

Civil and Structural Engineering Group

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Drainage Strategy Report

Manchester College Openshaw Campus

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1.0 Introduction

BDP are appointed to provide the Civil and Structural Engineering design for the new Manchester College Openshaw Campus development including both the new build and refurbishment elements.

This report provides a formal site specific Drainage Statement for the development in support of a full Planning Application.

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BDP has endeavoured to assess all information provided to them during this appraisal. The report summarises from a number of external sources and cannot offer any guarantees or warranties for the completeness or accuracy of information relied upon.

2.0 Existing Drainage

United Utilities sewer records show that the highways surrounding the site contain a number of existing public sewers.

- 450mm dia. Combined Sewer flowing westward along Whitworth Street;
- 300mm dia. Combined Sewer flowing southward in Odell Street;
- 600 dia. Combined Sewer flowing southward along Clayton Lane South;
- 900mm dia. Combined Sewer flowing Westward across the southern end of the site;
- 225mm dia. Private Surface Water drain to the east of the site flowing southward and into the 900 dia. Combined Sewer.
- 1200/825 dia. Surface Water Sewer flowing southward along Clayton Lane South.

In addition to the sewer records, further survey work was undertaken in the form of below ground GPR utility survey. This survey yielded a reasonable amount of information with regards to pipe diameters, cover levels, invert levels etc. However, further survey work will be required to fill in a number of data gaps.

3.0 Flood Risk

A Flood Risk Assessment was undertaken by BWB consulting in March 2017 and by Scott Hughes in July 2019. As of the writing of this report, the Scott Hughes report is not available but will form part of the planning application. The BWB Report states the site is in an area identified as having a 'low' probability of flooding on the Environment Agency Flood Map and is located in Flood Zone 1.

The BWB report demonstrated that the proposed development is not at significant risk of flooding, subject to the recommended flood mitigation strategies being implemented. These are summarised in the table below:

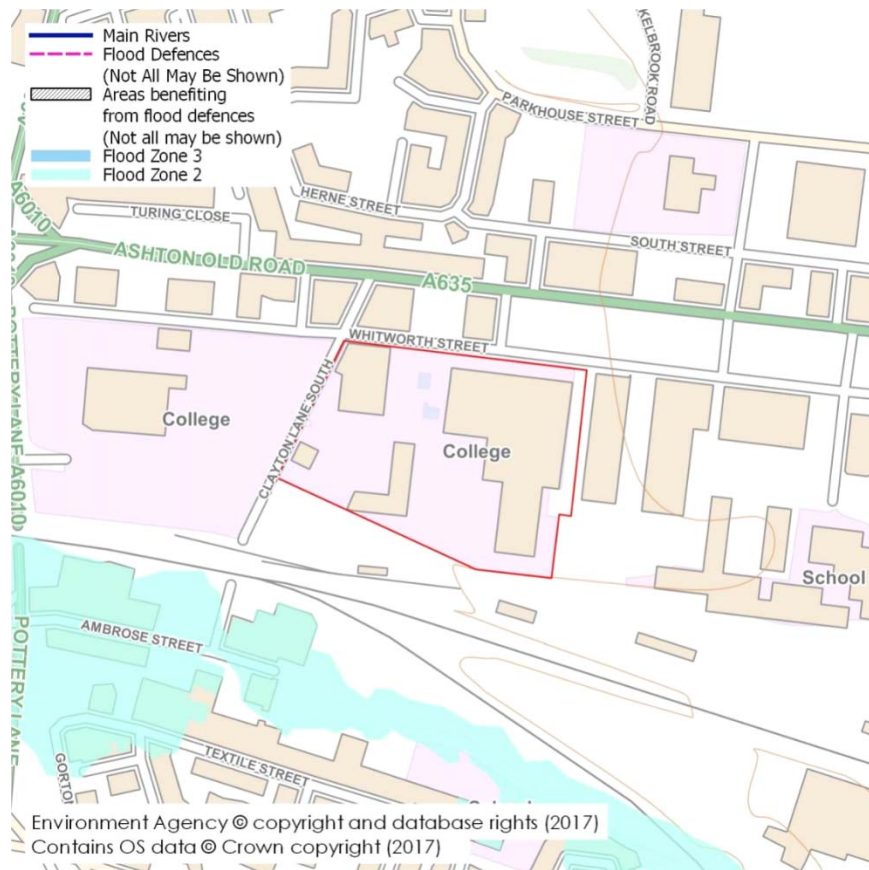
Flood Source	Proposed Mitigation Measure
Groundwater	Any residual flood risk from groundwater sources will be mitigated by raising the development a nominal 150mm above surrounding ground levels.
Sewers/pluvial runoff	The risk of the external sewer capacity being exceeded and pluvial runoff will be mitigated through nominally raising/re-profiling levels. Typically a 5m standoff from centre of the 900mm sewer would be required to ensure that construction does not cause detriment to the existing sewer network, if this is not feasible alternatively a diversion could be investigated in both instance confirmation would need to be sought from the sewer undertaker, United Utilities
Impact of the Development	Due to site constraints it may be impracticable to incorporate above ground storage within the proposed development therefore cellular storage would be the next viable alternative. Sustainable drainage systems (SuDS) such as permeable paving, a silt trap or petrol interceptor should be incorporated within the drainage arrangements where practicable, in order to assist in treating flows from the site. Surface water will outfall at a restricted rate to the nearby sewer in agreement through further consultation with United Utilities.
This summary should be read in conjunction with BWB's full report. It reflects an assessment of the Site based on information received by BWB at the time of production.	

Flood risk from other sources including reservoirs, canals and groundwater has been assessed and represents a low residual risk to the site.

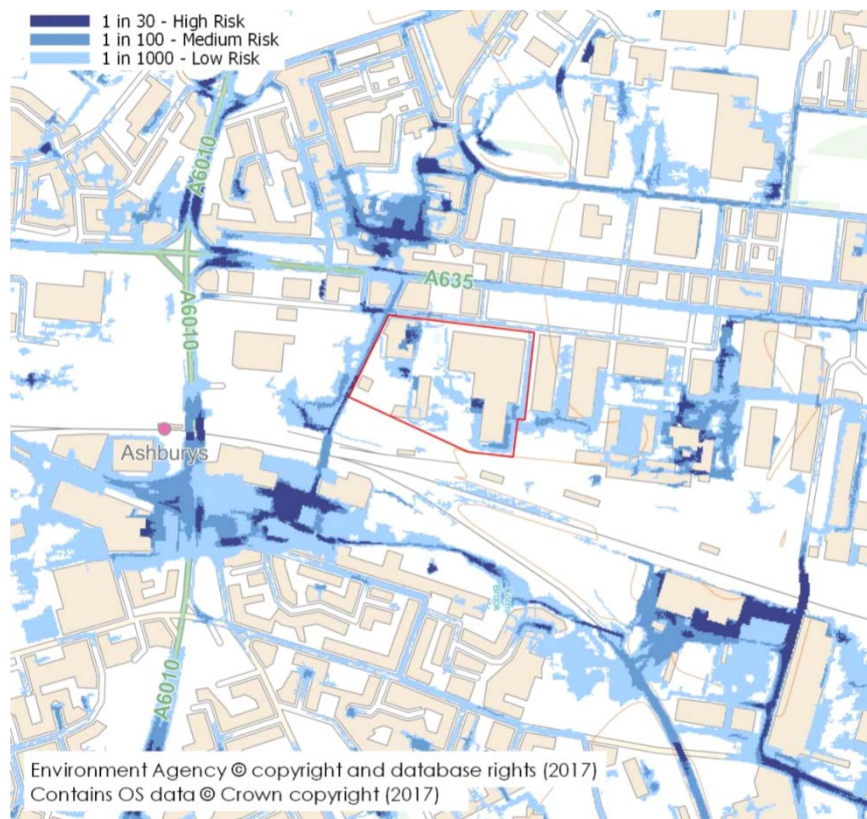
The site is indicated to lie within the Conurbation Core Critical Drainage Area, which is indicated to be an area of major regeneration and redevelopment that could have significant impact on surface water runoff to the sewer network. However, there is indicated to be no history of surface water flooding at the site.

To manage any residual flood risk, ground levels should be profiled to encourage pluvial runoff and overland flows away from the built development and level accesses towards the nearest drainage point. Floor levels should generally be raised 150mm above surrounding ground levels to prevent any overland flow resulting from pluvial runoff or overland exceedance from entering buildings.

In compliance with the requirements of National Planning Policy Framework, and subject to the mitigation measures proposed, the proposed development site can proceed without being subject to significant flood risk. Moreover, the development will not increase flood risk to the wider catchment area as a result of suitable management of surface water runoff discharging from the site.



Environment Agency Flood Map for Planning (Rivers and Sea)



Pluvial Flood Map - Risk of Flooding from Surface Water

4.0 Surface Water Drainage Strategy

The surface water drainage strategy for the scheme has been developed in accordance with the principles of Sustainable Drainage Systems (SuDS) as set out in the National Planning Policy Framework, Building Regulations and other standards and best practice guidance.

In general this requires the separation of foul and surface water drainage systems and the management of surface water runoff in a sustainable manner, as far as practicable to mimic the surface water flows arising prior to the proposed development, whilst also reducing flood risk and taking into account climate change.

There are three methods that have been reviewed for the management and discharge of surface water for the proposed development which are detailed below; these may be applied individually or collectively to form a complete strategy. They should be applied in the order of priority as listed.

5.0 Discharge via Infiltration

The British Geological Survey data indicates that the bedrock geology at the site location is sandstone with no superficial deposits. It is therefore possible that soakaways could feasibly be used as a method for surface water disposal.

However, permeability tests have been undertaken which have establish infiltration rates to be poor and therefore this method is not considered be feasible.

6.0 Discharge to a Watercourse

The nearest water feature to the site is Corn Brook which lies approximately 150m from the southern boundary of the site. However, the existing railway separates the site from the brook and any route along the adopted highway would ultimately require a connection through third party land.

The River Ribble which is located circa 1km from the site boundary. Given the excessive distance it is considered that discharge to a watercourse would not be practicable and therefore it has not been considered further.

7.0 Discharge to Public Sewer

As discussed above, UU records show combined sewerage either traversing the site, or in close proximity. Based on the GPR survey undertaken the existing drainage networks serving the various buildings and hard paved areas all drain to the public combined sewer network.

It is noted that an existing Surface Water Sewer is present to the west along Clayton Lane South. However, no survey information is currently available in relation to this asset and therefore it is not clear whether a connection would be achievable. Furthermore, as the existing site discharges to the combined sewer network, any new connection to this surface water sewer would need to be restricted to Greenfield Runoff rates which would lead to a significant increase in attenuation volumes to meet this discharge requirement.

Taking the above into consideration, it is therefore proposed that the development will be served via separate foul and surface water drainage with connection to the existing on-site drainage systems which ultimately outfall to the existing 900 dia. combined sewer crossing the campus to the south.

Currently two connections to the existing combined sewer network are proposed to suit the split of catchments and development phasing:

- Catchment 1A - Connection to an existing private combined manhole close to the Auto Electrical Workshop just prior to its outfall to the public combined sewer network.

- Catchment 1B - Connection to an existing private combined manhole within Service Yard to the South of the New Build Extension, just prior to its outfall to the public combined sewer network.
- Catchment 2A – Connection to a new combined manhole on an existing private combined drain to the north of the Auto Electrical Workshop.

Based on the anticipated levels and known invert from the GPR survey it is expected that a gravity connection to these sewers will be achievable. However, this will be subject to detailed design and co-ordination with other disciplines.

The preliminary peak rate of runoff for the existing site has been established through calculations undertaken in accordance with the Wallingford Procedure and using Microdrainage design software. Existing discharge rates for the three catchment outlined above have been calculated for the Q1, Q30 and Q100 return periods. These are summarised below.

Catchment	Imp. Area (ha)	Perm. Area (ha)	Q ₁ (l/s)	Q ₃₀ (l/s)	Q ₁₀₀ (l/s)
1A	0.135	0.036	11.79	28.92	37.24
1B	0.248	0.077	21.66	53.13	68.40
2A	0.871	0.212	76.07	186.58	240.24
TOTAL			109.51	268.63	345.88

The Non-Technical Sustainable Drainage Technical Standards advise the following with respect to 'Peak Flow Control'.

S3 For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event

Based on the above, it is proposed to restrict discharge from each catchment to the 1 in 1 year and 1 in 100 year peak BROWNFIELD runoff rates with a 50% reduction applied in accordance with Manchester City Council planning policy.

This would ensure that surface water runoff from the proposed development would not exceed the existing scenario and a betterment would be provided for larger return periods.

The table below therefore summarises the indicative proposed restricted discharge rates for the development. These are subject to agreement in principle with the LLFA and United Utilities. They may also be subject to change during detailed design stage and should not be recognised as final flow rates at this stage.

Catchment	Gross Area (ha)	Q ₁ (l/s)	Q ₁₀₀ (l/s)
1A	0.171	5.90	18.62
1B	0.325	10.83	34.20
2A	1.083	38.00	120.12
TOTAL		54.73	172.94

The proposed restricted discharge and calculated post-development runoff rates generate a storage requirement during periods of intense rainfall. Microdrainage design software has been used to estimate the storage volume required on-site to accommodate the 100 year return period with a 40% allowance for climate change.

The total storage volume across all three catchments has been calculated at 180m³ and it is currently intended that this will take the form of geocellular attenuation and sub-base storage below the proposed sports pitch.

This volume is indicative only and is subject to confirmation at detailed design stage and pending agreement in principle with the Lead Local Flood Authority and United Utilities.

8.0 Performance Criteria

The foul and surface water drainage systems serving the site will be designed and installed in accordance with the following standards and best practice guidance:

- Approved Document H - Drainage and waste disposal;
- BS EN 752:2008 - Drain and sewer systems outside buildings;
- Sewers For Adoption 7th Edition;
- PPG 3 - Use and design of oil separators in surface water drainage systems;
- National Planning Policy Framework;
- CIRIA Report 697 – The SUDS Manual;
- CIRIA Report 156 – Infiltration Drainage, Manual of Good Practice;
- CIRIA Report C635 - Designing for Exceedance in Urban Drainage;

The surface water network will be designed to the following criteria:

- No surcharging of the network for the 1 in 2 year storm event;
- No flooding for the 1 in 30 year event. This will include for the outfall from the network to be surcharged in accordance with United Utilities requirements;
- Controlled surface water flooding for the 1 in 100 year plus climate change event providing it does not inundate any buildings and pose a risk to human health/ life.

9.0 Foul Drainage Strategy

It is proposed to install a new foul drainage system to serve the proposed new extension.

The removal of a number of existing buildings across the site and replacement with new sports pitch and associated parking is expected to lead to a reduction in foul water flow rates overall. However, this will need to be confirmed pending receipt of MEPH foul flow information.

United Utilities have confirmed as part of the consultation undertaken by BWB that foul water can discharge from the site without any restriction and at a point to suit the development.

It is therefore intended that a new foul drainage network will be provided which will discharge into an existing private combined manhole within the 97 Space Car Park to the South of the New Build Extension, just prior to its outfall to the public combined sewer network.

Based on the GPR survey it is anticipated that a gravity connection will be achievable. However, this will be subject to detailed design and co-ordination with other disciplines.