



RIDGE

**ROCHDALE ROAD, MANCHESTER
FLOOD RISK ASSESSMENT &
DRAINAGE STRATEGY REPORT**

SEPTEMBER 2021

ROCHDALE ROAD, MANCHESTER FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY REPORT

Prepared for

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1. EXECUTIVE SUMMARY

This report details the Flood Risk and Drainage Strategy for a proposed residential development on land off Rochdale Road, Manchester. Table 1 below provides a summary of the Flood Risk and Drainage/SuDS Strategy for the scheme.

Table 1 – Drainage / SuDS Summary

Item	Brief Description
Flood Zone	Fluvial Flood Zone 1 (Low Risk). At low risk of flooding from all other sources.
Geology	British Geological Survey (BGS) mapping and borehole information indicates that the site is underlain by silty, sandy, clay.
Infiltration Rate	The presence of cohesive underlying geology and contamination mean infiltration is not a viable solution.
Nearest Watercourses	River Irk is approximately 340m to the north.
Nearest Adopted Sewers	A number of adopted sewers pass within the adjacent highways.
Surface Water Outfall and SuDS Hierarchal Approach	Based on the above, surface water from the development will discharge into the combined water sewerage network via an existing connection.
Existing Discharge Rate	Site is fully hardstanding and classed as brownfield.
Proposed Discharge Rate	Runoff will be restricted to 18l/s . This equates to a greater than 50% reduction on existing brownfield rates.
Allowance for Climate Change	40% - based on a residential >50-year design life to 'the 2080's'.
Proposed Attenuation Method and Volume	Geo-cellular Storage 162 m³ to contain the 100year + 40% event.
SuDS features	Water Butts, Permeable Paving
Maintenance Responsibility	Management Company / Site owner
Foul Drainage Outfall	Existing combined sewerage network via an existing connection.

There is no residual flood risk from the development site to the surrounding district due to the reduction of existing storm water flow rates. Therefore, the development does not increase the risk of flooding to the other adjacent properties and roads. Out of chamber or gully flooding for the extreme 100-year plus climate change event may occur within the development site and is classed as exceedance flows. Flood water from this event will be contained within the development site and directed away from the buildings to the external hard and soft landscaped areas.

2. INTRODUCTION

- 2.1 Ridge & Partners LLP have been appointed by Portwood Developments Ltd to prepare this Flood Risk Assessment and Drainage Strategy Report to support a planning application for the proposed demolition of existing buildings and structures; development of three new buildings comprising residential apartments and duplex homes (Use Class C3), commercial use (Use Class E), basement car parking, new landscaping and public realm, and associated engineering and infrastructure works on land off Rochdale Road, Manchester. The assessment has been undertaken in line with the 'National Planning Policy Framework 2021' (NPPF), plus the accompanying 'Flood Risk and Coastal Change' chapter of the National Planning Practice Guidance.
- 2.2 This report has been commissioned by Portwood Developments Ltd and is specific to their interests in the development proposals as described by the Architectural plan in Appendix A.
- 2.3 The report has been commissioned to identify any drainage-related issues associated with the proposed development and which are subsequently addressed within this report;
- Identify available data relating to flood risk at the site.
 - Determine whether the site is at risk from flooding from all sources, including from breach or overtopping of any existing flood defences, surface water flooding and/or groundwater flooding.
 - Consider the flood risk from all other sources.
 - Determine the current surface water drainage regime and assess any potential increase in surface water runoff as a result of the proposed development.
 - Discuss Sustainable Drainage Systems (SuDS) as an option for reducing surface water flood risk.
 - Devise an appropriate outline surface water drainage strategy (including calculation where appropriate) to deal with any potential increase in surface water runoff and include for climate change.
 - Devise an appropriate outline foul water drainage strategy.
 - Consider the recommendations of Manchester City Council Strategic Flood Risk Assessment (SFRA).
 - Assess mitigation measures & off-site impacts and define any residual risks.

3. PLANNING POLICY AND CONSULTATION

3.1. Planning Policy Framework

3.1.1 The flood maps provided by the Environment Agency (EA) locate the site within Flood Zone 1, i.e. land defined as having an annual probability of fluvial flooding of less than 1 in 1000 in any year (<0.1%). As a requirement of the NPPF (2021) and accompanying National Planning Practice Guidance (NPPG), the proposed development has to satisfy the requirements of the Sequential Test and where applicable the Exception Test.

3.1.2 Sequential Test:

Under the NPPF (2021), Zone 1 is defined as low probability flood risk. The proposal is for a new residential development, which in line with Table 2 is classified as 'More Vulnerable'.

Placing both these criteria into Table 3 (Flood Risk Vulnerability and Flood Zone 'Compatibility'), More Vulnerable development in Flood Zone 1 determines that 'Development is Appropriate'.

3.1.3 Exception Test:

As the Sequential test is passed, the Exception test is not required.

3.2. Strategic Flood Risk Assessment (SFRA)

3.2.1 SFRA's assess the risk associated with all types of flooding and provide the information required to identify the amount of development permitted in an area; how drainage systems in the area should function and also how risks in vulnerable areas can be reduced and/or mitigated. The NPPF states that Regional Planning Bodies (RPB's) or Local Planning Authorities (LPA's) should prepare SFRA's in consultation with the EA.

3.2.2 In May 2009, JBA Consulting was commissioned by Manchester City, Salford City and Trafford (MST) Councils to update a Level 2 Hybrid Strategic Flood Risk Assessment (SFRA) for the area, following on from the Greater Manchester Sub-Regional SFRA completed in August 2008. The purpose of the SFRA is to assess and map all known sources of flood risk including fluvial, surface water, sewer, groundwater and all impounded water bodies, taking into account future climate change predictions.

3.2.3 A summary of the main elements from the SFRA associated with the development site is detailed below. The full report can be found on the Manchester City Council Website.

- SFRA provides a detailed understanding of flood risks across the borough from all sources.
- The main source of flood risk in Manchester is from the Grey Irwell, the Rivers Irk, Medlock and Mersey and Corn Brook. The River Irk is located approximately 340m to the north of the site. The site is located outside of the floodplain of the River Irk.

- According to SFRA maps the site is at low risk of fluvial flooding.
- According to Greater Manchester sub-regional SFRA there are no known reports of groundwater flooding in Manchester, Trafford and Salford Authorities.
- Development should aim to deliver greenfield runoff rates on greenfield sites up to a 1 in 100-year storm event, considering climate change. A 50% reduction on existing rates will apply to all brownfield sites.
- Development should be designed so that there is no flooding to the development in a 1 in 30-year event and so that there is no property flooding in a 1 in 100 year plus climate change event. Where possible SUDS should be implemented.

3.3. Statutory Authority Correspondence

- 3.3.1. Graham Perry, Development Engineer at United Utilities, has confirmed that all surface water flow from the proposed development should drain in-line with the drainage hierarchy. In accordance with the hierarchy of drainage options within the National Planning Practice Guidance, both discharge to ground via infiltration and discharge to a waterbody should be discounted prior to consideration of discharging surface water to the public sewer system. Evidence should be provided to demonstrate how these have been discounted. Once evidence is provided, United Utilities will consider a connection to the 480 x 720 dia public combined sewer within Rochdale Road located west of the proposed site at a pass forward flow to be agreed by the Lead Local Flood Authority. United Utilities request that any agreed rate does not exceed 18l/s.
- 3.3.2. Foul flows from the site will be allowed to drain into the public foul water/combined sewer system. Our preferred point of discharge would be to the 480 x 720 dia public combined sewer within Rochdale Road located to the west of the proposed development at an unrestricted rate.

4. THE SITE

4.1. Site Details

4.1.1 The site details are summarised in Table 2 below:

Table 2: Site Referencing Information

Item	Brief Description
Site name	87 Rochdale Road, Manchester
Site address and location	87 Rochdale Road, Manchester, M4 4HY
Planning Authority	Manchester City Council
Lead Local Flood Authority	Manchester City Council
Drainage Statutory Undertaker	United Utilities
Site Area	0.5ha
Approximate Grid Reference	OS: 384723, 399157
General Locality	The site is located less than a mile to the northwest of Manchester City Centre.

4.2. Site Description

- 4.2.1. The site is currently used predominantly as a car park, with some existing buildings on site. The site is fully hardstanding with a positive drainage system out-falling to the surrounding United Utilities sewers and is classified as brownfield.
- 4.2.2. Industrial buildings and associated car parks border the site to the north. Gould Street and existing buildings, including The Marble Arch pub borders the site to the west. Clive Street and existing car parks border the site to the east. Rochdale Road borders the site to the south.
- 4.2.3. An aerial photograph of the existing site is shown in Figure 1 below. The red line boundary denotes the approximate application boundary.

Figure 1: Aerial Photograph of Existing Site (Google, 2021)



4.3. Proposed Development

- 4.3.1. As discussed in the earlier sections, the report is prepared to support a planning application for the proposed demolition of existing buildings and structures; development of three new buildings comprising residential apartments and duplex homes (Use Class C3), commercial use (Use Class E), basement car parking, new landscaping and public realm, and associated engineering and infrastructure works at 87 Rochdale Road, Manchester.
- 4.3.2. The current outline Architectural Master Plan in Appendix A provides an indication of the proposals of the site.

5. DEFINITION OF FLOOD HAZARD

5.1. Sources of information

The NPPF (2021) requires the developer to consider the impact of runoff generated by the proposed development onto the downstream catchment, and to assess the risk of runoff from the surrounding district impacting on the development footprint. Further, the report is to consider flood risk from all other sources. The following section defines the flood risk receptors and anticipated flood risk. Section 5 then discusses in further detail the probability of flooding and the likely impacts.

Table 2: Sources of information used in the identification of flood risk

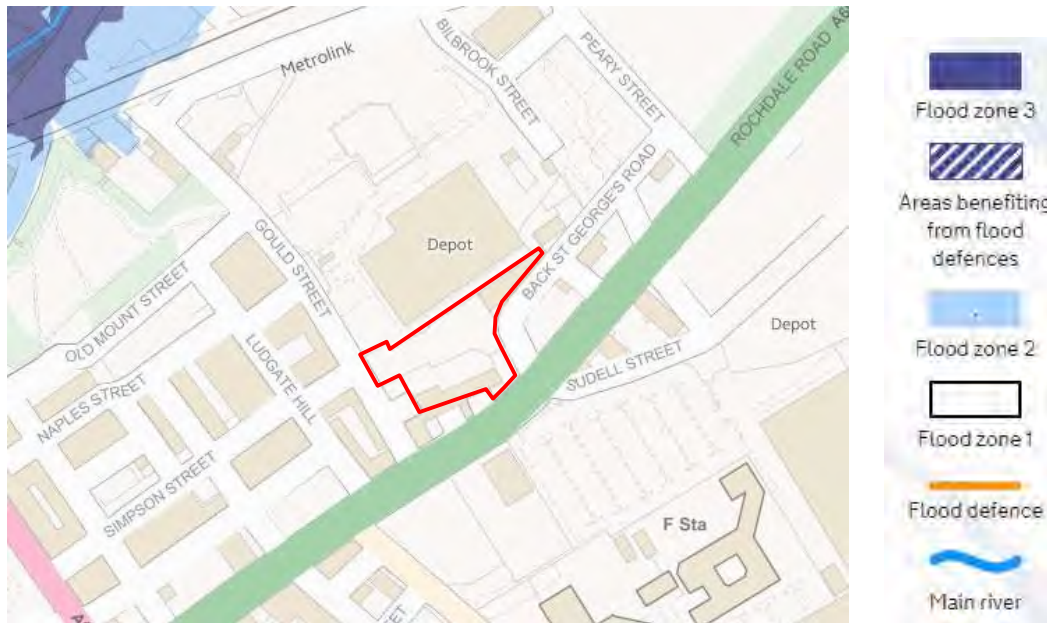
Source of Information	Details
Environment Agency Flood Map	Indicative Flood Maps
United Utilities	Sewer Records
Historic Maps	From various websites
Manchester City Council	Report & Various Maps from SFRA

5.2. Flooding from Rivers (Fluvial)

5.2.1 The closest watercourse is the River Irk, located approximately 340m to the north of the site.

5.2.2 Figure 2 below locates the site on the Environment Agency's indicative floodplain map. It is clear from this that the red line boundary sits outside of a fluvial generator of flood water from the River Irk or any other identified water body. It is considered therefore that the site lays outside of the active 100-year and extreme event floodplains, thus lying within 'Flood Zone 1 Classification' in accordance with NPPF Guidance, i.e. probability of annual fluvial flooding significantly less than 1 in 1000 in any one year (<0.1%). The risk from fluvial flood water is diminished to acceptable levels, removing the requirement for further investigation and assessment of the fluvial flood regime.

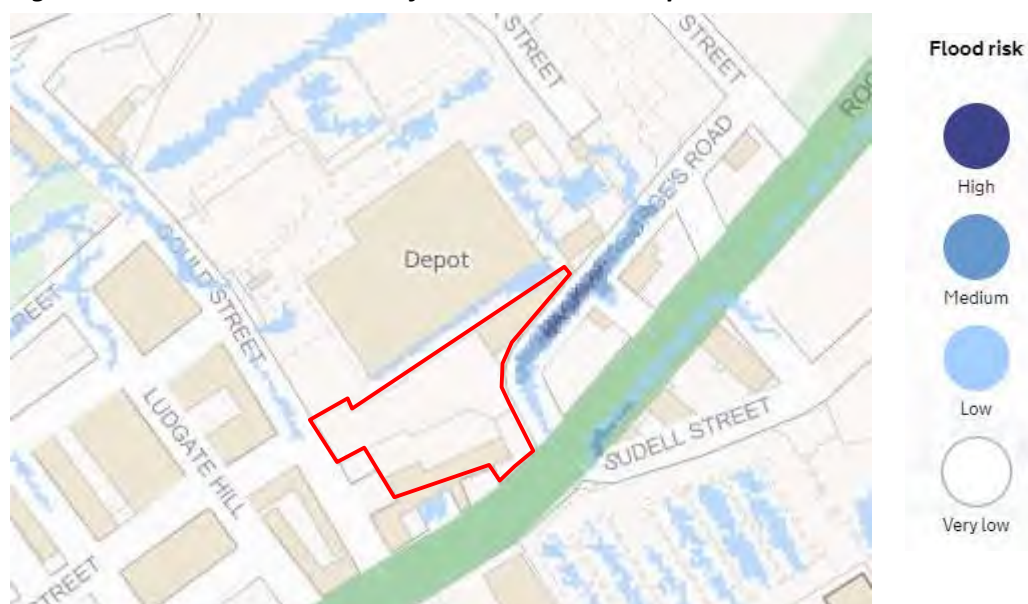
Figure 2 – The EA's 100-year Fluvial Floodplain Map



5.3. Flooding From Land (Overland Flow)

- 5.3.1 Any surface water runoff from the site is currently intercepted by the existing private drainage and conveyed away from the site by the existing network. Any surface water runoff from the surrounding area is intercepted by the existing highway drainage and conveyed away from the site.
- 5.3.2 A review of the EA Indicative Surface Water Flood Risk maps indicates that the site is at very low/low risk of surface water flooding as illustrated in figure 3 below.
- 5.3.3 There are no existing surface water flow routes through the site that would need to be maintained. As part of the proposed development the levels across the area of the new housing will ensure that all falls are away from properties and all low points are located away from the properties, thus maintaining low risk surface water flooding.

Figure 3 – The EA's Indicative Surface Water Flood Map



5.4. Flooding from Sewers and Private Drainage

- 5.4.1 There is an existing private drainage network on site which serves the existing car park and industrial buildings. A drainage survey of the network has confirmed there are no offsite connections which need to be maintained and as such this network will be removed during the site works.
- 5.4.2 The United Utilities (UU) sewer records have been reviewed and confirm that there is a 2362mm BR (brick) United Utilities Combined Sewer in Rochdale Road to the south. There is also a 500x760mm BR UU Combined Sewer in Rochdale Road which becomes 750x375mm BR before it passes north into Gould Street to the west. There is also a 750x500mm UU Combined Sewer in Clive Street to the east (See figure 4 below for further information).
- 5.4.3 The extensive UU adopted drainage network serving the surrounding urban district ensures that the development footprint is protected from the impact of both upstream and downstream runoff. It is speculated that complete protection may well exist beyond a storm event equivalent to the 30-year statistical event. Beyond this projection, there may be a small degree of peripheral 'Exceedance' flooding within the areas above the sewers. However, this is expected to be localised and restricted to the location of specific manhole covers located outside the development footprint. Thus, flood risk to the site from sewers is diminished to acceptable levels.

Figure 4 – Extract of United Utilities Sewer Records (2006)



5.5. Flooding from Groundwater

- 5.5.1 The site is underlain by a Secondary A Aquifer which are classified as permeable layers capable of supporting water supplies at a local scale, and in some cases forming an important source of base flow to rivers. A Principal Aquifer also underlies the site, these are layers of rock or drift deposits that have high intergranular and/or fracture permeability meaning they usually provide a high level of water storage.
- 5.5.2 According to the Greater Manchester sub-regional SFRA there are no known reports of groundwater flooding in Manchester, Trafford and Salford Authorities. Therefore, the site is deemed to have a low susceptibility to groundwater flooding.

5.6. Flooding from Artificial Sources

- 5.6.1 There are no canals or reservoirs in close proximity to the site. Therefore the risk of flooding from artificial sources is considered to be diminished to acceptable levels, removing the requirement for further investigation and assessment.

6. ASSESSMENT OF FLOOD RISK ON DEVELOPMENT SITE (PROBABILITY)

6.1. Summary

Section 5 has defined the anticipated flood risks from all sources. Table 3 below considers each of the sources and defines in tabular format the Probability of Flood Risk associated to each and the likely impacts. Below is a table summary of the flood risks associated with the development site.

Table 3 – Flood Risk Summary

Source	Flood Risk	Likely Impacts	Remarks
Tidal	Low	Low	Site not tidally influenced.
Fluvial (Watercourse)	Low	Low	Site located in Flood Zone 1 (low risk).
Surface (Overland Flood Flow)	Low	Low	Indicative EA mapping shows site is at low risk. There are no flow routes through the site that need to be maintained.
Sewers	Low	Low	There are no UU sewers passing through the site.
Groundwater	Low	Low	No indication through SFRA or local borehole records that site at risk of groundwater flooding.
Artificial Sources	Low	Low	No artificial sources in close proximity.

7. OUTLINE DRAINAGE STRATEGY

7.1. Existing Surface Water Runoff

- 7.1.1. The site has positive drainage system and is classified as brownfield.
- 7.1.2. In accordance with Manchester City Council SFRA, a 50% reduction on existing rates will apply to all brownfield sites. Table 4 below details the existing brownfield runoff rates and allowable rate based on the 50% reduction.

Table 4: Brownfield Runoff Rates

	Impermeable Area (m ²)	Existing Discharge Rate - (Imp Area x 50mm/hr) ÷ 3600	Allowable Discharge Rate (50% Reduction from Existing)
Rochdale Road	5000	70l/s	35 l/s

7.2. Geology

- 7.2.1. Based on the site use, it is anticipated that the site is underlain by a variable thickness of Made Ground. According to British Geological Survey data, any Made Ground is expected to be underlain by Superficial strata comprising Glacial Till (comprised of sandy, silty boulder clay). These are then underlain by sandstone bedrock of the Chester Formation at depths of approximately 13mbgl.
- 7.2.2. Based on the presence of cohesive boulder clay and contamination from previous site uses, infiltration is not a viable option and should be discounted.

7.3. Hydrology

- 7.3.1. The River Irk is located approximately 340m to the north of the site. There are no watercourses in close proximity to the site. Therefore, based on the distance to the nearest watercourse this option should be discounted.

7.4. Existing Drainage

- 7.4.1. There are no surface water sewers in close proximity to the site.
- 7.4.2. There is an existing 2362mm BR (brick) United Utilities Combined Sewer in Rochdale Road to the south. There is also a 500x760mm BR UU Combined Sewer in Rochdale Road which becomes 750x375mm BR before it passes north into Gould Street to the west. There is also a 750x500mm UU Combined Sewer in Clive Street to the east.

- 7.4.3. The site has existing connections into these combined sewers. A pre-development enquiry has been sent to United Utilities to confirm allowable discharge locations and rates.

7.5. Sustainable Drainage Systems

7.5.1. SuDS Objectives

Sustainable drainage developed in line with the ideals of sustainable development is collectively referred to as Sustainable Drainage Systems (SuDS). At a particular site, these systems are designed both to manage the environmental risks resulting from the urban runoff and to contribute wherever possible to environmental enhancement. SuDS objectives are therefore to minimise the impacts from the development on the quantity and quality of the runoff and maximise amenity and biodiversity opportunities (CIRIA C753, 2015).

7.5.2. SuDS's Design Themes

A strong design theme is essential if the maximum aesthetic benefits are to be gained from the SuDS approach. At a more local scale the SuDS should link with the individual's plot structure, planting, public open space requirements and amenity areas, gaining multiple benefits from a limited area of land.

7.5.3. The SuDS Management Train

The 'Management Train Approach' should be central to the surface water drainage strategy of the proposed site. The main objective is treatment and control of runoff as near to the source as possible protecting downstream habitats and further enhancing the amenity value of the site. This concept uses a hierarchy of drainage techniques to incrementally reduce pollution, flow rates and volumes of storm water discharge from the site, and is as follows:

1. **Prevention** – The use of good site design and housekeeping measures to prevent runoff and pollution and includes the use of rainwater reuse / harvesting.
2. **Source Controls** – Control of runoff at source or as close to source as possible (e.g. soakaways, green roofs, pervious pavements).
3. **Site Control** – Management of water in a local area and can include below ground storage / attenuation, detention basins, large infiltration devices.
4. **Regional Control** – Management of water from a site or various sites and can include wetlands and balancing ponds.

7.5.4. SuDS Site Constraints

SuDS techniques are suitable for all sites; therefore, an assessment of the existing site is required so that SuDS limitations can be determined.

- Land Use Characteristics: The size and type of the development plot allows a range of source control and site control SuDS devices to be considered both above and below ground.
- Site Characteristics: Cohesive underlying clays and contamination mean infiltration is not a viable SuDS technique.
- Catchment Characteristics: The site is currently classed as brownfield.

- **Environmental and Amenity Performance:** The inclusion of SuDS within the overall development is a key driver in providing both amenity and habitat creation. Safety to all future occupiers is paramount and so best practice guidance will be incorporated so that these devices blend into the surrounding without the need for significant safety precautions. Maintenance plans will be prepared for all SuDS devices that are included.

7.5.5. SuDS Methods

Tables 5 and 6, below, provide an assessment of various above and below ground SuDS methods that can provide water quality treatment and management of flows to reduce runoff rates and volumes and whether they can be suitably incorporated at this development site. The purpose of this assessment is to set out options to be considered at the planning stage with consideration to time constraints, viability and lifetime maintenance of the development.

Table 5: Surface SuDS Methods

Method	Comment	Suitability for Development
Green Roofs	• Can be used on suitable low-rise buildings to provide retention, attenuation and treatment of rainwater Promotes evaporation and local biodiversity.	<u>Not suitable:</u> • Architectural proposals for the development and maintenance issues deem this unsuitable.
Water Butts	• Plastic tanks placed at the base of rainwater down pipes to collect rainwater runoff from the roof areas.	<u>Suitable:</u> • Can be located at base of rainwater downpipes. Subject to Client approval.
Rainwater Harvesting	• Rainwater harvesting reduces the total runoff volume from the developed site and reduces treated water consumption.	<u>Not Suitable:</u> • Additional costs of installation would have severe effect on viability of development. • Running and maintenance costs would not be acceptable to client and future occupiers.
Infiltration Options	• Reduces total run off volume from the development.	<u>Not Suitable:</u> • Cohesive underlying clays and presence of contamination means infiltration is not viable.
Permeable Surfacing (Infiltration)	• Reduces total run off volume from the development. • Can be used to enhance water quality.	<u>Not Suitable:</u> • Cohesive underlying clays and presence of contamination means infiltration is not viable.
Permeable Surfacing (Standard)	• Can be used to enhance quality of runoff water. • Sub-base provides 'source' storage and reduces the volume of storage downstream.	<u>Suitable:</u> • Private parking bays have the potential to attenuate and filter surface water flows through the use of permeable

	- The storage can be created with selection of the stone fill or use of plastic box stems. - Impermeable membrane at base of construction to prevent impact on pavement stability.	surfacing (subject to confirmation from architect on surface finishes).
Swales, basins and ponds	- Provide areas for above ground surface runoff storage. - Swales also improve water quality through filtration.	Not Suitable: The type of development and requirement for significant amounts of outdoor parking means the incorporation of swales, basins or ponds will impact viability of development.

Table 6: Sub-Surface SuDS Methods

Method	Comment	Suitability for Development
Geocellular Storage	- Suitable for sites with insufficient space for basins etc. - Suitable for sites where topography prevents the use of open basins etc. - Can be very effective infiltration devices subject to ground conditions.	<u>Suitable:</u> The use of geocellular attenuation may be possible to retain excess storm water.
Large Diameter Pipes, Culverts or Tanks	- Suitable for sites with insufficient space for basins etc. - Provide a volume of below ground storage with a high void ratio and good man entry provision to allow for future maintenance and cleaning. - Generally suitable for adoption by the statutory water company.	<u>Suitable:</u> The use of oversized pipes may be possible to retain excess storm water.

7.5.6. SuDS Hierarchal Approach

Based on the SuDS assessment in Tables 5 and 6, plus an assessment of the local site conditions, the SuDS hierarchal approach for discharge of surface water at the development site is considered in greater detail below:

Table 7: SuDS Hierarchal Approach

Method	Suitability	Suitability for Development
Infiltration to Ground	No	Cohesive underlying clay and presence of contamination means infiltration is not viable.
Connection to Watercourse	No	There are no watercourses in close proximity.
Connection to Surface Water Sewer	No	There are no surface water sewers in close proximity.
Connection to a Combined Sewer	Yes	There are multiple combined sewers in the surrounding highways, into which the site has existing connections.

7.5.7. SuDS Design Philosophy

The SuDS assessment and hierarchal approach discussed in Tables 5, 6 and 7 above has defined the overall SuDS strategy. Thus, the SuDS philosophy for the development site is the promotion of Prevention, Source Control and Site Control techniques with discharge rates to be restricted to greenfield rates, to reduce the risk of both site and downstream flooding.

The following design philosophy is proposed:

- Surface water treatment using the 'Management Train' approach to remove and isolate contamination at all SuDS facilities prior to conveyance to the ground.
- Cohesive underlying clays and contamination mean infiltration is not a viable option.
- The site will discharge into the combined sewerage system in Rochdale Road at a rate of **18l/s** as requested by United Utilities.
- Source control in the form of water butts and permeable paving.
- Site control in the form of geo-cellular storage.
- Aim to limit where possible the impermeable fraction of development.

7.6. Surface Water Drainage Strategy

- 7.6.1. The outline strategy is to collect runoff from the roofs and other site areas and direct it to new below-ground surface water drainage pipework. This pipework will discharge into the combined sewerage system.
- 7.6.2. The discharge rate will be restricted to a maximum of 18l/s as requested by United Utilities; this rate is equivalent to a 75% reduction on existing runoff rates which is greater than required by MCC LLFA. In turn this will generate surface water attenuation volumes which will be contained within geocellular storage prior to outfall. Water butts and permeable paving will be installed to provide source control.
- 7.6.3. The proposed drainage layout for the new development site will be designed in accordance with Design & Construction Guidance (DCG), BS EN 752: 2008 and Building Regulations Part H guidance, i.e. up to the 30-year storm return period criterion and tested for the 1 in 100 year return period

including a 40% increase to account for climate change to confirm that there is no flood risk to the properties.

- 7.6.4. Flooding can occur on a local scale beyond the 30-year criterion due to runoff exceeding the capacity of the minor system during extreme events and it can only be addressed on a site-specific basis. Design & Construction Guidance states that developments should be protected against flooding from extreme events (1 in 30 year) and that flood pathways are identified when the drainage system is exceeded.
- 7.6.5. In the case of this development, exceedance flows will be all those over and above the 30-year design criterion set by Design & Construction Guidance. Using storage within the external areas would be achievable and would direct flood water away from the proposed properties, with flows directed back into the surface water drainage network as water levels in the drainage network receded. The exceedance flows and volumes can be calculated for the new development drainage layout. In the case of this development and due to the fall across the site, consideration will be given to make sure all water is controlled so that it does not impact on any adjoining properties.
- 7.6.6. Table 8 below defines the outline post-development attenuation volumes. The volumes identified below are preliminary for this outline assessment and are likely to alter at detailed design stage.
- 7.6.7. Any future drainage calculations carried out as part of a site-wide drainage strategy or for the development layouts themselves must include the appropriate increase in rainfall to satisfy the future Climate Change allowances.

Table 8: Outline Attenuation Volumes

	New Impermeable Area (ha)	Allowable Runoff Rate (l/s)	1 in 30-year Attenuation (m ³)	1 in 100-year Attenuation + 40% Climate Change Allowance (m ³)
Residential Development	0.4	18.0	79.0	162.0

7.7. Pollution Control

- 7.7.1. Silt is to be prevented from entering the drainage system by the use of trapped gullies, channels with silt traps, French drains with silt traps or by the use of Sustainable Drainage techniques.

7.8. Foul Water Strategy

- 7.8.1. The outline foul water drainage strategy is to connect to the surrounding combined sewerage system via existing connections. There would be very limited increase in the foul water discharge rates generated by the new development.

8. MANAGEMENT MEASURES, OFF SITE IMPACTS AND RESIDUAL RISK

8.1. Flood Risk Management Measures

- 8.1.1. The report has found the site to be at low risk of flooding from all sources.
- 8.1.2. The surface water drainage strategy will restrict runoff to 18l/s as requested by United Utilities, prior to discharge into the United Utilities combined sewerage network via an existing connection. Attenuation has been proposed in the form of geo-cellular storage. The new surface water networks will be designed in line with current British Standard and Design & Construction Guidance up to the 100-year storm return period including an allowance for climate change.
- 8.1.3. The use of SuDS in the form of Source Control and Site Control measures, with controlled (restricted) outflow, will help to minimise the flood risk impact to the surrounding sewer network.
- 8.1.4. There will be a site management health and safety document prepared in respect of the final development. This will include the required maintenance regime for the on-site drains and drainage facilities such as the channels, gullies, pipes, manholes and all SuDS facilities.
- 8.1.5. The Management Company, to be appointed on build completion, and site occupiers will be responsible for site cleanliness, gully emptying and drain cleansing to ensure that the surface water drainage system will always operate at its maximum efficiency.
- 8.1.6. Should any flooding occur from the new sewers and drains it will be directed away from the buildings to the external areas.

8.2. Off Site Impacts

- 8.2.1. Up to and including the 100-year plus increase in rainfall allowance due to climate change (CC) event, the report has justified that there is no risk of flooding.
- 8.2.2. Surface water runoff does not increase from the pre-development regime and utilises SuDS solutions to satisfy the site constraints, the proposed development will therefore not increase flood risk onto its locality.

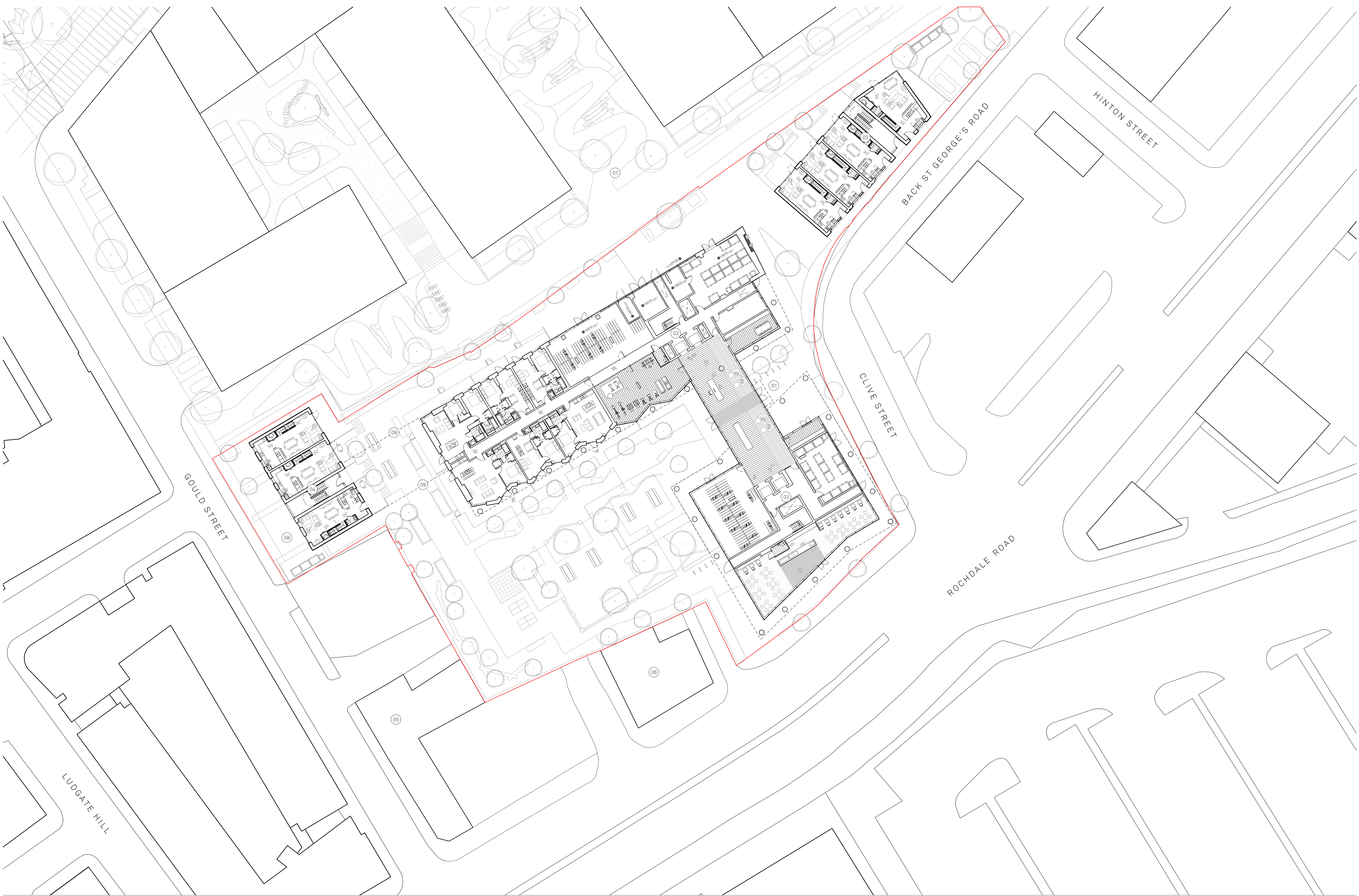
8.3. Residual Risk

- 8.3.1. With careful design of the drainage elements as described above there will be no residual flood-related risks that will remain after the development has been completed.

9. APPENDICES

- Appendix A – Architectural Site Layout
- Appendix B – Site Topographical Survey
- Appendix C – Ridge Design Drawings
- Appendix D – Outline Surface Water Attenuation Calculations
- Appendix E – Statutory Authority Correspondence

APPENDIX A – ARCHITECTURAL SITE LAYOUT



Notes:

Site Application Boundary

KEY:

01

Entrance

02

GF of Apartment blocks

03

GF of Duplex town houses

04

GF of Duplex coach houses

05

Marble Arch Pub

06

Shop

07

MCR Site

08

Basement ramp entrance

09

Line of basement ramp below landscape

Project Name:

87 Rochdale Road

Title:

Proposed Ground Floor Site Plan

Scale:

1:250 @ A1

Drawn:

JBe

Checked:

MH

Status:

Planning

Project:

136-JMA-MP-XX-P-A-001005

Drawing No:

Rev:

-

Details:

-

26/08/21

Issued for Planning

Jon Matthews Architects

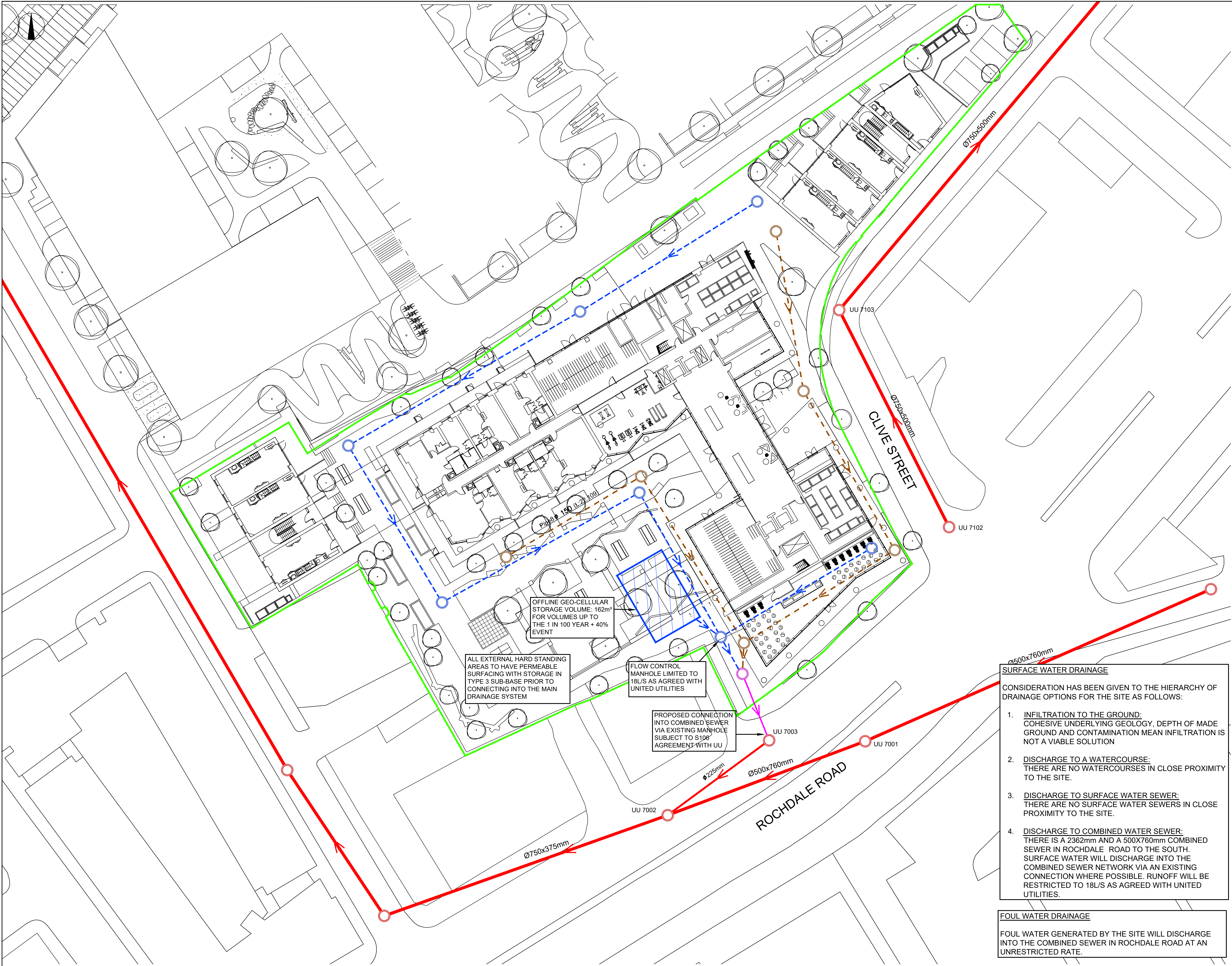
4th Floor Centurion House, 129 Deansgate, Manchester, M3 3WR

0161 974 3690

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APPENDIX B – SITE TOPOGRAPHICAL SURVEY

APPENDIX C – RIDGE DESIGN DRAWINGS



PLAN
SCALE 1:250

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KEY

- EXISTING COMBINED SEWER
- PROPOSED SURFACE WATER DRAIN
- PROPOSED FOUL WATER DRAIN
- PROPOSED COMBINED DRAIN
- SITE BOUNDARY

P01	FIRST ISSUE	09.09.21	EJD	KC
REV	DESCRIPTION	DATE	BY	CHKD
ORIGINATOR:				



5TH FLOOR
BELVEDERE HOUSE
12 BOOTH STREET
MANCHESTER, M2 4AW

TEL: 0161 833 9579
WWW.RIDGE.CO.UK

CLIENT:
PORTWOOD DEVELOPMENTS LTD

IN ASSOCIATION WITH:
JON MATTHEWS ARCHITECTS

PROJECT:
ROCHDALE ROAD

TITLE:
DRAINAGE STRATEGY PLAN

ENG/TECH:	CSE:	ICSE:	SCALE:	AS NOTED	@	A1
AS	EJD	KC	STATUS ISSUE:	09.09.21		
STATUS:						
PRELIMINARY						
UNLESS ISSUED FOR CONSTRUCTION - WORKS AT CLIENT/CONTRACTORS RISK						
SUITABILITY:	S0 - Initial Status or WIP					
PROJECT:	ORG:	ZONE:	LEVEL:	TYPE:	ROLE:	NUMBER:
5015359	RDG	XX	ST	DR	C	01000
						REV:
						P01

APPENDIX D – OUTLINE SURFACE WATER ATTENUATION CALCULATIONS

Scott Hughes Design Ltd							Page 1
The Flint Glass Works 64 Jersey Street Manchester M4 6JW			30 year Rochdale Road				
Date 08/09/2021 File 30yr.SRCX			Designed by EJD Checked by				
Micro Drainage			Source Control 2018.1				
<u>Summary of Results for 30 year Return Period</u>							
Half Drain Time : 57 minutes.							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	49.144	0.144	0.0	11.1	11.1	48.0	O K
30 min Summer	49.179	0.179	0.0	14.2	14.2	59.7	O K
60 min Summer	49.203	0.203	0.0	15.6	15.6	67.6	O K
120 min Summer	49.215	0.215	0.0	15.8	15.8	71.6	O K
180 min Summer	49.213	0.213	0.0	15.8	15.8	70.9	O K
240 min Summer	49.206	0.206	0.0	15.7	15.7	68.6	O K
360 min Summer	49.190	0.190	0.0	15.0	15.0	63.1	O K
480 min Summer	49.176	0.176	0.0	13.9	13.9	58.4	O K
600 min Summer	49.164	0.164	0.0	12.9	12.9	54.5	O K
720 min Summer	49.154	0.154	0.0	12.0	12.0	51.3	O K
960 min Summer	49.139	0.139	0.0	10.5	10.5	46.3	O K
1440 min Summer	49.120	0.120	0.0	8.4	8.4	39.9	O K
2160 min Summer	49.103	0.103	0.0	6.6	6.6	34.1	O K
2880 min Summer	49.092	0.092	0.0	5.4	5.4	30.5	O K
4320 min Summer	49.078	0.078	0.0	4.1	4.1	26.0	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
15 min Summer	65.948	0.0	54.0	25			
30 min Summer	43.740	0.0	72.1	35			
60 min Summer	27.812	0.0	93.1	54			
120 min Summer	17.191	0.0	115.2	86			
180 min Summer	12.841	0.0	129.2	120			
240 min Summer	10.394	0.0	139.5	152			
360 min Summer	7.672	0.0	154.5	214			
480 min Summer	6.185	0.0	166.1	276			
600 min Summer	5.230	0.0	175.5	338			
720 min Summer	4.558	0.0	183.6	398			
960 min Summer	3.668	0.0	196.9	520			
1440 min Summer	2.696	0.0	216.9	762			
2160 min Summer	1.979	0.0	239.9	1124			
2880 min Summer	1.588	0.0	256.5	1480			
4320 min Summer	1.163	0.0	281.3	2212			
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The Flint Glass Works 64 Jersey Street Manchester M4 6JW			30 year Rochdale Road				
Date 08/09/2021 File 30yr.SRCX			Designed by EJD Checked by				
Micro Drainage			Source Control 2018.1				
<u>Summary of Results for 30 year Return Period</u>							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
5760 min Summer	49.070	0.070	0.0	3.3	3.3	23.2	O K
7200 min Summer	49.064	0.064	0.0	2.8	2.8	21.2	O K
8640 min Summer	49.059	0.059	0.0	2.5	2.5	19.7	O K
10080 min Summer	49.056	0.056	0.0	2.2	2.2	18.5	O K
15 min Winter	49.160	0.160	0.0	12.6	12.6	53.3	O K
30 min Winter	49.200	0.200	0.0	15.5	15.5	66.5	O K
60 min Winter	49.228	0.228	0.0	16.1	16.1	75.7	O K
120 min Winter	49.235	0.235	0.0	16.2	16.2	78.0	O K
180 min Winter	49.225	0.225	0.0	16.0	16.0	74.8	O K
240 min Winter	49.211	0.211	0.0	15.7	15.7	70.1	O K
360 min Winter	49.185	0.185	0.0	14.6	14.6	61.5	O K
480 min Winter	49.166	0.166	0.0	13.1	13.1	55.2	O K
600 min Winter	49.152	0.152	0.0	11.8	11.8	50.4	O K
720 min Winter	49.141	0.141	0.0	10.7	10.7	46.7	O K
960 min Winter	49.125	0.125	0.0	9.0	9.0	41.5	O K
1440 min Winter	49.105	0.105	0.0	6.8	6.8	35.0	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
5760 min Summer	0.932	0.0	301.6	2944			
7200 min Summer	0.784	0.0	317.2	3672			
8640 min Summer	0.681	0.0	330.3	4408			
10080 min Summer	0.604	0.0	341.4	5144			
15 min Winter	65.948	0.0	60.7	26			
30 min Winter	43.740	0.0	81.0	35			
60 min Winter	27.812	0.0	104.3	56			
120 min Winter	17.191	0.0	129.1	92			
180 min Winter	12.841	0.0	144.8	128			
240 min Winter	10.394	0.0	156.3	160			
360 min Winter	7.672	0.0	173.1	224			
480 min Winter	6.185	0.0	186.1	286			
600 min Winter	5.230	0.0	196.7	346			
720 min Winter	4.558	0.0	205.8	408			
960 min Winter	3.668	0.0	220.7	530			
1440 min Winter	2.696	0.0	243.1	770			
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The Flint Glass Works 64 Jersey Street Manchester M4 6JW			30 year Rochdale Road				
Date 08/09/2021 File 30yr.SRCX			Designed by EJD Checked by				
Micro Drainage			Source Control 2018.1				
<u>Summary of Results for 30 year Return Period</u>							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control Σ (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
2160 min Winter	49.089	0.089	0.0	5.1	5.1	29.5	O K
2880 min Winter	49.079	0.079	0.0	4.1	4.1	26.2	O K
4320 min Winter	49.067	0.067	0.0	3.1	3.1	22.1	O K
5760 min Winter	49.059	0.059	0.0	2.5	2.5	19.7	O K
7200 min Winter	49.054	0.054	0.0	2.1	2.1	18.0	O K
8640 min Winter	49.050	0.050	0.0	1.8	1.8	16.6	O K
10080 min Winter	49.047	0.047	0.0	1.6	1.6	15.6	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
2160 min Winter	1.979	0.0	268.7	1132			
2880 min Winter	1.588	0.0	287.4	1500			
4320 min Winter	1.163	0.0	315.3	2208			
5760 min Winter	0.932	0.0	337.9	2944			
7200 min Winter	0.784	0.0	355.3	3664			
8640 min Winter	0.681	0.0	370.1	4496			
10080 min Winter	0.604	0.0	382.7	5048			
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Scott Hughes Design Ltd		Page 5
The Flint Glass Works 64 Jersey Street Manchester M4 6JW	30 year Rochdale Road	
Date 08/09/2021 File 30yr.SRCX	Designed by EJD Checked by	
Micro Drainage		Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 51.000

Cellular Storage Structure

Invert Level (m) 49.000

Infiltration Coefficient Base (m/hr) 0.00000

Infiltration Coefficient Side (m/hr) 0.00000

Safety Factor 2.0

Porosity 0.95

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	350.0	350.0	1.201	0.0	439.8
1.200	350.0	439.8			

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0178-1800-1800-1800

Design Head (m) 1.800

Design Flow (l/s) 18.0

Flush-Flo™ Calculated

Objective Minimise upstream storage

Application Surface

Sump Available Yes

Diameter (mm) 178

Invert Level (m) 49.000

Minimum Outlet Pipe Diameter (mm) 225

Suggested Manhole Diameter (mm) 1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.800	18.0
Flush-Flo™	0.522	18.0
Kick-Flo®	1.119	14.4
Mean Flow over Head Range	-	15.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

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Scott Hughes Design Ltd		Page 6																																																																								
The Flint Glass Works 64 Jersey Street Manchester M4 6JW	30 year Rochdale Road																																																																									
Date 08/09/2021 File 30yr.SRCX	Designed by EJD Checked by																																																																									
Micro Drainage Source Control 2018.1																																																																										
<u>Hydro-Brake® Optimum Outflow Control</u> <table><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr><tr><td>0.100</td><td>6.3</td><td>1.200</td><td>14.8</td><td>3.000</td><td>23.0</td><td>7.000</td><td>34.5</td></tr><tr><td>0.200</td><td>15.5</td><td>1.400</td><td>16.0</td><td>3.500</td><td>24.7</td><td>7.500</td><td>35.7</td></tr><tr><td>0.300</td><td>17.1</td><td>1.600</td><td>17.0</td><td>4.000</td><td>26.4</td><td>8.000</td><td>36.8</td></tr><tr><td>0.400</td><td>17.7</td><td>1.800</td><td>18.0</td><td>4.500</td><td>27.9</td><td>8.500</td><td>37.9</td></tr><tr><td>0.500</td><td>18.0</td><td>2.000</td><td>18.9</td><td>5.000</td><td>29.3</td><td>9.000</td><td>39.0</td></tr><tr><td>0.600</td><td>17.9</td><td>2.200</td><td>19.8</td><td>5.500</td><td>30.7</td><td>9.500</td><td>40.0</td></tr><tr><td>0.800</td><td>17.4</td><td>2.400</td><td>20.6</td><td>6.000</td><td>32.0</td><td></td><td></td></tr><tr><td>1.000</td><td>16.0</td><td>2.600</td><td>21.4</td><td>6.500</td><td>33.3</td><td></td><td></td></tr></table>			Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	6.3	1.200	14.8	3.000	23.0	7.000	34.5	0.200	15.5	1.400	16.0	3.500	24.7	7.500	35.7	0.300	17.1	1.600	17.0	4.000	26.4	8.000	36.8	0.400	17.7	1.800	18.0	4.500	27.9	8.500	37.9	0.500	18.0	2.000	18.9	5.000	29.3	9.000	39.0	0.600	17.9	2.200	19.8	5.500	30.7	9.500	40.0	0.800	17.4	2.400	20.6	6.000	32.0			1.000	16.0	2.600	21.4	6.500	33.3		
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)																																																																			
0.100	6.3	1.200	14.8	3.000	23.0	7.000	34.5																																																																			
0.200	15.5	1.400	16.0	3.500	24.7	7.500	35.7																																																																			
0.300	17.1	1.600	17.0	4.000	26.4	8.000	36.8																																																																			
0.400	17.7	1.800	18.0	4.500	27.9	8.500	37.9																																																																			
0.500	18.0	2.000	18.9	5.000	29.3	9.000	39.0																																																																			
0.600	17.9	2.200	19.8	5.500	30.7	9.500	40.0																																																																			
0.800	17.4	2.400	20.6	6.000	32.0																																																																					
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Micro Drainage			Source Control 2018.1																																																																																																																																																																																																																				
<u>Summary of Results for 100 year Return Period (+40%)</u> Half Drain Time : 80 minutes. <table><thead><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Control (l/s)</th><th>Max Σ Outflow (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr></thead><tbody><tr><td>15 min Summer</td><td>49.259</td><td>0.259</td><td>0.0</td><td>16.6</td><td>16.6</td><td>86.0</td><td>O K</td></tr><tr><td>30 min Summer</td><td>49.336</td><td>0.336</td><td>0.0</td><td>17.4</td><td>17.4</td><td>111.8</td><td>O K</td></tr><tr><td>60 min Summer</td><td>49.399</td><td>0.399</td><td>0.0</td><td>17.7</td><td>17.7</td><td>132.6</td><td>O K</td></tr><tr><td>120 min Summer</td><td>49.429</td><td>0.429</td><td>0.0</td><td>17.8</td><td>17.8</td><td>142.7</td><td>O K</td></tr><tr><td>180 min Summer</td><td>49.430</td><td>0.430</td><td>0.0</td><td>17.8</td><td>17.8</td><td>142.9</td><td>O K</td></tr><tr><td>240 min Summer</td><td>49.418</td><td>0.418</td><td>0.0</td><td>17.8</td><td>17.8</td><td>139.0</td><td>O K</td></tr><tr><td>360 min Summer</td><td>49.383</td><td>0.383</td><td>0.0</td><td>17.7</td><td>17.7</td><td>127.3</td><td>O K</td></tr><tr><td>480 min Summer</td><td>49.347</td><td>0.347</td><td>0.0</td><td>17.5</td><td>17.5</td><td>115.5</td><td>O K</td></tr><tr><td>600 min Summer</td><td>49.314</td><td>0.314</td><td>0.0</td><td>17.2</td><td>17.2</td><td>104.5</td><td>O K</td></tr><tr><td>720 min Summer</td><td>49.285</td><td>0.285</td><td>0.0</td><td>16.9</td><td>16.9</td><td>94.8</td><td>O K</td></tr><tr><td>960 min Summer</td><td>49.239</td><td>0.239</td><td>0.0</td><td>16.2</td><td>16.2</td><td>79.3</td><td>O K</td></tr><tr><td>1440 min Summer</td><td>49.185</td><td>0.185</td><td>0.0</td><td>14.6</td><td>14.6</td><td>61.6</td><td>O K</td></tr><tr><td>2160 min Summer</td><td>49.150</td><td>0.150</td><td>0.0</td><td>11.6</td><td>11.6</td><td>49.8</td><td>O K</td></tr><tr><td>2880 min Summer</td><td>49.131</td><td>0.131</td><td>0.0</td><td>9.6</td><td>9.6</td><td>43.4</td><td>O K</td></tr><tr><td>4320 min Summer</td><td>49.109</td><td>0.109</td><td>0.0</td><td>7.2</td><td>7.2</td><td>36.1</td><td>O K</td></tr></tbody></table> <table><thead><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Discharge Volume (m³)</th><th>Time-Peak (mins)</th></tr></thead><tbody><tr><td>15 min Summer</td><td>119.221</td><td>0.0</td><td>98.9</td><td>26</td></tr><tr><td>30 min Summer</td><td>79.853</td><td>0.0</td><td>133.0</td><td>37</td></tr><tr><td>60 min Summer</td><td>51.110</td><td>0.0</td><td>171.7</td><td>60</td></tr><tr><td>120 min Summer</td><td>31.656</td><td>0.0</td><td>212.8</td><td>94</td></tr><tr><td>180 min Summer</td><td>23.604</td><td>0.0</td><td>238.1</td><td>130</td></tr><tr><td>240 min Summer</td><td>19.048</td><td>0.0</td><td>256.3</td><td>162</td></tr><tr><td>360 min Summer</td><td>13.964</td><td>0.0</td><td>281.9</td><td>230</td></tr><tr><td>480 min Summer</td><td>11.210</td><td>0.0</td><td>301.7</td><td>294</td></tr><tr><td>600 min Summer</td><td>9.446</td><td>0.0</td><td>317.8</td><td>356</td></tr><tr><td>720 min Summer</td><td>8.209</td><td>0.0</td><td>331.4</td><td>418</td></tr><tr><td>960 min Summer</td><td>6.571</td><td>0.0</td><td>353.7</td><td>534</td></tr><tr><td>1440 min Summer</td><td>4.794</td><td>0.0</td><td>386.9</td><td>764</td></tr><tr><td>2160 min Summer</td><td>3.491</td><td>0.0</td><td>423.5</td><td>1124</td></tr><tr><td>2880 min Summer</td><td>2.784</td><td>0.0</td><td>450.2</td><td>1480</td></tr><tr><td>4320 min Summer</td><td>2.020</td><td>0.0</td><td>489.5</td><td>2208</td></tr></tbody></table>								Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status	15 min Summer	49.259	0.259	0.0	16.6	16.6	86.0	O K	30 min Summer	49.336	0.336	0.0	17.4	17.4	111.8	O K	60 min Summer	49.399	0.399	0.0	17.7	17.7	132.6	O K	120 min Summer	49.429	0.429	0.0	17.8	17.8	142.7	O K	180 min Summer	49.430	0.430	0.0	17.8	17.8	142.9	O K	240 min Summer	49.418	0.418	0.0	17.8	17.8	139.0	O K	360 min Summer	49.383	0.383	0.0	17.7	17.7	127.3	O K	480 min Summer	49.347	0.347	0.0	17.5	17.5	115.5	O K	600 min Summer	49.314	0.314	0.0	17.2	17.2	104.5	O K	720 min Summer	49.285	0.285	0.0	16.9	16.9	94.8	O K	960 min Summer	49.239	0.239	0.0	16.2	16.2	79.3	O K	1440 min Summer	49.185	0.185	0.0	14.6	14.6	61.6	O K	2160 min Summer	49.150	0.150	0.0	11.6	11.6	49.8	O K	2880 min Summer	49.131	0.131	0.0	9.6	9.6	43.4	O K	4320 min Summer	49.109	0.109	0.0	7.2	7.2	36.1	O K	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	15 min Summer	119.221	0.0	98.9	26	30 min Summer	79.853	0.0	133.0	37	60 min Summer	51.110	0.0	171.7	60	120 min Summer	31.656	0.0	212.8	94	180 min Summer	23.604	0.0	238.1	130	240 min Summer	19.048	0.0	256.3	162	360 min Summer	13.964	0.0	281.9	230	480 min Summer	11.210	0.0	301.7	294	600 min Summer	9.446	0.0	317.8	356	720 min Summer	8.209	0.0	331.4	418	960 min Summer	6.571	0.0	353.7	534	1440 min Summer	4.794	0.0	386.9	764	2160 min Summer	3.491	0.0	423.5	1124	2880 min Summer	2.784	0.0	450.2	1480	4320 min Summer	2.020	0.0	489.5	2208
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The Flint Glass Works 64 Jersey Street Manchester M4 6JW			100 year + CC Rochdale Road				
Date 08/09/2021 File 100yr + CC.SRCX			Designed by EJD Checked by				
Micro Drainage			Source Control 2018.1				
<u>Summary of Results for 100 year Return Period (+40%)</u>							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
5760 min Summer	49.095	0.095	0.0	5.8	5.8	31.7	O K
7200 min Summer	49.087	0.087	0.0	4.9	4.9	28.8	O K
8640 min Summer	49.080	0.080	0.0	4.2	4.2	26.5	O K
10080 min Summer	49.075	0.075	0.0	3.8	3.8	24.8	O K
15 min Winter	49.292	0.292	0.0	17.0	17.0	97.0	O K
30 min Winter	49.380	0.380	0.0	17.7	17.7	126.5	O K
60 min Winter	49.454	0.454	0.0	17.9	17.9	151.0	O K
120 min Winter	49.484	0.484	0.0	17.9	17.9	161.0	O K
180 min Winter	49.477	0.477	0.0	17.9	17.9	158.6	O K
240 min Winter	49.455	0.455	0.0	17.9	17.9	151.4	O K
360 min Winter	49.398	0.398	0.0	17.7	17.7	132.2	O K
480 min Winter	49.343	0.343	0.0	17.4	17.4	113.9	O K
600 min Winter	49.294	0.294	0.0	17.0	17.0	97.9	O K
720 min Winter	49.254	0.254	0.0	16.5	16.5	84.6	O K
960 min Winter	49.199	0.199	0.0	15.5	15.5	66.1	O K
1440 min Winter	49.155	0.155	0.0	12.1	12.1	51.6	O K
Storm Event		Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)		
5760 min Summer		1.607	0.0	520.3	2944		
7200 min Summer		1.345	0.0	544.2	3672		
8640 min Summer		1.162	0.0	564.1	4408		
10080 min Summer		1.027	0.0	580.9	5136		
15 min Winter		119.221	0.0	111.0	26		
30 min Winter		79.853	0.0	149.2	38		
60 min Winter		51.110	0.0	192.4	62		
120 min Winter		31.656	0.0	238.5	102		
180 min Winter		23.604	0.0	266.8	140		
240 min Winter		19.048	0.0	287.1	176		
360 min Winter		13.964	0.0	315.8	246		
480 min Winter		11.210	0.0	338.0	312		
600 min Winter		9.446	0.0	356.1	374		
720 min Winter		8.209	0.0	371.3	434		
960 min Winter		6.571	0.0	396.3	540		
1440 min Winter		4.794	0.0	433.5	774		
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The Flint Glass Works 64 Jersey Street Manchester M4 6JW			100 year + CC Rochdale Road																																																																																																												
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The Flint Glass Works 64 Jersey Street Manchester M4 6JW	100 year + CC Rochdale Road	
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Micro Drainage		Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 51.000

Cellular Storage Structure

Invert Level (m) 49.000

Infiltration Coefficient Base (m/hr) 0.00000

Infiltration Coefficient Side (m/hr) 0.00000

Safety Factor 2.0

Porosity 0.95

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	350.0	350.0	1.201	0.0	439.8
1.200	350.0	439.8			

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0178-1800-1800-1800

Design Head (m) 1.800

Design Flow (l/s) 18.0

Flush-Flo™ Calculated

Objective Minimise upstream storage

Application Surface

Sump Available Yes

Diameter (mm) 178

Invert Level (m) 49.000

Minimum Outlet Pipe Diameter (mm) 225

Suggested Manhole Diameter (mm) 1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.800	18.0
Flush-Flo™	0.522	18.0
Kick-Flo®	1.119	14.4
Mean Flow over Head Range	-	15.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

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APPENDIX E – STATUTORY AUTHORITY CORRESPONDENCE

Eleanor Dale

From: Perry, Graham <Graham.Perry@uuplc.co.uk>
Sent: 26 July 2021 22:45
To: Eleanor Dale
Cc: Wastewater Developer Services
Subject: Pre Development Enquiry for : Land off Rochdale Road, Manchester, M4 4HY UU
ref : 4200041798

Pre Development Enquiry for: Land off Rochdale Road, Manchester, M4 4HY UU ref : 4200041798

We have carried out an assessment of your application which is based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your drainage strategy will need to be reviewed by other competent authorities as part of the planning process, and we advise that you carry out the necessary site investigations to confirm the viability of your proposals.

If your investigations require access to our public sewer network, we ask that you contact our network engineers with a request for an access certificate via our main contact telephone number 0345 3723223 or refer to the link below:

<https://www.unitedutilities.com/builders-developers/working-near-our-assets/>

Foul Water

Foul flow from this site will be allowed to drain into the public foul water/combined sewer system.

Our preferred point of discharge would be to the 480 x 720mm diameter public combined sewer within Rochdale Rd located to the west of your proposed development at an unrestricted rate.

If you are able to identify an alternative, more suitable point of discharge, we request that you contact us at your earliest convenience so that we can assess suitability.

Surface Water

All surface water flow from the proposed development should drain in-line with the drainage hierarchy, as outlined in Paragraph 80, (Reference ID: 7-080-20150323), of the National Planning Practice Guidance. We also recommend you prioritise the use of multi-functional sustainable drainage systems for the management of surface water in accordance with national planning policy.

Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable.

This is outlined as follows, in order of priority:

- 1. into the ground (infiltration);**
- 2. to a surface waterbody;**
- 3. to a surface water sewer or highway drain;**
- 4. to a combined sewer.**

For guidance, The **North West SuDS Pro-Forma** provides information on the appropriate evidence required at each stage of the hierarchy, to demonstrate how each level has been discounted.

The Lead Local Flood Authority has responsibility for all surface water drainage concerns and their input to your proposal is critical. You should also consider whether it is necessary to discuss your proposal with the Environment Agency, or Internal Drainage Board (if operating in your area).

The Local Planning Authority are the determining authority for any application for planning permission and the appropriate authority for determining cost viability of a proposed drainage scheme, such assessments are outside of the jurisdiction of United Utilities.

Infiltration

Surface water runoff generated from this development should discharge to the ground via infiltration system where feasible.

A detailed evidence based feasibility assessment must be carried out in line with Chapter 25 of the CIRIA SuDS Manual 2015 to determine whether infiltration is a suitable method of surface water disposal.

Particular attention must be paid to Ground Water Source Protection Zones to ensure that the risk of pollution to these valuable resources is not compromised. Details can be obtained from the government website:

<https://www.gov.uk/guidance/groundwater-source-protection-zones-spzs#find-groundwater-spzs>

If your site is in a Groundwater Source Protection Zone, you should have regard to the Environment Agency's approach to Groundwater Protection. Information on this is available via the link below:

<https://www.gov.uk/government/publications/groundwater-protection-position-statements>

Please note that such a location could have implications for the principle of your development and the need for additional mitigating measures to protect the groundwater environment and public water supply in the detailed design of your site.

Public Sewer

In accordance with the hierarchy of drainage options within the National Planning Practice Guidance, both discharge to ground via infiltration and discharge to a waterbody should be discounted prior to consideration of discharging surface water to the public sewer system. Evidence should be provided to demonstrate how these have been discounted, as outlined in the North West SuDS pro-forma.

Once evidence is provided as outlined above, United Utilities will consider a connection to the 480mm x720mm diameter public combined sewer within Rochdale Rd located west of the proposed site at a pass forward flow to be agreed by the Lead Local Flood Authority. United Utilities request that any agreed rate does not exceed 18l/s.

I have based the discharge rate on roof areas alone because no evidence has been provided to confirm the method of surface water disposal for the area. I have also made the assumption that 30% betterment as required by the Local Planning Authority is achieved by excluding any indirect discharges from the existing hard standing areas that may currently drain into the public sewer

As a Water Company, we have no obligation to accept highway drainage into our public sewer network. However, should your proposals include runoff from highways, we would request that consideration is given to SuDS components that deliver source control are incorporated within the design of the scheme to reduce the volume and frequency of discharges of these flows to the public sewer.

SuDS

If your development proposal incorporates any SuDS component(s) which interact with a sewer network you plan on offering for adoption to United Utilities; contact should be made with our technical team at your earliest

convenience, please complete the 'Section 104 pre-application form : ' and include as much relevant detail as you can. These discussions can help prevent delays later in the development process.

Section 104 Pre application form (1b)

As per the sewerage sector guidance, all SuDS should be designed in accordance with the standards within the Design & construction guidance & the CIRIA SuDS manual (C753)

Levels

For low-lying sites, (where the ground level of the site or the level of a basement is below the ground level at the point where the drainage connects to the public sewer), care should be taken to ensure that the property is not at increased risk of flooding. If these circumstances exist, we recommend that you contact us to discuss further. It could affect the detailed design of your site and result in the need to incorporate appropriate mitigating measures in your drainage scheme.

Land drainage / Overland flows / track drainage

United Utilities have no obligation, and furthermore we do not accept land drainage, overland flows or track drainage into the public sewerage network under any circumstances

Existing Water Assets Crossing the Site

It is the developer responsibility to identify utilities on-site. Where clean water assets are shown on our records, we recommend that you contact our Water Pre-Development Team, via the following email address:

DeveloperServicesWater@uuplc.co.uk. Further information for this service can be found on our website via the link below:

<https://www.unitedutilities.com/builders-developers/larger-developments/pre-development/water-pre-dev/>

Connection Application

Although we may discuss and agree discharge points and rates in principle, please be aware that you will have to apply for a formal sewer connection. This is so that we can assess the method of construction, Health & Safety requirements and to ultimately inspect the connection when it is made. Details of the application process and the form itself can be obtained from our website by following the link below:

<https://www.unitedutilities.com/builders-developers/larger-developments/wastewater/sewer-connections/>

We recommend that the detailed design should confirm the locations of all utilities in the area and ensure that any proposed drainage solution considers routing and clash checks where required.

If we can be of any further assistance please don't hesitate to contact us further.

Kind regards,

Graham Perry



Graham Perry
Development Engineer
Developer Services
M: 07557 577548
T: 01925 679405
unitedutilities.com

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