of The SuDS Manual

To determine if a swale is enough for the school site using the simple index approach (SIA) from the CIRIA SuDS Manual (C753), the pollution hazard indices will need to be compared with the mitigation indices of the SuDS components.

| Pollutant          | TSS | Metals | Hydrocarbons |
|--------------------|-----|--------|--------------|
| Pollution Index    | 0.5 | 0.4    | 0.4          |
| Swale              | 0.5 | 0.6    | 0.6          |
| Meets requirement? | yes | yes    | yes          |

Table 5.4: Surface Water Pollution Mitigation Index vs mitigation assessment

Provided that the mitigation indices of the treatment techniques are greater than or equal to the hazard indices for the proposed development then there should be no reduction in the overall water quality within the receiving watercourse or groundwater body. Therefore, the incorporation of a swale will provide suitable prevention from pollution to surface water.

## 5.6 Biodiversity and Amenity

Swales have been selected as the primary SuDS feature for this site due to their ability to effectively manage surface water runoff while offering additional benefits in terms of biodiversity, amenity, and educational value. Swales are shallow, vegetated channels designed to convey, attenuate, and treat surface water runoff close to where it falls. By slowing flow rates and allowing infiltration and sedimentation, they contribute to both water quantity and quality objectives in line with the CIRIA SuDS Manual (C753).

From a biodiversity perspective, well-designed swales planted with native and pollinator-friendly vegetation can provide valuable linear habitats for invertebrates, birds, and small mammals. They can act as wildlife corridors, linking fragmented green spaces and enhancing ecological connectivity across the site. The use of varied planting and subtle changes in topography within the swale profiles further improves their ecological value, encouraging a diverse range of species.

In terms of amenity, swales offer a more visually attractive alternative to conventional piped systems, integrating into landscaped areas and softening the overall site layout. Within a school environment, swales also present a unique opportunity for hands-on environmental education. They provide a tangible, real-world example of sustainable water management that can support the curriculum in subjects such as geography, science, and environmental studies. Interpretation signage or integration into outdoor learning areas can further enhance their educational potential.

Overall, the proposed swales serve multiple functions: they contribute to runoff control, improve water quality, enhance biodiversity, and support the amenity and educational value of the development in a cost-effective and sustainable way.

## 5.7 Surface Water Maintenance Strategy

The successful implementation and operation of a SuDS system depends on a robust and clear maintenance strategy being implemented. The following measures should form part of the site's proposed management plan. It is envisaged that the majority of the site drainage will be offered for adoption to United Utilities subject to further discussions. However, the majority of the SuDS will be maintained by The Hopwood Hall College School and will form part of the overall maintenance regime for the site. A SuDS Proforma has been attached in Appendix J.

Effective SuDS design must assess all foreseeable risks during construction and maintenance. These must be mitigated during the detailed design stages where effective design will aim to avoid, reduce and mitigate risks. This process will also require input from the principal contractor who will ensure the construction of SuDS components are carried out in a safe and sustainable manner. In addition, this strategy also includes ancillary non-SuDS drainage components (such as oil-water interceptors and flow control devices), which are not classed as SuDS elements but are critical to the proper operation of the overall drainage system. Their inclusion ensures the Flood Risk Assessment provides a comprehensive site-wide maintenance plan to satisfy local planning and LLFA expectations.

| SuDS Element          | Maintenance              |                                                                                                                                         |                                                                                      |
|-----------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|                       | Activity                 | Required Action                                                                                                                         | Typical Frequency                                                                    |
| Swale                 | Regular Maintenance      | Remove litter and debris                                                                                                                | Monthly, or as required                                                              |
|                       |                          | Cut the grass, manage vegetation and remove nuisance plants                                                                             | Monthly at start, then as required                                                   |
|                       |                          | Inspect inlets, outlets and overflows for blockages, and clear if required                                                              | Monthly                                                                              |
|                       |                          | Inspect for ponding, compaction and silt accumulation                                                                                   | Monthly or when required                                                             |
|                       |                          | Inspect vegetation coverage                                                                                                             | Monthly for 6 months, quarterly for 2 years, then half yearly                        |
|                       |                          | Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies                               | Half yearly                                                                          |
|                       | Occasional Maintenance   | Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required                                        | As required or if bare soil is exposed over 10% of more of the swale treatment area. |
|                       | Remedial Actions         | Repair erosion or other damage by re-turfing or reseedling                                                                              | As required                                                                          |
|                       |                          | Relevel uneven surfaces and reinstate design levels                                                                                     |                                                                                      |
| Attenuation Tank      | Monitoring / Inspections | Inspect all inlets, outlets, vents, overflows and control structures to ensure they are working as they should                          | Annually or after severe storms                                                      |
|                       |                          | Inspect and identify any elements that are not operating correctly.                                                                     | Monthly for three months, then half yearly or as required.                           |
|                       | Regular Maintenance      | Remove sediments / debris from catch pits / gullies and control structures                                                              | Annually, after severe storms or as required                                         |
|                       | Remedial Actions         | Repair inlets, outlets, vents, overflows and control structures.                                                                        | As required                                                                          |
| Oil-Water Interceptor | Regular Maintenance      | - Visual inspection of integrity and liquid levels<br>- Check for presence of oils, silt, debris, and blockages<br>- Record inspections | Monthly to Quarterly (depending on site risk level)                                  |

| SuDS Element              | Maintenance                   |                                                                                                                                                                                               |                                                              |
|---------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
|                           | Activity                      | Required Action                                                                                                                                                                               | Typical Frequency                                            |
| Hydrobrake (flow control) | <b>Occasional Maintenance</b> | <ul style="list-style-type: none"> <li>- Remove accumulated oil and silt via licensed waste contractor</li> <li>- Clean chamber and filters as necessary</li> </ul>                           | Every 6 months (or more frequently if high oil load)         |
|                           | <b>Remedial actions</b>       | <ul style="list-style-type: none"> <li>- Repair or replace damaged parts (e.g. baffles, filters, access covers)</li> <li>- Investigate and resolve causes of abnormal oil build-up</li> </ul> | As required (after defect or pollution incident)             |
|                           | <b>Regular Maintenance</b>    | <ul style="list-style-type: none"> <li>- Visual inspection of chamber</li> <li>- Confirm that the unit is free of debris and silt</li> <li>- Check for blockages or damage</li> </ul>         | Quarterly                                                    |
|                           | <b>Occasional Maintenance</b> | <ul style="list-style-type: none"> <li>- Jet wash or manually remove silt, debris, or sediment from the chamber</li> <li>- Service moving parts if applicable</li> </ul>                      | Every 12 months                                              |
|                           | <b>Remedial Actions</b>       | <ul style="list-style-type: none"> <li>- Repair or replace damaged components</li> <li>- Investigate and clear persistent blockages</li> </ul>                                                | As required (following blockage, failure, or flood incident) |

Table 5.5 SuDS Maintenance Strategy as taken from The SuDS Manual

The successful implementation and operation of a SuDS system depend on a robust and clear maintenance strategy being implemented. The following measures should form part of the site's proposed management plan. It is envisaged that the majority of the site drainage will be offered for adoption to United Utilities subject to further discussions. However, the majority of the SuDS will be maintained by The Hopwood Hall College School and will form part of the overall maintenance regime for the site. A SuDS Proforma has been attached in Appendix J.

Effective SuDS design must assess all foreseeable risks during construction and maintenance. These must be mitigated during the detailed design stages where effective design will aim to avoid, reduce and mitigate risks. This process will also require input from the principal contractor who will ensure the construction of SuDS components are carried out in a safe and sustainable manner.

## 6.0 Exceedance Routes and Overland Flows

Surface water exceedance and overland flows occur when intense rainfall is unable to either soak into the ground or enter a drainage system; due to blockages or the capacity of the system being exceeded. Although drainage systems are currently designed for extreme storm events, it is not economical or sustainable to build large, oversized drainage networks for all types of extreme rainfall or scenarios. As a result, there will be occasions when surface water runoff will exceed the capacity of drains as outlined in CIRA 635 document 'Designing for exceedance in urban drainage – good practice':

"It is inevitable that as a result of extreme rainfall the capacities of sewers, covered watercourses and other drainage systems will be exceeded on occasion. Periods of exceedance occur when the rate of surface runoff exceeds the drainage system inlet capacity, when the pipe system becomes overloaded, or when the outfall becomes restricted due to flood levels in the receiving water."

Designing for exceedance aims to divert and control flood flows along routes where the risk of property flooding and the risk to health and safety is minimised and can be managed.

The proposed school building will be higher than the surrounding site, therefore the exceedance routes flow away from the building. The proposed attenuation tank and the surface water drainage network has been designed not to flood for the 1 in 100 year plus 45% rainfall event. A pre and post development ground levels plan is provided in Appendix A to demonstrate offsite flow paths on the site and that the level changes will not have a negative offsite risk.

## 7.0 Foul Water Assessment

As outlined in Section 1.0 the site has an existing foul and surface water drainage network serving the site which eventually discharge into public United Utilities assets before then discharging offsite.

It is proposed to re-use this existing connection to the public sewers with a new foul water network constructed to serve the proposed buildings. This network will connect into the public sewer via a new manhole ref FWMH9.

All proposed networks will be designed to Adoptable Standards as outlined in the Design and Construction Guidance (Appendix C of the Sewerage Sector Guidance in relation to the adoption of sewerage assets) (DCG) and in accordance with Building Regulations Part H.

The foul water drainage will discharge at an unrestricted flow, a foul flows worksheet has been attached in Appendix H.

A 'Pre-development Enquiry' will be submitted to United Utilities to confirm capacity exists within the receiving public sewers.

## 8.0 Conclusions

- Roscoe have been commissioned to undertake a Flood Risk Assessment (FRA) for the proposed development at Hopwood Hall College, Rochdale, OL12 6RY.
- The EA mapping indicates that the site is within Flood Zone 3 and is at risk of flooding from the River Roch.
- The site is located off Saint Marys Gate (A58), Rochdale. The postcode of the site is OL12 6RY, and can be further identified by grid reference 389339, 413366.
- The proposal involves the demolition of the existing Block B building including the basement and the construction of a new four-storey block intended for teaching purposes. The development is to be situated in the northern section of the site, opposite College Road, on land currently occupied by car parking spaces.
- Product 4 data was obtained from the EA and the flood levels are:
  - 1% AEP (with +70% climate change): 120.23m AOD
- The proposed FFL of the building is 120.83m AOD.
- Based on the available ground investigation data and the nature of the proposed development, the risk of groundwater flooding is considered to be low.
- With the existing infrastructure and proposed SuDS strategy, the residual risk of pluvial flooding is considered low, and surface water will be managed in accordance with best practice guidance and LLFA expectations.
- The residual risk from overland flow is considered low and can be effectively managed through site design and surface water drainage infrastructure.
- The risk of groundwater flooding during the enabling phase is considered low and will be mitigated through measures such as non-return valves.
- The residual risk from reservoir flooding is considered low.
- A Safe Access and Egress Plan has been prepared to support this FRA, which identifies designated access routes across the site relative to the modelled flood level of 120.23m AOD (1% AEP event with +70% climate change allowance).
- The proposed surface water drainage strategy has been developed using detailed hydraulic modelling carried out in InfoDrainage, based on the 1 in 100-year rainfall event plus 45% climate change allowance.
- Roscoe proposes a 50% betterment on the 2-year storm discharge rate, aligning with the requirements set out by the Local Lead Flood Authority (LLFA). The total discharge rate of 75 l/s will be distributed across two drainage outlets on the site—45 l/s to the western side and 30 l/s to the eastern side. To achieve these flow rates, two separate attenuation tanks will be provided, with storage volumes of approximately 185 m<sup>3</sup> and 72 m<sup>3</sup>, respectively.
- Swales and attenuation tanks will be used as the main method of SuDS for this proposal.

## Appendix A

### Existing and Proposed Enabling Works Site Levels

## Appendix B

### Product 4 Data

## Appendix C

### MicroDrainage Calculations for Existing Site

## Appendix D

### InfoDrainage Calculations for Proposed Site

## Appendix E

### Proposed Site Drainage Layout

## Appendix F

### Catchment Areas for InfoDrainage

## Appendix G

### Infiltration Test Results

## Appendix H

### Proposed Site Foul Drainage Flow Calculations

## Appendix I

### Riparian Zone Drawing

## Appendix J

### SuDS Pro-Forma

## Appendix K

### Overland Flood Levels

## Appendix L

### Flood Compensation Levels