BURO HAPPOLD

Manchester Metropolitan University
All Saints Library

Drainage Strategy Report for Planning

1350B-BHE-XX-XX-RP-C-200001

065290

21 November 2025

Revision P02

Copyright © 1976 - 2025 Buro Happold. All rights reserved

Revision	Description	Issued by	Date	Checked
P01	Planning Issue	NC	03/11/2025	PA
P02	Planning Issue – Updated Deloitte comments	NC	21/11/2025	PA

https://burohappold.sharepoint.com/sites/065290/02_Documents/04_Reports/CIV/Planning Report/1350B-BHE-XX-XX-RP-C-200001_P02.docx

Report Disclaimer

This Report was prepared by Buro Happold Limited ("BH") in accordance with, and remains subject to, the terms of BH's appointment for the benefit of Manchester Metropolitan University in relation to Planning Issue. BH responsibility shall be limited to the purpose for which this Report was prepared, with BH assuming no liability for any reliance placed on this Report by any third party.

Notwithstanding the foregoing, the content of this Report shall remain subject to the following:

1. This Report is based upon the information and knowledge available to BH at the time of writing and, unless otherwise expressly stipulated herein, BH has not sought to verify or validate any data received by BH and/or which may underpin this Report.
2. BH assumes no ownership nor liability in respect of any third-party design, workmanship and/or deliverables, and shall not be held responsible for the consequences of any negligence, error or omission in respect of the same.
3. BH does not guarantee any particular outcome, nor does BH provide any warranty in respect of any third-party services, equipment requirements and/or software and is not responsible for the outcome or use of the same; regardless of whether the content of this Report is followed.
4. Where specifications or materials are mentioned or referred to in this Report, BH does not condone use or supply of materials that would breach any laws, sanctions or other restrictive measures in any jurisdiction including but not limited to use or supply of steel or its components originating from Russia.
5. This Report shall not be construed as investment or financial advice.

BH reserves the right on notice to withdraw this Report and all associated intellectual property rights, licences or otherwise granted pursuant to BH's appointment should any payments which fall due not be paid in full. Any reliance placed upon the Report in such circumstances shall be deemed null and void.

author	**Niamh Cullen**
date	**21/11/2025**
approved	**Phil Anwyl**

Copyright © 1976 - 2025 Buro Happold. All rights reserved

signature [redacted]

date **21/11/2025**

Copyright © 1976 - 2025 Buro Happold. All rights reserved

Contents

1. Executive Summary **8**

2 Introduction **10**

2.1 Appointment and Brief 10

2.2 Limitations 10

2.3 Review of Available Information 10

3 Existing Site **12**

3.1 Site Location and Description 12

3.2 Topography and Existing Levels 13

3.3 Geology 13

3.4 Flood Risk 14

3.5 Existing Drainage 14

3.5.1 Public Drainage 14

3.5.2 Private Drainage 15

3.5.3 Watercourses 16

3.5.4 Existing Drainage Catchment Areas 17

3.5.5 Existing Exceedance Flow Routes 18

4 Proposed Development **19**

5 Statutory & Non-Statutory Policies and Guidance **20**

5.1 National Planning Policy Framework (NPPF) 20

5.2 Local Policy 20

5.3 Best Practice 20

6 Proposed Surface Water Drainage Strategy **22**

6.1 Introduction 22

6.2 Consultation 22

6.2.1 Manchester City Council (LLFA) 22

6.2.2 United Utilities (UU) 22

6.2.3 Manchester City Council (MCC) - Highways Team 23

Copyright © 1976 - 2025 Buro Happold. All rights reserved

6.3 Existing Brownfield Discharge Rates 23
6.4 Greenfield Discharge Rates 24
6.5 Proposed Catchment Areas 24
6.6 Drainage Hierarchy 25
6.6.1 Infiltration 25
6.6.2 Watercourse 25
6.6.3 Surface Water Sewer 25
6.6.4 Combined Water Sewer 26
6.7 Sustainable Drainage Systems (SuDS) 26
6.8 Climate Change 30
6.9 Proposed Discharge Rate and Attenuation Volume 30
6.10 Water Quality and Pollution Control 31
6.11 Designing for Exceedance 32
6.12 Maintenance Requirements 33
7 Proposed Foul Water Drainage Strategy 34
7.1 General 34
7.2 Consultation 34
7.3 Foul Water Management Strategy 34
Appendix A Consultation 35
Appendix B Greenfield Runoff Calculation 38
Appendix C United Utilities Asset Records 39
Appendix D Existing Drainage Plan 40
Appendix E Proposed Drainage Strategy Drawings 41
Appendix F Proposed Manhole Schedules 43
Appendix G Hydraulic Modelling Results 45
Appendix H Inspection and Maintenance of Drainage Features 48

Table of Tables

Copyright © 1976 - 2025 Buro Happold. All rights reserved

Table 4-1 Summary of Existing Catchment Areas 17

Table 6-1 Existing Brownfield Discharge Rates 24

Table 6-2 Greenfield Discharge Rates 24

Table 6-3 Summary of Proposed Catchment Areas 24

Table 6-4 SuDS Feasibility Summary 27

Table 6-5 Irwell Management Catchment Peak Rainfall Allowances (Environment Agency 2022) 30

Table 6-6 Summary of Storage Features and Volumes 30

Table 6-7 Pollution Hazard Indices (based on Table 26.2 of the SuDS Manual) 31

Table 6-8 Indicative SuDS Mitigation Indices (based on Table 26.3 of the SuDS Manual and product literature) 32

Table of Figures

Figure 4.1 Site Location Plan 12

Figure 4.2 Existing Site Levels Plan 13

Figure 4.3 United Utilities Asset Records 15

Figure 4.4 Sketch showing existing drainage catchment areas 17

Figure 4.5 Existing Exceedance Flow Routes 18

Figure 5.1 Proposed Landscape Plan (Planit, 28th August 2025) 19

Figure 7.1 Typical permeable paving detail (Marshalls photo) 29

Figure 7.2 Proposed tree pits with permeable resin paving (photo courtesy of Planit) 29

Figure 7.3 Proposed Exceedance Flow Routes 33

Copyright © 1976 - 2025 Buro Happold. All rights reserved

Glossary

Term	Definition
BH	Buro Happold
The University	Manchester Metropolitan University
MCC	Manchester City Council
EA	Environmental Agency
UU	United Utilities
LLFA	Lead Local Flood Authority
FRA	Flood Risk Assessment
SuDS	Sustainable Drainage Systems
MH	Manhole
m AOD	Metres Above Ordnance Datum.
m bgl	Metres below ground level
Greenfield	Land which has not been previously developed.
Groundwater	Water present within underground strata known as aquifers.
Discharge	The rate of flow of water measured in terms of volume per unit time.
Attenuation	A method to reduce a flood peak to prevent flooding, often utilising temporary storage, but increasing the duration of the flow.

Copyright © 1976 - 2025 Buro Happold. All rights reserved

1. Executive Summary

Buro Happold Engineering have been instructed by Manchester Metropolitan University (the University) to prepare a drainage strategy in support of a Full Planning Permission Application for the Proposed Development of the All Saints Library in Manchester, approximate postcode M15 6BH.

The follow report has been produced for the planning authority and Lead Local Flood Authority (LLFA), Manchester City Council (MCC) and any other parties involved in the planning application process.

This report is to be read in conjunction with the Buro Happold Flood Risk Assessment (FRA) and all other documentation prepared and submitted in support of the planning application.

Recent pre-development enquiries have been undertaken with United Utilities (UU) and MCC LLFA in their roles as statutory consultees, as well as MCC Highways Team. Consultation has been undertaken to confirm the proposed management strategy, proposed connection locations and discharge rates for both surface and foul water.

A pre-development enquiry was issued to MCC in their capacity as LLFA on 5th May 2025. A meeting was successfully arranged and held on 31st July 2025 with written response received the same day.

A pre-development enquiry was issued to UU on 19th March 2025. Following this, a meeting was undertaken on 26th March 2025. A follow up meeting was undertaken on 4th July 2025 to provide an update following design development and consultation. A written response was received on 15th August 2025 confirming proposed connection and discharge rate.

Consultation with MCC Highways team was undertaken and a meeting carried out on 3rd July 2025 to discuss the feasibility of connecting to a surface water public sewer within Oxford Road. Section 6.2 summarises the discussions and outcomes of each consultation and details of the responses are provided within Appendix A.

The proposed drainage strategy, which includes surface water management plan and foul water drainage, has been undertaken in accordance with local and national standards, best practice and the requirements of MCC and United Utilities (UU).

A feasibility study has been undertaken to determine the viability of connecting surface water runoff following the drainage hierarchy as follows:

- Soakaway or other adequate infiltration system
- Watercourse
- Surface water sewer
- Combined water sewer

Due to existing site constraints, the most viable proposed connection is to maintain the existing connections to the combined water public sewer.

The development includes separate systems for foul and surface water drainage which will remain separate to the point of discharge to the existing combined water drainage network, as agreed in principle with the LLFA and UU.

The proposed surface water strategy includes permeable paving, tree pits and channel drains at ground level to intercept and convey stormwater runoff at source. The surface water runoff will then be conveyed through a below ground pipe network to a below ground storage tank. The proposed drainage network will be designed to manage

Copyright © 1976 - 2025 Buro Happold. All rights reserved

and accommodate storm events up to and including the 1 in 100-year storm event plus 45% climate change allowance in accordance with MCC guidance. Surface water will discharge to the existing combined water drainage network at a restricted rate (11.0 l/s) as agreed in principle with UU.

The proposed foul water strategy for the proposed development will convey foul water through a new piped network to the north of the site before discharging to the existing combined water drainage network at an unrestricted rate, as agreed in principle with UU.

Copyright © 1976 - 2025 Buro Happold. All rights reserved

2 Introduction

2.1 Appointment and Brief

This drainage strategy report for planning has been prepared for the Manchester Metropolitan University (herein referred to as the University) for the Proposed Development comprising of a nine-storey library building (Use Class F1), public realm, access and servicing arrangements and other associated works.

This report should be read in conjunction with all other document prepared and submitted in support of the full planning permission application.

This Report will review and document the following information;

- Existing site constraints
- Overview of existing drainage regime
- Proposed surface water drainage strategy
- Sustainable Drainage Systems (SuDS) strategy
- Proposed foul water drainage strategy

The drainage strategy has been developed to demonstrate a viable solution for disposal of surface water from the proposed development meeting local and national planning policy, and without increasing flood risk to others. The approving bodies for the scheme will be Manchester City Council (MCC) as the Lead Local Flood Authority (LLFA) and United Utilities (UU) as the local water authority.

2.2 Limitations

This report is based on the interpretation and assessment of data provided by third parties. Buro Happold cannot be held responsible for the accuracy of third-party data or the conclusions that come from this information or as a result of changes arising from the developing design.

It should be noted that the detailed design of the drainage and associated Sustainable Drainage Systems (SuDS) features for the site has not been finalised and the assumptions and information presented herein are subject to design development and outcomes from consultation with relative authorities.

Operation and maintenance of all SuDS (including proprietary systems) will need to be considered once the proposed development has been finalised with all specific information being presented to those responsible for the maintenance of the facility.

The conclusions and findings of this report may change if the proposed development is amended or updated after the date of publishing.

2.3 Review of Available Information

The following information has been made available to inform the Civil Engineering design presented in this report:

- CCTV Surveys by Survey & Engineering Project (SEP) undertaken in July 2023, August 2023 and January 2024.
- GPR Survey by SEP undertaken in July 2023
- Trench surveys by Ameon Utilities Engineering undertaken in April 2024

Copyright © 1976 - 2025 Buro Happold. All rights reserved

- Landscape proposals by Planit (28 August 2025).

Copyright © 1976 - 2025 Buro Happold. All rights reserved

3 Existing Site

3.1 Site Location and Description

The Site is within Manchester City Centre and is bound by Oxford Road to the east, by the Mancunian Way to the north, Manchester Metropolitan University's Faculty of Business and Law to the west, and All Saints Park to the south.

The Site currently comprises the vacant All Saints Library building (a seven-storey brick building). The building on site Is considered no longer fit for purpose and has been vacant since summer 2024. The Site is subject to a planning application (submitted August 2025) for demolition, due to be determined early December 2025.

The site is approximately 0.6 hectares with approximate postcode and coordinates respectively, M15 6BH and SJ 84225 97158.

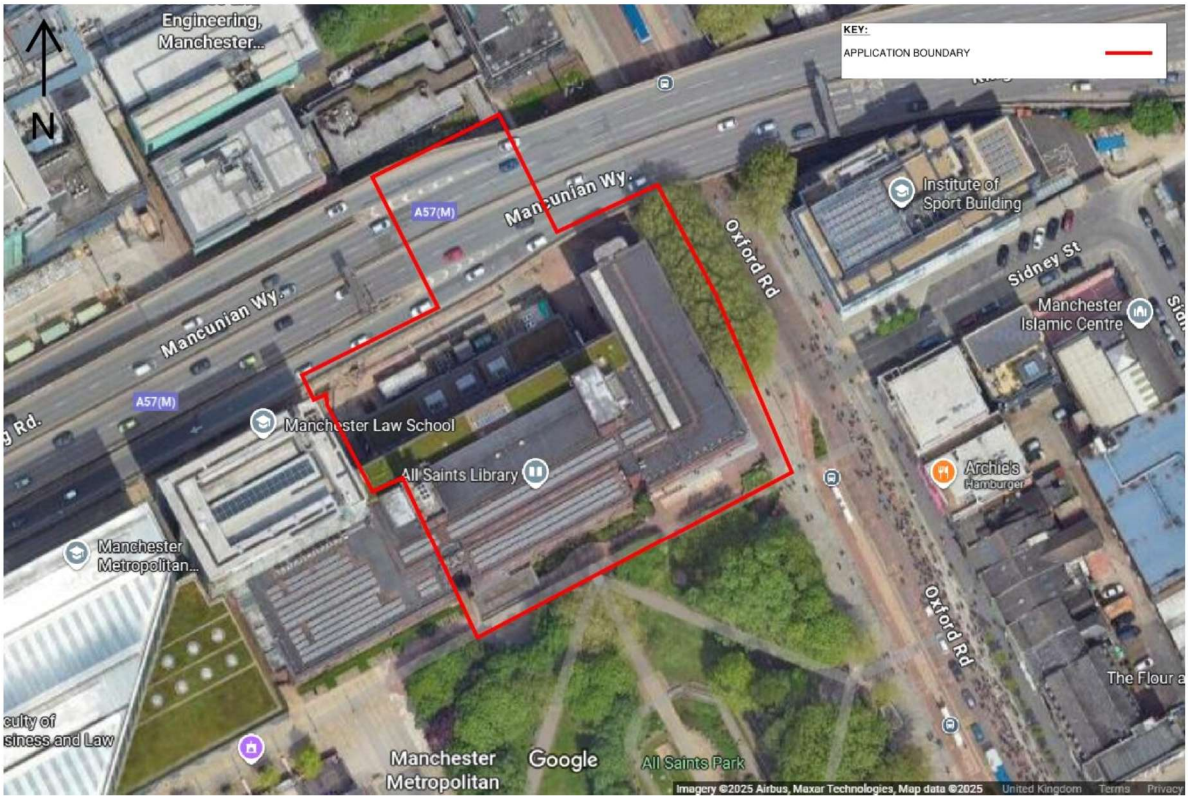


Figure 3.1 Site Location Plan

Copyright © 1976 - 2025 Buro Happold. All rights reserved

3.2 Topography and Existing Levels

The existing topography of the site is generally flat with the highest point southwest of the site near All Saints Park with an approximate elevation of +37.9m above ordnance datum (AOD). The site generally slopes northwards towards Mancunian Way to a low point of approximately +36.9m AOD.

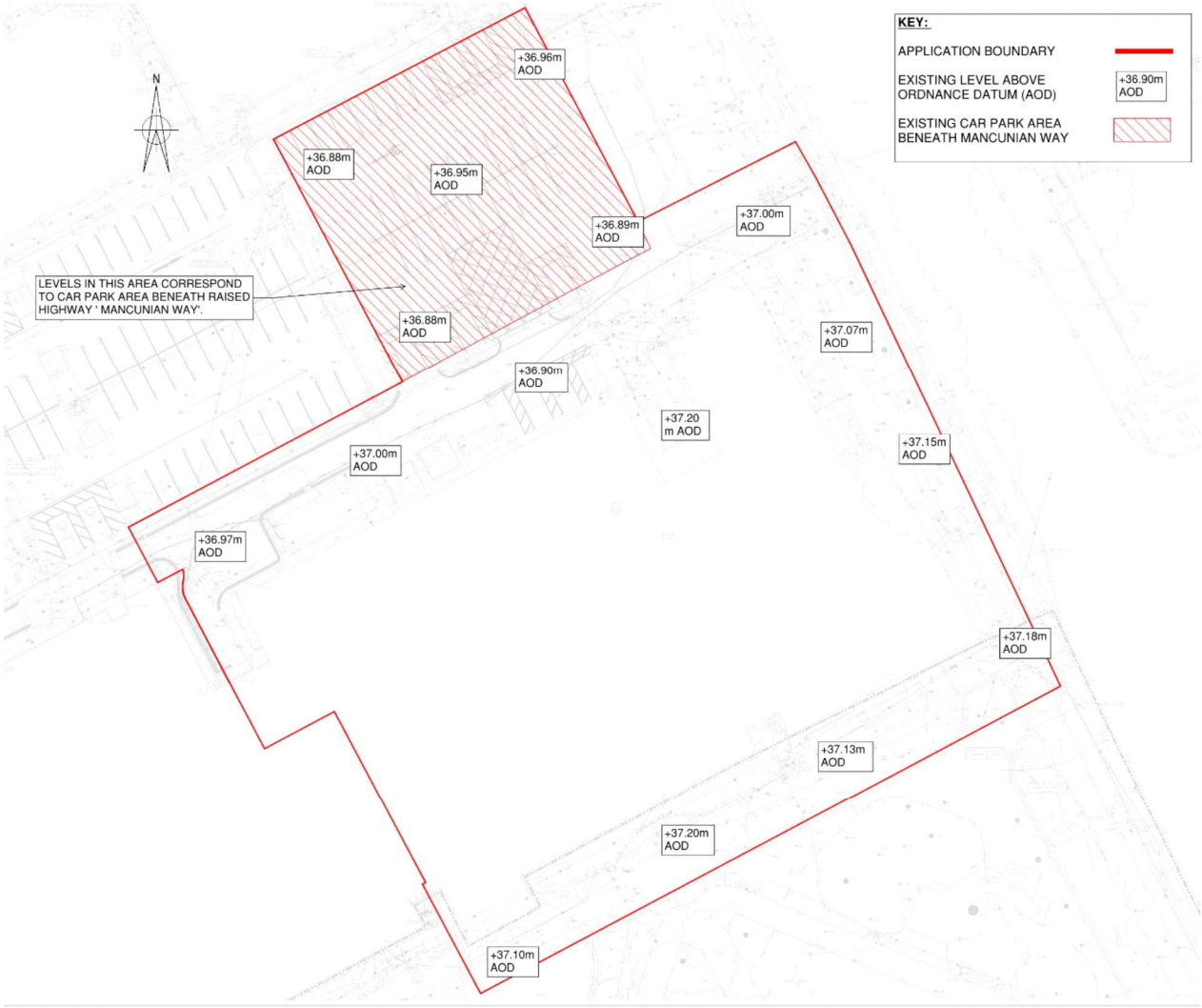


Figure 3.2 Existing Site Levels Plan

3.3 Geology

Ground conditions across the site generally comprise varying depths of Made Ground, underlain by Glaciofluvial Deposits (dense to very dense SAND and/or GRAVEL), underlain by Glacial Till Deposits (firm to stiff sandy gravelly CLAY) which is underlain by bedrock (extremely weak siltstone, sandstone and mudstone) (Manchester Marl Formation).

Copyright © 1976 - 2025 Buro Happold. All rights reserved

During the GI, groundwater strikes were encountered in five exploratory holes across the site and were recorded to range between 2.30m below ground level (BGL) (BH01 in glaciofluvial deposits) and 2.90m BGL (WS04 in Made Ground).

Post field work monitoring was completed between May and August 2023 which indicates groundwater within the following:

- Made Ground / Glacial Till at ~36m AOD
- Glaciofluvial deposits at ~35-36m AOD
- Chester Formation / Manchester Marls Formations ~24-26m AOD.

3.4 Flood Risk

The development site lies within Flood Zone 1, meaning that the risk of flooding is considered to be low, with less than a 1 in 1000-year annual probability of flooding from fluvial or tidal sources. For further details of flood risk at the site please refer to the Flood Risk Assessment (FRA) by Buro Happold which is being produced in support of the planning application for this project.

3.5 Existing Drainage

This section is to be read in conjunction with the Existing Drainage Plan (drawing number 1350B-BHE-XX-XX-DR-C-003100) refer to Appendix D.

3.5.1 Public Drainage

Record information obtained from United Utilities (UU) indicates that an extensive network of public sewers is located within, and immediately adjacent to, the site. The following systems are shown to be present:

- 300mm combined sewer runs within the site in a north-westerly direction passing beneath the existing library building and Sandra Burslem building. Manhole reference 2102 appears to be the head of this run however, there are two manholes in close proximity.
- 600x880mm combined sewer running in a south-easterly direction beneath Lower Ormond Street to the south of the site, which reduces to 590x930mm. Manhole reference 2102 is also shown to be the head of this run however, the sewer flows in the opposite direction to the 300mm combined sewer within the site.
- 600x900mm combined sewer within Oxford Road to the east of the site, running in a north-westerly direction.
- 830x960mm surface water sewer within Oxford Road to the east of the site running in a north-westerly direction.

Figure 3.3 shows UU's public sewer asset records within the vicinity of the proposed development site.

UU's asset records highlight an existing combined sewer overflow (CSO) to the north of the John Dalton building within the University campus. This is located downstream of the existing 300mm sewer which lies within the site and runs beneath the Sandra Burslem building. The CSO connects to the River Medlock at a point further north.

Copyright © 1976 - 2025 Buro Happold. All rights reserved



Figure 3.3 United Utilities Asset Records

3.5.2 Private Drainage

The extent of the private drainage on site has been determined based on the following survey information:

- External areas CCTV survey (April 2023)
- Internal building CCTV survey (December 2023)
- Trial trench survey (April 2024)
- Additional CCTV survey (July 2024).

The survey information indicates that the site is served by a private network primarily consisting of combined drainage with a number of surface water drains.

The following drainage systems have been identified within the site:

- 225mm diameter combined water drain, increasing to 300mm diameter, within the service area to the north of the building which flows in a south-westerly direction. This drain is shown to collect flows from within the existing building and discharges into the existing public combined sewer at UU manhole 1102. The internal

Copyright © 1976 - 2025 Buro Happold. All rights reserved

CCTV survey identified the existing internal drainage is combined and picks up flows from foul and surface water pipework. The combined drainage to the north of the building also picks up flows from existing hardstanding to the north through channel drain and gullies

- 150mm diameter combined water drain, increasing to 225mm, within the pedestrianised corridor to the south of the building which flows in a south-westerly direction. This drain is shown to collect flows from the existing building and discharges into the existing public combined sewer at UU manhole 2102. The internal CCTV survey identified the existing internal drainage as combined and picks up flows from foul and surface water pipework. The combined drainage to the south of the building also picks up flows from existing hardstanding area to the south of the building through existing gullies

- An existing surface water pipe to the southeastern corner of the existing building which appears to connect into the existing combined water drainage to the south of the building. The pipe appears to be flowing from All Saints Park however, it is understood that works within All Saints Park have been undertaken since the most recent CCTV survey. As-built drainage drawings for the All Saints Parks development were requested from University to facilitate analysis of the upstream catchment. It was determined that this pipe is redundant and does not serve the All Saints Park development

- An existing surface water channel drain along the existing tree bed to the eastern side of the building. This is considered to flow in a north-westerly direction. It is unconfirmed where this connects into the downstream network however, it is assumed that is connects into the existing combined drainage network

- Various untraced gullies and drainage channels are identified across the site. It is assumed that these connect into the existing combined drainage network within the site where reasonable

- Two existing rainwater pipes which run within the adjoining wall of the existing library building and the Sandra Burslem building. These have been identified as picking up drainage from part of the existing library building roof. These are picked up by combined drainage beneath Sandra Burslem and connect to the combined drainage network to the north of the development.

All the drainage systems above have been surveyed to determine connectivity with the existing building and external areas of the site, condition and positive connection points with the United Utilities public sewer network. Refer to drawing 1350B-BHE-XX-XX-DR-C-003100 Existing Drainage Plan.

3.5.3 Watercourses

The nearest watercourse to the proposed development is the River Medlock, a Main River managed by the Environment Agency, which is located approximately 250m north of the site. Due to the distance between the river and the proposed development, and the significant difficulties in routing a new sewer within the densely developed City Centre district, this option is not considered practical.

Copyright © 1976 - 2025 Buro Happold. All rights reserved

3.5.4 Existing Drainage Catchment Areas

Based on the understanding of existing topographical levels and drainage, Figure 3.4 summarises the assumed existing catchment areas for the site within the application boundary.

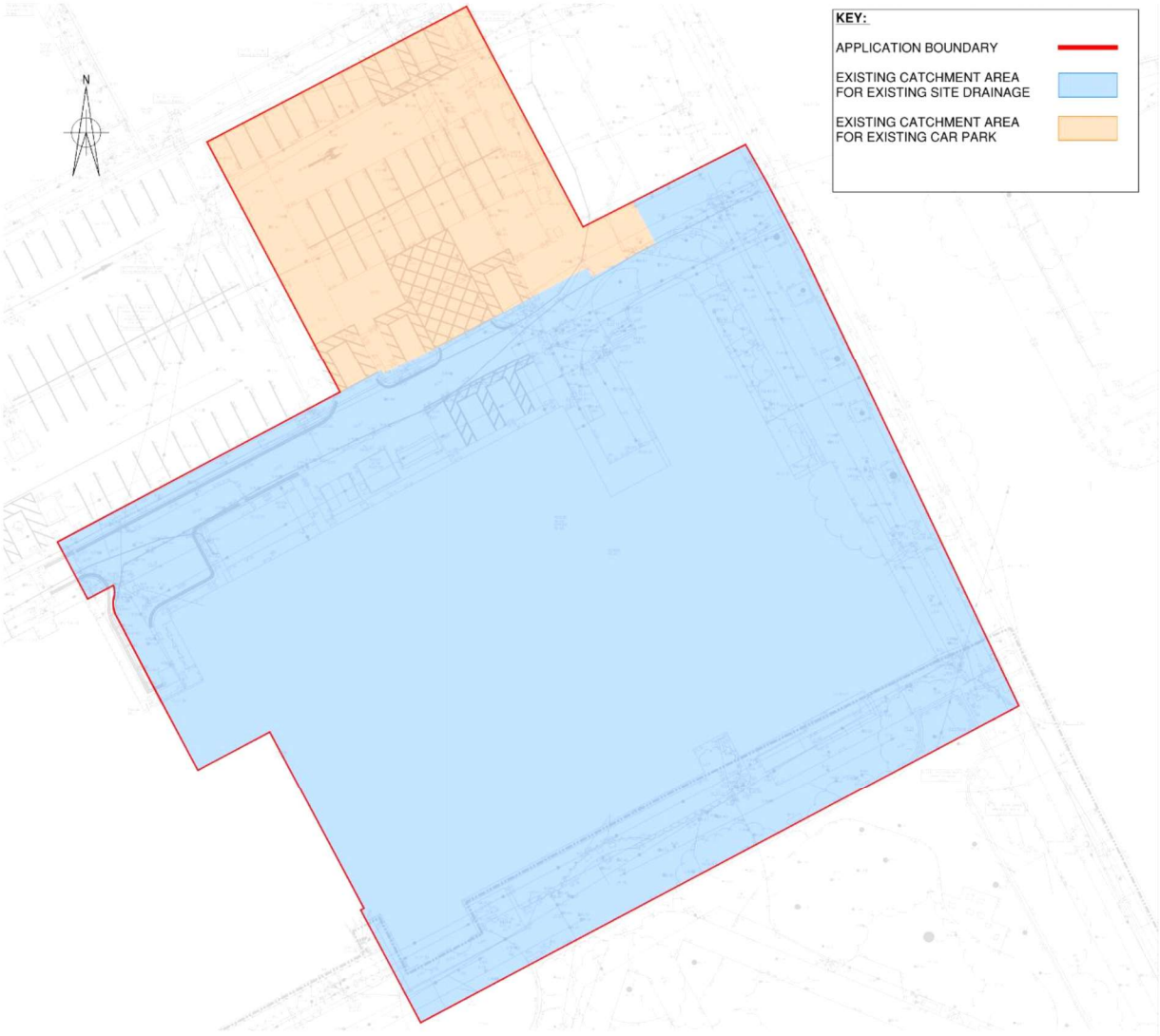


Figure 3.4 Sketch showing existing drainage catchment areas

The existing catchment areas are considered to be entirely impermeable, and approximate areas are summarised in Table 3-1.

Table 3-1 Summary of Existing Catchment Areas

Existing Catchment Areas	Approximate area (m2)
Existing site drainage	5160
Existing car park drainage	1040
Total	6200

Copyright © 1976 - 2025 Buro Happold. All rights reserved

The catchment areas above correspond to two separate drainage networks. It is considered that the existing car park area and drainage is to be maintained for the proposed development.

3.5.5 Existing Exceedance Flow Routes

Figure 3.5 shows the expected existing exceedance flow routes for the site.

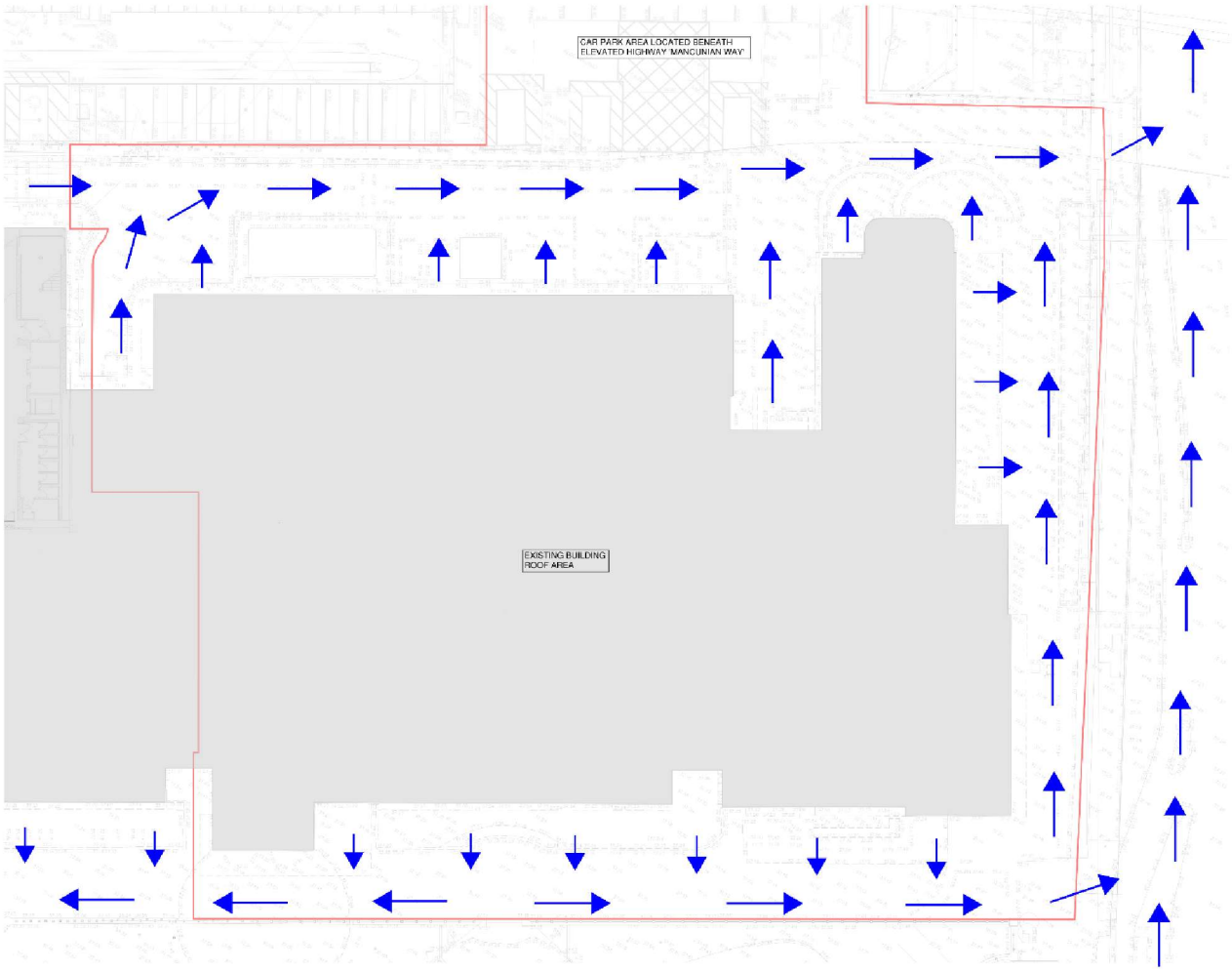


Figure 3.5 Existing Exceedance Flow Routes

Copyright © 1976 - 2025 Buro Happold. All rights reserved

4 Proposed Development

The proposals comprise the development of a nine-storey library building (Use Class F1), public realm, access and servicing arrangements and other associated works. The proposed public realm areas include permeable paving, tree pits and paved areas.

The application boundary includes the existing car park area to the north of the site underneath the elevated highway, Mancunian Way. The car park area is proposed to be retained with no changes to landscaping other than updated white lining.



Figure 4.1 Proposed Landscape Plan (Planit, 3rd November 2025)

Copyright © 1976 - 2025 Buro Happold. All rights reserved

5 Statutory & Non-Statutory Policies and Guidance

5.1 National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) provides planning policy from central government for all local planning authorities. Clause 173 of the document states that "when determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere."

The Building Regulations Part H specify a hierarchy for the disposal of surface water which should be adhered to as part of any surface water drainage design. This hierarchy, which is echoed within the Non-Statutory Technical Standards for Sustainable Drainage, states that surface water should be discharged to:

- An adequate soakaway or some other adequate infiltration system; or where that is not practicable,
- A watercourse; or where that is not practicable,
- A sewer.

5.2 Local Policy

The Flood and Water Management Act 2010 (FWMA) sets out a range of duties and responsibilities for local authorities in planning for flooding and delivering effective flood risk management. Manchester City Council are designated as Lead Local Flood Authority (LLFA) and are responsible for leading on local flood risk management.

Manchester's Local Flood Risk Management Strategy (LFRMS) sets out how the LLFA will undertake their local flood risk management functions and sets out a risk-based approach to achieve the successful results using the budgets and resources available. The primary aims of the LFRMS is to:

- Reduce the likelihood, severity and consequences of flooding from ordinary watercourses, groundwater and surface water runoff.
- Seek opportunities to improve water quality and biodiversity through flood risk management activities

Manchester, Trafford and Salford Strategic Flood Risk Assessment (SFRA) has been produced by Manchester City Council, Salford City Council and Trafford Council. The SFRA presents an independent analysis of the risk posed by flooding from all sources including rivers, canals, surface water, sewers, groundwater and other water bodies within the study area. The primary purpose of the SFRA is to provide evidence to inform future sustainable development with Manchester, Salford and Trafford.

In addition, Greater Manchester's Sustainable Drainage Design Guide document has been produced to provide guidance on the design, delivery and maintenance of SuDS features. The document has been adopted by the Greater Manchester Combined Authority (GMCA).

5.3 Best Practice

The CIRIA SuDS Manual C753 is widely considered to set the best practice standard for the design of Sustainable Drainage Systems (SuDS). Along with design guidance for the hydraulic performance of SuDS, the Manual also provides a qualitative means of assessing the quality of runoff using indices of likely pollution levels and SuDS performance capacities.

Copyright © 1976 - 2025 Buro Happold. All rights reserved

Sewer Sector Guidance (SSG) refers to a set of documents developed to standardise and regulate the adoption of sewerage assets by water and sewerage companies in England. The SSG provides a framework for the design, construction and adoption of new sewerage infrastructure to ensure consistency across the industry. These documents allows developers and consultants to meet legal and technical requirements. These documents are maintained by Water UK and approved by Ofwat.

BS EN 752:2008 Drains and Sewer Systems outside buildings is a British and European Standard that provides guidance on the planning, design, construction, maintenance and rehabilitation of drain and sewer systems located outside buildings.

Copyright © 1976 - 2025 Buro Happold. All rights reserved

6 Proposed Surface Water Drainage Strategy

6.1 Introduction

New developments are required to cater for all surface water that will be generated within the site, so as not to cause flooding, damage or inconvenience to on-site or off-site areas. In accordance with associated legislation, local policy and general best practice, this will typically require the introduction of a dedicated surface water drainage network that intercepts, treats and stores surface water runoff prior to it being discharged from site.

Refer to Appendix E for the proposed surface water drainage strategy drawing.

6.2 Consultation

Consultation with the relevant authorities has been carried out in order to inform the development of the drainage strategy. A summary of these consultations is provided below, and copies of relevant correspondence are provided in Appendix A.

6.2.1 Manchester City Council (LLFA)

A pre-application enquiry was issued to Manchester City Council (MCC), in their capacity as the Lead Local Flood Authority (LLFA), on 5th May 2025.

A meeting with the LLFA was successfully arranged and carried out on 31st July 2025. The following information was presented:

- Existing site constraints
- Existing drainage regime
- Drainage hierarchy
- Proposed development
- Proposed surface water management strategy including proposed connection location and discharge rates.

A written response was received from the LLFA on 31st July 2025. The LLFA officers noted that maintaining the current discharge route for drainage flows via an indirect connection to the existing combined water sewer is considered acceptable in principle given the existing constraints of the site subject to a letter of approval and agreement in principle from United Utilities.

The LLFA advised that greenfield proposed discharge rate is preferable however, the LLFA understand that it may not be feasible for a brownfield site of this nature. The LLFA also advised that green SuDS components should be integrated as far as possible.

Consultation received from the LLFA can be found in Appendix A.

6.2.2 United Utilities (UU)

As the existing site currently discharges to the public sewer network, United Utilities (UU) has been engaged in order to ascertain their requirements.

A pre-application enquiry was issued to UU on 19th March 2025. Following this, a pre-development enquiry meeting was undertaken on 26/03/2025. In this meeting, UU advised that their preferred point of surface water connection

Copyright © 1976 - 2025 Buro Happold. All rights reserved

would be to the existing 830mm x 960mm surface water sewer within Oxford Road to the east of the proposed development site. UU have advised that there is good capacity available within the surface water sewer.

In general, UU are seeking to remove all surface water discharge to combined sewers at planning stages and are resistant to connections to combined sewers where there are surface water sewers nearby. UU advised that a connection to a combined sewer would only be accepted as a last resort if it was proved that no other option was feasible, and that they would only accept a significant restriction to the proposed discharge rate.

However, a follow up meeting was undertaken with UU on 4th July 2025 to provide an update following design development, discussions with the LLFA and MCC highways. BH presented slides including site context highlighting the key constraints, consultation with other stakeholders, previous scheme proposals, new scheme proposals and emerging drainage strategy.

As requested by UU, a hydraulic model of the existing drainage network was provided to UU to provide evidence of existing brownfield discharge rates in order to agreement a betterment.

A written response was received from UU on 15th August 2025 confirming UU approval for the development to utilise the existing connections to the combined sewer with a proposed discharge rate of 11 litres per second.

Consultation received from United Utilities can be found in Appendix A.

6.2.3 Manchester City Council (MCC) - Highways Team

A meeting with Manchester City Council (MCC) Highways team was arranged and carried out on 3rd July 2025. The following information was discussed within the meeting:

- Existing surface water sewer in Oxford Road
- Existing United Utilities water main and other utilities with Oxford Road footpath and highway
- Potential to connect to surface water sewer subject to UU approval.

The below summarises the key points discussed within the meeting:

- If option to connect to SW sewer in Oxford Road is progressed, MCC highways would consider temporary lights and single lane closure reasonable to undertake the works due to Oxford Road being a vital highway within the highway network
- Consider potential phasing of the construction works due to single lane closure rather than full road closure
- Any works to Oxford Road would ideally take place over a weekend or through night shifts
- Difficulties with avoiding existing utilities including UU 24-inch water main
- Contractor engagement to advise on constructability of proposed connection with existing utilities
- A Section 50 approval would be required due to new apparatus in the public highway.

Based on these discussions, MCC Highways officers advised that works to Oxford Road would cause too much disruption to the network and therefore, alternative options for sewer connections should be explored.

This meeting informed the most recent consultation with the LLFA and UU, as detailed in sections 6.2.1 and 6.2.2.

Consultation received from MCC Highways Team can be found in Appendix A.

6.3 Existing Brownfield Discharge Rates

Copyright © 1976 - 2025 Buro Happold. All rights reserved

Based on the existing CCTV survey information available, a hydraulic model was created to determine the existing regime and approximate brownfield discharge rates for the existing site.

Table 6-1 summarises existing brownfield discharge rates and the corresponding 50% betterment value, for different storm events formed from the hydraulic model using FEH 2022 rainfall data and no climate change allowance.

Table 6-1 Existing Brownfield Discharge Rates

Storm Event	Existing Discharge Rate (l/s)	50% Betterment on Existing Discharge Rates
1 in 2-year 15 minute (winter)	63.2	31.6
1 in 2-year 60 minute (winter)	**40.3**	**20.2**
1 in 30-year 15 minute (winter)	129.5	64.8
1 in 100-year 15 minute (winter)	149.4	74.7

The 1 in 2-year, 60-minute storm event is considered to represent a realistic and reasonable estimate for the existing brownfield discharge rate for the site and it was agreed with United Utilities that this would inform the proposed discharge rate for the proposed development.

A capacity check has also been undertaken on the existing pipe that forms the final connection to the public sewer. Based on 300mm diameter pipe laid at a 1 in 85 gradient, the full-bore velocity is 120 l/s.

6.4 Greenfield Discharge Rates

Table 6-2 summarises the greenfield discharge rates for different storm events obtained using the UK and Ireland Rural Runoff Calculator within InfoDrainage software based on the proposed landscaping works area of 0.516 hectares.

Table 6-2 Greenfield Discharge Rates

Storm Event	Discharge Rate (l/s)
QBAR	3.2
1 in 1-year	2.8
1 in 30-year	5.4
1 in 100-year	6.6

6.5 Proposed Catchment Areas

The proposed drainage network is designed to accommodate surface water runoff from the existing site catchment area as shown in blue in Figure 3.4.

The existing catchment area within the existing car park beneath Mancunian Way is considered to be accommodated by the existing drainage network in this area, and it is not accounted for within the proposed drainage strategy.

Based on the proposed landscape strategy, the proposed catchment areas are summarised in Table 6-3. Permeable areas including proposed soft landscaping and permeable resin bound paved areas.

Table 6-3 Summary of Proposed Catchment Areas

Proposed Catchment Areas	Estimated Area (m2)

Copyright © 1976 - 2025 Buro Happold. All rights reserved

Impermeable	4460
Permeable	700
Total	5160

6.6 Drainage Hierarchy

The Building Regulations Approved Document Part H (Drainage and Waste Disposal) specifies a hierarchy for the disposal of surface water which should be adhered to as part of any surface water drainage design. This hierarchy, which is echoed within the Non-Statutory Technical Standards for Sustainable Drainage and the North-West SuDS Proforma, states that surface water should be discharged as follows:

1. Soakaway or other adequate infiltration system
2. Watercourse
3. Surface water sewer
4. Combined water sewer.

The feasibility of each item on the hierarchy has been reviewed for this scheme.

6.6.1 Infiltration

Ground investigation surveys were undertaken in April 2023 by Geotechnical Engineering Limited as part of the previous scheme including permeability and soakaway testing. The permeability test concluded a permeability, k value of 3.6E-5 ms^{-1} however, remarks stated that *"test data after 20 minutes appears to be influenced by disturbance or other factor and is considered to be unrepresentative and is not presented."*

In addition, the soakaway test results were inconclusive due to the collapse of one of the boreholes, and rapid infiltration of water into two other boreholes. Although the rapid infiltration of water suggests a high infiltration rate, it is considered that the water dissipated into the adjacent made ground. Made ground was identified up to a maximum of 3.3 metres below ground level.

The site is also understood to be located within an area with the potential for groundwater flooding. The ground investigation also identified a high-water table with strikes at 2.30m below ground level, and post-field work monitoring recording levels at 36.0m AOD, approximately 1m below ground level. This would further reduce the likelihood of infiltration drainage being feasible.

Based on this evidence, infiltration is not considered feasible due to the existing ground conditions, the constrained nature of the site and proximity of existing structures.

6.6.2 Watercourse

The nearest watercourse to the proposed development is the River Medlock, a Main River managed by the Environment Agency, which is located approximately 250m north of the site. Due to the distance between the river and the proposed development, and the significant difficulties in routing a new sewer within the densely developed City Centre district, this option is not considered practical.

6.6.3 Surface Water Sewer

Existing survey information suggests that the nearest surface water sewer is a United Utilities surface water public sewer located within Oxford Road on the eastern side of the proposed development. The sewer is 830x960mm brick, approximately 10m deep with a 900mm diameter shaft.

Copyright © 1976 - 2025 Buro Happold. All rights reserved

Asset record information shows that there is an existing UU combined water public sewer adjacent to the surface water public sewer, which is approximately 9m deep. In addition, there is an existing UU 24-inch cast iron water main located along Oxford Road. Alongside the above critical utilities assets, there is an array of other existing utilities within the footpath and carriageway which must be maintained.

In addition, the existing surface water sewer is located within a major highway in a largely congested city centre. Consultation with MCC Highways has been undertaken which outlined the significant challenges involved with undertaking construction works within the major highway. Refer to Section 6.2.3 for consultation with MCC Highways.

Therefore, a connection to the surface water public sewer is not considered feasible due to the significant challenges and risks including the depth of the public sewer, the largely congested footpath and highway with existing utilities and works within a major city centre highway.

6.6.4 Combined Water Sewer

There is CCTV survey evidence which shows the existing drainage regime for the site discharges to the existing 300mm combined water public sewer within the site. It is considered feasible to discharge proposed surface water from the proposed development to the existing combined water public sewer within the site by utilising the existing connections.

While the proposed drainage strategy includes for a connection to combined water sewer, it is proposed to maintain separate systems of surface and foul water drainage for as long as is practicable within the proposed site. To mitigate the risk of odours from the combined water sewer entering the private surface water drainage network, an in-line valve is proposed close to the outlet of the proposed private surface water network. The proposed private foul water network is to be vented to atmosphere through soil vent pipes or similar within the above ground drainage design.

6.7 Sustainable Drainage Systems (SuDS)

The Sustainable Drainage Systems (SuDS) approach essentially involves the slowing down of surface water runoff from a development to manage on-site and downstream flood risk, as well as providing water quality improvements. This can generally be achieved by harvesting, infiltrating, slowing, storing and conveying runoff via a variety of techniques, as opposed to the historical and more traditional method of sole reliance on below ground pipework.

The variety of SuDS techniques available are generally not all appropriate for every development, and the selection depends on the characteristics of the site including permeability of the underlying ground, space constraints, land use and topography.

Table 6-4 presents a summary of SuDS techniques and an initial screening exercise with regard to the suitability of each technique for use on the proposed development. The drainage strategy presented within this report, which includes provision of flow control and below ground attenuation, represents the minimum requirements with regard to SuDS. The ultimate selection of which SuDS techniques are implemented within the scheme will need to be determined via a multi-disciplinary approach together with client input. The measures identified within the table are therefore presented here as opportunities for further consideration as part of the Stage 3 design progression.

Copyright © 1976 - 2025 Buro Happold. All rights reserved

Table 6-4 SuDS Feasibility Summary

SuDS Technique	Flood Reduction	Pollution Reduction	Landscape and Wildlife Benefit	Suitability for the Proposed Development	Comments
Green/ Blue roofs	✓	✓	✓	No	Viability discussed with wider design team and considered unsuitable due to the nature of the building structure and development.
Basins and ponds				No	Not feasible due to land use, lack of external space and proximity to buildings and site boundaries.
Constructed wetland				No	
Balancing ponds				No	
Retention ponds				No	
Filter strips	✓	✓		Yes	Filter strips considered viable. Filter strip to be provided for façade drainage, subject to coordination with existing utilities and landscape design.
Swales	✓	✓		No	Swales not considered feasible due to nature of proposed development.
Bioretention systems	✓	✓	✓	Yes	Bioretention considered feasible however, these have not been incorporated into the proposed landscape design.
Infiltration devices				No	Not feasible due to anticipated ground conditions and land use.
Soakaways				No	
Infiltration trenches and basins				No	
Rainwater harvesting	✓			No	Viability discussed with wider design team and considered unsuitable due to the nature of the building structure and development.

Copyright © 1976 - 2025 Buro Happold. All rights reserved

SuDS Technique	Flood Reduction	Pollution Reduction	Landscape and Wildlife Benefit	Suitability for the Proposed Development	Comments
Permeable surfaces	✓	✓		Yes	Access road and pedestrian areas are considered to be suitable for permeable surfacing. Permeable resin bound gravel surfacing included in proposed landscape design.
Tanked systems	✓			Yes	Viable where external space permits and subject to coordination with existing services and landscape design. Below ground tank located to the west of the proposed building.
Over-sized pipes/tanks	✓			Yes	
Proprietary Treatment Devices	✓	✓		Yes	Engineered devices such as media filtration systems, and oil and grit separators, can be used in densely developed areas.

Copyright © 1976 - 2025 Buro Happold. All rights reserved

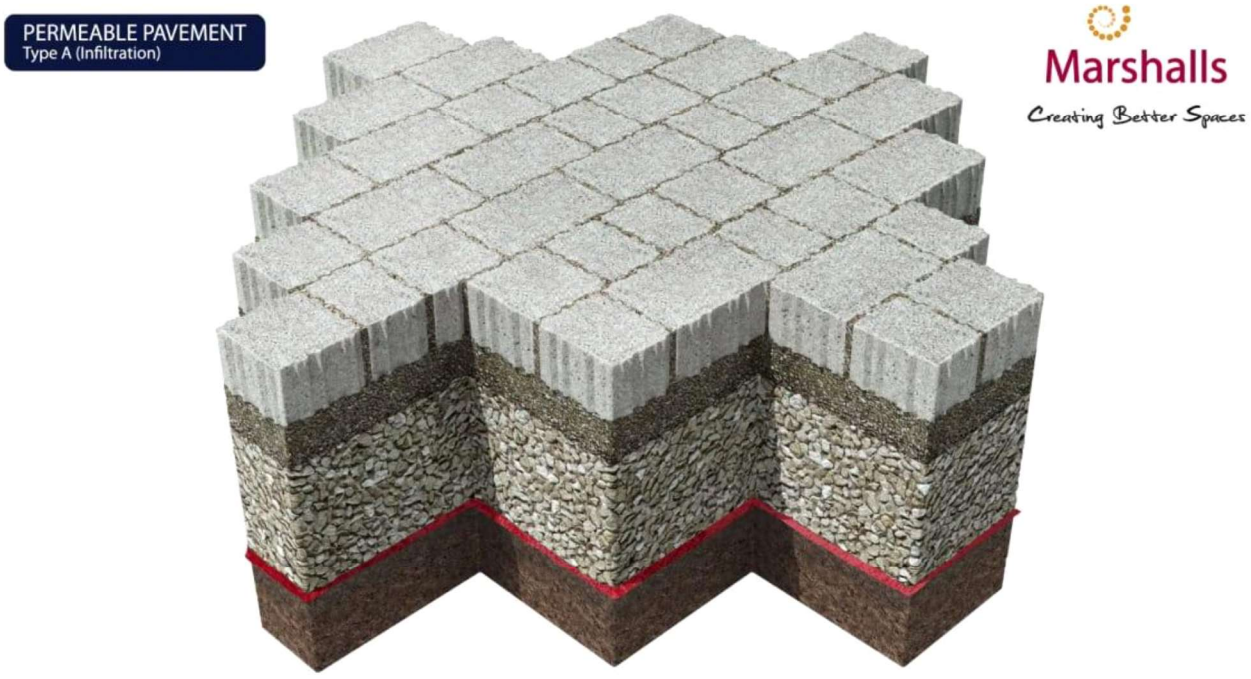


Figure 6.1 Typical permeable paving detail (Marshalls photo)



Figure 6.2 Proposed tree pits with permeable resin paving (photo courtesy of Planit)

Copyright © 1976 - 2025 Buro Happold. All rights reserved

6.8 Climate Change

Climate change allowances shall be based on the Irwell Management Catchment peak rainfall allowances. Table 6-5 details the allowances for the 1% annual exceedance rainfall event as produced by the Environment Agency. As the development is considered to have a lifetime between 2061 and 2125, the upper end allowance shall be used to develop the surface water management strategy.

Table 6-5 Irwell Management Catchment Peak Rainfall Allowances (Environment Agency 2022)

Epoch	Central Allowance	Upper End Allowance
2050s	+25%	+40%
2070s	+30%	**+45%**

6.9 Proposed Discharge Rate and Attenuation Volume

The site is considered Brownfield in nature as it is previously developed with an existing connection to public sewer. MCC's Local Flood Risk Management Strategy guidance states that for Brownfield sites, there should be a minimum of 50% reduction in runoff rates, with the aim of reducing to Greenfield rates. In addition, the guidance document "Greater Manchester's Sustainable Drainage Design Guide" has been used to develop the proposed drainage strategy. The guidance states:

"*Brownfield rates should be determined by a drainage engineer who will produce a simulation model of the existing drainage system and record the simulated flow rates from the site in the relevant storm events*."

As discussed in Section 6.3, a hydraulic model has been created based on available survey information to determine the existing brownfield discharge rates for the existing site.

As discussed in Section 6.2.2, a proposed discharge rate of **11 litres per second** has been agreed with United Utilities for the proposed connection to the existing combined water sewer as shown in Appendix A.2.

Due to the constrained nature of the site and densely developed city centre location, it is not considered feasible to restrict the surface water runoff to Greenfield discharge rates. United Utilities have agreed with this in principle and therefore, the agreed discharge rate provides an approximately 70% betterment on existing brownfield discharge rates.

The proposed drainage strategy will restrict and store surface water runoff from the site through the use of soft landscaped areas, tree pits, permeable paving and below ground attenuation storage.

Consultation with the LLFA has been undertaken to discuss the use of proposed SuDS features and outline the surface water management principles for the proposed development.

A hydraulic model has been created for the proposed surface water drainage strategy and designed to prevent flooding to buildings up to the 1 in 100-year critical storm event including 45% allowance for climate change. Table 6-6 summarises the component used to store surface water runoff and the corresponding storage volumes.

Table 6-6 Summary of Storage Features and Volumes

Storage Component	Area (m2)	Depth (m)	Porosity (%)	Volume (m3)
PP1	137.0	0.3	30	9.6

Copyright © 1976 - 2025 Buro Happold. All rights reserved

PP2	48.5	0.2	30	4.1
PP3	63.0	0.225	30	4.6
PP4	76.0	0.22	30	3.75
PP5	33.0	0.3	30	2.6
Tank	262.5	0.8	95	200
Total				**225**

PP – permeable paving

6.10 Water Quality and Pollution Control

It is widely recognised that diffuse pollution from urban surface water runoff is a significant factor which compromises receiving waterbodies including watercourses and groundwater. As such there is a requirement to identify and mitigate the impact of poor water quality originating from new developments.

The SuDS Manual (CIRIA C753) provides various methodologies for identifying potential sources of pollution within developments and a means of determining the treatment potential the various SuDS techniques can offer. The Simple Index Approach allocates pollution hazard indices against the proposed land use, along with pollution mitigation indices for each SuDS component. To ensure adequate treatment is being provided, the selected SuDS components must have a total pollution mitigation index equal to or greater than the pollution hazard index associated with the land use of the contributing drainage area. Two components or more will be required if the mitigation index of an individual component is insufficient. As there will be a reduced inflow concentrations for secondary or tertiary components a factor of 0.5 is used to account for this.

$$\underset{(for\ each\ contaminant\ type)}{Total\ SuDS\ mitigation\ index} \geq \underset{(for\ each\ contaminant\ type)}{pollution\ hazard\ index}$$

$$Total\ SuDS\ mitigation\ index = mitigation\ index_1 + 0.5(mitigation\ index_2)$$

Where;

$$mitigation\ index_{\,n} = mitigation\ index\ for\ component\ n$$

The pollution hazard indices for the proposed land use within the development are as follows, based on Table 26.2 of the SuDS Manual.

Table 6-7 Pollution Hazard Indices (based on Table 26.2 of the SuDS Manual)

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Commercial Roofs	Low	0.3	0.2	0.05
Pedestrian areas and low trafficked roads	Low	0.5	0.4	0.4
Commercial yard and delivery areas	Medium	0.7	0.6	0.7

Following an initial screening exercise (see Sustainable Drainage Systems section), Table 6-8 presents the mitigation indices for the SuDS components incorporated into the proposed development.

Copyright © 1976 - 2025 Buro Happold. All rights reserved

Table 6-8 Indicative SuDS Mitigation Indices (based on Table 26.3 of the SuDS Manual and product literature)

SuDS Component	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Permeable Pavement	0.7	0.6	0.7

The proposed site is deemed to have low pollution risks from its roof and pedestrian areas, and a medium pollution risk from its delivery areas. As existing hardstanding non-permeable pavement is retained for the delivery area, and other SuDS components are not deemed practical for this area, a proprietary system is proposed. Hydro International Downstream Defender, or equivalent product, is proposed in order to mitigate all pollution hazards to acceptable levels in accordance with manufacturers guidance. Since the mitigation index exceeds the pollution hazard index, this method of hazard mitigation is deemed sufficient.

6.11 Designing for Exceedance

Although the surface water drainage system will be designed to accommodate flows up to the 1 in 100-year storm event, including additional allowances for climate change, there is always a possibility of a storm event occurring which exceeds this design standard. In such an event, potential risks include the exceedance of the surface water network and attenuation system and flooding of the site.

Copyright © 1976 - 2025 Buro Happold. All rights reserved

It is proposed to design external pedestrian areas to shed water away from the building during such exceedance events and direct overland flood flows through the site towards off-site areas following the natural topography. It is anticipated that the local adopted highway network will act as the wider overland flow network and direct flows towards the River Medlock.

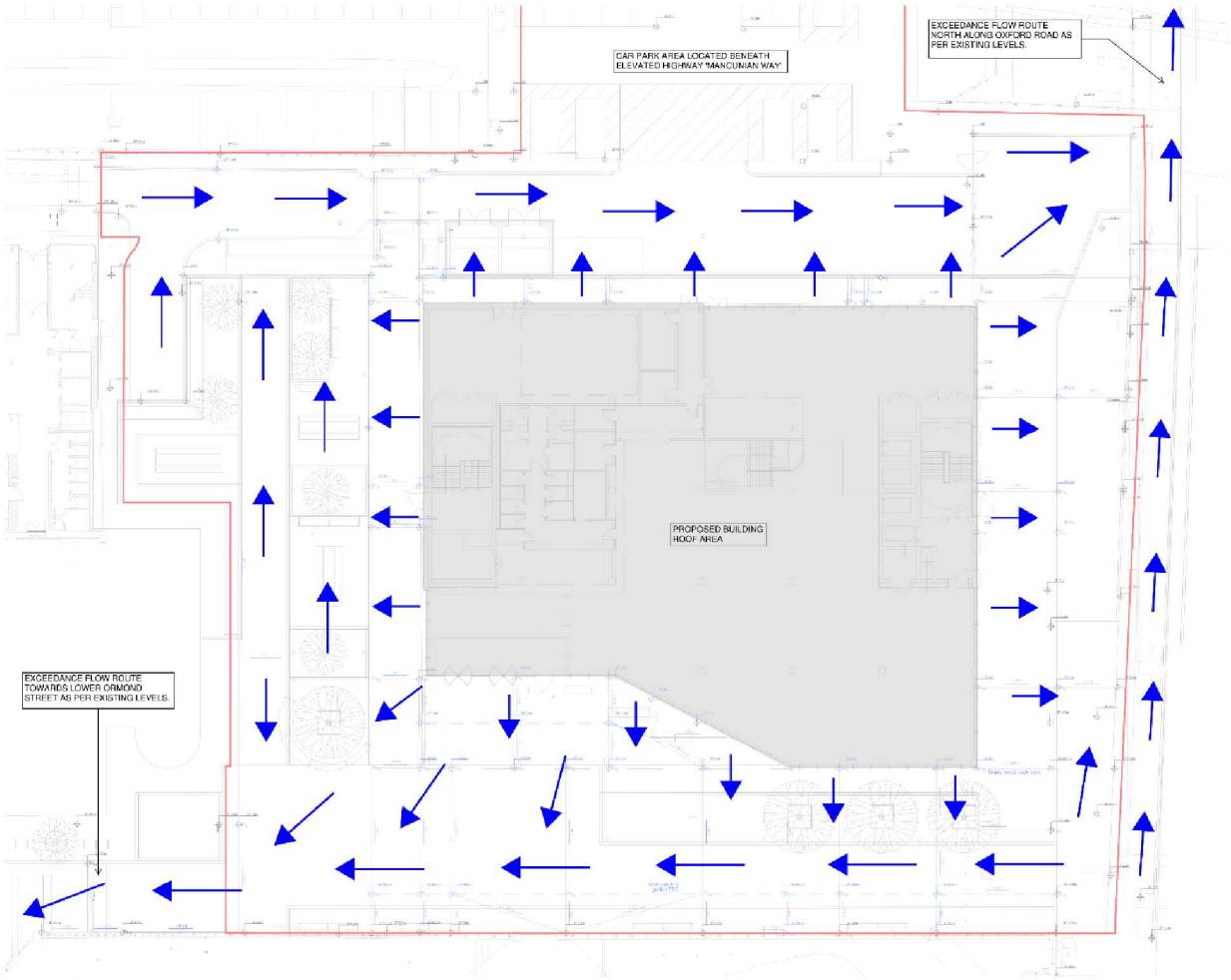


Figure 6.3 Proposed Exceedance Flow Routes

6.12 Maintenance Requirements

During the operation of the Proposed Development, a maintenance and inspection regime is advised for the SuDS features and other proprietary drainage features. Appendix H details the regular maintenance, remedial work and monitoring requirements for each SuDS feature within the proposed drainage strategy.

Copyright © 1976 - 2025 Buro Happold. All rights reserved

7 Proposed Foul Water Drainage Strategy

7.1 General

The foul water network that will serve the new development is to be designed in accordance with Building Regulations Approved Document Part H (Drainage and Waste Disposal). This document sets requirements for the design and construction of underground foul water drains to the point of connection to an existing sewer.

7.2 Consultation

A pre-development enquiry was sent to United Utilities (UU) on 19th March 2025. A response was received on 22nd March 2025 which confirmed that all foul water from the proposed development will be allowed to be discharged to the existing public combined sewer. Their preferred point of discharge would be to the 300mm combined sewer located within the proposed development site via existing connections at an unrestricted rate.

7.3 Foul Water Management Strategy

For the proposed scheme, it is anticipated that all new sanitary downpipes will be collected at slab level and routed, below the new slab, to external yard areas to the north of the building. From here, foul water flows will be routed to the west and connect to the existing private combined water network prior to discharging to the existing public combined sewer located beneath the adjacent, retained portion of the current library building to the west of the Site. The existing private drainage network will be reused where possible, subject to capacity and condition checks.

While the proposed drainage strategy includes for indirect connections to existing combined water sewer, it is proposed to maintain separate systems of surface and foul water drainage for as long as is practicable within the proposed site. The proposed private foul water network is to be vented to atmosphere through soil vent pipes or similar within the above ground drainage design.

Refer to Appendix E for the proposed foul water drainage strategy drawing.

Copyright © 1976 - 2025 Buro Happold. All rights reserved

Appendix A Consultation

A.1 Lead Local Flood Authority (LLFA)

Copyright © 1976 - 2025 Buro Happold. All rights reserved

Case Ref:	MMU/M15/A/PRE
Site Name:	Manchester Metropolitan University Library, All Saints Campus, Manchester, M15 6B
LLFA Advice Suitability Stage:	☐ **RIBA 0 – 2** (Strategic appraisals, feasibility, and concept design). ☒ **RIBA 3 – 7** (to prepare a Planning application and to discharge Planning Conditions for pre-commencement through to handover & occupation).

LLFA Comments 31/07/2025

Site checked in Asset Register	Yes
Data Screen Recommended	No
FRA Required	No

Notes:

The site will consist of three separate applications:

- All Saints East (wholly new building structure, with new drainage proposed).
- All Saints West (partial demolition, Sandra Burslem Building, infill and levelling).
- All Saints West (existing building refurbishment, re-using existing roof drainage, no below-ground works. This is not proposed to connect to the new drainage strategy for the East).

This response focuses on the 'All Saints East' application. However, the separate upcoming applications in the West were discussed within the site context.

The site boundary is different in the provided Location Plan & Drainage Strategy Layout (the latter includes the All Saints West demolition/refurbishment areas). A consistent site boundary will be required at the application stage.

Standard Condition Clauses (Pre-commencement and Pre-occupation)	**Notes made during meeting to appraise proposals against the Clauses**
Progression through the drainage hierarchy must be evidence based and supported by site investigation including assessments of ground	A 2023 infiltration survey indicated high water table, no watercourses are in close proximity to the site or can feasibly be connected to. See

conditions and infiltration testing in accordance with BRE365. Proposals of attenuation should achieve half drain time within 24 hours.	below for justification for not connecting to the surface water sewer in Oxford Road. The existing drainage on site discharges to the existing combined sewer. Based on the information presented, discharge to the existing combined sewer is acceptable.
Where surface water is connected to the main river, any works within or adjacent to the river that would affect it would require consent from Environment Agency. An email of acceptance of proposed flows and/or new connection will suffice.	N/A
Where surface water is connected to the ordinary watercourse, agreement in principle from Manchester City Council as Lead Local Flood Authority is required. Please note that all new connections to the watercourses shall comply with reduction of flows to Greenfield runoff rates. An email of acceptance of proposed flows and/or new connection will suffice.	N/A
Where surface water is connected to the public sewer, agreement in principle from United Utilities is required that there is adequate spare capacity in the existing system taking future development requirements into account. An email of acceptance of proposed flows and/or new connection will suffice.	UU's preference is for a new connection to the surface water sewer in Oxford Road to the east of the site, due to a CSO being present downstream of the existing combined sewer to the north. However, the presence of a water main, combined sewer, and numerous other services within the footpath on Oxford restricts the feasibility of this connection, and MCC Highways have stated that they will not consider works in Oxford Road without other alternatives being exhausted as it is a key route. Evidence of acceptance from UU will still be required, to support discharge to the combined sewer to the north.
Maximised integration of green SuDS components (utilising infiltration or attenuation) if practicable.	Based on the provided drainage layout, an 'opportunity area' has been identified in the south of the site, with tree pits and permeable paving suggested. SuDS also possible in the north of the site. The landscaping area to the West is no longer proposed, this is now part of the separate existing building refurbishment. Green SuDS components should be integrated as far as possible.

Details of surface water attenuation to align with the Manchester, Trafford and Salford Strategic Flood Risk Assessment. For brownfield sites a minimum of 50% betterment is required for reduction in runoff rate compared to the existing rates with the aim of reducing to the Greenfield runoff rates.	The site is located within Conurbation Core Critical Drainage Area. The provided drainage layout (UPRN-BHE-XX-XX-SK-C-3102) proposes a discharge rate of 4.1l/s (greenfield) to the existing combined sewer connection to the north. The applicant confirmed a minimum of 50% betterment on brownfield rates. The greenfield rate should be used where possible, and this may help to receive acceptance from UU for a discharge connection to the combined sewer to the north. Please provide the greenfield/brownfield rate calculations/hydraulic modelling as part of the submission.
Development must be limited to greenfield runoff on Greenfield sites up to a 1 in 100-year event, including climate change allowance.	The provided drainage layout (UPRN-BHE-XX-XX-SK-C-3102) proposes a discharge rate of 4.1l/s (greenfield) to the existing combined sewer connection to the north. A minimum of 50% betterment is required, but the greenfield rate should be used where possible.
A finalised drainage layout showing all components, outfalls, levels and connectivity.	To be provided within submission.
An existing and proposed impermeable areas drawing to accompany all discharge rate calculations.	To be provided within submission.
Hydraulic calculations of the proposed drainage system, including all design parameters. Calculations must Include Critical Storm Events for the 1 in 2, 1 in 30 and 1 in 100 + 45% Climate Change. Results must demonstrate no surcharge for the 1 in 2, no flooding in the 1 in 30 and no flooding of buildings for the 1 in 100 + 45% Climate Change.	To be provided within submission.
Where a public sewer diversion or abandonment is proposed, agreement in principle from United Utilities is required. An email of acceptance will suffice.	Proposed abandonment of the Combined sewer in the West of the site as part of the All Saints West refurbishment. This would be part of a separate application, but we recommend engaging with UU if masterplan may require abandonment or diversion. The applicant stated that the new-build area to the East requires abandonment of private drainage assets only.

Where a public sewer build-over is proposed, agreement in principle from United Utilities is required. An email of acceptance will suffice.	No public sewer build-overs are proposed. If any public sewer build-overs are proposed, agreement in principle from United Utilities is required.
A blockage risk assessment must be undertaken as part of the drainage strategy to support proposed flows less than 5 l/s.	The provided drainage layout (UPRN-BHE-XX-XX-SK-C-3102) proposes a discharge rate of 4.1l/s (greenfield) to the existing combined sewer connection to the north. A blockage risk assessment will therefore be required.
An assessment of surface water pollution risk in-line with CIRIA C753 and, where required, evidence of pollution control measures (preferably through SuDS) to treat surface water prior to discharge.	The provided drainage layout (UPRN-BHE-XX-XX-SK-C-3102) indicates permeable paving and green SuDS features will be used as water quality features, and a proprietary treatment device is proposed prior to discharge. Measures should be confirmed within submission.
A plan indicating surface water overland flow routes for extreme events to ensure flows are diverted away from existing and proposed buildings (including basements).	To be provided within submission.
Construction details of flow control and SuDS elements.	To be provided within submission.
A plan indicating easements. SuDS features (including attenuation tanks) should be appropriately positioned, including a 2.5m easement from the existing highway and a 5m easement from any dwellings, guaranteeing accessibility for future maintenance and contingency for asset failure. This practice is in accordance with SuDS Manual (C753).	To be provided within submission. A below-ground attenuation tank is proposed. Suitable easements should be provided. Where minimum easements cannot be met, evidence is required from a structural engineer that building foundations are appropriately designed to protect buildings and tanks/SuDS features.
Finished floor levels and proposed ground levels plan.	N/A
Where an application is part of a larger site which already has planning permission it is essential that the new proposal does not compromise the drainage scheme already approved.	N/A

Important Information

• **Our review and advice are proportional to the development stage of the proposal. Details of LLFA Advice Suitability Stage are in the top table of page 1.**
• **Where LLFA Advice Suitability Stage is RIBA 3 – 7, formal Planning submissions must contain information at approvable standard for all above clauses to avoid or discharge a Condition.**
• **Some matters cannot be Conditioned because they affect proposal viability. The LLFA may recommend an Objection if applications do not contain viability information to support the Planning Application. This includes but is not limited to inconsideration of drainage assets near development, inconsideration of flood risk assessment, inconsideration of securing at least one viable option to drain the site.**
• **This review has been made based on information presented in the MS Teams meeting 31/07/2025 & provided in the email 30/07/2025.**

A.2 United Utilities

Copyright © 1976 - 2025 Buro Happold. All rights reserved

Niamh Cullen

From: seweradoptions@uuplc.co.uk
Sent: 15 August 2025 10:22
To: Niamh Cullen
Subject: RE: FW: 07211835 - Wastewater PDE -MMU Library

External Email. This email originated from outside Buro Happold.

Good Morning, Niamh

Thank you for your patience whilst I have been consulting internally.

I can confirm that I am happy for the development to utilise the existing connections to the combined sewer with the significant betterment of 11l/s, with the All Saints internal refurbishment to discharge as existing due to there being no change to the below ground drainage.

Could you please submit this email chain and the drawings/modelling information you submitted, to the the LPA in order for a smooth process once I am re-consulted for a planning response.

Kind regards

United Utilities
Water for the North West

Gary Jaundrell
Developer Engineer
Developer Services & Metering
Customer Services
T: 01925 429099
unitedutilities.com

If you have received a great service today why not tell us?
Visit: http://unitedutilities.thewowawards.co.uk/nominate

---------- Original Message ----------
From: seweradoptions@uuplc.co.uk [seweradoptions@uuplc.co.uk]
Sent: 11/08/2025 13:12
[redacted]
Subject: RE: FW: 07211835 - Wastewater PDE -MMU Library

Good Afternoon

Your enquiry has been logged and sent to our engineer Gary Jaundrell and his contact number is 01925 429099. Our service Level agreement is to respond to you within 10 working days.

Many thanks

[redacted]
Customer Advisor Advanced
Developer Services & Metering
Customer Services
T: 0345 026 8989 option 4
unitedutilities.com

If you feel you have received a good service from myself, please can you take two minutes to fill in the survey below. This will be much appreciated

Visit: *https://unitedutilities.thewowawards.co.uk/nominate*

From: [redacted]
Sent: 11 August 2025 10:03
To: Jaundrell, [redacted]
Cc: Phil Anwyl [redacted]; P065290 MMU Library Redesign [redacted]
Subject: RE: 07211835 - Wastewater PDE -MMU Library

Good morning Gary,

Thank you for letting me know!

Please see associated documents to the email below in the following link:

250811 Information for United Utilities

Please let me know if you can access the above or if you have any questions.

Many thanks,

Niamh Cullen (she/her)

Infrastructure Engineer
Buro Happold | Cities – Infrastructure

[redacted]

[Image is no longer available]

[redacted]

Subject: RE: 07211835 - Wastewater PDE -MMU Library

External Email. This email originated from outside Buro Happold.

Hi Niamh

I didn't receive this email, I'm afraid.

This could be due to the file size limit of 10mb.

Could you please forward the previous email again, utilising a file sharing system like onedrive or wetransfer to ensure these are received.

Kind regards

[redacted]

Developer Engineer

Developer Services & Metering

[Image is no longer available]

Customer Services

T: 01925 429099

unitedutilities.com

If you have received a great service today why not tell us?

Visit: http://unitedutilities.thewowawards.co.uk/nominate

[redacted]

Sent: 11 August 2023 09:48

[redacted]

Subject: RE: 07211835 - Wastewater PDE -MMU Library

Good morning Gary,

Please can you confirm receipt of the email below?

Let me know if you have any questions or require any further information.

Many thanks,

Niamh Cullen (she/her)

Infrastructure Engineer
Buro Happold | Cities – Infrastructure

[redacted]

[Image is no longer available]

[redacted]

Subject: RE: 07211835 - Wastewater PDE -MMU Library

Good afternoon Gary,

Thank you for your time yesterday, it was great to meet you.

Apologies for the delay in sending across the attached information. Please see attached:

- Slides presented in the meeting
- Response received from UU clean water team
- Existing drainage plan used to create the existing drainage hydraulic model (UPRN-BHE-XX-XX-DR-C-003100)
- Results from hydraulic model for both new build and refurbishment schemes
- Sketches showing hydraulic model existing network and assumed catchments plan

As discussed in the meeting, the site is heavily constrained by existing utilities including key infrastructure within the adjacent footpath and highway (Oxford Road). Regarding the drainage hierarchy, infiltration, connection to watercourse and connection the existing surface water sewer have been discounted due to the feasibility of each option. We are proposing to maintain the existing connections to the combined water sewer as this is considered the most feasible solution for the proposed development.

MCC highways have been consulted regarding the surface water sewer within Oxford Road. They advised that they can't approve works on Oxford Road without looking at alternative first due to the disruption to the network. LLFA have also been consulted and agreed with the design principles proposed to maintain existing connections and understood the potential disruption to Oxford Road.

In addition, based on CCTV survey information, the existing drainage hydraulic model has been modelled using InfoDrainage and analysed using site-specific FEH rainfall data (2022). Please see attached results for both main scheme and refurbishment scheme. For the main scheme (MMU LIBRARY REDESIGN – EXISTING DRAINAGE NETWORK RESULTS & 065290-BHE-XX-XX-SK-C-003000), we are proposing to provide a 50% betterment on existing rates based on a 1 in 2 year, 60-minute storm event which equates to 50% of 44 l/s **= 22 l/s** and maintaining existing connections to the public combined water sewer (via a connection to the north of the site).

Regarding the All Saints West refurbishment scheme, since there are no below ground works to the refurbishment building and the impermeable area is not changed, we propose to utilise existing drainage and connections to the south of the site with existing discharge rates (calculated as approximately 11 l/s based on a 1 in 2 year, 60-minute storm event).

Based on our discussions, I understand that you are happy in principle with 50% betterment on existing discharge rates and maintaining existing connection points, subject to assessing the hydraulic model results attached. In addition, you intend to contact United Utilities' rainwater management team regarding the impracticality of connecting to the surface water sewer within Oxford Road.

Please can you provide your comments based on our discussions yesterday and on the above information?

Many thanks,

Niamh Cullen (she/her)

Infrastructure Engineer
Buro Happold | Cities – Infrastructure

[redacted]

[Image is no longer available]

[redacted]

Subject: RE: 07211835 - Wastewater PDE -MMU Library

External Email. This email originated from outside Buro Happold.

Hi Niamh

12pm Monday works for me.
I'll await the invite to [redacted]

Kind regards

[redacted]
Developer Engineer
Developer Services & Metering
Customer Services
T: 01925 429099
unitedutilities.com

If you have received a great service today why not tell us?
Visit: http://unitedutilities.thewowawards.co.uk/nominate

---------- Original Message ----------
[redacted]
Subject: RE: 07211835 - Wastewater PDE -MMU Library

Good morning Gary,

Thank you for your email and letting us know about Conor.

A meeting next week would be great – I'll send an invite for 12pm on Monday if that is good for you?

Many thanks,

Niamh Cullen (she/her)

Infrastructure Engineer
Buro Happold | Cities – Infrastructure

[redacted]
[Image is no longer available]

From: seweradoptions@uuplc.co.uk <seweradoptions@uuplc.co.uk>
Sent: 01 August 2025 11:22

[redacted]

Subject: RE: 07211835 - Wastewater PDE -MMU Library

External Email. This email originated from outside Buro Happold.

Hi Niamh,

Thank you for your enquiry.

Conor no longer works within developer services.

I would be more than happy to attend a meeting to be brought up to speed on the development and to discuss the connection points and associated constraints.

I am free any day next week between 12pm and 3:30pm, if this is suitable.

If so, please send a Teams meeting request directly to [redacted]

Kind regards

[redacted]
Developer Engineer
Developer Services & Metering
Customer Services
T: 01925 429099
unitedutilities.com

United Utilities
Water for the North West

If you have received a great service today why not tell us?
Visit: http://unitedutilities.thewowawards.co.uk/nominate

---------- Original Message ----------
[redacted]
seweradoptions@uuplc.co.uk
Subject: RE: 07211835 - Wastewater PDE -MMU Library

Good afternoon Conor,

I just wanted to reach out to give an update on the Manchester Metropolitan University (MMU) library project.

Following on from our conversation in April, in which we understand UU's preference is to connect to the surface water sewer within Oxford Road. We have reviewed the feasibility of this and determined that it is not considered practicable for the proposed development. MCC Highways have advised that there are significant risks associated with forming a connection into the public highway and stipulated that works should be considered as a last resort only, due to the significant disruption to the network. Essentially, Oxford Road is a major highway within the city centre and there are critical utilities present within the footpath and highway. Please see attached email summarising the discussions and MCC Highways position on the proposals. In addition, there are existing trees adjacent to Oxford Road and the proposed development whereby existing tree roots and required protection zones must also be considered with any works in this area.

We also had a meeting with MCC Lead Local Flood Authority (LLFA) today who agreed with our assessment. Following this, we are proceeding with our design for planning to utilise existing connections to the combined water public sewer and provide a betterment to existing discharge rates by discharging at a greenfield equivalent discharge rate, in recognition that UU previously advised that this arrangement would be acceptable if a connection to surface water public sewer could not be achieved.

We would value a follow up meeting with yourselves in which we would be happy to run through the details of our proposals. Please can you advise on your availability to discuss the proposed scheme?

Many thanks,

Niamh Cullen (she/her)

Infrastructure Engineer
Buro Happold | Cities – Infrastructure

[redacted]

[Image is no longer available]

From: seweradoptions@uuplc.co.uk <seweradoptions@uuplc.co.uk>
Sent: 08 April 2025 09:07
[redacted]
Subject: RE: 07211835 - Wastewater PDE -MMU Library

External Email. This email originated from outside Buro Happold.

Good Morning Niamh

Thank you for confirming, unfortunately I won't be able to undertake a full modelling exercise until an application is made however judging by the model information in the area as well as available invert information, I don't believe there would be any detriment to the network if this sewer was abandoned.

Kind Regards
If you have received a great service today why not tell us?
Visit: unitedutilities.com/wow

[Image is no longer available]

[redacted]
Developer Engineer
Developer Services & Metering
T: 01925 429097
unitedutilities.com

---------- Original Message ----------
From: seweradoptions@uuplc.co.uk [seweradoptions@uuplc.co.uk]
Sent: 01/04/2025 12:07
[redacted]
Subject: 07211835 - Wastewater PDE -MMU Library

Good Afternoon,

Thank you for your email.

I can confirm that I have now sent this across to Conor who will respond on or before 08/04/2025.

Kind regards,

If you have received a great service from myself today why not tell us?
Visit: The WOW! Awards | Nominate (thewowawards.co.uk)

[Image is no longer available]

Sewer Adoptions
Customer Care Team
Developer Services & Metering
Customer Services
T: 0345 026 8989
unitedutilities.com

---------- Original Message ----------
[redacted]
Sent: 01/04/2025 10:20
To: seweradoptions@uuplc.co.uk
[redacted]
Subject: RE: 07211835 - Wastewater PDE -MMU Library

Good morning Conor,

Thank you for your time last week and email below. We are looking into the feasibility of connecting to the existing surface water sewer.

Regarding the existing UU combined sewer within the site, would UU be able to confirm whether this provides the existing network with surcharge relief prior to submitting a formal abandonment application?

Kind regards,

Niamh Cullen (she/her)

Infrastructure Engineer
Buro Happold | Cities – Infrastructure

[redacted]

[Image is no longer available]

From: seweradoptions@uuplc.co.uk <seweradoptions@uuplc.co.uk>
Sent: 26 March 2025 15:48
[redacted]
Subject: RE: 07211835 - Wastewater PDE -MMU Library

External Email. This email originated from outside Buro Happold.

Good Afternoon Niamh & Phil

Thank you both for your time earlier, as discussed please see comments from myself regarding the MMU Library scheme:

1. We would prefer a connection be made into the 830x960mm SW sewer to be as sustainable as possible and we'd willing to consider an internal backdrop connection, with baffle plate, into the existing chamber to aid in connecting to the SW sewer.
2. We would be willing to assess the discharge rate i.e. increase the allowable discharge rate if this aids the applicant in connecting to the SW sewer.
3. We would prefer the existing 300mm combined sewer be abandoned rather than built over if its found that the 300mm sewer does not serve any other land owner and does not provide the existing network with surcharge relief.

I'm happy to have more teams calls regarding this development so please do keep me in touch from your end.

Kind Regards

If you have received a great service today why not tell us?
Visit: unitedutilities.com/wow

[Image is no longer available]

[redacted]
Developer Engineer
Developer Services & Metering
T: 01925 429097
unitedutilities.com

---------- Original Message ----------

[redacted]

Subject: RE: 07211835 - Wastewater PDE -MMU Library

Good afternoon Conor,

Thanks for your response. Please could we do Wednesday afternoon at 3pm?

Kind regards,

Niamh Cullen (she/her)

Infrastructure Engineer
Buro Happold | Cities – Infrastructure

[redacted]

[Image is no longer available]

[redacted]

External Email. This email originated from outside Buro Happold.

Good Afternoon Niamh

Yes that would be ideal, I'm free the following days, if you advise which is best for you then I can send over a teams invite.

1. Wednesday 13:00 - 16:00
2. Friday 11:30 - 16:00

Please let me know if these suit and I'll send over a teams invite to you.

Kind Regards
If you have received a great service today why not tell us?
Visit: unitedutilities.com/wow

[Image is no longer available]

[redacted]
Developer Engineer
Developer Services & Metering
T: 01925 429097
unitedutilities.com

---------- Original Message ----------

[redacted]

Good Morning,

Thank you for your email.

I can confirm that I have now sent this across to Conor who will respond on or before 31/03/2025.

Kind regards,
Sewer Adoption

If you have received a great service from myself today why not tell us?
Visit: The WOW! Awards | Nominate (thewowawards.co.uk)

[Image is no longer available]

Sewer Adoptions
Customer Care Team
Developer Services & Metering
Customer Services
T: 0345 026 8989
unitedutilities.com

Original Message

[redacted]

Good morning Conor,

Thank you for your response.

This may be easier to discuss in person if you are free at all this week for a Teams meeting?

Please let me know your availability.

Kind regards,

Niamh Cullen (she/her)

Infrastructure Engineer
Buro Happold | Cities – Infrastructure

[redacted]

[Image is no longer available]

From: seweradoptions@uuplc.co.uk <seweradoptions@uuplc.co.uk>
Sent: 22 March 2025 12:30

[redacted]

External Email. This email originated from outside Buro Happold.

Good Afternoon Niamh

I hope you're well

Please find attached Pre-Development response to your enquiry for the MMU Library. Please note, I have seen the previous discussions with Anthony regarding the discharge to the surface water sewer being unachievable however Anthony has since left the business so I'd like to understand this further if you're able to advise the reasoning behind why it's not possible.

As you may understand, United Utilities will try our upmost to remove any/all SW from combined sewers at planning stages as with recent investment increasing bills, we cannot allow connections to combined sewers when there are other SW sewers nearby.

If I can be of any further assistance please do get in touch.

Kind Regards
If you have received a great service today why not tell us?
Visit: unitedutilities.com/wow

[Image is no longer available]

[redacted]
Developer Engineer
Developer Services & Metering
T: 01925 429097
unitedutilities.com

----------Original Message----------

[redacted]

Subject: 07211835 - Wastewater PDE -MMU Library

Good Afternoon,

Many thanks for your email.

I can confirm that I have now sent this across to Conor Donaghy who will respond on or before 04/04/2025.

Kind Regards

[Image is no longer available]

[redacted]
Customer Advisor Advanced
Developer Services & Metering
Customer Services
T: 0345 026 8989 option 4
unitedutilities.com

If you feel you have received a good service from myself, please can you take two minutes to fill in the survey below. This will be much appreciated

[Image is no longer available]
Visit: https://unitedutilities.thewowawards.co.uk/nominate

---------- Original Message ----------

[redacted]

Good afternoon,

Please see email below regarding reference 07211835.

I got a bounce back email due to file size, therefore please see link below containing the relevant files:

https://we.tl/t-gLSG8nZ1h1

Kind regards,

Niamh Cullen (she/her)

Infrastructure Engineer
Buro Happold | Cities – Infrastructure

T: 0113 204 2979

M: +447714152407

[Image is no longer available]

[redacted]

Good afternoon,

In regards to the pre-development enquiry referred to below (reference 07211835), please see attached additional information to support the PDE.

Existing drainage plan is based on an array of existing surveys that were undertaken in recent years. I have also attached the previous correspondence with UU regarding the previous scheme.

We look forward to Conor's response.

Kind regards,

Niamh Cullen (she/her)

Infrastructure Engineer
Buro Happold | Cities – Infrastructure

[redacted]

[Image is no longer available]

From: seweradoptions@uuplc.co.uk <seweradoptions@uuplc.co.uk>
Sent: 20 March 2025 15:44

[redacted]

External Email. This email originated from outside Buro Happold.

Good Morning,

PRE DEVELOPMENT APPLICATION AT MMU Library: – UU Ref 07211835

Please accept this email as receipt of your application received on 19/03/2025 for the above development. This has now been logged on our system and the job reference is 07211835 we would ask that you quote this reference in all future correspondence.

I have reviewed your application (and attachments) and can confirm this is suitable to be passed to Conor Donaghy for technical assessment. You will receive their response on or before 09/04/2025.

Kind regards

[Image is no longer available]

[redacted] Customer Advisor Advanced
Developer Services & Metering
Customer Services
T: 0345 026 8989 option 4
unitedutilities.com

If you feel you have received a good service from myself, please can you take two minutes to fill in the survey below. This will be much appreciated

[Image is no longer available]
Visit: *https://unitedutilities.thewowawards.co.uk/nominate*

---------- Original Message ----------
From: [donotreply@uu-web.co.uk]
Sent: 19/03/2025 15:19
To: seweradoptions@uuplc.co.uk; webmaster@uuplc.co.uk
Subject: Wastewater Pre-Development Enquiry Submission

Question	Answer

The information contained in this e-mail is intended only for the individual to whom it is addressed. It may contain legally privileged or confidential information or otherwise be exempt from disclosure. If you have received this Message in error or there are any problems, please notify the sender immediately and delete the message from your computer. You must not use, disclose, copy or alter this message for any unauthorised purpose. Neither United Utilities Group PLC nor any of its subsidiaries will be liable for any direct, special, indirect or consequential damages as a result of any virus being passed on, or arising from the alteration of the contents of this message by a third party.

United Utilities Group PLC, Haweswater House, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP
Registered in England and Wales. Registered No 6559020

www.unitedutilities.com
www.unitedutilities.com/subsidiaries

A.3 Manchester City Council (MCC) Highways Team

Copyright © 1976 - 2025 Buro Happold. All rights reserved

Niamh Cullen

[redacted]

Subject: RE: MCC Highways - Connection to Surface Water Sewer within Oxford Road

External Email. This email originated from outside Buro Happold.

Hi Leia,

Many thanks for confirming MCC's clear approach on this. We will review and come back to you with further proposals.

Thanks,
Helen

Helen Hatcher | Senior Project Manager | Campus Development | Manchester Metropolitan University

[redacted]

Bridgewater House, 7th Floor | 58-60 Whitworth Street | Manchester, M1 6LT | United Kingdom | **mmu.ac.uk**

Manchester Metropolitan University

Before acting on this email or opening any attachments you should read the Manchester Metropolitan University's email disclaimer available on its website at **mmu.ac.uk/emaildisclaimer**.

[redacted]

Subject: Re: MCC Highways - Connection to Surface Water Sewer within Oxford Road

This email originated from outside of Manchester Met. Do not click links or open attachments unless you recognise the sender and believe the content to be safe. Please contact the IT ServiceDesk if you have any concerns,
https://www.mmu.ac.uk/about-us/professional-services/itd/about/contact

Hello Niamh,

Apologies for the delay in coming back to you and thank you for your time last week - it was good to hear about the project.

Unfortunately, MCC will be requesting you look at other options for the sewer connection - we can't approve works on Oxford Road without looking at alternatives first, it will cause too much disruption to the network.

Many Thanks,

Leia Daley

Event and Coordination Specialist
Manchester City Council

[redacted]

Highways Department,
Manchester City Council
Level 5 Town Hall Extension
Albert Square
Manchester
M60 2LA

[redacted]

Subject: RE: MCC Highways - Connection to Surface Water Sewer within Oxford Road

Some people who received this message don't often get email from [redacted] Learn why this is important

ALERT This message originated outside of the Manchester City Council network. **BE CAUTIOUS** before clicking any links or opening any attachments. Please remember your Cyber Training and report anything suspicious.

Good afternoon both,

I hope you are well. Please can you confirm your stance on the summary in the email below?

Many thanks,

Niamh Cullen (she/her)
Infrastructure Engineer
Buro Happold | Cities – Infrastructure

[redacted]

BURO HAPPOLD

[redacted]

Subject: MCC Highways - Connection to Surface Water Sewer within Oxford Road

Good afternoon both,

Thank you for your time earlier today.

Regarding the potential connection to the surface water sewer within Oxford Road, please see a summary of our discussions below:

- If connection to SW sewer in Oxford Road is progressed, MCC highways would consider temporary lights and single lane closure reasonable to undertake the works
- Ideally the works would take place over a weekend or through night shifts.
- Contractor engagement to advise on constructability of proposed connection
- Potential phasing of the construction works due to single lane closure rather than full road closure
- Difficulties with avoiding existing utilities including UU 24-inch water main
- A Section 50 approval would be required due to new apparatus in the public highway

Please can you confirm your stance the matter and any additional comments to the above?

Many thanks,

Niamh Cullen (she/her)
Infrastructure Engineer
Buro Happold | Cities - Infrastructure
[redacted]
www.burohappold.com

BURO HAPPOLD

This transmission is confidential and intended solely for the person or organisation to whom it is correctly addressed. If you are not the intended recipient of this transmission, you should not take any action in reliance on it. Further, this transmission may contain confidential design and other information owned by Buro Happold Ltd. You should not copy, distribute, use, offer for sale or hire such information or in any way infringe the design and intellectual property rights of Buro Happold Ltd. It is intended that communication by email from Buro Happold Ltd or its employees is limited to communications connected to the services provided by Buro Happold Ltd. Buro Happold Ltd accepts no liability for any communications not connected to the services it provides. Computer viruses may be transmitted or downloaded onto your computer system via email communication. It is the recipient's responsibility to take any action necessary to prevent computer viruses being transmitted in this way. Accordingly, Buro Happold Ltd disclaims all responsibility which arises directly or indirectly from such transmission of computer viruses. Buro Happold Ltd. Registered in England: 2049511.

****

This email and any files transmitted with it are confidential and intended solely for the use of the individual or entity to whom they are addressed.
If you have received this email in error, please notify the sender, or dpo@manchester.gov.uk, and then permanently delete the email, attachments and all copies.
The full text of the Council's email disclaimer is available at: www.manchester.gov.uk/emaildisclaimer.

Your personal data is very important to us. Please refer to our privacy notice at: www.manchester.gov.uk/privacy for further information.

This footnote also confirms that this email message has been swept for the presence of computer viruses.
****

"Before acting on this email or opening any attachments you should read the Manchester Metropolitan University email disclaimer available on its website http://www.mmu.ac.uk/emaildisclaimer "

Appendix B Greenfield Runoff Calculation

Copyright © 1976 - 2025 Buro Happold. All rights reserved

Greenfield runoff rate estimation tool

www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

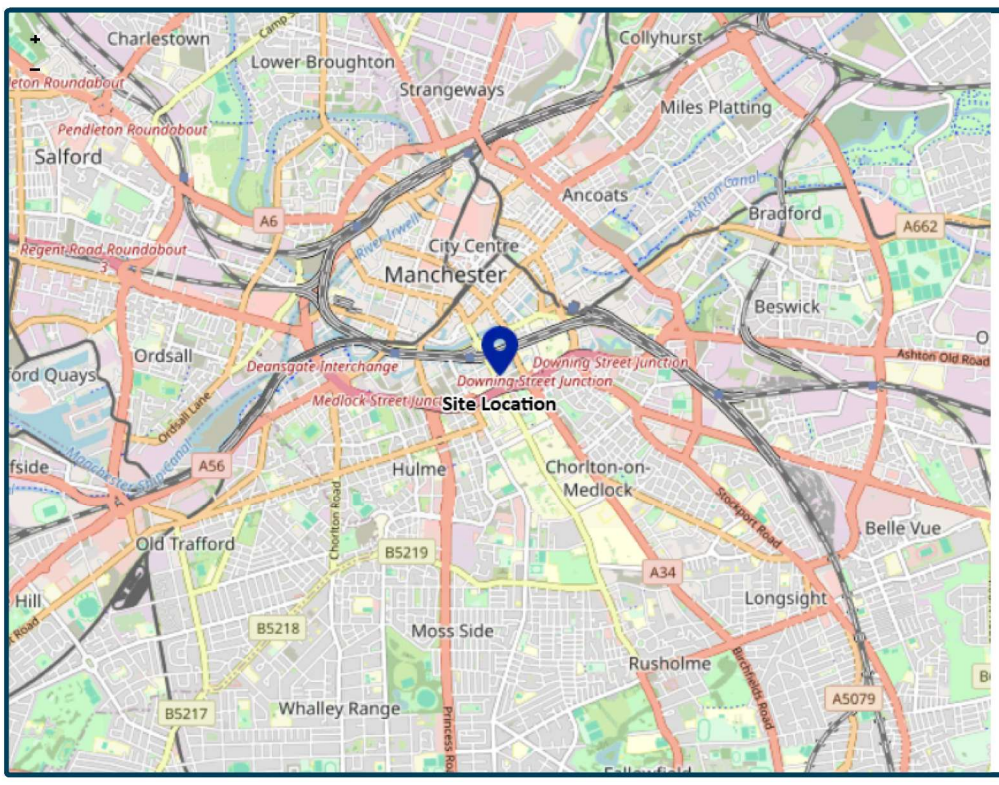
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015).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

Project details

Date	17/09/2025
Calculated by	NC
Reference	MMU LIBRARY NEW BUILD
Model version	2.1.2

Location

Site name	MMU LIBRARY
Site location	MANCHESTER



© OpenStreetMap (https://www.openstreetmap.org/copyright) contributors.

Site easting (British National Grid)	384245
Site northing (British National Grid)	397163

Site details

Total site area (ha)	0.516 ha

Greenfield runoff

Method

Method	IH124

IH124

	My value		Map value
SAAR (mm)	881 mm		881
How should SPR be derived?	WRAP soil type		
WRAP soil type	4		4
SPR	0.47		
QBar (IH124) (l/s)	3.26 l/s		

Growth curve factors

	My value		Map value
Hydrological region	10		10
1 year growth factor	0.87		
2 year growth factor	0.93		
10 year growth factor	1.38		
30 year growth factor	1.7		
100 year growth factor	2.08		
200 year growth factor	2.37		

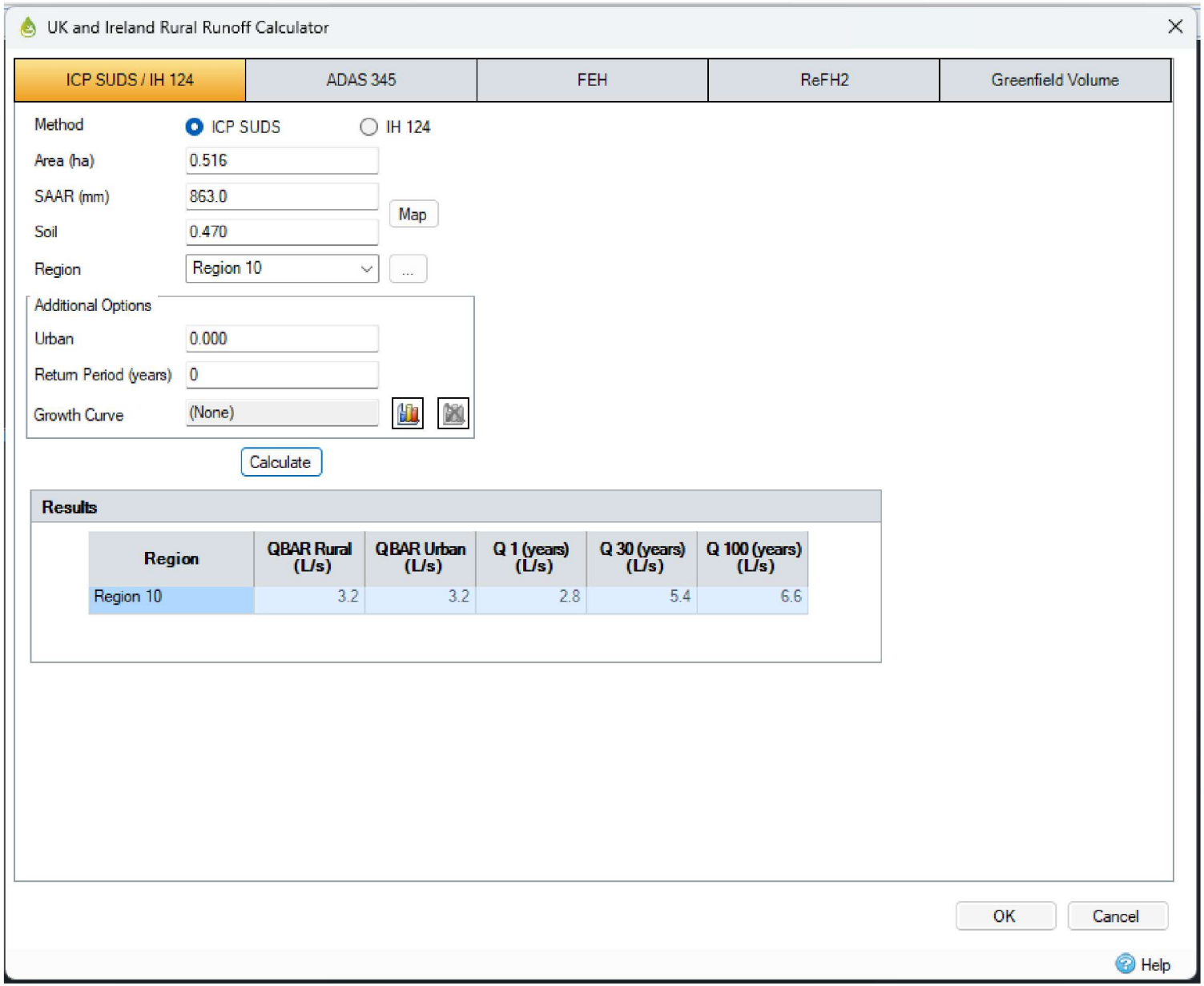
Results

Method	IH124	
Flow rate 1 year (l/s)	2.8	l/s
Flow rate 2 year (l/s)	3.0	l/s
Flow rate 10 years (l/s)	4.5	l/s
Flow rate 30 years (l/s)	5.5	l/s
Flow rate 100 years (l/s)	6.8	l/s
Flow rate 200 years (l/s)	7.7	l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.1.2) developed by HR Wallingford and available at uksuds.com (https://www.uksuds.com/). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (https://www.uksuds.com/terms-conditions). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

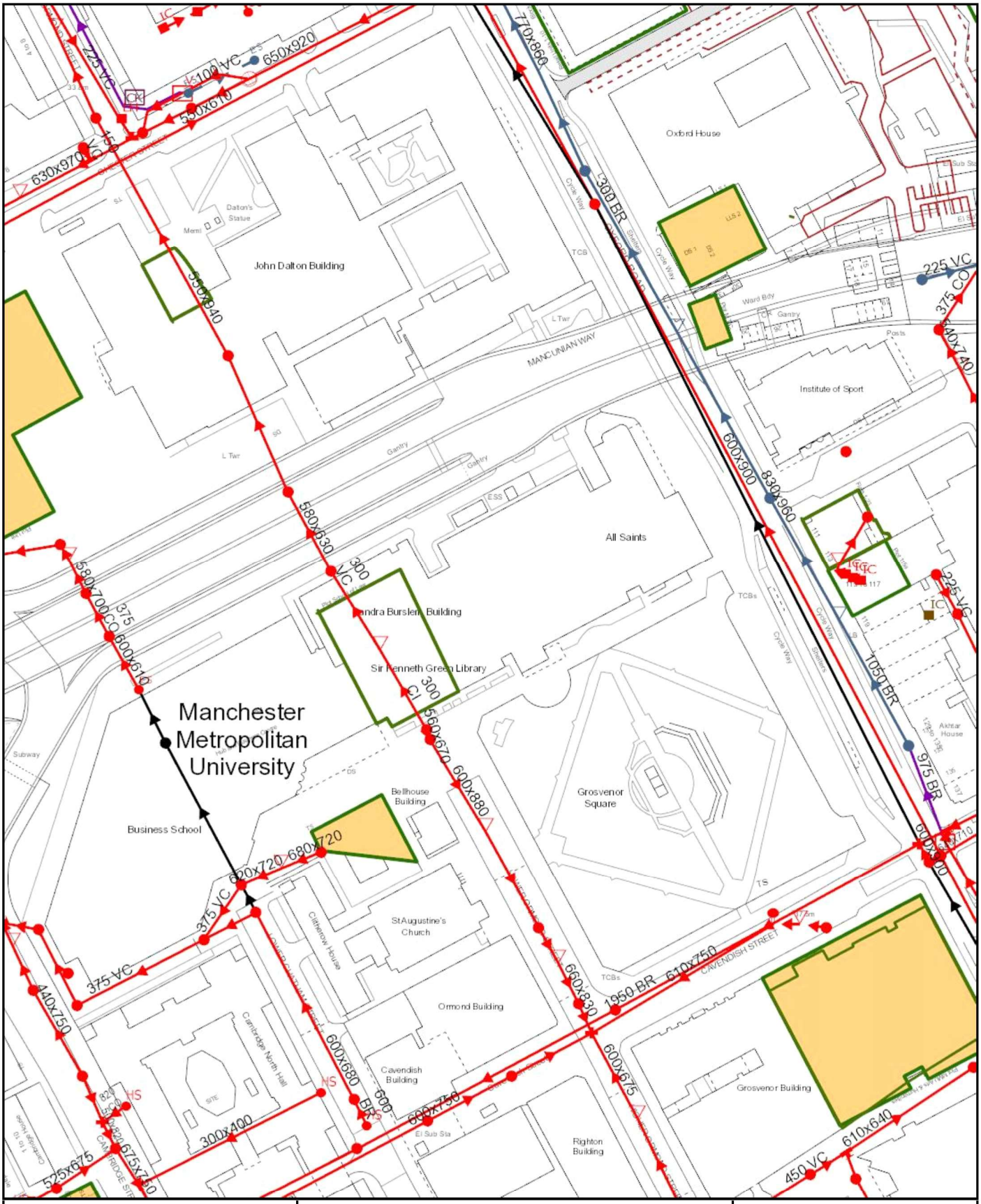


BUROHAPPOLD ENGINEERING	*Project:* Manchester Metropolitan University New Library	*Project Number:* P065290	*Date:* NOV 2025
			Initials: NC
	Sketch Title: Greenfield Results from InfoDrainage Rural Runoff Calculator	*Sketch Number:* SK-C-3000	*Revision:* P01

Copyright © 1976-2019 BuroHappold Engineering. All Rights Reserved

Appendix C United Utilities Asset Records

Copyright © 1976 - 2025 Buro Happold. All rights reserved



Scale:	1:1598	**SEWER RECORDS**	United Utilities Water for the North West
Date:	11/01/2023		
Address or Site Reference:	All Saints Library Manchester Metropolitan University All Saints Park Manchester. M15 6BH		
Printed by:	Property Searches		

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

Crown copyright and database rights 2017 Ordnance Survey 100022432. Unauthorised reproduction will infringe these copyrights.

Appendix D Existing Drainage Plan

Copyright © 1976 - 2025 Buro Happold. All rights reserved

© Buro Happold Limited or its group companies.
All Rights reserved. Buro Happold and its group companies assert (unless otherwise agreed in writing) their rights under s.77 & 80 of the Copyright, Designs and Patents Act 1988.

DO NOT SCALE THIS DRAWING.

HEALTH AND SAFETY INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING

CONSTRUCTION:
- WORKS UNDER MANCUNIAN WAY ELEVATED CARRIAGEWAY AND IN CLOSE PROXIMITY TO FOUNDATIONS
- WORKS IN PROXIMITY TO LIVE SERVICES
- WORKS INTERFACE WITH THE PUBLIC ON OXFORD ROAD AND STUDENTS USING THE SURROUNDING FACILITIES DURING CONSTRUCTION

MAINTENANCE/CLEANING/OPERATION:
- WORKS IN PROXIMITY TO LIVE SERVICES
- WORKS INTERFACE WITH THE PUBLIC ON OXFORD ROAD AND STUDENTS USING THE SURROUNDING FACILITIES DURING CONSTRUCTION

DECOMMISSIONING/DEMOLITION:
- WORKS IN PROXIMITY TO LIVE SERVICES
- WORKS INTERFACE WITH THE PUBLIC ON OXFORD ROAD AND STUDENTS USING THE SURROUNDING FACILITIES DURING CONSTRUCTION

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS STATED OTHERWISE.
2. THIS DRAWING HAS BEEN BASED ON THE FOLLOWING INFORMATION:
   - TOPOGRAPHICAL SURVEY: DRAWING No. 20A269 RECEIVED MARCH 2020, BY SURVEY OPERATIONS
   - EXTERNAL CCTV SURVEY: DRAWING No. S24432-IJ AND CCTV REPORT RECEIVED AUGUST 2023, BY SEP SURVEY CONTRACTOR
   - INTERNAL CCTV SURVEY: DRAWING No. S219921, CCTV REPORT AND MH CARDS RECEIVED JANUARY 2024, BY SEP SURVEY CONTRACTOR
   - EXISTING GROUND FLOOR PLAN DRAWING: S25865-GF RECEIVED JUN 2022, BY SURVEY & ENGINEERING PROJECTS
   - TREE CONSTRAINS PLAN: DRAWING No. TR-01 RECEIVED 04.02.19, BY PLANIT-IE
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS, DETAILS AND SPECIFICATIONS.
4. PRIOR TO THE COMMENCEMENT OF WORK THE LOCATION, SIZE AND DEPTH OF ALL EXISTING DRAINS/SEWERS AND SERVICES SHALL BE ESTABLISHED BY THE CONTRACTOR. ANY DISCREPANCIES FROM THE INFORMATION INDICATED ON THESE DRAWINGS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ARCHITECT OR ENGINEER.
5. THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT AND DIVERSION WORKS AS NECESSARY, TO ALL EXISTING SERVICES TO THE SATISFACTION OF THE PROJECT MANAGER.

LEGEND

- RED LINE BOUNDARY
- EXISTING TREE ROOT PROTECTION ZONE
- EXISTING TREE CANOPY
- EXISTING PUBLIC SURFACE WATER SEWER
- EXISTING PUBLIC COMBINED WATER SEWER
- EXISTING PRIVATE SURFACE WATER DRAIN
- EXISTING PRIVATE COMBINED WATER DRAIN
- EXISTING LINEAR CHANNEL DRAIN
- EXISTING GULLY CONNECTIONS (SHOWN INDICATIVELY)
- EXISTING BASEMENT AREA
- EXISTING FOUNDATIONS

SCALE BEFORE REDUCTION 1 : 100

EX MH 13 CL: 37.19 IL: 34.65
EX MH 15 CL: 37.00 IL: 34.74
EX MH16 CL: 37.01m IL: 34.84m
EX MH16A CL: 37.02 IL: 35.02
EX MH18 CL: 37.11m IL: 35.37m
EX MH17 CL: 37.13m IL: 36.11m
INTMH3 CL: 37.22 IL: UTL
INTMH1 CL: 37.23 IL: 35.85
INTMH2 CL: 37.24 IL: 35.97
INTMH4 CL: 37.23 IL: 35.70
INTMH5 UTL (APPROXIMATE POSITION)
INTMH6 CL: 37.53 IL: 35.93
INTMH7 CL: 37.55 IL: 35.66
INTMH8 CL: 37.55 IL: UTL
INTMH9 UTL (APPROXIMATE POSITION)
EX MH 9 CL: 37.21m IL: 35.35m
EX MH8 CL: 37.21m IL: 34.99m
EX MH 6 CL: 37.23m IL: 34.81m
EX MH 7 CL: 37.26 IL: 34.92
EX MH 10 CL: 37.19m IL: TBC
BURIED MANHOLE EX MH 10a CL: 37.21m IL: TBC
EX MH 19 CL: 37.21m IL: 36.29m
EX MH 20 CL: 37.18m IL: 36.36m
EX MH 20A CL: 37.10m IL: 36.23m

- INTERNAL CCTV SURVEY (JANUARY 2024) STATES RWP TRACED TO A COLUMN.
- PIPE EXTENDS 10.29m TOWARDS ACO CHANNEL, CRACK PRESENT AND JOINT DISPLACED.
- SURVEY ABANDONED DUE TO ATTACHED/SETTLED DEPOSITS.
- LOSS OF VISION @4.10m DUE TO SETTLED DEPOSITS. CAPPED END OF LINE.
- SURVEY ABANDONED DUE TO SETTLED DEPOSITS.
- LINE DEVIATES UP @0.40m - SUSPECTED RWP.
- SURVEY ABANDONED DUE TO LOSS OF VISION.
- SURVEY ABANDONED DUE TO LOSS OF VISION - SUSPECTED RWP.
- SURVEY ABANDONED DUE TO SILT BUILD UP - SUSPECTED RWP.
- LINE DEVIATES UP @1.80m - SVP.
- LINE DEVIATES UP @3.00m - SUSPECTED RWP.
- LINE DEVIATES UP @9.25m - SUSPECTED RWP.
- LINE DEVIATES UP @3.70m.
- LINE DEVIATES UP @3.20m SERVES M/F TOILETS FLOOR 3 (ALL SAINTS BUILDING)
- LINE DEVIATES UP @2.80m - SVP.
- LINE DEVIATES UP @2.75m SERVES M/F TOILETS FLOORS 4&5 (ALL SAINTS BUILDING)
- SURVEY ABANDONED DUE TO LARGE DEBRIS @3.55m.
- DYE TESTING SHOWS BURIED MH SERVES M/F TOILETS FROM FLOORS 1, 2, 4 AND 5 (ALL SAINTS LIBRARY).
- BURIED MH (APPROXIMATE POSITION)
- PIPE EXTENDS 3.21m AND DEVIATES UP TO SVP. DYE TESTING SHOWS SVP SERVES M/F TOILETS FROM FLOOR 3 (ALL SAINTS LIBRARY).
- PIPE EXTENDS 4.10m AND DEVIATES UP - SVP TRAP
- PIPE EXTENDS 2.15m AND DEVIATES UPWARDS - SUSPECTED RWP
- CONNECTIVITY WAS NOT CONFIRMED IN CCTV SURVEY. ASSUMED CONNECTION TO COMBINED NETWORK.
- PIPE EXTENDS TOWARDS BUILDING 5.10m ENDING AT CAPP END
- PIPE EXTENDS TOWARDS BUILDING 2.10m ENDING AT SPECIAL CHAMBER
- PIPE EXTENDS TOWARDS BUILDING 3.70m ENDING AT SPECIAL CHAMBER
- ASSUMED OUTFALL FROM EXISTING DRAINAGE CHANNEL TO ADJACENT SURFACE WATER DRAIN
- PIPE EXTENDS TOWARDS BUILDING 5.42m ENDING AT GULLY. FRACTURE PRESENT @4.25m. ASSUMED REDUNDANT AND ABANDONED.
- PIPE EXTENDS TOWARDS BUILDING 2.50m ENDING AT GULLY. ASSUMED REDUNDANT AND ABANDONED.
- SURVEYED UNTIL 26.45m WITH JUNCTIONS AT 10.49m, 17.64m AND 20.90m. SURVEY STATES CAPPED OFF AT END OF PIPE.
- SURVEYED UNTIL 19m WITH JUNCTIONS AT 4.84m AND 16.57m

Rev.	Description	Date	Init	Revd	Apprd
P01	ISSUED FOR INFORMATION	05.09.2025	NC	PA	MW

RIBA STAGE 3

Project Stage

INFORMATION

Status of Drawing

BURO HAPPOLD
2nd Floor, Eastgate
Castle Street
Manchester M3 4LZ
UK
Tel: +44 (0)161 233 5000
Fax: +44 (0)870 787 4143
Email: 000000@buro-happold.com
Web: www.burohappold.com

Client: MANCHESTER METROPOLITAN UNIVERSITY
Architect: HAWKINS BROWN
Project: MMU LIBRARY REDESIGN
Drg Title: EXISTING DRAINAGE GENERAL ARRANGEMENT PLAN

Job No.	Scale@A0
065290	1:100

Drawn/Designed By	Checked By	Approved By
N. CULLEN	P. ANWYL	M. WESTWOOD

Drawing No. 1350B-BHE-XX-XX-DR-C-003100
Revision P01

Appendix E Proposed Drainage Strategy Drawings

E.1 Proposed Surface Water Drainage Strategy

Copyright © 1976 - 2025 Buro Happold. All rights reserved

© Buro Happold Limited or its group companies.
All Rights reserved. Buro Happold and its group companies assert (unless otherwise agreed in writing) their rights under s.77 & 80 of the Copyright, Designs and Patents Act 1988.

DO NOT SCALE THIS DRAWING.

HEALTH AND SAFETY INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING.

CONSTRUCTION:

- WORKS UNDER/ MANCUNIAN WAY ELEVATED CARRIAGEWAY AND IN CLOSE PROXIMITY TO FOUNDATIONS
- WORKS IN PROXIMITY TO LIVE SERVICES
- WORKS INTERFACE WITH THE PUBLIC ON OXFORD ROAD AND STUDENTS USING THE SURROUNDING FACILITIES DURING CONSTRUCTION

MAINTENANCE/CLEANING/OPERATION:

- WORKS IN PROXIMITY TO LIVE SERVICES
- WORKS INTERFACE WITH THE PUBLIC ON OXFORD ROAD AND STUDENTS USING THE SURROUNDING FACILITIES DURING CONSTRUCTION

DECOMMISSIONING/DEMOLITION:

- WORKS IN PROXIMITY TO LIVE SERVICES
- WORKS INTERFACE WITH THE PUBLIC ON OXFORD ROAD AND STUDENTS USING THE SURROUNDING FACILITIES DURING CONSTRUCTION

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
2. THE DESIGN OF THIS SCHEME HAS BEEN BASED ON THE FOLLOWING DRAWINGS AND INFORMATION:
   - TOPOGRAPHICAL SURVEY DRAWING No. 202465 RECEIVED MARCH 2020, BY SURVEY OPERATIONS
   - ARCHITECT'S PROPOSED GROUND FLOOR PLAN DRAWING No. 1350B-HBA-XX-00-DR-A-200100 RECEIVED 07.08.25, BY HAWKINS BROWN
   - TREE CONSTRAINTS PLAN DRAWING No. TR-01 RECEIVED 04.02.19, BY PLANT-IE
   - LANDSCAPE ARCHITECT PROPOSED GENERAL ARRANGEMENT PLAN DRAWING No. 1350B-PLA-XX-DR-L-000001 RECEIVED 28.08.25, BY PLANT-IE
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS, DETAILS AND SPECIFICATIONS.
4. ALL ABOVE GROUND RAINWATER AND SANITARY PIPEWORK IS SHOWN INDICATIVELY. REFERENCE SHOULD BE MADE TO M&P DESIGN DRAWINGS FOR ALL ABOVE GROUND DRAINAGE APPARATUS.
5. REFER TO LANDSCAPE, STRUCTURAL AND MEP SPECIFICATIONS FOR ASSOCIATED DETAILS.
6. DRAINAGE CHANNEL LOCATIONS TO BE CONFIRMED AND COORDINATED WITH LANDSCAPE ARCHITECTS' PROPOSALS.
7. TOTAL ATTENUATION VOLUME SUBJECT TO APPROVAL OF LLFA AND UU. PROPOSED VOLUME OF 200m³ BASED ON DISCHARGE RATE OF 11.0 L/S AS AGREED IN PRINCIPLE WITH UNITED UTILITIES, OFFERING A BETTERMENT WHEN COMPARED WITH EXISTING BROWNFIELD DISCHARGE RATES.
8. PRIOR TO THE COMMENCEMENT OF WORK THE LOCATION, SIZE AND DEPTH OF ALL EXISTING DRAINS/SEWERS AND SERVICES SHALL BE ESTABLISHED BY THE CONTRACTOR. ANY DISCREPANCIES FROM THE INFORMATION INDICATED ON THESE DRAWINGS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ARCHITECT OR ENGINEER.
9. THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT AND DIVERSION WORKS AS NECESSARY, TO ALL EXISTING SERVICES TO THE SATISFACTION OF THE PUBLIC UTILITIES.
10. ANY DRAINAGE TO BE ABANDONED SHALL BE DONE IN ACCORDANCE WITH MCHW SERIES 500 CLAUSE 506.3.
11. DRAINAGE TO BE ABANDONED MUST BE PROVEN TO BE NOT IN USE BEFORE BEING ABANDONED. IF FOUND TO BE LIVE, CONTRACTOR WILL NEED TO PROVE TYPE (SURFACE OR FOUL WATER) AND CONNECT TO APPROPRIATE SYSTEM.
12. REFER TO DRAWING 1350B-BHE-XX-XX-DR-C-003800 FOR MANHOLE SCHEDULES.
13. ALLOWANCE TO BE MADE FOR REMEDIATION OF RETAINED

FLOW CONTROL MANHOLE
COVER LEVEL: 37.000m AOD
INVERT LEVEL: 34.800m AOD
DESIGN HEAD: 0.9m
LIMITED DISCHARGE RATE = 11.0 L/S

PROPRIETARY TREATMENT DEVICE
HYDROINTERNATIONAL DOWNSTREAM DEFENDER OR EQUIVALENT APPROVED.
COVER LEVEL: 37.150m AOD
INCOMING / OUTGOING PIPE INVERT LEVEL: 34.850m AOD
UNIT SUMP INVERT LEVEL: 33.850m AOD

SW-MH-107
CL= 37.000
IL = 34.800

SW-MH-108
CL= 37.150
IL = 33.850

SW-MH-109
CL= 37.140
IL = 35.000

SW-MH-201
CL= 37.150
IL = 35.150

SW-MH-200
CL= 37.200
IL = 35.400

300Ø @ 1:102
300Ø @ 1:111
300Ø @ 1:160
300Ø @ 1:97
300Ø @ 1:144
300Ø @ 1:60
300Ø @ 1:113
150Ø @ 1:10

GEOCELLULAR ATTENUATION TANK VENTILATION

GEOCELLULAR ATTENUATION TANK
COVER LEVEL: 37.140m AOD
BASE OF TANK: 34.900m AOD
AREA: 262.500m²
DEPTH: 0.8m
POROSITY: 0.95
STORAGE VOLUME: 200m³

PERMEABLE PAVING 1
COVER LEVEL: 37.140m AOD
BASE LEVEL: 36.770m AOD
AREA: 76.000m²
STORAGE DEPTH: 0.22m
POROSITY: 30%
STORAGE VOLUME: 3.75m³

SW-MH-300
CL= 37.140
IL = 35.600

SW-MH-105
CL= 37.150
IL = 34.950

150Ø @ 1:2

PERMEABLE PAVING 5
COVER LEVEL: 37.140m AOD
BASE LEVEL: 36.740m AOD
AREA: 33.000m²
STORAGE DEPTH: 0.3m
POROSITY: 30%
STORAGE VOLUME: 2.6m³

150Ø @ 1:19
150Ø @ 1:26

GEOCELLULAR ATTENUATION TANK ACCESS CHAMBER

PERMEABLE PAVING 3
COVER LEVEL: 37.140m AOD
BASE LEVEL: 36.765m AOD
AREA: 63.000m²
STORAGE DEPTH: 0.225m
POROSITY: 30%
STORAGE VOLUME: 4.6m³

150Ø @ 1:12
150Ø @ 1:12
SW-MH-104
CL= 37.150
IL = 35.100
150Ø @ 1:74
300Ø @ 1:93

PERMEABLE PAVING 2
COVER LEVEL: 37.140m AOD
BASE LEVEL: 36.790m AOD
AREA: 48.500m²
STORAGE DEPTH: 0.2m
POROSITY: 30%
STORAGE VOLUME: 4.1m³

150Ø @ 1:18
225Ø @ 1:97
SW-MH-100
CL= 37.200
IL = 36.000

300Ø @ 1:75
225Ø @ 1:37
SW-MH-103
CL= 37.150
IL = 35.300
150Ø @ 1:8
SW-MH-102
CL= 37.100
IL = 35.500
SW-MH-101
CL= 37.170
IL = 35.650

PERMEABLE PAVING 1
COVER LEVEL: 37.100m AOD
BASE LEVEL: 36.700m AOD
AREA: 137.000m²
STORAGE DEPTH: 0.3m
POROSITY: 30%
STORAGE VOLUME: 9.6m³

2 1 0 2 4 6 8
SCALE BEFORE REDUCTION 1 : 100

LEGEND

- RED LINE BOUNDARY
- LANDSCAPING WORKS BOUNDARY
- BUILDING BOUNDARY
- EXISTING TREE ROOT PROTECTION ZONE
- EXISTING TREE CANOPY
- MANCUNIAN WAY ELEVATED CARRIAGEWAY
- ELEVATED CARRIAGEWAY NO DIG ZONE (INDICATIVE)
- EXISTING PRIVATE SURFACE WATER DRAIN
- EXISTING PRIVATE COMBINED WATER DRAIN
- EXISTING LINEAR CHANNEL DRAIN
- EXISTING DRAINAGE TO BE ABANDONED
- PROPOSED PRIVATE SURFACE WATER DRAIN (BACKDROP=BD)
- PROPOSED RAINWATER PIPE AND BELOW GROUND DRAIN (RWP)
- PROPOSED FOUNDATION PILE CAP AND PILE
- PROPOSED PERMEABLE PAVING
- PROPOSED BELOW GROUND GEOCELLULAR ATTENUATION TANK
- PROPOSED PERFORATED PIPE
- PROPOSED FACADE COLLECTOR DRAIN (REFER TO DETAILS)
- PROPOSED CHANNEL DRAIN

Rev	Description	Date	Rev'd	Appr'd
P01	ISSUED FOR INFORMATION	05.09.2025	NC	PA MW

RIBA STAGE 3

Project Stage

INFORMATION

Status of Drawing

BURO HAPPOLD

2nd Floor, Eastgate
Castle Street
Manchester M3 4LZ
UK
Tel: +44 (0)161 233 5000
Fax: +44 (0)870 787 4143
Email: 000000@burohappold.com
Web: www.burohappold.com

Client: MANCHESTER METROPOLITAN UNIVERSITY
Architect: HAWKINS BROWN
Project: MMU LIBRARY REDESIGN
Drg Title: PROPOSED SURFACE WATER DRAINAGE PLAN

Job No.: 065290
Scale@A0: 1:100
Drawn/Designed By: N. CULLEN
Checked By: P. ANWYL
Approved By: M. WESTWOOD
Drawing No.: 1350B-BHE-XX-XX-DR-C-003101
Revision: P01

This drawing and its contents are the property of Buro Happold Limited and may not be reproduced or disclosed to any third party without the express permission of Buro Happold Limited. Any electronic data forming part of this drawing is for information only. The accuracy and completeness cannot be guaranteed. Buro Happold Limited accepts no responsibility or liability for any loss or damage caused by any alteration carried out by any party other than Buro Happold Limited.

E.2 Proposed Foul Water Drainage Strategy

Copyright © 1976 - 2025 Buro Happold. All rights reserved

© Buro Happold Limited or its group companies.
All Rights reserved. Buro Happold and its group companies assert (unless otherwise agreed in writing) their rights under s.77 to 89 of the Copyright, Designs and Patents Act 1988.

DO NOT SCALE THIS DRAWING.

HEALTH AND SAFETY INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING

CONSTRUCTION:
- WORKS UNDER MANCUNIAN WAY ELEVATED CARRIAGEWAY AND IN CLOSE PROXIMITY TO FOUNDATIONS
- WORKS IN PROXIMITY TO LIVE SERVICES
- WORKS INTERFACE WITH THE PUBLIC ON OXFORD ROAD AND STUDENTS USING THE SURROUNDING FACILITIES DURING CONSTRUCTION

MAINTENANCE/CLEANING/OPERATION:
- WORKS IN PROXIMITY TO LIVE SERVICES
- WORKS INTERFACE WITH THE PUBLIC ON OXFORD ROAD AND STUDENTS USING THE SURROUNDING FACILITIES DURING CONSTRUCTION

DECOMMISSIONING/DEMOLITION:
- WORKS IN PROXIMITY TO LIVE SERVICES
- WORKS INTERFACE WITH THE PUBLIC ON OXFORD ROAD AND STUDENTS USING THE SURROUNDING FACILITIES DURING CONSTRUCTION

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
2. THE DESIGN OF THIS SCHEME HAS BEEN BASED ON THE FOLLOWING DRAWINGS AND INFORMATION:
   - TOPOGRAPHICAL SURVEY DRAWING No. 20A265 RECEIVED MARCH 2020, BY SURVEY OPERATIONS
   - ARCHITECT'S PROPOSED GROUND FLOOR PLAN DRAWING No. 1350B-HBA-XX-00-DR-A-200100 RECEIVED 07.08.25, BY HAWKINS BROWN
   - TREE CONSTRAINTS PLAN DRAWING No. TR-01 RECEIVED 04.02.19, BY PLANIT-IE
   - LANDSCAPE ARCHITECT PROPOSED GENERAL ARRANGEMENT PLAN DRAWING No: 1350B-PLA-XX-XX-DR-L-000001 RECEIVED 28.08.25, BY PLANIT-IE
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS, DETAILS AND SPECIFICATIONS.
4. ALL ABOVE GROUND RAINWATER AND SANITARY PIPEWORK IS SHOWN INDICATIVELY. REFERENCE SHOULD BE MADE TO MEP DESIGN DRAWINGS FOR ALL ABOVE GROUND DRAINAGE APPARATUS.
5. REFER TO LANDSCAPE, STRUCTURAL AND MEP SPECIFICATIONS FOR ASSOCIATED DETAILS.
6. ALL INTERNAL INSPECTION CHAMBERS GREATER THAN 1.2m DEPTH TO BE FITTED WITH RESTRICTED ACCESS REDUCER SUCH AS POLYPIPE UDS14 OR EQUIVALENT APPROVED.
7. PRIOR TO THE COMMENCEMENT OF WORK THE LOCATION, SIZE AND DEPTH OF ALL EXISTING DRAINS/SEWERS AND SERVICES SHALL BE ESTABLISHED BY THE CONTRACTOR. ANY DISCREPANCIES FROM THE INFORMATION INDICATED ON THESE DRAWINGS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ARCHITECT OR ENGINEER.
8. THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT AND DIVERSION WORKS AS NECESSARY, TO ALL EXISTING SERVICES TO THE SATISFACTION OF THE PUBLIC UTILITIES.
9. ANY DRAINAGE TO BE ABANDONED SHALL BE DONE IN ACCORDANCE WITH MCHW SERIES 500 CLAUSE 506.3.
10. DRAINAGE TO BE ABANDONED MUST BE PROVEN TO BE NOT IN USE BEFORE BEING ABANDONED. IF FOUND TO BE LIVE, CONTRACTOR WILL NEED TO PROVE TYPE (SURFACE OR FOUL WATER) AND CONNECT TO APPROPRIATE SYSTEM.
11. REFER TO DRAWING 1350B-BHE-XX-XX-DR-C-003810 FOR MANHOLE SCHEDULES.
12. ALLOWANCE TO BE MADE FOR REMEDIATION OF RETAINED DRAINAGE E.G. JETTING.

PROPOSED FOUL WATER DRAINAGE TO DISCHARGE TO EXISTING COMBINED WATER PRIVATE DRAINAGE MANHOLE

FW-MH-104 CL= 37.140 IL = 35.100

FW-MH-103 CL = 37.200 IL = 35.500

FW-MH-102 CL = 37.200 IL = 35.700

FW-MH-101 CL = 37.200 IL = 35.900

FW-MH-100 CL = 37.206 IL = 36.000

EX MH 15 CL= 37.000 IL = 34.720

150Ø @ 1:60

150Ø @ 1:47

150Ø @ 1:71

150Ø @ 1:72

150Ø @ 1:55

150Ø @ 1:15

150Ø @ 1:69

150Ø @ 1:64

150Ø @ 1:92

150Ø @ 1:63

150Ø @ 1:89

150Ø @ 1:73

RODDING EYE 2 CL= 37.220 IL = 36.820

FW-MH-303 CL = 37.220 IL = 36.200

FW-MH-302 CL = 37.220 IL = 36.450

FW-MH-302 CL = 37.220 IL = 36.300

FW-MH-300 CL = 37.220 IL = 36.500

FW-MH-200 CL = 37.220 IL = 36.700

RODDING EYE 1 CL= 37.220 IL = 36.620

LEGEND

- RED LINE BOUNDARY
- LANDSCAPING WORKS BOUNDARY
- BUILDING BOUNDARY
- EXISTING TREE ROOT PROTECTION ZONE
- EXISTING TREE CANOPY
- MANCUNIAN WAY ELEVATED CARRIAGEWAY
- ELEVATED CARRIAGEWAY NO DIG ZONE (INDICATIVE)
- EXISTING PRIVATE SURFACE WATER DRAIN
- EXISTING PRIVATE COMBINED WATER DRAIN
- EXISTING LINEAR CHANNEL DRAIN
- EXISTING DRAINAGE TO BE ABANDONED
- PROPOSED PRIVATE FOUL WATER DRAIN
- DRAIN CAST IN FOUNDATION
- PROPOSED RODDING EYE
- PROPOSED SVP / SS / FLOOR GULLY AND BELOW GROUND DRAIN
- PROPOSED RODDING EYE
- PROPOSED FOUNDATION PILE CAP AND PILE

2 1 0 2 4 6 8 1 : 100

SCALE BEFORE REDUCTION

P01 ISSUED FOR INFORMATION 05.09.2025 NC PA MW

Rev	Description	Date	Iss'd	Rev'd	App'd

RIBA STAGE 3

Project Stage

INFORMATION

Status of Drawing

BURO HAPPOLD

2nd Floor, Eastgate
Castle Street
Manchester M3 4LZ
UK

Tel: +44 (0)161 233 5000
Fax: +44 (0)870 787 4143
Email: 000000@burohappold.com
Web: www.burohappold.com

Client: *MANCHESTER METROPOLITAN UNIVERSITY*

Architect: *HAWKINS BROWN*

Project: **MMU LIBRARY REDESIGN**

Drg Title: PROPOSED FOUL WATER DRAINAGE PLAN

Job No.	Scale@A0
065290	1:100

Drawn/Designed By	Checked By	Approved By
N. CULLEN	P. ANWYL	M. WESTWOOD

Drawing No.: 1350B-BHE-XX-XX-DR-C-003102

Revision: P01

C:\Users\NCullen\Buro Happold Limited\MMU - MMU Library Project - WP Design\Revit\MMU_LIBRARY_CENTRAL_NCULLEN.rvt

Appendix F Proposed Manhole Schedules

F.1 Proposed Surface Water Manhole Schedule

Copyright © 1976 - 2025 Buro Happold. All rights reserved

MANHOLE SCHEDULE - PR SW Network

MANHOLE REF.	EASTING [m]	NORTHING [m]	COVER LEVEL [m]	INVERT LEVEL [m]	DEPTH TO INVERT [m]	MANHOLE TYPE	INNER DIAMETER [mm]	CLEAR OPENING DIMENSIONS [mm]	COVER TYPE	COVER GRADE	INCOMING PIPE INVERT LEVEL [m]	INCOMING PIPE DIAMETER [mm]	OUTGOING PIPE INNER DIAMETER [mm]	OUTGOING PIPE INVERT LEVEL [m]	COMMENTS
SW-MH-100	384280.781	397174.134	37.200	36.000	1.200	600 dia. Type D Manhole	600 DIA.	450	RE	C250	36.075	150 (RWP)	225	36.000	HEAD OF RUN.
SW-MH-101	384285.762	397165.360	37.170	35.850	1.320	1,350 dia. Type C Manhole	1350 DIA.	600	RE	C250	35.850 36.000	225 150	225	35.850	BACKDROPS PRESENT ON INCOMING PIPE. REFER TO 1350B-BHE-XX-XX-DR-C-003101 FOR DETAILS.
SW-MH-102	384252.354	397147.652	37.100	35.500	1.600	1,200 dia. Type B Manhole	1200 DIA.	600	RE	C250	35.575 36.300 36.000	225 150 (PP 1) 150 (DC)	300	35.500	BACKDROPS PRESENT ON INCOMING PIPE. REFER TO 1350B-BHE-XX-XX-DR-C-003101 FOR DETAILS.
SW-MH-103	384238.698	397141.242	37.150	35.300	1.850	1,200 dia. Type B Manhole	1200 DIA.	600	RE	C250	35.300 36.000 36.000	300 150 (DC) 150 (DC)	300	35.300	BACKDROPS PRESENT ON INCOMING PIPE. REFER TO 1350B-BHE-XX-XX-DR-C-003101 FOR DETAILS.
SW-MH-104	384229.637	397157.425	37.150	35.100	2.050	1,200 dia. Type B Manhole	1200 DIA.	600	RE	B125	35.100 36.059 36.562 36.200	300 150 (PP 2) 150 (PP 3) 150 (RWP)	300	35.100	BACKDROPS PRESENT ON INCOMING PIPE. REFER TO 1350B-BHE-XX-XX-DR-C-003101 FOR DETAILS.
SW-MH-105	384223.736	397168.845	37.150	34.950	2.200	1,200 dia. Type B Manhole	1200 DIA.	600	RE	B125	34.950 36.200	300 150 (RWP)	300	34.950	BACKDROPS PRESENT ON INCOMING PIPE. REFER TO 1350B-BHE-XX-XX-DR-C-003101 FOR DETAILS.
SW-MH-106	384209.159	397179.597	37.150	33.850	3.300	1,500 dia. Specialist Manhole	1500 DIA.	600	ST	D400	34.850 36.531 36.000	300 150 (PP 4) 150 (DC)	300	34.850	BACKDROPS PRESENT ON INCOMING PIPE. HYDRO INTERNATIONAL DOWNSTREAM DEFENDER UNIT OR EQUIVALENT APPROVED. REFER TO 1350B-BHE-XX-XX-DR-C-003101 FOR DETAILS.
SW-MH-107	384204.294	397176.921	37.000	34.800	2.200	1,500 dia. Type B Manhole	1500 DIA.	600	ST	D400	34.800	300	300	34.800	HYDROBRAKE FLOW CONTROL OR EQUIVALENT APPROVED. REFER TO 1350B-BHE-XX-XX-DR-C-003101 FOR DETAILS.
SW-MH-200	384255.676	397203.782	37.200	35.400	1.800	1,200 dia. Type B Manhole	1200 DIA.	600	ST	D400	35.550	150 (RWP)	300	35.400	HEAD OF RUN.
SW-MH-201	384233.754	397193.642	37.150	35.150	2.000	1,200 dia. Type B Manhole	1200 DIA.	600	ST	D400	35.150 36.000	300 150 (DC)	300	35.150	BACKDROPS PRESENT ON INCOMING PIPE. REFER TO 1350B-BHE-XX-XX-DR-C-003101 FOR DETAILS.
SW-MH-203	384212.527	397182.425	37.140	35.000	2.140	1,200 dia. Type B Manhole	1200 DIA.	600	ST	D400	35.000	300	300	35.000	
SW-MH-300	384215.385	397160.974	37.140	35.600	1.540	1,200 dia. Type B Manhole	1200 DIA.	600	RE	B125	36.600	150 (PP 5)	150	35.600	BACKDROPS PRESENT ON INCOMING PIPE. REFER TO 1350B-BHE-XX-XX-DR-C-003101 FOR DETAILS.

ST = SOLID TOP
RE = RECESSED
DC = DRAINAGE CHANNEL
PP = PERMEABLE PAVING
RWP = RAINWATER PIPE

© Buro Happold Limited or its group companies.
All Rights reserved. Buro Happold and its group companies assert (unless otherwise agreed in writing) their rights under s77 to 83 of the Copyright, Designs and Patents Act 1988.

DO NOT SCALE THIS DRAWING.

HEALTH AND SAFETY INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING

CONSTRUCTION:
- WORKS UNDER MANCUNIAN WAY ELEVATED CARRIAGEWAY AND IN CLOSE PROXIMITY TO FOUNDATIONS
- WORKS IN PROXIMITY TO LIVE SERVICES
- WORKS INTERFACE WITH THE PUBLIC ON OXFORD ROAD AND STUDENTS USING THE SURROUNDING FACILITIES DURING CONSTRUCTION

MAINTENANCE/CLEANING/OPERATION:
- WORKS IN PROXIMITY TO LIVE SERVICES
- WORKS INTERFACE WITH THE PUBLIC ON OXFORD ROAD AND STUDENTS USING THE SURROUNDING FACILITIES DURING CONSTRUCTION

DECOMMISSIONING/DEMOLITION:
- WORKS IN PROXIMITY TO LIVE SERVICES
- WORKS INTERFACE WITH THE PUBLIC ON OXFORD ROAD AND STUDENTS USING THE SURROUNDING FACILITIES DURING CONSTRUCTION

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS, DETAILS AND SPECIFICATIONS.
3. THE CONTRACTOR SHALL TAKE ALL NECESSARY SAFETY PRECAUTIONS IN LINE WITH CURRENT LEGISLATION WHEN WORKING IN/NEAR CONFINED SPACES, DEEP EXCAVATIONS AND UTILITIES.
4. WHERE INFILL MANHOLE COVERS ARE SPECIFIED THE LOCATION OF MANHOLES AND ORIENTATION OF THE COVERS SHALL BE COORDINATED ON SITE TO SUIT THE SURFACING MATERIAL AND PAVING ARRANGEMENT WHEREVER POSSIBLE.
5. REFER TO BHE DRAWING No. 1350B-BHE-XX-XX-DR-C-003101 FOR DRAINAGE GENERAL ARRANGEMENT AND DRAWING SERIES No.1350B-BHE-XX-XX-DR-C-003700 FOR TYPICAL DRAINAGE DETAILS.

Rev	Description	Date	Init	Rev'd	Appr'd
P01	ISSUED FOR INFORMATION	05.09.2023	NC	PA	MW

RIBA STAGE 3

Project Stage

INFORMATION

Status of Drawing

BURO HAPPOLD

2nd Floor, Eastgate
Castle Street
Manchester M3 4LZ
UK

Tel: +44 (0)161 233 5000
Fax: +44 (0)870 787 4143
Email: 000000@burohappold.com
Web: www.burohappold.com

Client: *MANCHESTER METROPOLITAN UNIVERSITY*
Architect: *HAWKINS BROWN*
Project: **MMU LIBRARY REDESIGN**
Drg Title: PROPOSED SURFACE WATER MANHOLE SCHEDULE

Job No.: 065290
Scale@A0: NTS
Drawn/Designed By: N. CULLEN
Checked By: P. ANWYL
Approved By: M. WESTWOOD
Drawing No.: 1350B-BHE-XX-XX-DR-C-003800
Revision: P01

Plotted: 05 Sep 2023 09:58:45 BST | Plot Driver: Bluebeam PDF | Plot Style: BHE_A1.ctb | Plot Scale: 1.000 | Plot Paper Size: ISO full bleed A1 (841.00 x 594.00 mm) | Plot Origin: 0.00, 0.00 | Plot Area: Layout | Plot Offset: 0.00, 0.00 | Plot Layout: Landscape | Plot Options: Plot with plot styles, Plot paperspace last, Hide paperspace objects | Plot Modified: 05 September 2023 09:58:45 | Plot By: Nicholas Cullen | Source File: C:\Users\NCullen\Buro Happold Limited\Projects - 065290 MMU Library Redesign - Documents\Design\Drainage\1350B-BHE-XX-XX-DR-C-003800.dwg

F.2 Proposed Foul Water Manhole Schedule

Copyright © 1976 - 2025 Buro Happold. All rights reserved

© Buro Happold Limited or its group companies.
All Rights reserved. Buro Happold and its group companies assert (unless otherwise agreed in writing) their rights under s.77 & 80 of the Copyright, Designs and Patents Act 1988.

DO NOT SCALE THIS DRAWING.

HEALTH AND SAFETY INFORMATION

IN ADDITION TO THE HAZARDS RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE KEY LOWING:

CONSTRUCTION:
- WORKS UNDER MANCUNIAN WAY ELEVATED CARRIAGEWAY AND IN CLOSE PROXIMITY TO FOUNDATIONS
- WORKS IN PROXIMITY TO LIVE SERVICES
- WORKS INTERFACE WITH THE PUBLIC ON OXFORD ROAD AND STUDENTS USING THE SURROUNDING FACILITIES DURING CONSTRUCTION

MAINTENANCE/CLEANING/OPERATION:
- WORKS IN PROXIMITY TO LIVE SERVICES
- WORKS INTERFACE WITH THE PUBLIC ON OXFORD ROAD AND STUDENTS USING THE SURROUNDING FACILITIES DURING CONSTRUCTION

DECOMMISSIONING/DEMOLITION:
- WORKS IN PROXIMITY TO LIVE SERVICES
- WORKS INTERFACE WITH THE PUBLIC ON OXFORD ROAD AND STUDENTS USING THE SURROUNDING FACILITIES DURING CONSTRUCTION

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS, DETAILS AND SPECIFICATIONS.
3. THE CONTRACTOR SHALL TAKE ALL NECESSARY SAFETY PRECAUTIONS IN LINE WITH CURRENT LEGISLATION WHEN WORKING IN/NEAR CONFINED SPACES, DEEP EXCAVATIONS AND UTILITIES.
4. WHERE INFILL MANHOLE COVERS ARE SPECIFIED THE LOCATION OF MANHOLES AND ORIENTATION OF THE COVERS SHALL BE COORDINATED ON SITE TO SUIT THE SURFACING MATERIAL AND PAVING ARRANGEMENT WHEREVER POSSIBLE.
5. REFER TO BHE DRAWING No. 1350B-BHE-XX-XX-DR-C-003101 FOR DRAINAGE GENERAL ARRANGEMENT AND DRAWING SERIES No. 1350B-BHE-XX-XX-DR-C-003700 FOR TYPICAL DRAINAGE DETAILS .

MANHOLE SCHEDULE - PR FW Network

MANHOLE REF.	EASTING [m]	NORTHING [m]	COVER LEVEL [m]	INVERT LEVEL [m]	DEPTH TO INVERT [m]	MANHOLE TYPE	INNER DIAMETER [mm]	CLEAR OPENING DIMENSIONS [mm]	COVER TYPE	COVER GRADE	INCOMING PIPE INVERT LEVEL [m]	INCOMING PIPE DIAMETER [mm]	OUTGOING PIPE INNER DIAMETER [mm]	OUTGOING PIPE INVERT LEVEL [m]	COMMENTS
FW-MH-100	384255.493	397200.318	37.206	36.000	1.206	1,350 dia. Type C Manhole	1350 DIA.	600	ST	D400	36.000 36.300	150 150	150	36.000	HEAD OF RUN. BACKDROP PRESENT ON INCOMING PIPE.
FW-MH-101	384250.668	397197.591	37.200	35.900	1.300	1,350 dia. Type C Manhole	1350 DIA.	600	ST	D400	35.900 35.900	150 150	150	35.900	
FW-MH-102	384237.996	397190.809	37.200	35.700	1.500	1,200 dia. Type B Manhole	1200 DIA.	600	ST	D400	35.700 35.700	150 150	150	35.700	
FW-MH-103	384227.515	397192.772	37.200	35.550	1.650	1,200 dia. Type B Manhole	1200 DIA.	600	ST	D400	35.550	150	150	35.550	
FW-MH-104	384203.919	397180.089	37.140	35.100	2.040	1,200 dia. Type B Manhole	1200 DIA.	600	ST	D400	35.100	150	150	35.100	
FW-MH-200	384262.587	397175.158	37.220	36.700	0.520	600 x 600 Type D Manhole	600 DIA.	450	RE	AAA	36.700	150	150	36.700	HEAD OF RUN. INTERNAL INSPECTION CHAMBER.
FW-MH-300	384237.538	397170.528	37.220	36.500	0.720	600 x 600 Type D Manhole	600 DIA.	450	RE	AAA	36.500 36.500 36.500 36.500	150 150 150 150	150	36.500	HEAD OF RUN. INTERNAL INSPECTION CHAMBER.
FW-MH-301	384236.025	397173.628	37.220	36.450	0.770	600 x 600 Type D Manhole	600 DIA.	450	RE	AAA	36.450 36.450	150 150	150	36.450	INTERNAL INSPECTION CHAMBER.
FW-MH-302	384244.125	397178.621	37.220	36.300	0.920	600 x 600 Type D Manhole	600 DIA.	450	RE	AAA	36.300 36.300 36.300	150 150 150	150	36.300	INTERNAL INSPECTION CHAMBER.
FW-MH-303	384241.372	397184.348	37.220	36.200	1.020	600 x 600 Type D Manhole	600 DIA.	450	RE	AAA	36.200 36.200	150 150	150	36.200	INTERNAL INSPECTION CHAMBER.

ST = SOLID TOP
RE = RECESSED

Rev	Description	Date	Init'd	Rev'd	Appr'd
P01	ISSUED FOR INFORMATION	05.09.2023	NC	PA	MW

RIBA STAGE 3

Project Stage

INFORMATION

Status of Drawing

BURO HAPPOLD

2nd Floor, Eastgate
Castle Street
Manchester M3 4LZ
UK

Tel: +44 (0)161 233 5000
Fax: +44 (0)870 787 4143
Email: 000000@burohappold.com
Web: www.burohappold.com

Client: MANCHESTER METROPOLITAN UNIVERSITY
Architect: HAWKINS BROWN
Project: **MMU LIBRARY REDESIGN**
Drg Title: PROPOSED FOUL WATER MANHOLE SCHEDULE

Job No.	Scale@A0
065290	NTS

Drawn/Checked By	Checked By	Approved By
N. CULLEN	P. ANWYL	M. WESTWOOD

Drawing No.	Revision
1350B-BHE-XX-XX-DR-C-003810	P01

Buro Happold Limited Registered in England No. 1927609 VAT Reg No GB 243 0243 51 Registered Office: 17 Newman Street London W1T 1PD

Appendix G Hydraulic Modelling Results

G.1 Surface Water Hydraulic Modelling Results

Copyright © 1976 - 2025 Buro Happold. All rights reserved

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Junctions Storm Phase: Surface Network	Company Address:		

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)
UU MH1102	Manhole	384173.433	397160.683	37.140	2.800	34.340	Circular	1.800
EX MH 13	Manhole	384190.357	397169.159	37.190	2.540	34.650	Circular	1.200
EX MH 15	Manhole	384197.215	397172.856	37.000	2.280	34.720	Rectangular	
S01	Manhole	384285.762	397165.360	37.170	1.320	35.850	Circular	1.200
S02	Manhole	384252.354	397147.652	37.100	1.600	35.500	Circular	1.200
S03	Manhole	384238.698	397141.242	37.150	1.850	35.300	Circular	1.200
S11	Manhole	384233.754	397193.642	37.150	2.000	35.150	Circular	1.200
S14 - FLOW CONTROL	Manhole	384204.195	397176.765	37.000	2.200	34.800	Circular	1.500
S04	Manhole	384229.608	397157.420	37.150	2.050	35.100	Circular	1.200
S12	Manhole	384212.206	397183.100	37.140	2.140	35.000	Circular	1.200
S05 (1)	Manhole	384223.736	397168.845	37.150	2.200	34.950	Circular	1.200
S13 - GRIT SEPARATOR	Manhole	384209.346	397179.463	37.150	2.300	34.850	Circular	1.500
S07 (1)	Manhole	384280.804	397174.092	37.200	1.200	36.000	Circular	0.600
S08	Manhole	384255.676	397203.782	37.200	1.800	35.400	Circular	1.200
RWP1	Manhole	384228.540	397172.871	37.220	0.550	36.670	Circular	0.150
S06 (1)	Manhole	384215.385	397160.974	37.140	1.540	35.600	Circular	1.200
RWP4	Manhole	384269.517	397178.183	37.220	0.500	36.720	Circular	0.200
RWP3	Manhole	384262.650	397191.070	37.220	0.550	36.670	Circular	0.150
RWP2	Manhole	384235.461	397160.076	37.220	0.550	36.670	Circular	0.150
Simple Junction	Simple Junction	384292.408	397157.021					
Simple Junction (1)	Simple Junction	384240.650	397134.247					
Simple Junction (2)	Simple Junction	384251.129	397154.322					
Simple Junction (3)	Simple Junction	384229.007	397130.077					
Simple Junction (4)	Simple Junction	384213.359	397178.909					

Name	Diameter (m)	Width (m)	Lock
UU MH1102			None
EX MH 13			None
EX MH 15	1.400	1.000	None
S01			None
S02			None
S03			None
S11			None
S14 - FLOW CONTROL			None
S04			None
S12			None
S05 (1)			None
S13 - GRIT SEPARATOR			None
S07 (1)			None
S08			None
RWP1			None
S06 (1)			None
RWP4			None
RWP3			None
RWP2			None
Simple Junction			
Simple Junction (1)			
Simple Junction (2)			
Simple Junction (3)			
Simple Junction (4)			

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Junctions Storm Phase: Surface Network	Company Address:		

Inlets

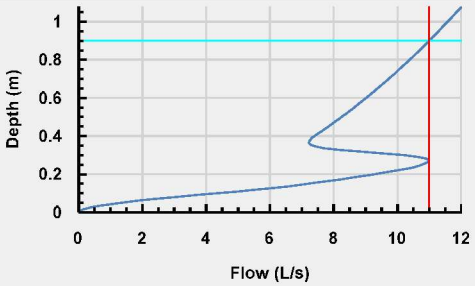
Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
UU MH1102	Inlet (1)	C1.001 (EX)	(None)	No Restriction
EX MH 13	Inlet	C1.000 (EX)	(None)	No Restriction
EX MH 15	Inlet	S1.007	(None)	No Restriction
S01	Inlet	Pipe (1)	(None)	No Restriction
	Inlet (1)	Catchment Area (6) Pipe (6)	(None)	No Restriction
S02	Inlet	S1.000 S2.000	(None)	No Restriction
	Inlet (1)	Pipe (8)	(None)	No Restriction
S03	Inlet	S1.001 Pipe (9)	(None)	No Restriction
	Inlet (1)	Catchment Area (9) Pipe (7)	(None)	No Restriction
S11	Inlet	Pipe (3)	(None)	No Restriction
	Inlet (1)	Catchment Area (16)	(None)	No Restriction
S14 - FLOW CONTROL	Inlet	S1.006 Catchment Area (25)	(None)	No Restriction
	Inlet (1)	Catchment Area (23)	(None)	No Restriction
S04	Inlet	S1.002 Pipe (5)	(None)	No Restriction
	Inlet (1)	Catchment Area (3) S4.000	(None)	No Restriction
	Inlet (2)	S3.000	(None)	No Restriction
S12	Inlet	S6.004	(None)	No Restriction
	Inlet (1)	Catchment Area (17)	(None)	No Restriction
	Inlet (2)	Catchment Area (18)	(None)	No Restriction
S05 (1)	Inlet	Catchment Area (1) Pipe (4)	(None)	No Restriction
	Inlet (1)	S1.003	(None)	No Restriction
S13 - GRIT SEPARATOR	Inlet	Pipe (10)	(None)	No Restriction
	Inlet (1)	S1.005 S7.000	(None)	No Restriction
S07 (1)	Inlet	Pipe	(None)	No Restriction
	Inlet (1)	Catchment Area (2) Catchment Area (4)	(None)	No Restriction
S08	Inlet	Catchment Area Pipe (2)	(None)	No Restriction
	Inlet (1)	Catchment Area (5) Catchment Area (15)	(None)	No Restriction
S06 (1)	Inlet	S5.000	(None)	No Restriction

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Junctions Storm Phase: Surface Network	Company Address:		

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
EX MH 13	Outlet	C1.001 (EX)	Free Discharge
EX MH 15	Outlet	C1.000 (EX)	Free Discharge
S01	Outlet	S1.000	Free Discharge
S02	Outlet	S1.001	Free Discharge
S03	Outlet	S1.002	Free Discharge
S11	Outlet	S6.004	Free Discharge
S14 - FLOW CONTROL	Outlet	S1.007	Hydro-Brake®

Invert Level (m)	34.800
Design Depth (m)	0.900
Design Flow (L/s)	11.0
Objective	Minimise Upstream Storage Requirements
Application	Surface Water Only
Sump Available	☐
Unit Reference	CHE-0146-1100-0900-1100



Junction	Outlet Name	Outgoing Connection	Outlet Type
S04	Outlet	S1.003	Free Discharge
S12	Outlet	S6.005	Free Discharge
S05 (1)	Outlet	S1.004	Free Discharge
S13 - GRIT SEPARATOR	Outlet	S1.006	Free Discharge
S07 (1)	Outlet	Pipe (1)	Free Discharge
S08	Outlet	Pipe (3)	Free Discharge
RWP1	Outlet	Pipe (4)	Free Discharge
S06 (1)	Outlet	S5.001	Free Discharge
RWP4	Outlet	Pipe	Free Discharge
RWP3	Outlet	Pipe (2)	Free Discharge
RWP2	Outlet	Pipe (5)	Free Discharge
Simple Junction	Outlet	Pipe (6)	Free Discharge
Simple Junction (1)	Outlet	Pipe (7)	Free Discharge
Simple Junction (2)	Outlet	Pipe (8)	Free Discharge
Simple Junction (3)	Outlet	Pipe (9)	Free Discharge
Simple Junction (4)	Outlet	Pipe (10)	Free Discharge

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Surface Network	Company Address:		



PP4

Type : Porous Paving

Dimensions

Exceedance Level (m)	37.140
Depth (m)	0.310
Base Level (m)	36.830
Paving Layer Depth (mm)	150
Membrane Percolation (m/hr)	2.0
Porosity (%)	30
Length (m)	14.079
Long. Slope (1:X)	500.00
Width (m)	3.853
Total Volume (m³)	2.775

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Colebrook-White Roughness
Roughness (mm)	0.6

Inlets

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Catchment Area (12) Catchment Area (19)
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (2)

Inlet Type	Point Inflow
Incoming Item(s)	Catchment Area (22)
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	S7.000
Outlet Type	Under Drain

Advanced

Conductivity (m/hr)	250.0

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Surface Network	Company Address:		



PP3

Type : Porous Paving

Dimensions

Exceedance Level (m)	37.140
Depth (m)	0.310
Base Level (m)	36.830
Paving Layer Depth (mm)	150
Membrane Percolation (m/hr)	2.0
Porosity (%)	30
Length (m)	11.982
Long. Slope (1:X)	500.00
Width (m)	5.508
Total Volume (m³)	3.315

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Colebrook-White Roughness
Roughness (mm)	0.6

Inlets

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Catchment Area (11)
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (2)

Inlet Type	Point Inflow
Incoming Item(s)	Catchment Area (20)
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (3)

Inlet Type	Point Inflow
Incoming Item(s)	Catchment Area (14)
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	S4.000
Outlet Type	Under Drain

Advanced

Conductivity (m/hr)	250.0

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Surface Network	Company Address:		



PP2

Type : Porous Paving

Dimensions

Exceedance Level (m)	37.140
Depth (m)	0.310
Base Level (m)	36.830
Paving Layer Depth (mm)	150
Membrane Percolation (m/hr)	1.0
Porosity (%)	30
Length (m)	10.199
Long. Slope (1:X)	500.00
Width (m)	6.600
Total Volume (m³)	3.356

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Colebrook-White Roughness
Roughness (mm)	0.6

Inlets

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Catchment Area (21) Catchment Area (10)
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (2)

Inlet Type	Point Inflow
Incoming Item(s)	Catchment Area (13)
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	S3.000
Outlet Type	Under Drain

Advanced

Conductivity (m/hr)	250.0

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Surface Network	Company Address:		



PP5

Type : Porous Paving

Dimensions

Exceedance Level (m)	37.140
Depth (m)	0.400
Base Level (m)	36.740
Paving Layer Depth (mm)	150
Membrane Percolation (m/hr)	2.0
Porosity (%)	30
Length (m)	8.414
Long. Slope (1:X)	500.00
Width (m)	3.950
Total Volume (m³)	2.597

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Colebrook-White Roughness
Roughness (mm)	0.6

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Catchment Area (24)
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	S5.000
Outlet Type	Under Drain

Advanced

Conductivity (m/hr)	250.0

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Surface Network	Company Address:		



PP1

Type : Porous Paving

Dimensions

Exceedance Level (m)	37.100
Depth (m)	0.450
Base Level (m)	36.650
Paving Layer Depth (mm)	150
Membrane Percolation (m/hr)	2.0
Porosity (%)	30
Length (m)	31.115
Long. Slope (1:X)	200.00
Width (m)	3.960
Total Volume (m³)	11.475

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Colebrook-White Roughness
Roughness (mm)	0.6

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Catchment Area (7)
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Catchment Area (8)
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	S2.000
Outlet Type	Under Drain

Advanced

Conductivity (m/hr)	250.0

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Surface Network	Company Address:		



TANK

Type : Cellular Storage

Dimensions

Exceedance Level (m)	37.140
Depth (m)	0.800
Base Level (m)	34.900
Number of Crates Long	70
Number of Crates Wide	15
Number of Crates High	2
Porosity (%)	95
Crate Length (m)	0.5
Crate Width (m)	0.5
Crate Height (m)	0.4
Total Volume (m³)	200.940

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	S1.004
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	S6.005
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (2)

Inlet Type	Point Inflow
Incoming Item(s)	S5.001
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	S1.005
Outlet Type	Free Discharge

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Connections Storm Phase: Surface Network	Company Address:		

Name	Length (m)	Connection Type	Slope (1:X)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)	Upstream Cover Level (m)	Upstream Invert Level (m)
C1.000 (EX)	7.791	Pipe	111.299		0.6	300	37.000	34.720
C1.001 (EX)	18.928	Pipe	61.059		0.6	300	37.190	34.650
Pipe (3)	24.154	Pipe	96.614		0.6	300	37.200	35.400
S1.007	8.001	Pipe	100.007		0.6	300	37.000	34.800
S1.000	37.811	Pipe	137.494		0.6	225	37.170	35.850
S1.001	15.086	Pipe	75.430		0.6	300	37.100	35.500
S1.002	18.557	Pipe	92.786		0.6	300	37.150	35.300
S6.004	23.989	Pipe	159.927		0.6	300	37.150	35.150
S2.000	6.106	Pipe	15.000		0.6	150	37.256	36.650
S1.006	5.814	Pipe	116.287		0.6	300	37.150	34.850
S1.004	5.637	Pipe	112.749		0.6	300	37.150	34.950
S1.005	12.000	Pipe	239.991		0.6	300	37.140	34.900
S1.003	12.846	Pipe	85.639		0.6	300	37.150	35.100
S3.000	10.960	Pipe	14.221		0.6	150	37.160	36.830
S4.000	5.095	Pipe	19.022		0.6	150	37.164	36.830
S6.005	12.285	Pipe	122.851		0.6	300	37.140	35.000
Pipe	12.006	Pipe	18.614		0.6	150	37.220	36.720
Pipe (4)	6.268	Pipe	13.336		0.6	150	37.220	36.670
S7.000	6.124	Pipe	20.495		0.6	150	37.168	36.830
S5.000	5.205	Pipe	37.177		0.6	150	37.157	36.740
S5.001	5.041	Pipe	50.409		0.6	150	37.140	35.600
Pipe (1)	10.041	Pipe	66.940		0.6	225	37.200	36.000
Pipe (2)	14.500	Pipe	12.946		0.6	150	37.220	36.670
Pipe (5)	6.428	Pipe	13.676		0.6	150	37.220	36.670
Pipe (6)	10.664	Pipe	20.910		0.6	150	37.110	36.360
Pipe (7)	7.262	Pipe	30.900		0.6	150	36.985	36.235
Pipe (8)	6.782	Pipe	17.390		0.6	150	37.140	36.390
Pipe (9)	14.784	Pipe	36.959		0.6	150	37.150	36.400
Pipe (10)	4.051	Pipe	10.127		0.6	150	0.100	36.400

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Connections Storm Phase: Surface Network	Company Address:		

Name	Downstream Cover Level (m)	Downstream Invert Level (m)	Part Family	Lock	Flow Restriction (L/s)	Velocity (m/s)	Culvert Type	Culvert Entrance
C1.000 (EX)	37.190	34.650		None			(None)	(None)
C1.001 (EX)	37.140	34.340		All			(None)	(None)
Pipe (3)	37.150	35.150		None			(None)	(None)
S1.007	37.000	34.720		None	12.03		(None)	(None)
S1.000	37.100	35.575		None			(None)	(None)
S1.001	37.150	35.300		None			(None)	(None)
S1.002	37.150	35.100		None			(None)	(None)
S6.004	37.140	35.000		None			(None)	(None)
S2.000	37.100	36.243		Levels	0.00		(None)	(None)
S1.006	37.000	34.800		Levels			(None)	(None)
S1.004	37.140	34.900		None			(None)	(None)
S1.005	37.150	34.850		None			(None)	(None)
S1.003	37.150	34.950		None			(None)	(None)
S3.000	37.150	36.059		Levels	0.00		(None)	(None)
S4.000	37.150	36.562		Levels	0.00		(None)	(None)
S6.005	37.140	34.900		None			(None)	(None)
Pipe	37.200	36.075		Levels			(None)	(None)
Pipe (4)	37.150	36.200		Levels			(None)	(None)
S7.000	37.150	36.531		Levels	0.00		(None)	(None)
S5.000	37.140	36.600		Levels	0.00		(None)	(None)
S5.001	37.140	35.500		Levels			(None)	(None)
Pipe (1)	37.170	35.850		None			(None)	(None)
Pipe (2)	37.200	35.550		None			(None)	(None)
Pipe (5)	37.150	36.200		Levels			(None)	(None)
Pipe (6)	37.170	35.850		None			(None)	(None)
Pipe (7)	37.150	36.000		None			(None)	(None)
Pipe (8)	37.100	36.000		None			(None)	(None)
Pipe (9)	37.150	36.000		None			(None)	(None)
Pipe (10)	37.150	36.000		None			(None)	(None)

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Connections Storm Phase: Surface Network	Company Address:		

Name	Wall Thickness (mm)	Material	Trench Width (mm)	Bedding Material	Surrounding Material
C1.000 (EX)	0		0		
C1.001 (EX)	0		0		
Pipe (3)	0		0		
S1.007	0		0		
S1.000	0		0		
S1.001	0		0		
S1.002	0		0		
S6.004	0		0		
S2.000	0		0		
S1.006	0		0		
S1.004	0		0		
S1.005	0		0		
S1.003	0		0		
S3.000	0		0		
S4.000	0		0		
S6.005	0		0		
Pipe	0		0		
Pipe (4)	0		0		
S7.000	0		0		
S5.000	0		0		
S5.001	0		0		
Pipe (1)	0		0		
Pipe (2)	0		0		
Pipe (5)	0		0		
Pipe (6)	0		0		
Pipe (7)	0		0		
Pipe (8)	0		0		
Pipe (9)	0		0		
Pipe (10)	0		0		

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Inflow Summary Storm Phase: Surface Network	Company Address:		

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Catchment Area	S08		Time of Concentration	0.036	100	0	100	0.036
Catchment Area (1)	S05 (1)		Time of Concentration	0.036	100	0	100	0.036
Catchment Area (2)	S07 (1)		Time of Concentration	0.054	100	0	100	0.054
Catchment Area (3)	S04		Time of Concentration	0.054	100	0	100	0.054
Catchment Area (4)	S07 (1)		Time of Concentration	0.014	100	0	100	0.014
Catchment Area (5)	S08		Time of Concentration	0.033	100	0	100	0.033
Catchment Area (6)	S01		Time of Concentration	0.015	100	0	100	0.015
Catchment Area (7)	PP1		Time of Concentration	0.021	100	0	100	0.021
Catchment Area (8)	PP1		Time of Concentration	0.027	100	0	100	0.027
Catchment Area (9)	S03		Time of Concentration	0.037	100	0	100	0.037
Catchment Area (10)	PP2		Time of Concentration	0.007	100	0	100	0.007
Catchment Area (11)	PP3		Time of Concentration	0.007	100	0	100	0.007
Catchment Area (12)	PP4		Time of Concentration	0.005	100	0	100	0.005
Catchment Area (13)	PP2		Time of Concentration	0.005	100	0	100	0.005
Catchment Area (14)	PP3		Time of Concentration	0.006	100	0	100	0.006
Catchment Area (15)	S08		Time of Concentration	0.022	100	0	100	0.022
Catchment Area (16)	S11		Time of Concentration	0.018	100	0	100	0.018
Catchment Area (17)	S12		Time of Concentration	0.017	100	0	100	0.017
Catchment Area (18)	S12		Time of Concentration	0.015	100	0	100	0.015
Catchment Area (19)	PP4		Time of Concentration	0.006	100	0	100	0.006
Catchment Area (20)	PP3		Time of Concentration	0.006	100	0	100	0.006
Catchment Area (21)	PP2		Time of Concentration	0.005	100	0	100	0.005
Catchment Area (22)	PP4		Time of Concentration	0.006	100	0	100	0.006
Catchment Area (23)	S14 - FLOW CONTROL		Time of Concentration	0.007	100	0	100	0.007
Catchment Area (24)	PP5		Time of Concentration	0.003	100	0	100	0.003
Catchment Area (25)	S14 - FLOW CONTROL		Time of Concentration	0.012	100	0	100	0.012
TOTAL		**0.0**		**0.476**				**0.476**

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Network Design Criteria Storm Phase: Surface Network	Company Address:		

Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

Pipe Options

Lock Slope Options	None
Design Options	Minimise Excavation
Design Level	Level Soffits
Min. Cover Depth (m)	1.200
Min. Slope (1:X)	500.00
Max. Slope (1:X)	40.00
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	☐
Reduce Channel Depths	☐

Manhole Options

Apply Offset	☐

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Outfall Details Storm Phase: Surface Network	Company Address:		

Outfalls

Outfall	Outfall Type	Gated	Fixed Surcharged Level (m)	Level Curve
UU MH1102	Free Discharge			

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Title: Rainfall Analysis Criteria	Company Address:		

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall

FEH Descriptors

Type: FEH

Site Location	GB 384232 397154 SJ 84232 97154
Rainfall Version	2022
Summer	☑
Winter	☑

Return Period

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

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
180	360
240	480
360	720
480	960
600	1200
720	1440
960	1920
1440	2880
2160	4320
2880	5760
4320	8640
5760	11520
7200	14400
8640	17280
10080	20160

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Surface Network	Company Address:		

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

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
Catchment Area	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.04	5.5	2.568
Catchment Area (1)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.04	5.6	2.571
Catchment Area (2)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.05	8.2	3.797
Catchment Area (3)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.05	8.2	3.791
Catchment Area (4)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.01	2.1	0.992
Catchment Area (5)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.03	5.1	2.335
Catchment Area (6)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.02	2.3	1.082
Catchment Area (7)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.02	3.3	1.510
Catchment Area (8)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.03	4.2	1.921
Catchment Area (9)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.04	5.7	2.640
Catchment Area (10)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.01	1.0	0.477
Catchment Area (11)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.01	1.0	0.465

Catchment Area (12)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.01	0.8	0.381
Catchment Area (19)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.01	0.9	0.405
Catchment Area (20)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.01	0.9	0.399
Catchment Area (21)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.00	0.8	0.348
Catchment Area (13)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.01	0.8	0.366
Catchment Area (14)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.01	0.9	0.414
Catchment Area (22)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.01	0.9	0.432
Catchment Area (15)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.02	3.4	1.573
Catchment Area (17)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.02	2.6	1.211
Catchment Area (18)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.02	2.3	1.082
Catchment Area (23)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.01	1.1	0.527
Catchment Area (16)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.02	2.7	1.265
Catchment Area (24)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.00	0.5	0.237
Catchment Area (25)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	0.01	1.8	0.821

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Surface Network	Company Address:		

FEH Descriptors: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
Catchment Area	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.04	12.1	5.618
Catchment Area (1)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.04	12.2	5.621
Catchment Area (2)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.05	17.9	8.295
Catchment Area (3)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.05	17.9	8.292
Catchment Area (4)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.01	4.7	2.173
Catchment Area (5)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.03	11.0	5.105
Catchment Area (6)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.02	5.1	2.362
Catchment Area (7)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.02	7.2	3.310
Catchment Area (8)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.03	9.1	4.200
Catchment Area (9)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.04	12.5	5.774
Catchment Area (10)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.01	2.2	1.040
Catchment Area (11)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.01	2.2	1.022

Catchment Area (12)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.01	1.8	0.839
Catchment Area (19)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.01	1.9	0.878
Catchment Area (20)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.01	1.9	0.875
Catchment Area (21)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.00	1.7	0.767
Catchment Area (13)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.01	1.7	0.803
Catchment Area (14)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.01	2.0	0.905
Catchment Area (22)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.01	2.1	0.947
Catchment Area (15)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.02	7.4	3.442
Catchment Area (17)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.02	5.7	2.638
Catchment Area (18)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.02	5.1	2.368
Catchment Area (23)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.01	2.5	1.151
Catchment Area (16)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.02	6.0	2.761
Catchment Area (24)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.00	1.1	0.513
Catchment Area (25)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	0.01	3.9	1.796

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Surface Network	Company Address:		

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

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
Catchment Area	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.04	22.4	10.349
Catchment Area (1)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.04	22.4	10.367
Catchment Area (2)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.05	33.1	15.291
Catchment Area (3)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.05	33.0	15.282
Catchment Area (4)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.01	8.6	3.998
Catchment Area (5)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.03	20.3	9.411
Catchment Area (6)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.02	9.4	4.354
Catchment Area (7)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.02	13.2	6.100
Catchment Area (8)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.03	16.7	7.743
Catchment Area (9)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.04	23.0	10.643
Catchment Area (10)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.01	4.1	1.916
Catchment Area (11)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.01	4.1	1.880

Catchment Area (12)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.01	3.3	1.544
Catchment Area (19)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.01	3.5	1.625
Catchment Area (20)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.01	3.5	1.613
Catchment Area (21)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.00	3.0	1.406
Catchment Area (13)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.01	3.2	1.475
Catchment Area (14)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.01	3.6	1.667
Catchment Area (22)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.01	3.8	1.748
Catchment Area (15)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.02	13.7	6.340
Catchment Area (17)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.02	10.5	4.864
Catchment Area (18)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.02	9.5	4.372
Catchment Area (23)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.01	4.6	2.126
Catchment Area (16)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.02	11.0	5.089
Catchment Area (24)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.00	2.0	0.945
Catchment Area (25)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	0.01	7.2	3.311

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Surface Network	Company Address:		

FEH Descriptors: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
Catchment Area	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.04	15.4	7.137
Catchment Area (1)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.04	15.4	7.143
Catchment Area (2)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.05	22.8	10.539
Catchment Area (3)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.05	22.8	10.533
Catchment Area (4)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.01	6.0	2.758
Catchment Area (5)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.03	14.0	6.490
Catchment Area (6)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.02	6.5	3.001
Catchment Area (7)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.02	9.1	4.203
Catchment Area (8)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.03	11.5	5.339
Catchment Area (9)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.04	15.9	7.335
Catchment Area (10)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.01	2.9	1.319
Catchment Area (11)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.01	2.8	1.298

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Surface Network	Company Address:		

Catchment Area (12)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.01	2.3	1.064
Catchment Area (19)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.01	2.4	1.118
Catchment Area (20)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.01	2.4	1.112
Catchment Area (21)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.00	2.1	0.971
Catchment Area (13)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.01	2.2	1.016
Catchment Area (14)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.01	2.5	1.151
Catchment Area (22)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.01	2.6	1.205
Catchment Area (15)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.02	9.5	4.370
Catchment Area (17)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.02	7.2	3.354
Catchment Area (18)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.02	6.5	3.015
Catchment Area (23)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.01	3.2	1.469
Catchment Area (16)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.02	7.6	3.510
Catchment Area (24)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.00	1.4	0.650
Catchment Area (25)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	0.01	4.9	2.281

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Surface Network	Company Address:		

FEH Descriptors: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
UU MH1102	FEH Descriptors: 2 years: +0 %: 120 mins: Winter	37.140	34.340	34.391	0.051	8.9	0.000	0.000	8.9	65.901	OK
EX MH 13	FEH Descriptors: 2 years: +0 %: 120 mins: Winter	37.190	34.650	34.702	0.052	8.9	0.059	0.000	8.9	65.901	OK
EX MH 15	FEH Descriptors: 2 years: +0 %: 120 mins: Winter	37.000	34.720	34.782	0.062	8.9	0.087	0.000	8.9	65.942	OK
S01	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	37.170	35.850	35.930	0.080	12.6	0.090	0.000	11.2	5.849	OK
S02	FEH Descriptors: 2 years: +0 %: 30 mins: Winter	37.100	35.500	35.563	0.063	11.9	0.071	0.000	11.8	11.808	OK
S03	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	37.150	35.300	35.378	0.078	16.6	0.088	0.000	15.9	11.260	OK
S11	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	37.150	35.150	35.239	0.089	16.3	0.101	0.000	15.3	7.726	OK
S14 - FLOW CONTROL	FEH Descriptors: 2 years: +0 %: 120 mins: Winter	37.000	34.800	35.052	0.252	8.9	0.445	0.000	8.9	66.009	OK
S04	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	37.150	35.100	35.198	0.098	24.3	0.110	0.000	23.3	16.936	OK
S12	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	37.140	35.000	35.096	0.096	20.3	0.108	0.000	19.5	10.029	OK
S05 (1)	FEH Descriptors: 2 years: +0 %: 30 mins: Winter	37.150	34.950	35.059	0.109	26.6	0.123	0.000	26.3	26.339	OK
S13 - GRIT SEPARATOR	FEH Descriptors: 2 years: +0 %: 120 mins: Winter	37.150	34.850	35.053	0.203	8.6	0.359	0.000	8.6	63.239	OK
S07 (1)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	37.200	36.000	36.065	0.065	10.3	0.018	0.000	10.2	4.788	OK
S08	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	37.200	35.400	35.471	0.071	14.0	0.081	0.000	13.6	6.478	OK
RWP1	FEH Descriptors: 2 years: +0 %: 15 mins: Summer	37.220	36.670	36.670	0.000	0.0	0.000	0.000	0.0	0.000	OK
S06 (1)	FEH Descriptors: 2 years: +0 %: 30 mins: Winter	37.140	35.600	35.611	0.011	0.2	0.012	0.000	0.2	0.271	OK
RWP4	FEH Descriptors: 2 years: +0 %: 15 mins: Summer	37.220	36.720	36.720	0.000	0.0	0.000	0.000	0.0	0.000	OK
RWP3	FEH Descriptors: 2 years: +0 %: 15 mins: Summer	37.220	36.670	36.670	0.000	0.0	0.000	0.000	0.0	0.000	OK
RWP2	FEH Descriptors: 2 years: +0 %: 15 mins: Summer	37.220	36.670	36.670	0.000	0.0	0.000	0.000	0.0	0.000	OK
Simple Junction	FEH Descriptors: 2 years: +0 %: 15 mins: Summer		36.360	36.360	0.000	0.0			0.0	0.000	OK

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Surface Network	Company Address:		

Simple Junction (1)	FEH Descriptors: 2 years: +0 %: 15 mins: Summer	36.235	36.235	0.000	0.0	0.0	0.000	OK
Simple Junction (2)	FEH Descriptors: 2 years: +0 %: 15 mins: Summer	36.390	36.390	0.000	0.0	0.0	0.000	OK
Simple Junction (3)	FEH Descriptors: 2 years: +0 %: 15 mins: Summer	36.400	36.400	0.000	0.0	0.0	0.000	OK
Simple Junction (4)	FEH Descriptors: 2 years: +0 %: 15 mins: Summer	36.400	36.400	0.000	0.0	0.0	0.000	OK

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Surface Network	Company Address:		

FEH Descriptors: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
UU MH1102	FEH Descriptors: 30 years: +0 %: 480 mins: Winter	37.140	34.340	34.396	0.056	11.0	0.000	0.000	11.0	205.222	OK
EX MH 13	FEH Descriptors: 30 years: +0 %: 480 mins: Winter	37.190	34.650	34.708	0.058	11.0	0.065	0.000	11.0	205.222	OK
EX MH 15	FEH Descriptors: 30 years: +0 %: 120 mins: Winter	37.000	34.720	34.789	0.069	11.0	0.097	0.000	11.0	102.920	OK
S01	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	37.170	35.850	35.977	0.127	27.4	0.144	0.000	24.9	12.805	OK
S02	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	37.100	35.500	35.601	0.101	27.8	0.115	0.000	26.9	19.634	OK
S03	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	37.150	35.300	35.431	0.131	39.3	0.148	0.000	37.4	25.352	OK
S11	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	37.150	35.150	35.290	0.140	35.8	0.159	0.000	34.0	16.932	OK
S14 - FLOW CONTROL	FEH Descriptors: 30 years: +0 %: 120 mins: Winter	37.000	34.800	35.283	0.483	11.1	0.854	0.000	11.0	103.168	Surcharged
S04	FEH Descriptors: 30 years: +0 %: 120 mins: Winter	37.150	35.100	35.285	0.185	26.7	0.210	0.000	26.9	79.011	OK
S12	FEH Descriptors: 30 years: +0 %: 120 mins: Winter	37.140	35.000	35.285	0.285	14.9	0.322	0.000	14.1	43.382	OK
S05 (1)	FEH Descriptors: 30 years: +0 %: 120 mins: Winter	37.150	34.950	35.285	0.335	30.7	0.379	0.000	30.2	89.846	Surcharged
S13 - GRIT SEPARATOR	FEH Descriptors: 30 years: +0 %: 120 mins: Winter	37.150	34.850	35.284	0.434	10.8	0.767	0.000	10.9	97.959	Surcharged
S07 (1)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	37.200	36.000	36.104	0.104	22.6	0.029	0.000	22.3	10.468	OK
S08	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	37.200	35.400	35.511	0.111	30.6	0.126	0.000	29.8	14.168	OK
RWP1	FEH Descriptors: 30 years: +0 %: 15 mins: Summer	37.220	36.670	36.670	0.000	0.0	0.000	0.000	0.0	0.000	OK
S06 (1)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	37.140	35.600	35.618	0.018	0.7	0.020	0.000	0.7	0.430	OK
RWP4	FEH Descriptors: 30 years: +0 %: 15 mins: Summer	37.220	36.720	36.720	0.000	0.0	0.000	0.000	0.0	0.000	OK
RWP3	FEH Descriptors: 30 years: +0 %: 15 mins: Summer	37.220	36.670	36.670	0.000	0.0	0.000	0.000	0.0	0.000	OK
RWP2	FEH Descriptors: 30 years: +0 %: 15 mins: Summer	37.220	36.670	36.670	0.000	0.0	0.000	0.000	0.0	0.000	OK
Simple Junction	FEH Descriptors: 30 years: +0 %: 15 mins: Summer		36.360	36.360	0.000	0.0			0.0	0.000	OK

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Surface Network	Company Address:		

Simple Junction (1)	FEH Descriptors: 30 years: +0 %: 15 mins: Summer	36.235	36.235	0.000	0.0	0.0	0.000	OK
Simple Junction (2)	FEH Descriptors: 30 years: +0 %: 15 mins: Summer	36.390	36.390	0.000	0.0	0.0	0.000	OK
Simple Junction (3)	FEH Descriptors: 30 years: +0 %: 15 mins: Summer	36.400	36.400	0.000	0.0	0.0	0.000	OK
Simple Junction (4)	FEH Descriptors: 30 years: +0 %: 15 mins: Summer	36.400	36.400	0.000	0.0	0.0	0.000	OK

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Surface Network	Company Address:		

FEH Descriptors: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
UU MH1102	FEH Descriptors: 100 years: +45 %: 1440 mins: Winter	37.140	34.340	34.396	0.056	11.0	0.000	0.000	11.0	525.619	OK
EX MH 13	FEH Descriptors: 100 years: +45 %: 1440 mins: Winter	37.190	34.650	34.708	0.058	11.0	0.065	0.000	11.0	525.619	OK
EX MH 15	FEH Descriptors: 100 years: +45 %: 1440 mins: Winter	37.000	34.720	34.789	0.069	11.0	0.097	0.000	11.0	525.621	OK
S01	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	37.170	35.850	36.061	0.211	50.5	0.238	0.000	44.7	23.611	OK
S02	FEH Descriptors: 100 years: +45 %: 180 mins: Winter	37.100	35.500	35.691	0.191	18.8	0.216	0.000	18.8	81.653	OK
S03	FEH Descriptors: 100 years: +45 %: 180 mins: Winter	37.150	35.300	35.691	0.391	24.1	0.442	0.000	23.5	104.766	Surcharged
S11	FEH Descriptors: 100 years: +45 %: 180 mins: Winter	37.150	35.150	35.690	0.540	15.7	0.610	0.000	14.1	66.780	Surcharged
S14 - FLOW CONTROL	FEH Descriptors: 100 years: +45 %: 180 mins: Winter	37.000	34.800	35.687	0.887	11.0	1.567	0.000	10.7	180.683	Surcharged
S04	FEH Descriptors: 100 years: +45 %: 180 mins: Winter	37.150	35.100	35.690	0.590	35.9	0.668	0.000	34.7	158.526	Surcharged
S12	FEH Descriptors: 100 years: +45 %: 180 mins: Winter	37.140	35.000	35.689	0.689	18.8	0.780	0.000	18.2	85.195	Surcharged
S05 (1)	FEH Descriptors: 100 years: +45 %: 180 mins: Winter	37.150	34.950	35.690	0.740	39.9	0.837	0.000	39.6	179.980	Surcharged
S13 - GRIT SEPARATOR	FEH Descriptors: 100 years: +45 %: 180 mins: Winter	37.150	34.850	35.688	0.838	10.3	1.480	0.000	10.4	169.979	Surcharged
S07 (1)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	37.200	36.000	36.162	0.162	41.7	0.046	0.000	41.0	19.285	OK
S08	FEH Descriptors: 100 years: +45 %: 180 mins: Winter	37.200	35.400	35.690	0.290	13.1	0.328	0.000	13.1	56.927	OK
RWP1	FEH Descriptors: 100 years: +45 %: 15 mins: Summer	37.220	36.670	36.670	0.000	0.0	0.000	0.000	0.0	0.000	OK
S06 (1)	FEH Descriptors: 100 years: +45 %: 180 mins: Winter	37.140	35.600	35.689	0.089	0.5	0.101	0.000	0.5	2.043	OK
RWP4	FEH Descriptors: 100 years: +45 %: 15 mins: Summer	37.220	36.720	36.720	0.000	0.0	0.000	0.000	0.0	0.000	OK
RWP3	FEH Descriptors: 100 years: +45 %: 15 mins: Summer	37.220	36.670	36.670	0.000	0.0	0.000	0.000	0.0	0.000	OK
RWP2	FEH Descriptors: 100 years: +45 %: 15 mins: Summer	37.220	36.670	36.670	0.000	0.0	0.000	0.000	0.0	0.000	OK
Simple Junction	FEH Descriptors: 100 years: +45 %: 15 mins: Summer		36.360	36.360	0.000	0.0			0.0	0.000	OK

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Surface Network	Company Address:		

Simple Junction (1)	FEH Descriptors: 100 years: +45 %: 15 mins: Summer	36.235	36.235	0.000	0.0	0.0	0.000	OK
Simple Junction (2)	FEH Descriptors: 100 years: +45 %: 15 mins: Summer	36.390	36.390	0.000	0.0	0.0	0.000	OK
Simple Junction (3)	FEH Descriptors: 100 years: +45 %: 15 mins: Summer	36.400	36.400	0.000	0.0	0.0	0.000	OK
Simple Junction (4)	FEH Descriptors: 100 years: +45 %: 15 mins: Summer	36.400	36.400	0.000	0.0	0.0	0.000	OK

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Surface Network	Company Address:		

FEH Descriptors: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
UU MH1102	FEH Descriptors: 100 years: +0 %: 960 mins: Summer	37.140	34.340	34.396	0.056	11.0	0.000	0.000	11.0	286.919	OK
EX MH 13	FEH Descriptors: 100 years: +0 %: 480 mins: Winter	37.190	34.650	34.708	0.058	11.0	0.065	0.000	11.0	260.218	OK
EX MH 15	FEH Descriptors: 100 years: +0 %: 360 mins: Winter	37.000	34.720	34.789	0.069	11.0	0.097	0.000	11.0	238.700	OK
S01	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	37.170	35.850	36.000	0.150	34.8	0.170	0.000	31.6	16.271	OK
S02	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	37.100	35.500	35.622	0.122	37.2	0.138	0.000	36.1	25.088	OK
S03	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	37.150	35.300	35.455	0.155	52.0	0.176	0.000	49.7	32.375	OK
S11	FEH Descriptors: 100 years: +0 %: 120 mins: Winter	37.150	35.150	35.413	0.263	14.6	0.297	0.000	14.6	42.310	OK
S14 - FLOW CONTROL	FEH Descriptors: 100 years: +0 %: 120 mins: Winter	37.000	34.800	35.411	0.611	11.2	1.079	0.000	10.9	101.160	Surcharged
S04	FEH Descriptors: 100 years: +0 %: 120 mins: Winter	37.150	35.100	35.413	0.313	33.9	0.354	0.000	33.7	99.610	Surcharged
S12	FEH Descriptors: 100 years: +0 %: 120 mins: Winter	37.140	35.000	35.412	0.412	18.9	0.467	0.000	17.7	53.727	Surcharged
S05 (1)	FEH Descriptors: 100 years: +0 %: 120 mins: Winter	37.150	34.950	35.413	0.463	38.5	0.523	0.000	37.8	112.897	Surcharged
S13 - GRIT SEPARATOR	FEH Descriptors: 100 years: +0 %: 120 mins: Winter	37.150	34.850	35.411	0.561	9.3	0.992	0.000	8.7	94.672	Surcharged
S07 (1)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	37.200	36.000	36.123	0.123	28.8	0.035	0.000	28.3	13.297	OK
S08	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	37.200	35.400	35.529	0.129	38.9	0.146	0.000	37.9	18.006	OK
RWP1	FEH Descriptors: 100 years: +0 %: 15 mins: Summer	37.220	36.670	36.670	0.000	0.0	0.000	0.000	0.0	0.000	OK
S06 (1)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	37.140	35.600	35.620	0.020	0.9	0.023	0.000	0.9	0.565	OK
RWP4	FEH Descriptors: 100 years: +0 %: 15 mins: Summer	37.220	36.720	36.720	0.000	0.0	0.000	0.000	0.0	0.000	OK
RWP3	FEH Descriptors: 100 years: +0 %: 15 mins: Summer	37.220	36.670	36.670	0.000	0.0	0.000	0.000	0.0	0.000	OK
RWP2	FEH Descriptors: 100 years: +0 %: 15 mins: Summer	37.220	36.670	36.670	0.000	0.0	0.000	0.000	0.0	0.000	OK
Simple Junction	FEH Descriptors: 100 years: +0 %: 15 mins: Summer		36.360	36.360	0.000	0.0			0.0	0.000	OK

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Surface Network	Company Address:		

Simple Junction (1)	FEH Descriptors: 100 years: +0 %: 15 mins: Summer	36.235	36.235	0.000	0.0	0.0	0.000	OK
Simple Junction (2)	FEH Descriptors: 100 years: +0 %: 15 mins: Summer	36.390	36.390	0.000	0.0	0.0	0.000	OK
Simple Junction (3)	FEH Descriptors: 100 years: +0 %: 15 mins: Summer	36.400	36.400	0.000	0.0	0.0	0.000	OK
Simple Junction (4)	FEH Descriptors: 100 years: +0 %: 15 mins: Summer	36.400	36.400	0.000	0.0	0.0	0.000	OK

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Surface Network	Company Address:		

FEH Descriptors: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
TANK	FEH Descriptors: 2 years: +0 %: 120 mins: Winter	35.056	35.056	0.156	0.156	22.5	38.807	0.000	0.000	8.3	60.697	80.687	OK
PP4	FEH Descriptors: 2 years: +0 %: 30 mins: Winter	36.905	36.869	0.047	0.039	1.7	0.714	0.000	0.000	1.4	1.500	74.261	OK
PP3	FEH Descriptors: 2 years: +0 %: 30 mins: Winter	36.901	36.869	0.047	0.039	1.8	0.841	0.000	0.000	1.4	1.542	74.642	OK
PP2	FEH Descriptors: 2 years: +0 %: 30 mins: Winter	36.895	36.866	0.045	0.036	1.7	0.802	0.000	0.000	1.3	1.419	76.099	OK
PP5	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	36.776	36.753	0.020	0.013	0.5	0.164	0.000	0.000	0.2	0.175	93.683	OK
PP1	FEH Descriptors: 2 years: +0 %: 30 mins: Winter	36.870	36.728	0.064	0.078	4.8	2.401	0.000	0.000	4.3	4.204	79.074	OK

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Surface Network	Company Address:		

FEH Descriptors: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
TANK	FEH Descriptors: 30 years: +0 %: 120 mins: Winter	35.285	35.285	0.385	0.385	44.6	95.951	0.000	0.000	10.8	93.529	52.249	OK
PP4	FEH Descriptors: 30 years: +0 %: 30 mins: Winter	36.931	36.900	0.073	0.070	3.8	1.167	0.000	0.000	3.6	3.438	57.951	OK
PP3	FEH Descriptors: 30 years: +0 %: 30 mins: Winter	36.927	36.900	0.074	0.070	4.0	1.418	0.000	0.000	3.5	3.571	57.232	OK
PP2	FEH Descriptors: 30 years: +0 %: 30 mins: Winter	36.920	36.895	0.070	0.065	3.7	1.361	0.000	0.000	3.2	3.308	59.439	OK
PP5	FEH Descriptors: 30 years: +0 %: 30 mins: Winter	36.788	36.764	0.031	0.024	0.7	0.276	0.000	0.000	0.6	0.652	89.363	OK
PP1	FEH Descriptors: 30 years: +0 %: 30 mins: Winter	36.912	36.779	0.107	0.129	10.8	4.134	0.000	0.000	9.3	9.647	63.969	OK

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Surface Network	Company Address:		

FEH Descriptors: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
TANK	FEH Descriptors: 100 years: +45 %: 180 mins: Winter	35.689	35.689	0.789	0.789	58.3	196.804	0.000	0.000	10.1	160.802	2.058	OK
PP4	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	36.977	36.931	0.119	0.101	10.6	1.753	0.000	0.000	6.3	4.698	36.825	OK
PP3	FEH Descriptors: 100 years: +45 %: 30 mins: Winter	36.964	36.937	0.110	0.107	7.5	2.147	0.000	0.000	6.9	6.748	35.223	OK
PP2	FEH Descriptors: 100 years: +45 %: 30 mins: Winter	36.954	36.930	0.104	0.100	6.9	2.056	0.000	0.000	6.3	6.250	38.740	OK
PP5	FEH Descriptors: 100 years: +45 %: 30 mins: Winter	36.799	36.778	0.042	0.038	1.4	0.399	0.000	0.000	1.3	1.233	84.641	OK
PP1	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	37.058	36.830	0.253	0.180	29.9	7.870	0.000	0.000	15.2	13.019	31.411	OK

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Surface Network	Company Address:		

FEH Descriptors: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
TANK	FEH Descriptors: 100 years: +0 %: 120 mins: Winter	35.412	35.412	0.512	0.512	55.9	127.762	0.000	0.000	8.3	89.287	36.418	OK
PP4	FEH Descriptors: 100 years: +0 %: 30 mins: Winter	36.943	36.913	0.085	0.083	4.9	1.366	0.000	0.000	4.6	4.431	50.758	OK
PP3	FEH Descriptors: 100 years: +0 %: 30 mins: Winter	36.940	36.913	0.086	0.083	5.1	1.668	0.000	0.000	4.6	4.611	49.688	OK
PP2	FEH Descriptors: 100 years: +0 %: 30 mins: Winter	36.932	36.907	0.081	0.077	4.8	1.602	0.000	0.000	4.3	4.276	52.275	OK
PP5	FEH Descriptors: 100 years: +0 %: 30 mins: Winter	36.792	36.769	0.035	0.029	0.9	0.319	0.000	0.000	0.8	0.832	87.712	OK
PP1	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	36.965	36.800	0.159	0.150	20.6	5.170	0.000	0.000	12.5	8.885	54.947	OK

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Surface Network	Company Address:		

FEH Descriptors: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m^3)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
C1.000 (EX)	FEH Descriptors: 2 years: +0 %: 120 mins: Winter	Pipe	EX MH 15	EX MH 13	37.000	34.782	0.057	65.942	0.9	0.08	8.9	OK
C1.001 (EX)	FEH Descriptors: 2 years: +0 %: 120 mins: Winter	Pipe	EX MH 13	UU MH1102	37.190	34.702	0.051	65.901	1.1	0.06	8.9	OK
Pipe (3)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	Pipe	S08	S11	37.200	35.471	0.080	6.478	0.9	0.12	13.6	OK
S1.007	FEH Descriptors: 2 years: +0 %: 120 mins: Winter	Pipe	S14 - FLOW CONTROL	EX MH 15	37.000	35.052	0.062	65.987	0.9	0.08	8.9	OK
S1.000	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	Pipe	S01	S02	37.170	35.930	0.078	5.849	0.9	0.25	11.2	OK
S1.001	FEH Descriptors: 2 years: +0 %: 30 mins: Winter	Pipe	S02	S03	37.100	35.563	0.070	11.808	0.9	0.09	11.8	OK
S1.002	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	Pipe	S03	S04	37.150	35.378	0.088	11.260	0.9	0.14	15.9	OK
S6.004	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	Pipe	S11	S12	37.150	35.239	0.092	7.726	0.8	0.17	15.3	OK
S2.000	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	Pipe	PP1	S02	37.256	36.715	0.033	2.851	1.6	0.1	4.8	OK
S1.006	FEH Descriptors: 2 years: +0 %: 120 mins: Winter	Pipe	S13 - GRIT SEPARATOR	S14 - FLOW CONTROL	37.150	35.053	0.227	63.239	0.2	0.08	8.6	OK
S1.004	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	Pipe	S05 (1)	TANK	37.150	35.058	0.090	19.405	2.2	0.27	28.3	OK

S1.005	FEH Descriptors: 2 years: +0 %: 120 mins: Winter	Pipe	TANK	S13 - GRIT SEPARATOR	37.140	35.056	0.179	60.697	0.4	0.12	8.3	OK
S1.003	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	Pipe	S04	S05 (1)	37.150	35.198	0.103	16.936	1.1	0.19	23.3	OK
S3.000	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	Pipe	PP2	S04	37.160	36.869	0.018	0.927	1.2	0.03	1.4	OK
S4.000	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	Pipe	PP3	S04	37.164	36.872	0.020	1.020	1.1	0.04	1.5	OK
S6.005	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	Pipe	S12	TANK	37.140	35.096	0.072	10.029	1.7	0.19	19.5	OK
Pipe	FEH Descriptors: 2 years: +0 %: 15 mins: Summer	Pipe	RWP4	S07 (1)	37.220	36.720	0.000	0.000	0.0	0	0.0	OK
Pipe (4)	FEH Descriptors: 2 years: +0 %: 15 mins: Summer	Pipe	RWP1	S05 (1)	37.220	36.670	0.000	0.000	0.0	0	0.0	OK
S7.000	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	Pipe	PP4	S13 - GRIT SEPARATOR	37.168	36.872	0.021	1.035	1.1	0.04	1.6	OK
S5.000	FEH Descriptors: 2 years: +0 %: 30 mins: Winter	Pipe	PP5	S06 (1)	37.157	36.756	0.010	0.274	0.5	0.01	0.2	OK
S5.001	FEH Descriptors: 2 years: +0 %: 30 mins: Winter	Pipe	S06 (1)	TANK	37.140	35.611	0.011	0.271	0.4	0.01	0.2	OK
Pipe (1)	FEH Descriptors: 2 years: +0 %: 15 mins: Winter	Pipe	S07 (1)	S01	37.200	36.065	0.072	4.788	0.9	0.16	10.2	OK
Pipe (2)	FEH Descriptors: 2 years: +0 %: 15 mins: Summer	Pipe	RWP3	S08	37.220	36.670	0.000	0.000	0.0	0	0.0	OK
Pipe (5)	FEH Descriptors: 2 years: +0 %: 15 mins: Summer	Pipe	RWP2	S04	37.220	36.670	0.000	0.000	0.0	0	0.0	OK
Pipe (6)	FEH Descriptors: 2 years: +0 %: 15 mins: Summer	Pipe	Simple Junction	S01	37.110	36.360	0.039	0.000	0.0	0	0.0	OK

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Surface Network	Company Address:		

Pipe (7)	FEH Descriptors: 2 years: +0 %: 15 mins: Summer	Pipe	Simple Junction (1)	S03	36.985	36.235	0.000	0.000	0.0	0	0.0	OK
Pipe (8)	FEH Descriptors: 2 years: +0 %: 15 mins: Summer	Pipe	Simple Junction (2)	S02	37.140	36.390	0.000	0.000	0.0	0	0.0	OK
Pipe (9)	FEH Descriptors: 2 years: +0 %: 15 mins: Summer	Pipe	Simple Junction (3)	S03	37.150	36.400	0.000	0.000	0.0	0	0.0	OK
Pipe (10)	FEH Descriptors: 2 years: +0 %: 15 mins: Summer	Pipe	Simple Junction (4)	S13 - GRIT SEPARATOR	0.100	36.400	0.000	0.000	0.0	0	0.0	OK

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Surface Network	Company Address:		

FEH Descriptors: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m^3)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
C1.000 (EX)	FEH Descriptors: 30 years: +0 %: 120 mins: Winter	Pipe	EX MH 15	EX MH 13	37.000	34.789	0.064	102.920	1.0	0.1	11.0	OK
C1.001 (EX)	FEH Descriptors: 30 years: +0 %: 480 mins: Winter	Pipe	EX MH 13	UU MH1102	37.190	34.708	0.057	205.222	1.2	0.08	11.0	OK
Pipe (3)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	Pipe	S08	S11	37.200	35.511	0.126	14.168	1.1	0.26	29.8	OK
S1.007	FEH Descriptors: 30 years: +0 %: 360 mins: Summer	Pipe	S14 - FLOW CONTROL	EX MH 15	37.000	35.186	0.069	169.248	0.9	0.1	11.1	Surcharged
S1.000	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	Pipe	S01	S02	37.170	35.977	0.124	12.805	1.1	0.56	24.9	OK
S1.001	FEH Descriptors: 30 years: +0 %: 30 mins: Winter	Pipe	S02	S03	37.100	35.601	0.113	26.574	1.1	0.22	27.6	OK
S1.002	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	Pipe	S03	S04	37.150	35.431	0.150	25.352	1.1	0.32	37.4	OK
S6.004	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	Pipe	S11	S12	37.150	35.290	0.143	16.932	1.0	0.39	34.0	OK
S2.000	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	Pipe	PP1	S02	37.256	36.760	0.052	6.867	2.0	0.24	10.9	OK
S1.006	FEH Descriptors: 30 years: +0 %: 360 mins: Summer	Pipe	S13 - GRIT SEPARATOR	S14 - FLOW CONTROL	37.150	35.184	0.300	162.421	0.2	0.11	11.3	Surcharged
S1.004	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	Pipe	S05 (1)	TANK	37.150	35.135	0.208	43.439	2.3	0.64	66.8	OK

Project:			Date: 28/07/2025			
			Designed by: ncullen	Checked by:	Approved By:	
Report Details: Type: Connections Summary Storm Phase: Surface Network			Company Address:			

S1.005	FEH Descriptors: 30 years: +0 %: 360 mins: Summer	Pipe	TANK	S13 - GRIT SEPARATOR	37.140	35.178	0.300	156.250	0.4	0.17	11.8	OK
S1.003	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	Pipe	S04	S05 (1)	37.150	35.269	0.172	38.380	1.3	0.47	56.3	OK
S3.000	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	Pipe	PP2	S04	37.160	36.894	0.027	2.298	1.5	0.07	3.4	OK
S4.000	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	Pipe	PP3	S04	37.164	36.898	0.031	2.501	1.4	0.09	3.7	OK
S6.005	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	Pipe	S12	TANK	37.140	35.145	0.182	21.330	1.8	0.43	43.2	OK
Pipe	FEH Descriptors: 30 years: +0 %: 15 mins: Summer	Pipe	RWP4	S07 (1)	37.220	36.720	0.013	0.000	0.0	0	0.0	OK
Pipe (4)	FEH Descriptors: 30 years: +0 %: 15 mins: Summer	Pipe	RWP1	S05 (1)	37.220	36.670	0.000	0.000	0.0	0	0.0	OK
S7.000	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	Pipe	PP4	S13 - GRIT SEPARATOR	37.168	36.898	0.031	2.459	1.4	0.09	3.6	OK
S5.000	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	Pipe	PP5	S06 (1)	37.157	36.766	0.016	0.438	0.7	0.02	0.7	OK
S5.001	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	Pipe	S06 (1)	TANK	37.140	35.618	0.017	0.430	0.6	0.03	0.7	OK
Pipe (1)	FEH Descriptors: 30 years: +0 %: 15 mins: Winter	Pipe	S07 (1)	S01	37.200	36.104	0.116	10.468	1.1	0.35	22.3	OK
Pipe (2)	FEH Descriptors: 30 years: +0 %: 15 mins: Summer	Pipe	RWP3	S08	37.220	36.670	0.000	0.000	0.0	0	0.0	OK
Pipe (5)	FEH Descriptors: 30 years: +0 %: 15 mins: Summer	Pipe	RWP2	S04	37.220	36.670	0.000	0.000	0.0	0	0.0	OK
Pipe (6)	FEH Descriptors: 30 years: +0 %: 15 mins: Summer	Pipe	Simple Junction	S01	37.110	36.360	0.061	0.000	0.0	0	0.0	OK

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Surface Network	Company Address:		

Pipe (7)	FEH Descriptors: 30 years: +0 %: 15 mins: Summer	Pipe	Simple Junction (1)	S03	36.985	36.235	0.000	0.000	0.0	0	0.0	OK
Pipe (8)	FEH Descriptors: 30 years: +0 %: 15 mins: Summer	Pipe	Simple Junction (2)	S02	37.140	36.390	0.000	0.000	0.0	0	0.0	OK
Pipe (9)	FEH Descriptors: 30 years: +0 %: 15 mins: Summer	Pipe	Simple Junction (3)	S03	37.150	36.400	0.000	0.000	0.0	0	0.0	OK
Pipe (10)	FEH Descriptors: 30 years: +0 %: 15 mins: Summer	Pipe	Simple Junction (4)	S13 - GRIT SEPARATOR	0.100	36.400	0.000	0.000	0.0	0	0.0	OK

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Surface Network	Company Address:		

FEH Descriptors: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m^3)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
C1.000 (EX)	FEH Descriptors: 100 years: +45 %: 1440 mins: Winter	Pipe	EX MH 15	EX MH 13	37.000	34.789	0.064	525.621	1.0	0.1	11.0	OK
C1.001 (EX)	FEH Descriptors: 100 years: +45 %: 1440 mins: Winter	Pipe	EX MH 13	UU MH1102	37.190	34.708	0.057	525.619	1.2	0.08	11.0	OK
Pipe (3)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	Pipe	S08	S11	37.200	35.563	0.188	26.135	1.2	0.49	55.2	OK
S1.007	FEH Descriptors: 100 years: +45 %: 480 mins: Winter	Pipe	S14 - FLOW CONTROL	EX MH 15	37.000	35.624	0.069	377.000	0.9	0.1	11.0	Surcharged
S1.000	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	Pipe	S01	S02	37.170	36.061	0.194	23.611	1.2	1.01	44.7	OK
S1.001	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	Pipe	S02	S03	37.100	35.657	0.180	36.553	1.2	0.41	53.0	OK
S1.002	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	Pipe	S03	S04	37.150	35.503	0.264	46.979	1.1	0.63	72.7	OK
S6.004	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	Pipe	S11	S12	37.150	35.362	0.282	29.788	1.2	0.72	62.8	OK
S2.000	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	Pipe	PP1	S02	37.256	36.863	0.062	12.998	2.2	0.33	15.2	Surcharged
S1.006	FEH Descriptors: 100 years: +45 %: 720 mins: Winter	Pipe	S13 - GRIT SEPARATOR	S14 - FLOW CONTROL	37.150	35.561	0.300	409.747	0.2	0.11	10.9	Surcharged
S1.004	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	Pipe	S05 (1)	TANK	37.150	35.357	0.300	79.437	2.5	1.23	129.2	Surcharged

Project:		Date: 28/07/2025		
		Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Surface Network		Company Address:		

S1.005	FEH Descriptors: 100 years: +45 %: 720 mins: Winter	Pipe	TANK	S13 - GRIT SEPARATOR	37.140	35.562	0.300	394.186	0.4	0.15	10.8	Surcharged
S1.003	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	Pipe	S04	S05 (1)	37.150	35.425	0.300	70.220	1.5	0.9	108.3	Surcharged
S3.000	FEH Descriptors: 100 years: +45 %: 30 mins: Winter	Pipe	PP2	S04	37.160	36.932	0.037	6.244	1.8	0.13	6.3	OK
S4.000	FEH Descriptors: 100 years: +45 %: 30 mins: Winter	Pipe	PP3	S04	37.164	36.938	0.043	6.742	1.6	0.17	6.8	OK
S6.005	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	Pipe	S12	TANK	37.140	35.357	0.300	37.260	2.0	0.79	79.4	Surcharged
Pipe	FEH Descriptors: 100 years: +45 %: 15 mins: Summer	Pipe	RWP4	S07 (1)	37.220	36.720	0.040	0.000	0.0	0	0.0	OK
Pipe (4)	FEH Descriptors: 100 years: +45 %: 15 mins: Summer	Pipe	RWP1	S05 (1)	37.220	36.670	0.000	0.000	0.0	0	0.0	OK
S7.000	FEH Descriptors: 100 years: +45 %: 30 mins: Winter	Pipe	PP4	S13 - GRIT SEPARATOR	37.168	36.938	0.043	6.458	1.6	0.17	6.8	OK
S5.000	FEH Descriptors: 100 years: +45 %: 30 mins: Winter	Pipe	PP5	S06 (1)	37.157	36.780	0.022	1.230	0.8	0.04	1.3	OK
S5.001	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	Pipe	S06 (1)	TANK	37.140	35.624	0.024	0.854	0.7	0.05	1.3	OK
Pipe (1)	FEH Descriptors: 100 years: +45 %: 15 mins: Winter	Pipe	S07 (1)	S01	37.200	36.162	0.186	19.285	1.2	0.64	41.0	OK
Pipe (2)	FEH Descriptors: 100 years: +45 %: 15 mins: Summer	Pipe	RWP3	S08	37.220	36.670	0.004	0.000	0.0	0	0.0	OK
Pipe (5)	FEH Descriptors: 100 years: +45 %: 15 mins: Summer	Pipe	RWP2	S04	37.220	36.670	0.000	0.000	0.0	0	0.0	OK
Pipe (6)	FEH Descriptors: 100 years: +45 %: 15 mins: Summer	Pipe	Simple Junction	S01	37.110	36.360	0.098	0.000	0.0	0	0.0	OK

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Surface Network	Company Address:		

Pipe (7)	FEH Descriptors: 100 years: +45 %: 15 mins: Summer	Pipe	Simple Junction (1)	S03	36.985	36.235	0.000	0.000	0.0	0	0.0	OK
Pipe (8)	FEH Descriptors: 100 years: +45 %: 15 mins: Summer	Pipe	Simple Junction (2)	S02	37.140	36.390	0.000	0.000	0.0	0	0.0	OK
Pipe (9)	FEH Descriptors: 100 years: +45 %: 15 mins: Summer	Pipe	Simple Junction (3)	S03	37.150	36.400	0.000	0.000	0.0	0	0.0	OK
Pipe (10)	FEH Descriptors: 100 years: +45 %: 15 mins: Summer	Pipe	Simple Junction (4)	S13 - GRIT SEPARATOR	0.100	36.400	0.000	0.000	0.0	0	0.0	OK

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Surface Network	Company Address:		

FEH Descriptors: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m^3)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
C1.000 (EX)	FEH Descriptors: 100 years: +0 %: 480 mins: Winter	Pipe	EX MH 15	EX MH 13	37.000	34.789	0.064	260.229	1.0	0.1	11.0	OK
C1.001 (EX)	FEH Descriptors: 100 years: +0 %: 960 mins: Summer	Pipe	EX MH 13	UU MH1102	37.190	34.708	0.057	286.919	1.2	0.08	11.0	OK
Pipe (3)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	Pipe	S08	S11	37.200	35.529	0.146	18.006	1.1	0.34	37.9	OK
S1.007	FEH Descriptors: 100 years: +0 %: 360 mins: Winter	Pipe	S14 - FLOW CONTROL	EX MH 15	37.000	35.356	0.069	238.721	0.9	0.1	11.0	Surcharged
S1.000	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	Pipe	S01	S02	37.170	36.000	0.145	16.271	1.2	0.71	31.6	OK
S1.001	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	Pipe	S02	S03	37.100	35.622	0.139	25.088	1.2	0.28	36.1	OK
S1.002	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	Pipe	S03	S04	37.150	35.455	0.181	32.375	1.1	0.43	49.7	OK
S6.004	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	Pipe	S11	S12	37.150	35.313	0.166	21.245	1.1	0.49	43.3	OK
S2.000	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	Pipe	PP1	S02	37.256	36.790	0.055	8.858	2.1	0.27	12.4	OK
S1.006	FEH Descriptors: 100 years: +0 %: 360 mins: Winter	Pipe	S13 - GRIT SEPARATOR	S14 - FLOW CONTROL	37.150	35.357	0.300	229.082	0.2	0.11	10.9	Surcharged
S1.004	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	Pipe	S05 (1)	TANK	37.150	35.207	0.282	54.956	2.4	0.84	88.0	OK

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Surface Network	Company Address:		

S1.005	FEH Descriptors: 100 years: +0 %: 360 mins: Winter	Pipe	TANK	S13 - GRIT SEPARATOR	37.140	35.358	0.300	220.304	0.4	0.15	10.8	Surcharged
S1.003	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	Pipe	S04	S05 (1)	37.150	35.307	0.210	48.669	1.4	0.62	74.7	OK
S3.000	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	Pipe	PP2	S04	37.160	36.904	0.031	2.975	1.6	0.09	4.3	OK
S4.000	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	Pipe	PP3	S04	37.164	36.908	0.035	3.241	1.5	0.11	4.7	OK
S6.005	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	Pipe	S12	TANK	37.140	35.206	0.256	26.492	1.9	0.55	55.0	OK
Pipe	FEH Descriptors: 100 years: +0 %: 15 mins: Summer	Pipe	RWP4	S07 (1)	37.220	36.720	0.022	0.000	0.0	0	0.0	OK
Pipe (4)	FEH Descriptors: 100 years: +0 %: 15 mins: Summer	Pipe	RWP1	S05 (1)	37.220	36.670	0.000	0.000	0.0	0	0.0	OK
S7.000	FEH Descriptors: 100 years: +0 %: 30 mins: Winter	Pipe	PP4	S13 - GRIT SEPARATOR	37.168	36.914	0.036	4.426	1.4	0.12	4.6	OK
S5.000	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	Pipe	PP5	S06 (1)	37.157	36.770	0.018	0.574	0.7	0.03	0.9	OK
S5.001	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	Pipe	S06 (1)	TANK	37.140	35.620	0.020	0.565	0.7	0.04	0.9	OK
Pipe (1)	FEH Descriptors: 100 years: +0 %: 15 mins: Winter	Pipe	S07 (1)	S01	37.200	36.123	0.137	13.297	1.1	0.44	28.3	OK
Pipe (2)	FEH Descriptors: 100 years: +0 %: 15 mins: Summer	Pipe	RWP3	S08	37.220	36.670	0.000	0.000	0.0	0	0.0	OK
Pipe (5)	FEH Descriptors: 100 years: +0 %: 15 mins: Summer	Pipe	RWP2	S04	37.220	36.670	0.000	0.000	0.0	0	0.0	OK
Pipe (6)	FEH Descriptors: 100 years: +0 %: 15 mins: Summer	Pipe	Simple Junction	S01	37.110	36.360	0.072	0.000	0.0	0	0.0	OK

Project:	Date: 28/07/2025		
	Designed by: ncullen	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Surface Network	Company Address:		

Pipe (7)	FEH Descriptors: 100 years: +0 %: 15 mins: Summer	Pipe	Simple Junction (1)	S03	36.985	36.235	0.000	0.000	0.0	0	0.0	OK
Pipe (8)	FEH Descriptors: 100 years: +0 %: 15 mins: Summer	Pipe	Simple Junction (2)	S02	37.140	36.390	0.000	0.000	0.0	0	0.0	OK
Pipe (9)	FEH Descriptors: 100 years: +0 %: 15 mins: Summer	Pipe	Simple Junction (3)	S03	37.150	36.400	0.000	0.000	0.0	0	0.0	OK
Pipe (10)	FEH Descriptors: 100 years: +0 %: 15 mins: Summer	Pipe	Simple Junction (4)	S13 - GRIT SEPARATOR	0.100	36.400	0.000	0.000	0.0	0	0.0	OK

G.2 Foul Water Hydraulic Modelling Results

Copyright © 1976 - 2025 Buro Happold. All rights reserved

Name	From	To	Length (m)	Connection Type	Slope (1:X)	Colebrook-White Roughness (mm)	No. of Barrels	Diameter / Base Width (mm)	Upstream Cover Level (m)	Upstream Invert Level (m)	Downstream Cover Level (m)	Downstream Invert Level (m)
F1.000	F01	F03	5.542	Pipe	36.945	1.5	1	150	37.206	36.050	37.200	35.900
Branch: F2.000												
F2.000	F02	F03	25.403	Pipe	31.754	1.5	1	150	37.220	36.700	37.200	35.900
F1.001	F03	F08	14.373	Pipe	71.866	1.5	1	150	37.200	35.900	37.200	35.700
Branch: F3.000												
F3.000	RODDING EYE 1	F04	8.742	Pipe	72.851	1.5	1	150	37.220	36.620	37.220	36.500
F3.001	F04	F05	3.450	Pipe	68.992	1.5	1	150	37.220	36.500	37.220	36.450
F3.002	F05	F06	9.515	Pipe	63.434	1.5	1	150	37.220	36.450	37.220	36.300
F3.003	F06	F07	6.354	Pipe	63.541	1.5	1	150	37.220	36.300	37.220	36.200
Branch: F4.000												
F4.000	RODDING EYE 2	F07	18.707	Pipe	69.284	1.5	1	150	37.220	36.470	37.220	36.200
F3.004	F07	F08	7.290	Pipe	14.579	1.5	1	150	37.220	36.200	37.200	35.700
F1.002	F08	F09	10.664	Pipe	71.091	1.5	1	150	37.200	35.700	37.200	35.550
F1.003	F09	F10	26.788	Pipe	59.529	1.5	1	150	37.200	35.550	37.140	35.100
F1.004	F10	EX MH 15	9.850	Pipe	46.903	1.5	1	150	37.140	35.100	37.000	34.890

Cover Depth (m)	Total Area (ha)	Volumetric Runoff Coefficient	Local Time of Concentration (mins)	Total Base Flow (L/s)	Total Discharge Units	Total Dwellings	Proportional Depth (mm)	Proportional Velocity (m/s)	Proportional Velocity At 1/3 Flow (m/s)	Full Bore Velocity (m/s)	Capacity (L/s)	Flow (L/s)
1.006	0.002	0.750	5		0.3		13	0.509	0.346	1.444	25.524	0.383
0.370	0.002	0.750	5		0.3		13	0.537	0.372	1.558	27.539	0.383
1.150	0.004		0		0.6		15	0.401	0.280	1.034	18.274	0.542
0.450	0.002	0.750	5		0.7		19	0.459	0.327	1.027	18.150	0.586
0.570	0.004	0.750	5		73.5		58	0.938	0.683	1.056	18.653	6.001
0.620	0.006	0.750	5		127.3		57	0.968	0.703	1.101	19.457	7.898
0.770	0.007	0.750	5		130.3		57	0.967	0.703	1.100	19.441	7.990
0.600	0.002	0.750	5		16.1		40	0.756	0.542	1.053	18.614	2.809
0.870	0.009		0		146.4		39	1.639	1.176	2.302	40.686	8.470
1.350	0.013		0		147.0		59	0.928	0.675	1.040	18.374	8.487
1.500	0.013		0		147.0		56	0.990	0.719	1.137	20.088	8.487
1.890	0.013		0		147.0		53	1.079	0.783	1.281	22.643	8.487

G.3 Existing Network Hydraulic Modelling Results

Copyright © 1976 - 2025 Buro Happold. All rights reserved

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Junctions Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)
EX MH17	Manhole	384253.012	397200.130	37.130	1.020	36.110	Circular	1.200
EX MH18	Manhole	384250.377	397196.692	37.110	1.740	35.370	Circular	1.200
INT MH5	Manhole	384255.970	397185.604	37.400	1.750	35.650	Rectangular	
INT MH9	Manhole	384258.953	397179.960	37.550	1.850	35.700	Rectangular	
INT MH8	Manhole	384263.369	397171.391	37.550	1.760	35.790	Rectangular	
INT MH7	Manhole	384260.658	397169.921	37.550	1.690	35.860	Rectangular	
INT MH6	Manhole	384257.108	397168.119	37.530	1.600	35.930	Rectangular	
INT MH4	Manhole	384248.774	397181.945	37.230	1.530	35.700	Rectangular	
EX MH10A	Manhole	384262.619	397150.926	37.210	1.010	36.200	Circular	1.200
EX MH10	Manhole	384239.918	397136.999	37.190	1.090	36.100	Circular	1.200
EX MH7	Manhole	384226.840	397130.198	37.260	2.340	34.920	Circular	1.200
EX MH8	Manhole	384225.295	397132.820	37.210	2.220	34.990	Circular	1.200
EX MH6	Manhole	384222.988	397128.081	37.230	2.420	34.810	Circular	1.200
EX MH5	Manhole	384209.130	397121.268	37.200	2.550	34.650	Circular	1.200
EX MH4	Manhole	384201.023	397115.874	37.200	2.680	34.520	Circular	1.200
MH2 (UU MH2102)	Manhole	384201.432	397112.848	37.050	8.730	28.320	Circular	1.800
EX MH3	Manhole	384194.864	397113.888	37.200	2.370	34.830	Circular	1.200
EX MH11	Manhole	384169.961	397158.102	37.170	2.400	34.770	Circular	1.200
MH12 (UU MH1102)	Manhole	384173.488	397160.589	37.140	9.330	27.810	Circular	1.800
EX MH13A	Manhole	384184.336	397165.932	37.200	2.650	34.550	Circular	1.200
EX MH13	Manhole	384190.337	397169.208	37.190	2.540	34.650	Circular	1.200
EX MH15	Manhole	384197.178	397172.678	37.000	2.260	34.740	Circular	1.200
EX MH16	Manhole	384201.862	397170.634	37.010	2.170	34.840	Circular	1.200
EX MH16A	Manhole	384225.235	397182.980	37.020	2.000	35.020	Rectangular	
INT MH3	Manhole	384211.909	397149.684	37.220	1.220	36.000	Rectangular	
INT MH1	Manhole	384216.654	397140.890	37.230	1.380	35.850	Rectangular	
INT MH2	Manhole	384221.282	397143.560	37.240	1.270	35.970	Rectangular	
BURIED MH	Manhole	384217.366	397150.163	37.200	1.200	36.000	Circular	1.200
UU MH1103	Manhole	384164.206	397178.685	36.840	9.140	27.700	Circular	1.800
EX RWP2	Simple Junction	384198.771	397144.665					
EX RWP1	Simple Junction	384185.501	397137.623					

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Junctions Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

Name	Diameter (m)	Width (m)	Lock
EX MH17			None
EX MH18			None
INT MH5	1.050	0.750	None
INT MH9	1.200	1.200	None
INT MH8	1.200	1.200	None
INT MH7	1.200	1.200	None
INT MH6	1.000	1.000	None
INT MH4	2.000	1.000	None
EX MH10A			None
EX MH10			None
EX MH7			None
EX MH8			None
EX MH6			None
EX MH5			None
EX MH4			None
MH2 (UU MH2102)			None
EX MH3			None
EX MH11			None
MH12 (UU MH1102)			None
EX MH13A			None
EX MH13			None
EX MH15			None
EX MH16			None
EX MH16A	2.000	1.200	None
INT MH3	1.050	0.700	None
INT MH1	1.050	0.800	None
INT MH2	1.050	0.700	None
BURIED MH			None
UU MH1103			None
EX RWP2			
EX RWP1			

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Junctions Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
EX MH17	Inlet	Catchment Area Catchment Area (2)	(None)	No Restriction
	Inlet (1)	Catchment Area (3)	(None)	No Restriction
EX MH18	Inlet	Pipe (19)	(None)	No Restriction
	Inlet (1)	Pipe (27)	(None)	No Restriction
	Inlet (2)	Catchment Area (12)	(None)	No Restriction
INT MH5	Inlet	Pipe (17)	(None)	No Restriction
	Inlet (1)	Pipe (18)	(None)	No Restriction
INT MH9	Inlet	Pipe (16)	(None)	No Restriction
INT MH8	Inlet	Pipe (15)	(None)	No Restriction
	Inlet (1)	Catchment Area (1)	(None)	No Restriction
INT MH7	Inlet	Pipe (14)	(None)	No Restriction
INT MH4	Inlet	Catchment Area (10)	(None)	No Restriction
EX MH10A	Inlet	Catchment Area (16)	(None)	No Restriction
	Inlet (1)	Catchment Area (19)	(None)	No Restriction
EX MH10	Inlet	Pipe	(None)	No Restriction
	Inlet (1)	Catchment Area (20)	(None)	No Restriction
EX MH7	Inlet	Pipe (1) Pipe (12)	(None)	No Restriction
	Inlet (1)	Catchment Area (21)	(None)	No Restriction
EX MH6	Inlet	Pipe (2)	(None)	No Restriction
	Inlet (1)	Pipe (11)	(None)	No Restriction
EX MH5	Inlet	Pipe (3)	(None)	No Restriction
EX MH4	Inlet	Pipe (4)	(None)	No Restriction
	Inlet (1)	Pipe (5)	(None)	No Restriction
MH2 (UU MH2102)	Inlet	Pipe (6)	(None)	No Restriction
EX MH11	Inlet	Pipe (29)	(None)	No Restriction
MH12 (UU MH1102)	Inlet	UU SEWER	(None)	No Restriction
	Inlet (1)	Pipe (8)	(None)	No Restriction
	Inlet (2)	Pipe (25)	(None)	No Restriction
EX MH13A	Inlet	Pipe (24)	(None)	No Restriction
EX MH13	Inlet	Pipe (23)	(None)	No Restriction
	Inlet (1)	Pipe (28)	(None)	No Restriction
EX MH15	Inlet	Pipe (22)	(None)	No Restriction
	Inlet (1)	Catchment Area (15)	(None)	No Restriction
EX MH16	Inlet	Pipe (21)	(None)	No Restriction
	Inlet (1)	Catchment Area (9)	(None)	No Restriction
	Inlet (2)	Catchment Area (14)	(None)	No Restriction
EX MH16A	Inlet	Pipe (20)	(None)	No Restriction
	Inlet (1)	Catchment Area (11)	(None)	No Restriction
	Inlet (2)	Catchment Area (13)	(None)	No Restriction
INT MH1	Inlet	Pipe (10) Catchment Area (4)	(None)	No Restriction
	Inlet (1)	Pipe (13)	(None)	No Restriction
INT MH2	Inlet	Pipe (9)	(None)	No Restriction
	Inlet (1)	Catchment Area (17)	(None)	No Restriction
UU MH1103	Inlet	UU SEWER 1	(None)	No Restriction

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Junctions Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
EX MH17	Outlet	Pipe (27)	Free Discharge
EX MH18	Outlet	Pipe (20)	Free Discharge
INT MH5	Outlet	Pipe (19)	Free Discharge
INT MH9	Outlet	Pipe (17)	Free Discharge
INT MH8	Outlet	Pipe (16)	Free Discharge
INT MH7	Outlet	Pipe (15)	Free Discharge
INT MH6	Outlet	Pipe (14)	Free Discharge
INT MH4	Outlet	Pipe (18)	Free Discharge
EX MH10A	Outlet	Pipe	Free Discharge
EX MH10	Outlet	Pipe (1)	Free Discharge
EX MH7	Outlet	Pipe (2)	Free Discharge
EX MH8	Outlet	Pipe (12)	Free Discharge
EX MH6	Outlet	Pipe (3)	Free Discharge
EX MH5	Outlet	Pipe (4)	Free Discharge
EX MH4	Outlet	Pipe (6)	Free Discharge
MH2 (UU MH2102)	Outlet	UU SEWER	Free Discharge
EX MH3	Outlet	Pipe (5)	Free Discharge
EX MH11	Outlet	Pipe (8)	Free Discharge
MH12 (UU MH1102)	Outlet	UU SEWER 1	Free Discharge
EX MH13A	Outlet	Pipe (25)	Free Discharge
EX MH13	Outlet	Pipe (24)	Free Discharge
EX MH15	Outlet	Pipe (23)	Free Discharge
EX MH16	Outlet	Pipe (22)	Free Discharge
EX MH16A	Outlet	Pipe (21)	Free Discharge
INT MH3	Outlet	Pipe (13)	Free Discharge
INT MH1	Outlet	Pipe (11)	Free Discharge
INT MH2	Outlet	Pipe (10)	Free Discharge
BURIED MH	Outlet	Pipe (9)	Free Discharge
EX RWP2	Outlet	Pipe (28)	Free Discharge
EX RWP1	Outlet	Pipe (29)	Free Discharge

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Connections Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

Name	Length (m)	Connection Type	Slope (1:X)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)	Upstream Cover Level (m)	Upstream Invert Level (m)
Pipe	26.633	Pipe	266.325		0.6	150	37.210	36.200
Pipe (1)	14.741	Pipe	12.492		0.6	150	37.190	36.100
Pipe (2)	4.395	Pipe	39.954		0.6	150	37.260	34.920
Pipe (3)	15.442	Pipe	96.514		0.6	225	37.230	34.810
Pipe (4)	9.738	Pipe	74.905		0.6	225	37.200	34.650
Pipe (5)	6.471	Pipe	20.874		0.6	150	37.200	34.830
Pipe (6)	3.054	Pipe	16.075		0.6	225	37.200	34.520
UU SEWER	55.318	Pipe	108.467		0.6	225	37.050	28.320
Pipe (8)	4.315	Pipe	33.194		0.6	225	37.170	34.770
Pipe (9)	7.677	Pipe	255.895		0.6	150	37.200	36.000
Pipe (10)	5.344	Pipe	44.530		0.6	150	37.240	35.970
Pipe (11)	14.289	Pipe	13.739		0.6	150	37.230	35.850
Pipe (12)	3.043	Pipe	43.467		0.6	100	37.210	34.990
Pipe (13)	9.993	Pipe	66.618		0.6	150	37.220	36.000
Pipe (14)	3.982	Pipe	56.880		0.6	150	37.530	35.930
Pipe (15)	3.083	Pipe	44.047		0.6	150	37.550	35.860
Pipe (16)	9.639	Pipe	107.104		0.6	150	37.550	35.790
Pipe (17)	6.384	Pipe	127.676		0.6	150	37.550	35.700
Pipe (18)	8.073	Pipe	161.453		0.6	100	37.230	35.700
Pipe (19)	12.419	Pipe	44.354		0.6	225	37.400	35.650
Pipe (20)	28.638	Pipe	81.824		0.6	225	37.110	35.370
Pipe (21)	26.433	Pipe	146.848		0.6	225	37.020	35.020
Pipe (22)	5.111	Pipe	51.105		0.6	300	37.010	34.840
Pipe (23)	7.671	Pipe	85.235		0.6	300	37.000	34.740
Pipe (24)	6.837	Pipe	68.366		0.6	300	37.190	34.650
Pipe (25)	12.093	Pipe	57.585		0.6	300	37.200	34.550
UU SEWER 1	20.337	Pipe	184.885		0.6	580	37.140	27.810
Pipe (27)	4.331	Pipe	5.853		0.6	150	37.130	36.110
Pipe (28)	25.952	Pipe	13.377		0.6	150	0.100	37.500
Pipe (29)	25.707	Pipe	9.556		0.6	150	0.100	37.500

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Connections Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

Name	Downstream Cover Level (m)	Downstream Invert Level (m)	Part Family	Lock	Velocity (m/s)
Pipe	37.190	36.100		All	
Pipe (1)	37.260	34.920		All	
Pipe (2)	37.230	34.810		All	
Pipe (3)	37.200	34.650		All	
Pipe (4)	37.200	34.520		All	
Pipe (5)	37.200	34.520		All	
Pipe (6)	37.050	34.330		Levels	
UU SEWER	37.140	27.810		All	
Pipe (8)	37.140	34.640		Levels	
Pipe (9)	37.240	35.970		All	
Pipe (10)	37.230	35.850		All	
Pipe (11)	37.230	34.810		All	
Pipe (12)	37.260	34.920		All	
Pipe (13)	37.230	35.850		All	
Pipe (14)	37.550	35.860		All	
Pipe (15)	37.550	35.790		All	
Pipe (16)	37.550	35.700		All	
Pipe (17)	37.400	35.650		All	
Pipe (18)	37.400	35.650		All	
Pipe (19)	37.110	35.370		All	
Pipe (20)	37.020	35.020		All	
Pipe (21)	37.010	34.840		All	
Pipe (22)	37.000	34.740		All	
Pipe (23)	37.190	34.650		All	
Pipe (24)	37.200	34.550		All	
Pipe (25)	37.140	34.340		Levels	
UU SEWER 1	36.840	27.700		All	
Pipe (27)	37.110	35.370		All	
Pipe (28)	37.190	35.560		Levels	
Pipe (29)	37.170	34.810		Levels	

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Inflow Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Catchment Area	EX MH17		Time of Concentration	0.045	100	0	100	0.045
Catchment Area (1)	INT MH8		Time of Concentration	0.068	100	0	100	0.068
Catchment Area (2)	EX MH17		Time of Concentration	0.040	100	0	100	0.040
Catchment Area (3)	EX MH17		Time of Concentration	0.020	100	0	100	0.020
Catchment Area (4)	INT MH1		Time of Concentration	0.014	100	0	100	0.014
Catchment Area (9)	EX MH16		Time of Concentration	0.042	100	0	100	0.042
Catchment Area (10)	INT MH4		Time of Concentration	0.034	100	0	100	0.034
Catchment Area (11)	EX MH16A		Time of Concentration	0.037	100	0	100	0.037
Catchment Area (12)	EX MH18		Time of Concentration	0.023	100	0	100	0.023
Catchment Area (13)	EX MH16A		Time of Concentration	0.028	100	0	100	0.028
Catchment Area (14)	EX MH16		Time of Concentration	0.018	100	0	100	0.018
Catchment Area (15)	EX MH15		Time of Concentration	0.013	100	0	100	0.013
Catchment Area (16)	EX MH10A		Time of Concentration	0.044	100	0	100	0.044
Catchment Area (17)	INT MH2		Time of Concentration	0.050	100	0	100	0.050
Catchment Area (19)	EX MH10A		Time of Concentration	0.031	100	0	100	0.031
Catchment Area (20)	EX MH10		Time of Concentration	0.027	100	0	100	0.027
Catchment Area (21)	EX MH7		Time of Concentration	0.010	100	0	100	0.010
TOTAL		**0.0**		**0.544**				**0.544**

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Network Design Criteria Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

FEH22

Type: FEH

Site Location	GB 385108 397575 SJ 85108 97575
Return Period (years)	100.0
Rainfall Version	2013
Data Type	Point

Pipe Options

Lock Slope Options	None
Design Options	Minimise Excavation
Design Level	Level Soffits
Min. Cover Depth (m)	1.200
Min. Slope (1:X)	500.00
Max. Slope (1:X)	40.00
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	☐
Reduce Channel Depths	☐

Pipe Size Library

Default

Add. Increment (mm)	75
Max. Diameter (mm)	0

Diameter (mm)	Min. Slope (1:X)	Max. Slope (1:X)
100	0.00	0.00
150	0.00	0.00

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Network Design Criteria Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

Manhole Options

Apply Offset	☐

Manhole Size Library

Default

Diameter / Width

Connection (mm)	Diameter / Length (m)	Width (m)
0	1.200	0.000
375	1.350	0.000
500	1.500	0.000
750	1.800	0.000

Additional Sizing

Connection (mm)	900
Diameter / Length (m)	0.900
Width (m)	0.000

Depth

Depth (m)	Diameter / Length (m)	Width (m)
0.000	1.050	0.000
1.500	1.200	0.000

Access

Depth (m)	Ladder Protrusion (mm)
0.000	130
3.000	230

Benching Requirements

Landing Width (mm)	500
Benching Width (mm)	225

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Outfall Details Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

Outfalls

Outfall	Outfall Type	Fixed Surcharged Level (m)	Level Curve
UU MH1103	Free Discharge		

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Rainfall Analysis Criteria	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Shortest
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall

FEH Descriptors

Type: FEH

Site Location	GB 385108 397575 SJ 85108 97575
Rainfall Version	2022
Summer	☑
Winter	☑

Return Period

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

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
180	360
240	480
360	720
480	960
600	1200
720	1440
960	1920
1440	2880
2160	4320
2880	5760
4320	8640
5760	11520
7200	14400
8640	17280
10080	20160

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

FEH Descriptors: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Inflow	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
Catchment Area	0.05	6.6	2.886
Catchment Area (1)	0.07	9.9	4.308
Catchment Area (2)	0.04	5.8	2.538
Catchment Area (3)	0.02	2.9	1.272
Catchment Area (9)	0.04	6.2	2.679
Catchment Area (10)	0.03	5.0	2.166
Catchment Area (11)	0.04	5.4	2.358
Catchment Area (12)	0.02	3.3	1.443
Catchment Area (13)	0.03	4.0	1.752
Catchment Area (14)	0.02	2.7	1.167
Catchment Area (15)	0.01	1.9	0.822
Catchment Area (16)	0.04	6.4	2.772
Catchment Area (17)	0.05	7.3	3.162
Catchment Area (19)	0.03	4.5	1.959
Catchment Area (20)	0.03	3.9	1.713
Catchment Area (21)	0.01	1.4	0.618
Catchment Area (4)	0.01	2.0	0.879

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

FEH Descriptors: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Inflow	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
Catchment Area	0.05	7.0	3.228
Catchment Area (1)	0.07	10.4	4.821
Catchment Area (2)	0.04	6.1	2.844
Catchment Area (3)	0.02	3.1	1.425
Catchment Area (9)	0.04	6.5	3.003
Catchment Area (10)	0.03	5.2	2.424
Catchment Area (11)	0.04	5.7	2.640
Catchment Area (12)	0.02	3.5	1.614
Catchment Area (13)	0.03	4.2	1.959
Catchment Area (14)	0.02	2.8	1.305
Catchment Area (15)	0.01	2.0	0.924
Catchment Area (16)	0.04	6.7	3.105
Catchment Area (17)	0.05	7.7	3.543
Catchment Area (19)	0.03	4.8	2.196
Catchment Area (20)	0.03	4.1	1.917
Catchment Area (21)	0.01	1.5	0.687
Catchment Area (4)	0.01	2.1	0.981

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

FEH Descriptors: 2 years: Increase Rainfall (%): +0: 60 mins: Summer

Inflow	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
Catchment Area	0.05	3.7	4.668
Catchment Area (1)	0.07	5.6	6.972
Catchment Area (2)	0.04	3.3	4.116
Catchment Area (3)	0.02	1.6	2.064
Catchment Area (9)	0.04	3.5	4.350
Catchment Area (10)	0.03	2.8	3.510
Catchment Area (11)	0.04	3.0	3.816
Catchment Area (12)	0.02	1.9	2.340
Catchment Area (13)	0.03	2.3	2.832
Catchment Area (14)	0.02	1.5	1.890
Catchment Area (15)	0.01	1.1	1.332
Catchment Area (16)	0.04	3.6	4.500
Catchment Area (17)	0.05	4.1	5.118
Catchment Area (19)	0.03	2.5	3.168
Catchment Area (20)	0.03	2.2	2.772
Catchment Area (21)	0.01	0.8	0.996
Catchment Area (4)	0.01	1.1	1.422

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

FEH Descriptors: 2 years: Increase Rainfall (%): +0: 60 mins: Winter

Inflow	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
Catchment Area	0.05	3.4	5.232
Catchment Area (1)	0.07	5.0	7.812
Catchment Area (2)	0.04	3.0	4.602
Catchment Area (3)	0.02	1.5	2.316
Catchment Area (9)	0.04	3.1	4.866
Catchment Area (10)	0.03	2.5	3.936
Catchment Area (11)	0.04	2.8	4.272
Catchment Area (12)	0.02	1.7	2.622
Catchment Area (13)	0.03	2.0	3.174
Catchment Area (14)	0.02	1.4	2.112
Catchment Area (15)	0.01	1.0	1.488
Catchment Area (16)	0.04	3.2	5.028
Catchment Area (17)	0.05	3.7	5.736
Catchment Area (19)	0.03	2.3	3.552
Catchment Area (20)	0.03	2.0	3.108
Catchment Area (21)	0.01	0.7	1.116
Catchment Area (4)	0.01	1.0	1.590

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

FEH Descriptors: 30 years: Increase Rainfall (%): +0: 15 mins: Summer

Inflow	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
Catchment Area	0.05	14.5	6.284
Catchment Area (1)	0.07	21.6	9.386
Catchment Area (2)	0.04	12.7	5.528
Catchment Area (3)	0.02	6.4	2.775
Catchment Area (9)	0.04	13.5	5.849
Catchment Area (10)	0.03	10.9	4.721
Catchment Area (11)	0.04	11.8	5.135
Catchment Area (12)	0.02	7.2	3.144
Catchment Area (13)	0.03	8.8	3.813
Catchment Area (14)	0.02	5.9	2.544
Catchment Area (15)	0.01	4.1	1.797
Catchment Area (16)	0.04	13.9	6.047
Catchment Area (17)	0.05	15.9	6.890
Catchment Area (19)	0.03	9.9	4.274
Catchment Area (20)	0.03	8.6	3.729
Catchment Area (21)	0.01	3.1	1.344
Catchment Area (4)	0.01	4.4	1.914

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

FEH Descriptors: 30 years: Increase Rainfall (%): +0: 15 mins: Winter

Inflow	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
Catchment Area	0.05	15.2	7.043
Catchment Area (1)	0.07	22.7	10.511
Catchment Area (2)	0.04	13.4	6.191
Catchment Area (3)	0.02	6.7	3.105
Catchment Area (9)	0.04	14.2	6.548
Catchment Area (10)	0.03	11.4	5.291
Catchment Area (11)	0.04	12.4	5.756
Catchment Area (12)	0.02	7.6	3.528
Catchment Area (13)	0.03	9.2	4.272
Catchment Area (14)	0.02	6.2	2.850
Catchment Area (15)	0.01	4.4	2.019
Catchment Area (16)	0.04	14.7	6.773
Catchment Area (17)	0.05	16.7	7.718
Catchment Area (19)	0.03	10.4	4.785
Catchment Area (20)	0.03	9.0	4.179
Catchment Area (21)	0.01	3.3	1.506
Catchment Area (4)	0.01	4.6	2.142

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

FEH Descriptors: 100 years: Increase Rainfall (%): +0: 15 mins: Summer

Inflow	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
Catchment Area	0.05	18.4	7.964
Catchment Area (1)	0.07	27.4	11.891
Catchment Area (2)	0.04	16.2	7.007
Catchment Area (3)	0.02	8.1	3.516
Catchment Area (9)	0.04	17.1	7.412
Catchment Area (10)	0.03	13.8	5.984
Catchment Area (11)	0.04	15.0	6.512
Catchment Area (12)	0.02	9.2	3.984
Catchment Area (13)	0.03	11.1	4.835
Catchment Area (14)	0.02	7.4	3.222
Catchment Area (15)	0.01	5.3	2.280
Catchment Area (16)	0.04	17.7	7.664
Catchment Area (17)	0.05	20.1	8.729
Catchment Area (19)	0.03	12.5	5.411
Catchment Area (20)	0.03	10.9	4.724
Catchment Area (21)	0.01	3.9	1.701
Catchment Area (4)	0.01	5.6	2.424

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

FEH Descriptors: 100 years: Increase Rainfall (%): +0: 15 mins: Winter

Inflow	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
Catchment Area	0.05	19.3	8.918
Catchment Area (1)	0.07	28.8	13.322
Catchment Area (2)	0.04	17.0	7.850
Catchment Area (3)	0.02	8.5	3.939
Catchment Area (9)	0.04	18.0	8.297
Catchment Area (10)	0.03	14.5	6.701
Catchment Area (11)	0.04	15.8	7.289
Catchment Area (12)	0.02	9.7	4.464
Catchment Area (13)	0.03	11.7	5.414
Catchment Area (14)	0.02	7.8	3.615
Catchment Area (15)	0.01	5.5	2.553
Catchment Area (16)	0.04	18.6	8.585
Catchment Area (17)	0.05	21.2	9.782
Catchment Area (19)	0.03	13.1	6.065
Catchment Area (20)	0.03	11.5	5.294
Catchment Area (21)	0.01	4.1	1.905
Catchment Area (4)	0.01	5.9	2.712



FEH Descriptors: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

Junction	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
EX MH17	37.130	36.110	36.156	0.046	15.4	0.052	0.000	15.3	6.696	OK
EX MH18	37.110	35.370	35.492	0.122	31.8	0.138	0.000	30.6	14.586	OK
INT MH5	37.400	35.650	35.712	0.062	13.4	0.049	0.000	13.1	6.453	OK
INT MH9	37.550	35.700	35.784	0.084	9.2	0.121	0.000	8.8	4.299	OK
INT MH8	37.550	35.790	35.875	0.085	9.9	0.123	0.000	9.2	4.335	OK
INT MH7	37.550	35.860	35.875	0.015	0.4	0.021	0.000	0.0	0.028	OK
INT MH6	37.530	35.930	35.930	0.000	0.0	0.000	0.000	0.0	0.000	OK
INT MH4	37.230	35.700	35.782	0.082	5.0	0.163	0.000	4.5	2.160	OK
EX MH10A	37.210	36.200	36.316	0.116	10.9	0.131	0.000	10.2	4.727	OK
EX MH10	37.190	36.100	36.154	0.054	14.2	0.061	0.000	13.9	6.437	OK
EX MH7	37.260	34.920	35.014	0.094	15.3	0.106	0.000	14.4	7.085	OK
EX MH8	37.210	34.990	35.013	0.023	0.3	0.026	0.000	0.0	0.035	OK
EX MH6	37.230	34.810	34.920	0.110	23.2	0.125	0.000	22.3	11.079	OK
EX MH5	37.200	34.650	34.752	0.102	22.3	0.115	0.000	21.6	11.067	OK
EX MH4	37.200	34.520	34.593	0.073	21.6	0.082	0.000	21.2	11.059	OK
MH2 (UU MH2102)	37.050	28.320	28.418	0.098	21.2	0.249	0.000	19.5	11.025	OK
EX MH3	37.200	34.830	34.830	0.000	0.0	0.000	0.000	0.0	0.000	OK
EX MH11	37.170	34.770	34.770	0.000	0.0	0.000	0.000	0.0	0.000	OK
MH12 (UU MH1102)	37.140	27.810	27.961	0.151	62.6	0.383	0.000	58.7	34.215	OK
EX MH13A	37.200	34.550	34.674	0.124	44.5	0.140	0.000	43.1	23.268	OK
EX MH13	37.190	34.650	34.788	0.138	45.3	0.157	0.000	44.5	23.287	OK
EX MH15	37.000	34.740	34.889	0.149	46.2	0.169	0.000	45.3	23.300	OK
EX MH16	37.010	34.840	34.980	0.140	45.6	0.158	0.000	44.3	22.489	OK
EX MH16A	37.020	35.020	35.192	0.172	40.0	0.414	0.000	36.8	18.656	OK
INT MH3	37.220	36.000	36.000	0.000	0.0	0.000	0.000	0.0	0.000	OK
INT MH1	37.230	35.850	35.894	0.044	9.0	0.037	0.000	8.8	4.037	OK
INT MH2	37.240	35.970	36.028	0.058	7.3	0.042	0.000	7.0	3.202	OK
BURIED MH	37.200	36.000	36.027	0.027	0.1	0.031	0.000	0.1	0.041	OK
UU MH1103	36.840	27.700	27.839	0.139	58.7	0.000	0.000	58.7	34.215	OK
EX RWP2		37.500	37.500	0.000	0.0			0.0	0.000	OK
EX RWP1		37.500	37.500	0.000	0.0			0.0	0.000	OK

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

FEH Descriptors: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

Junction	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
EX MH17	37.130	36.110	36.157	0.047	16.2	0.054	0.000	16.1	7.497	OK
EX MH18	37.110	35.370	35.496	0.126	33.4	0.142	0.000	32.4	16.329	OK
INT MH5	37.400	35.650	35.715	0.065	14.1	0.051	0.000	13.8	7.223	OK
INT MH9	37.550	35.700	35.787	0.087	9.7	0.126	0.000	9.3	4.812	OK
INT MH8	37.550	35.790	35.879	0.089	10.4	0.128	0.000	9.7	4.853	OK
INT MH7	37.550	35.860	35.878	0.018	0.3	0.026	0.000	0.0	0.034	OK
INT MH6	37.530	35.930	35.930	0.000	0.0	0.000	0.000	0.0	0.000	OK
INT MH4	37.230	35.700	35.786	0.086	5.2	0.171	0.000	4.8	2.418	OK
EX MH10A	37.210	36.200	36.320	0.120	11.5	0.136	0.000	10.8	5.297	OK
EX MH10	37.190	36.100	36.155	0.055	14.9	0.062	0.000	14.6	7.211	OK
EX MH7	37.260	34.920	35.018	0.098	16.1	0.111	0.000	15.3	7.933	OK
EX MH8	37.210	34.990	35.018	0.028	0.3	0.031	0.000	0.0	0.040	OK
EX MH6	37.230	34.810	34.925	0.115	24.6	0.130	0.000	23.8	12.405	OK
EX MH5	37.200	34.650	34.756	0.106	23.8	0.120	0.000	23.0	12.392	OK
EX MH4	37.200	34.520	34.596	0.076	23.0	0.086	0.000	22.6	12.384	OK
MH2 (UU MH2102)	37.050	28.320	28.422	0.102	22.6	0.259	0.000	20.9	12.349	OK
EX MH3	37.200	34.830	34.830	0.000	0.0	0.000	0.000	0.0	0.000	OK
EX MH11	37.170	34.770	34.770	0.000	0.0	0.000	0.000	0.0	0.000	OK
MH12 (UU MH1102)	37.140	27.810	27.966	0.156	67.0	0.398	0.000	63.2	38.331	OK
EX MH13A	37.200	34.550	34.678	0.128	47.3	0.145	0.000	46.0	26.062	OK
EX MH13	37.190	34.650	34.794	0.144	48.2	0.163	0.000	47.3	26.081	OK
EX MH15	37.000	34.740	34.895	0.155	49.1	0.175	0.000	48.2	26.094	OK
EX MH16	37.010	34.840	34.985	0.145	48.3	0.164	0.000	47.1	25.182	OK
EX MH16A	37.020	35.020	35.201	0.181	42.3	0.435	0.000	39.0	20.886	OK
INT MH3	37.220	36.000	36.000	0.000	0.0	0.000	0.000	0.0	0.000	OK
INT MH1	37.230	35.850	35.895	0.045	9.5	0.038	0.000	9.3	4.520	OK
INT MH2	37.240	35.970	36.029	0.059	7.7	0.044	0.000	7.4	3.586	OK
BURIED MH	37.200	36.000	36.029	0.029	0.1	0.033	0.000	0.1	0.043	OK
UU MH1103	36.840	27.700	27.844	0.144	63.2	0.000	0.000	63.3	38.331	OK
EX RWP2		37.500	37.500	0.000	0.0			0.0	0.000	OK
EX RWP1		37.500	37.500	0.000	0.0			0.0	0.000	OK



FEH Descriptors: 2 years: Increase Rainfall (%): +0: 60 mins: Summer

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

Junction	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
EX MH17	37.130	36.110	36.145	0.035	8.7	0.039	0.000	8.7	10.848	OK
EX MH18	37.110	35.370	35.459	0.089	18.9	0.101	0.000	18.9	23.664	OK
INT MH5	37.400	35.650	35.700	0.050	8.4	0.039	0.000	8.4	10.474	OK
INT MH9	37.550	35.700	35.765	0.065	5.6	0.093	0.000	5.6	6.969	OK
INT MH8	37.550	35.790	35.852	0.062	5.6	0.090	0.000	5.6	6.972	OK
INT MH7	37.550	35.860	35.860	0.000	0.0	0.000	0.000	0.0	0.000	OK
INT MH6	37.530	35.930	35.930	0.000	0.0	0.000	0.000	0.0	0.000	OK
INT MH4	37.230	35.700	35.758	0.058	2.8	0.115	0.000	2.8	3.507	OK
EX MH10A	37.210	36.200	36.283	0.083	6.1	0.094	0.000	6.1	7.666	OK
EX MH10	37.190	36.100	36.141	0.041	8.4	0.047	0.000	8.4	10.437	OK
EX MH7	37.260	34.920	34.988	0.068	9.2	0.077	0.000	9.2	11.432	OK
EX MH8	37.210	34.990	34.990	0.000	0.0	0.000	0.000	0.0	0.000	OK
EX MH6	37.230	34.810	34.895	0.085	14.4	0.096	0.000	14.4	17.970	OK
EX MH5	37.200	34.650	34.731	0.081	14.4	0.091	0.000	14.4	17.968	OK
EX MH4	37.200	34.520	34.578	0.058	14.4	0.066	0.000	14.4	17.966	OK
MH2 (UU MH2102)	37.050	28.320	28.403	0.083	14.4	0.210	0.000	14.4	17.963	OK
EX MH3	37.200	34.830	34.830	0.000	0.0	0.000	0.000	0.0	0.000	OK
EX MH11	37.170	34.770	34.770	0.000	0.0	0.000	0.000	0.0	0.000	OK
MH12 (UU MH1102)	37.140	27.810	27.938	0.128	44.7	0.326	0.000	44.7	55.831	OK
EX MH13A	37.200	34.550	34.650	0.100	30.3	0.113	0.000	30.3	37.871	OK
EX MH13	37.190	34.650	34.759	0.109	30.3	0.124	0.000	30.3	37.873	OK
EX MH15	37.000	34.740	34.856	0.116	30.3	0.131	0.000	30.3	37.874	OK
EX MH16	37.010	34.840	34.946	0.106	29.2	0.120	0.000	29.2	36.543	OK
EX MH16A	37.020	35.020	35.147	0.127	24.3	0.305	0.000	24.3	30.303	OK
INT MH3	37.220	36.000	36.000	0.000	0.0	0.000	0.000	0.0	0.000	OK
INT MH1	37.230	35.850	35.883	0.033	5.2	0.028	0.000	5.2	6.539	OK
INT MH2	37.240	35.970	36.013	0.043	4.1	0.031	0.000	4.1	5.136	OK
BURIED MH	37.200	36.000	36.013	0.013	0.1	0.015	0.000	0.0	0.018	OK
UU MH1103	36.840	27.700	27.821	0.121	44.7	0.000	0.000	44.7	55.831	OK
EX RWP2		37.500	37.500	0.000	0.0			0.0	0.000	OK
EX RWP1		37.500	37.500	0.000	0.0			0.0	0.000	OK

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

FEH Descriptors: 2 years: Increase Rainfall (%): +0: 60 mins: Winter

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

Junction	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
EX MH17	37.130	36.110	36.143	0.033	7.8	0.037	0.000	7.8	12.150	OK
EX MH18	37.110	35.370	35.454	0.084	17.1	0.095	0.000	17.1	26.515	OK
INT MH5	37.400	35.650	35.697	0.047	7.6	0.037	0.000	7.6	11.740	OK
INT MH9	37.550	35.700	35.761	0.061	5.0	0.088	0.000	5.0	7.809	OK
INT MH8	37.550	35.790	35.849	0.059	5.0	0.085	0.000	5.0	7.812	OK
INT MH7	37.550	35.860	35.860	0.000	0.0	0.000	0.000	0.0	0.000	OK
INT MH6	37.530	35.930	35.930	0.000	0.0	0.000	0.000	0.0	0.000	OK
INT MH4	37.230	35.700	35.754	0.054	2.5	0.108	0.000	2.5	3.933	OK
EX MH10A	37.210	36.200	36.279	0.079	5.5	0.089	0.000	5.5	8.578	OK
EX MH10	37.190	36.100	36.139	0.039	7.5	0.044	0.000	7.5	11.685	OK
EX MH7	37.260	34.920	34.983	0.063	8.3	0.072	0.000	8.3	12.800	OK
EX MH8	37.210	34.990	34.990	0.000	0.0	0.000	0.000	0.0	0.000	OK
EX MH6	37.230	34.810	34.890	0.080	13.0	0.090	0.000	13.0	20.124	OK
EX MH5	37.200	34.650	34.726	0.076	13.0	0.086	0.000	13.0	20.122	OK
EX MH4	37.200	34.520	34.575	0.055	13.0	0.062	0.000	13.0	20.121	OK
MH2 (UU MH2102)	37.050	28.320	28.398	0.078	13.0	0.199	0.000	13.0	20.118	OK
EX MH3	37.200	34.830	34.830	0.000	0.0	0.000	0.000	0.0	0.000	OK
EX MH11	37.170	34.770	34.770	0.000	0.0	0.000	0.000	0.0	0.000	OK
MH12 (UU MH1102)	37.140	27.810	27.931	0.121	40.3	0.309	0.000	40.3	62.528	OK
EX MH13A	37.200	34.550	34.644	0.094	27.3	0.107	0.000	27.3	42.414	OK
EX MH13	37.190	34.650	34.753	0.103	27.3	0.116	0.000	27.3	42.416	OK
EX MH15	37.000	34.740	34.849	0.109	27.3	0.123	0.000	27.3	42.417	OK
EX MH16	37.010	34.840	34.939	0.099	26.3	0.112	0.000	26.3	40.929	OK
EX MH16A	37.020	35.020	35.139	0.119	21.9	0.286	0.000	21.9	33.951	OK
INT MH3	37.220	36.000	36.000	0.000	0.0	0.000	0.000	0.0	0.000	OK
INT MH1	37.230	35.850	35.882	0.032	4.7	0.027	0.000	4.7	7.325	OK
INT MH2	37.240	35.970	36.011	0.041	3.7	0.030	0.000	3.7	5.750	OK
BURIED MH	37.200	36.000	36.011	0.011	0.0	0.012	0.000	0.0	0.014	OK
UU MH1103	36.840	27.700	27.815	0.115	40.3	0.000	0.000	40.3	62.528	OK
EX RWP2		37.500	37.500	0.000	0.0			0.0	0.000	OK
EX RWP1		37.500	37.500	0.000	0.0			0.0	0.000	OK

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		



FEH Descriptors: 30 years: Increase Rainfall (%): +0: 15 mins: Summer

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

Junction	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
EX MH17	37.130	36.110	36.180	0.070	33.6	0.080	0.000	33.5	14.583	OK
EX MH18	37.110	35.370	35.877	0.507	54.3	0.574	0.000	50.8	31.782	Surcharged
INT MH5	37.400	35.650	35.885	0.235	19.8	0.185	0.000	21.2	14.092	Surcharged
INT MH9	37.550	35.700	35.915	0.215	14.1	0.310	0.000	13.5	9.382	Surcharged
INT MH8	37.550	35.790	35.985	0.195	21.6	0.281	0.000	14.1	10.040	Surcharged
INT MH7	37.550	35.860	35.977	0.117	4.8	0.169	0.000	1.9	0.883	OK
INT MH6	37.530	35.930	35.956	0.026	2.2	0.026	0.000	0.2	0.224	OK
INT MH4	37.230	35.700	35.976	0.276	10.9	0.552	0.000	6.3	4.716	Surcharged
EX MH10A	37.210	36.200	36.638	0.438	23.8	0.495	0.000	20.6	10.320	Surcharged
EX MH10	37.190	36.100	36.182	0.082	29.2	0.092	0.000	28.8	14.041	OK
EX MH7	37.260	34.920	35.164	0.244	31.9	0.276	0.000	28.3	15.655	Surcharged
EX MH8	37.210	34.990	35.160	0.170	1.7	0.192	0.000	0.6	0.271	Surcharged
EX MH6	37.230	34.810	34.995	0.185	47.7	0.209	0.000	46.3	24.174	OK
EX MH5	37.200	34.650	34.812	0.162	46.3	0.183	0.000	45.0	24.161	OK
EX MH4	37.200	34.520	34.635	0.115	45.0	0.130	0.000	44.3	24.152	OK
MH2 (UU MH2102)	37.050	28.320	28.477	0.157	44.3	0.400	0.000	41.3	24.116	OK
EX MH3	37.200	34.830	34.830	0.000	0.0	0.000	0.000	0.0	0.000	OK
EX MH11	37.170	34.770	34.770	0.000	0.0	0.000	0.000	0.0	0.000	OK
MH12 (UU MH1102)	37.140	27.810	28.034	0.224	126.1	0.570	0.000	121.7	74.886	OK
EX MH13A	37.200	34.550	34.739	0.189	86.5	0.214	0.000	84.8	50.853	OK
EX MH13	37.190	34.650	34.866	0.216	87.7	0.244	0.000	86.5	50.873	OK
EX MH15	37.000	34.740	34.977	0.237	88.9	0.268	0.000	87.7	50.887	OK
EX MH16	37.010	34.840	35.068	0.228	85.7	0.258	0.000	84.8	49.103	OK
EX MH16A	37.020	35.020	35.565	0.545	71.4	1.309	0.000	66.4	40.735	Surcharged
INT MH3	37.220	36.000	36.000	0.000	0.0	0.000	0.000	0.0	0.000	OK
INT MH1	37.230	35.850	35.916	0.066	19.7	0.056	0.000	19.4	8.800	OK
INT MH2	37.240	35.970	36.062	0.092	15.9	0.068	0.000	15.3	6.989	OK
BURIED MH	37.200	36.000	36.062	0.062	0.3	0.070	0.000	0.3	0.100	OK
UU MH1103	36.840	27.700	27.902	0.202	121.7	0.000	0.000	121.8	74.886	OK
EX RWP2		37.500	37.500	0.000	0.0			0.0	0.000	OK
EX RWP1		37.500	37.500	0.000	0.0			0.0	0.000	OK



FEH Descriptors: 30 years: Increase Rainfall (%): +0: 15 mins: Winter

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

Junction	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
EX MH17	37.130	36.110	36.183	0.073	35.4	0.082	0.000	35.2	16.335	OK
EX MH18	37.110	35.370	35.933	0.563	55.2	0.637	0.000	52.1	35.615	Surcharged
INT MH5	37.400	35.650	35.941	0.291	28.4	0.229	0.000	29.8	15.788	Surcharged
INT MH9	37.550	35.700	35.964	0.264	16.2	0.380	0.000	19.9	10.508	Surcharged
INT MH8	37.550	35.790	36.022	0.232	22.7	0.335	0.000	16.2	11.375	Surcharged
INT MH7	37.550	35.860	36.013	0.153	7.1	0.220	0.000	6.8	1.186	Surcharged
INT MH6	37.530	35.930	36.007	0.077	3.7	0.077	0.000	2.7	0.318	OK
INT MH4	37.230	35.700	36.031	0.331	11.4	0.662	0.000	8.6	5.285	Surcharged
EX MH10A	37.210	36.200	36.694	0.494	25.0	0.559	0.000	21.9	11.556	Surcharged
EX MH10	37.190	36.100	36.185	0.085	30.9	0.096	0.000	30.5	15.726	OK
EX MH7	37.260	34.920	35.196	0.276	33.7	0.313	0.000	29.9	17.552	Surcharged
EX MH8	37.210	34.990	35.192	0.202	1.9	0.228	0.000	0.8	0.320	Surcharged
EX MH6	37.230	34.810	35.005	0.195	50.4	0.220	0.000	48.9	27.078	OK
EX MH5	37.200	34.650	34.819	0.169	48.9	0.191	0.000	47.7	27.064	OK
EX MH4	37.200	34.520	34.640	0.120	47.7	0.136	0.000	47.0	27.055	OK
MH2 (UU MH2102)	37.050	28.320	28.486	0.166	47.0	0.421	0.000	44.0	27.033	OK
EX MH3	37.200	34.830	34.830	0.000	0.0	0.000	0.000	0.0	0.000	OK
EX MH11	37.170	34.770	34.770	0.000	0.0	0.000	0.000	0.0	0.000	OK
MH12 (UU MH1102)	37.140	27.810	28.042	0.232	133.0	0.589	0.000	129.5	83.925	OK
EX MH13A	37.200	34.550	34.745	0.195	90.5	0.221	0.000	88.9	56.988	OK
EX MH13	37.190	34.650	34.873	0.223	91.5	0.253	0.000	90.5	57.009	OK
EX MH15	37.000	34.740	34.986	0.246	92.5	0.278	0.000	91.5	57.023	OK
EX MH16	37.010	34.840	35.076	0.236	89.0	0.267	0.000	88.2	55.017	OK
EX MH16A	37.020	35.020	35.609	0.589	73.8	1.413	0.000	68.7	45.644	Surcharged
INT MH3	37.220	36.000	36.000	0.000	0.0	0.000	0.000	0.0	0.000	OK
INT MH1	37.230	35.850	35.918	0.068	20.8	0.058	0.000	20.5	9.855	OK
INT MH2	37.240	35.970	36.066	0.096	16.7	0.070	0.000	16.2	7.823	OK
BURIED MH	37.200	36.000	36.066	0.066	0.3	0.074	0.000	0.3	0.105	OK
UU MH1103	36.840	27.700	27.909	0.209	129.5	0.000	0.000	129.5	83.925	OK
EX RWP2		37.500	37.500	0.000	0.0			0.0	0.000	OK
EX RWP1		37.500	37.500	0.000	0.0			0.0	0.000	OK



FEH Descriptors: 100 years: Increase Rainfall (%): +0: 15 mins: Summer

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

Junction	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
EX MH17	37.130	36.110	36.310	0.200	42.6	0.226	0.000	34.2	18.483	Surcharged
EX MH18	37.110	35.370	36.060	0.690	57.7	0.781	0.000	53.3	40.289	Surcharged
INT MH5	37.400	35.650	36.076	0.426	33.0	0.336	0.000	37.1	17.862	Surcharged
INT MH9	37.550	35.700	36.107	0.407	18.5	0.586	0.000	23.1	11.888	Surcharged
INT MH8	37.550	35.790	36.208	0.418	27.4	0.601	0.000	18.5	13.396	Surcharged
INT MH7	37.550	35.860	36.219	0.359	9.3	0.517	0.000	7.8	2.116	Surcharged
INT MH6	37.530	35.930	36.222	0.292	4.1	0.292	0.000	3.5	0.605	Surcharged
INT MH4	37.230	35.700	36.192	0.492	13.8	0.984	0.000	9.9	5.977	Surcharged
EX MH10A	37.210	36.200	36.885	0.685	30.1	0.774	0.000	26.0	13.075	Surcharged
EX MH10	37.190	36.100	36.196	0.096	36.9	0.108	0.000	36.4	17.787	OK
EX MH7	37.260	34.920	35.319	0.399	40.4	0.451	0.000	33.9	20.027	Surcharged
EX MH8	37.210	34.990	35.306	0.316	3.2	0.357	0.000	1.1	0.536	Surcharged
EX MH6	37.230	34.810	35.073	0.263	58.5	0.298	0.000	54.8	30.627	Surcharged
EX MH5	37.200	34.650	34.837	0.187	54.8	0.212	0.000	54.2	30.616	OK
EX MH4	37.200	34.520	34.651	0.131	54.2	0.148	0.000	53.4	30.606	OK
MH2 (UU MH2102)	37.050	28.320	28.512	0.192	53.4	0.489	0.000	48.7	30.595	OK
EX MH3	37.200	34.830	34.830	0.000	0.0	0.000	0.000	0.0	0.000	OK
EX MH11	37.170	34.770	34.770	0.000	0.0	0.000	0.000	0.0	0.000	OK
MH12 (UU MH1102)	37.140	27.810	28.057	0.247	147.8	0.628	0.000	145.6	94.967	OK
EX MH13A	37.200	34.550	34.762	0.212	100.8	0.239	0.000	99.1	64.478	OK
EX MH13	37.190	34.650	34.894	0.244	101.9	0.276	0.000	100.8	64.499	OK
EX MH15	37.000	34.740	35.018	0.278	103.4	0.315	0.000	101.9	64.513	OK
EX MH16	37.010	34.840	35.106	0.266	99.2	0.301	0.000	98.1	62.246	OK
EX MH16A	37.020	35.020	35.728	0.708	79.5	1.699	0.000	74.7	51.640	Surcharged
INT MH3	37.220	36.000	36.000	0.000	0.0	0.000	0.000	0.0	0.000	OK
INT MH1	37.230	35.850	35.926	0.076	25.0	0.064	0.000	24.7	11.143	OK
INT MH2	37.240	35.970	36.079	0.109	20.1	0.080	0.000	19.4	8.857	OK
BURIED MH	37.200	36.000	36.079	0.079	0.4	0.089	0.000	0.3	0.129	OK
UU MH1103	36.840	27.700	27.923	0.223	145.6	0.000	0.000	145.6	94.967	OK
EX RWP2		37.500	37.500	0.000	0.0			0.0	0.000	OK
EX RWP1		37.500	37.500	0.000	0.0			0.0	0.000	OK



FEH Descriptors: 100 years: Increase Rainfall (%): +0: 15 mins: Winter

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

Junction	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
EX MH17	37.130	36.110	36.442	0.332	44.8	0.375	0.000	38.2	20.703	Surcharged
EX MH18	37.110	35.370	36.139	0.769	60.0	0.870	0.000	57.4	45.137	Surcharged
INT MH5	37.400	35.650	36.147	0.497	33.8	0.392	0.000	37.8	20.008	Surcharged
INT MH9	37.550	35.700	36.241	0.541	18.7	0.779	0.000	23.6	13.318	Surcharged
INT MH8	37.550	35.790	36.370	0.580	28.8	0.836	0.000	18.7	15.142	Surcharged
INT MH7	37.550	35.860	36.379	0.519	8.9	0.748	0.000	6.8	2.572	Surcharged
INT MH6	37.530	35.930	36.382	0.452	3.9	0.452	0.000	3.0	0.746	Surcharged
INT MH4	37.230	35.700	36.336	0.636	14.5	1.272	0.000	10.2	6.693	Surcharged
EX MH10A	37.210	36.200	36.957	0.757	31.7	0.856	0.000	27.6	14.649	Flood Risk
EX MH10	37.190	36.100	36.200	0.100	39.0	0.113	0.000	38.5	19.932	OK
EX MH7	37.260	34.920	35.384	0.464	42.6	0.525	0.000	35.3	22.459	Surcharged
EX MH8	37.210	34.990	35.368	0.378	3.7	0.427	0.000	2.0	0.620	Surcharged
EX MH6	37.230	34.810	35.119	0.309	61.3	0.350	0.000	59.1	34.316	Surcharged
EX MH5	37.200	34.650	34.847	0.197	59.1	0.223	0.000	56.9	34.305	OK
EX MH4	37.200	34.520	34.655	0.135	56.9	0.153	0.000	55.9	34.295	OK
MH2 (UU MH2102)	37.050	28.320	28.542	0.222	55.9	0.566	0.000	48.6	34.282	OK
EX MH3	37.200	34.830	34.830	0.000	0.0	0.000	0.000	0.0	0.000	OK
EX MH11	37.170	34.770	34.770	0.000	0.0	0.000	0.000	0.0	0.000	OK
MH12 (UU MH1102)	37.140	27.810	28.059	0.249	150.2	0.634	0.000	149.4	106.404	OK
EX MH13A	37.200	34.550	34.767	0.217	104.2	0.246	0.000	102.9	72.228	OK
EX MH13	37.190	34.650	34.901	0.251	105.1	0.284	0.000	104.2	72.250	OK
EX MH15	37.000	34.740	35.033	0.293	106.6	0.331	0.000	105.1	72.264	OK
EX MH16	37.010	34.840	35.121	0.281	102.5	0.317	0.000	101.1	69.724	OK
EX MH16A	37.020	35.020	35.775	0.755	83.1	1.812	0.000	76.7	57.841	Surcharged
INT MH3	37.220	36.000	36.000	0.000	0.0	0.000	0.000	0.0	0.000	OK
INT MH1	37.230	35.850	35.929	0.079	26.3	0.066	0.000	26.0	12.484	OK
INT MH2	37.240	35.970	36.083	0.113	21.2	0.083	0.000	20.4	9.917	OK
BURIED MH	37.200	36.000	36.083	0.083	0.4	0.094	0.000	0.3	0.136	OK
UU MH1103	36.840	27.700	27.926	0.226	149.4	0.000	0.000	149.4	106.404	OK
EX RWP2		37.500	37.500	0.000	0.0			0.0	0.000	OK
EX RWP1		37.500	37.500	0.000	0.0			0.0	0.000	OK

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

FEH Descriptors: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Connection	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m^3)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe	Pipe	EX MH10A	EX MH10	37.210	36.316	0.085	4.727	1.0	0.95	10.2	OK
Pipe (1)	Pipe	EX MH10	EX MH7	37.190	36.154	0.074	6.437	1.6	0.27	13.9	OK
Pipe (2)	Pipe	EX MH7	EX MH6	37.260	35.014	0.102	7.049	1.1	0.51	14.4	OK
Pipe (3)	Pipe	EX MH6	EX MH5	37.230	34.920	0.106	11.079	1.2	0.42	22.3	OK
Pipe (4)	Pipe	EX MH5	EX MH4	37.200	34.752	0.087	11.067	1.5	0.36	21.6	OK
Pipe (5)	Pipe	EX MH3	EX MH4	37.200	34.830	0.036	0.000	0.0	0	0.0	OK
Pipe (6)	Pipe	EX MH4	MH2 (UU MH2102)	37.200	34.593	0.067	11.059	2.1	0.16	21.2	OK
UU SEWER	Pipe	MH2 (UU MH2102)	MH12 (UU MH1102)	37.050	28.418	0.124	11.025	0.9	0.39	19.5	OK
Pipe (8)	Pipe	EX MH11	MH12 (UU MH1102)	37.170	34.770	0.000	0.000	0.0	0	0.0	OK
Pipe (9)	Pipe	BURIED MH	INT MH2	37.200	36.027	0.043	0.000	0.0	0	0.1	OK
Pipe (10)	Pipe	INT MH2	INT MH1	37.240	36.028	0.051	3.158	1.3	0.26	7.0	OK
Pipe (11)	Pipe	INT MH1	EX MH6	37.230	35.894	0.077	4.037	1.0	0.18	8.8	OK
Pipe (12)	Pipe	EX MH8	EX MH7	37.210	35.013	0.058	0.000	0.0	0	0.0	OK
Pipe (13)	Pipe	INT MH3	INT MH1	37.220	36.000	0.022	0.000	0.0	0	0.0	OK
Pipe (14)	Pipe	INT MH6	INT MH7	37.530	35.930	0.007	0.000	0.0	0	0.0	OK
Pipe (15)	Pipe	INT MH7	INT MH8	37.550	35.875	0.050	0.000	0.0	0	0.0	OK
Pipe (16)	Pipe	INT MH8	INT MH9	37.550	35.875	0.085	4.304	0.9	0.53	9.2	OK
Pipe (17)	Pipe	INT MH9	INT MH5	37.550	35.784	0.073	4.299	1.0	0.56	8.8	OK
Pipe (18)	Pipe	INT MH4	INT MH5	37.230	35.782	0.072	2.160	0.8	0.96	4.5	OK
Pipe (19)	Pipe	INT MH5	EX MH18	37.400	35.712	0.092	6.453	0.9	0.17	13.1	OK
Pipe (20)	Pipe	EX MH18	EX MH16A	37.110	35.492	0.147	14.586	1.1	0.53	30.6	OK
Pipe (21)	Pipe	EX MH16A	EX MH16	37.020	35.192	0.156	18.656	1.3	0.86	36.8	OK
Pipe (22)	Pipe	EX MH16	EX MH15	37.010	34.980	0.144	22.489	1.3	0.28	44.3	OK
Pipe (23)	Pipe	EX MH15	EX MH13	37.000	34.889	0.144	23.300	1.4	0.38	45.3	OK
Pipe (24)	Pipe	EX MH13	EX MH13A	37.190	34.788	0.131	23.287	1.5	0.33	44.5	OK
Pipe (25)	Pipe	EX MH13A	MH12 (UU MH1102)	37.200	34.674	0.117	23.268	1.7	0.29	43.1	OK
UU SEWER 1	Pipe	MH12 (UU MH1102)	UU MH1103	37.140	27.961	0.145	34.215	1.1	0.13	58.7	OK

Pipe (27)	Pipe	EX MH17	EX MH18	37.130	36.156	0.084	6.696	1.5	0.21	15.3	OK
Pipe (28)	Pipe	EX RWP2	EX MH13	0.100	37.500	0.000	0.000	0.0	0	0.0	OK
Pipe (29)	Pipe	EX RWP1	EX MH11	0.100	37.500	0.000	0.000	0.0	0	0.0	OK

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

FEH Descriptors: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Connection	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe	Pipe	EX MH10A	EX MH10	37.210	36.320	0.088	5.297	1.0	1	10.8	OK
Pipe (1)	Pipe	EX MH10	EX MH7	37.190	36.155	0.077	7.211	1.6	0.29	14.6	OK
Pipe (2)	Pipe	EX MH7	EX MH6	37.260	35.018	0.106	7.892	1.1	0.54	15.3	OK
Pipe (3)	Pipe	EX MH6	EX MH5	37.230	34.925	0.110	12.405	1.2	0.45	23.8	OK
Pipe (4)	Pipe	EX MH5	EX MH4	37.200	34.756	0.091	12.392	1.5	0.38	23.0	OK
Pipe (5)	Pipe	EX MH3	EX MH4	37.200	34.830	0.038	0.000	0.0	0	0.0	OK
Pipe (6)	Pipe	EX MH4	MH2 (UU MH2102)	37.200	34.596	0.069	12.384	2.2	0.17	22.6	OK
UU SEWER	Pipe	MH2 (UU MH2102)	MH12 (UU MH1102)	37.050	28.422	0.129	12.349	0.9	0.42	20.9	OK
Pipe (8)	Pipe	EX MH11	MH12 (UU MH1102)	37.170	34.770	0.000	0.000	0.0	0	0.0	OK
Pipe (9)	Pipe	BURIED MH	INT MH2	37.200	36.029	0.044	0.000	0.0	0.01	0.1	OK
Pipe (10)	Pipe	INT MH2	INT MH1	37.240	36.029	0.052	3.539	1.4	0.28	7.4	OK
Pipe (11)	Pipe	INT MH1	EX MH6	37.230	35.895	0.080	4.520	1.0	0.19	9.3	OK
Pipe (12)	Pipe	EX MH8	EX MH7	37.210	35.018	0.063	0.000	0.0	0	0.0	OK
Pipe (13)	Pipe	INT MH3	INT MH1	37.220	36.000	0.022	0.000	0.0	0	0.0	OK
Pipe (14)	Pipe	INT MH6	INT MH7	37.530	35.930	0.009	0.000	0.0	0	0.0	OK
Pipe (15)	Pipe	INT MH7	INT MH8	37.550	35.878	0.054	0.000	0.0	0	0.0	OK
Pipe (16)	Pipe	INT MH8	INT MH9	37.550	35.879	0.088	4.818	0.9	0.57	9.7	OK
Pipe (17)	Pipe	INT MH9	INT MH5	37.550	35.787	0.076	4.812	1.0	0.59	9.3	OK
Pipe (18)	Pipe	INT MH4	INT MH5	37.230	35.786	0.075	2.418	0.8	1.01	4.8	OK
Pipe (19)	Pipe	INT MH5	EX MH18	37.400	35.715	0.095	7.223	0.9	0.18	13.8	OK
Pipe (20)	Pipe	EX MH18	EX MH16A	37.110	35.496	0.153	16.329	1.1	0.56	32.4	OK
Pipe (21)	Pipe	EX MH16A	EX MH16	37.020	35.201	0.163	20.886	1.3	0.91	39.0	OK
Pipe (22)	Pipe	EX MH16	EX MH15	37.010	34.985	0.150	25.182	1.3	0.3	47.1	OK
Pipe (23)	Pipe	EX MH15	EX MH13	37.000	34.895	0.149	26.094	1.4	0.4	48.2	OK
Pipe (24)	Pipe	EX MH13	EX MH13A	37.190	34.794	0.136	26.081	1.5	0.35	47.3	OK
Pipe (25)	Pipe	EX MH13A	MH12 (UU MH1102)	37.200	34.678	0.122	26.062	1.7	0.31	46.0	OK
UU SEWER 1	Pipe	MH12 (UU MH1102)	UU MH1103	37.140	27.966	0.150	38.331	1.2	0.14	63.2	OK

Pipe (27)	Pipe	EX MH17	EX MH18	37.130	36.157	0.087	7.497	1.5	0.22	16.1	OK
Pipe (28)	Pipe	EX RWP2	EX MH13	0.100	37.500	0.000	0.000	0.0	0	0.0	OK
Pipe (29)	Pipe	EX RWP1	EX MH11	0.100	37.500	0.000	0.000	0.0	0	0.0	OK

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

FEH Descriptors: 2 years: Increase Rainfall (%): +0: 60 mins: Summer

Connection	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe	Pipe	EX MH10A	EX MH10	37.210	36.283	0.062	7.666	0.9	0.57	6.1	OK
Pipe (1)	Pipe	EX MH10	EX MH7	37.190	36.141	0.054	10.437	1.4	0.17	8.4	OK
Pipe (2)	Pipe	EX MH7	EX MH6	37.260	34.988	0.076	11.432	1.0	0.32	9.2	OK
Pipe (3)	Pipe	EX MH6	EX MH5	37.230	34.895	0.083	17.970	1.1	0.27	14.4	OK
Pipe (4)	Pipe	EX MH5	EX MH4	37.200	34.731	0.069	17.968	1.4	0.24	14.4	OK
Pipe (5)	Pipe	EX MH3	EX MH4	37.200	34.830	0.029	0.000	0.0	0	0.0	OK
Pipe (6)	Pipe	EX MH4	MH2 (UU MH2102)	37.200	34.578	0.054	17.966	2.0	0.11	14.4	OK
UU SEWER	Pipe	MH2 (UU MH2102)	MH12 (UU MH1102)	37.050	28.403	0.105	17.963	0.8	0.29	14.4	OK
Pipe (8)	Pipe	EX MH11	MH12 (UU MH1102)	37.170	34.770	0.000	0.000	0.0	0	0.0	OK
Pipe (9)	Pipe	BURIED MH	INT MH2	37.200	36.013	0.028	0.000	0.0	0	0.0	OK
Pipe (10)	Pipe	INT MH2	INT MH1	37.240	36.013	0.038	5.116	1.2	0.15	4.1	OK
Pipe (11)	Pipe	INT MH1	EX MH6	37.230	35.883	0.059	6.539	0.8	0.11	5.2	OK
Pipe (12)	Pipe	EX MH8	EX MH7	37.210	34.990	0.034	0.000	0.0	0	0.0	OK
Pipe (13)	Pipe	INT MH3	INT MH1	37.220	36.000	0.017	0.000	0.0	0	0.0	OK
Pipe (14)	Pipe	INT MH6	INT MH7	37.530	35.930	0.000	0.000	0.0	0	0.0	OK
Pipe (15)	Pipe	INT MH7	INT MH8	37.550	35.860	0.031	0.000	0.0	0	0.0	OK
Pipe (16)	Pipe	INT MH8	INT MH9	37.550	35.852	0.064	6.972	0.8	0.33	5.6	OK
Pipe (17)	Pipe	INT MH9	INT MH5	37.550	35.765	0.057	6.969	0.9	0.36	5.6	OK
Pipe (18)	Pipe	INT MH4	INT MH5	37.230	35.758	0.054	3.507	0.7	0.59	2.8	OK
Pipe (19)	Pipe	INT MH5	EX MH18	37.400	35.700	0.069	10.474	0.8	0.11	8.4	OK
Pipe (20)	Pipe	EX MH18	EX MH16A	37.110	35.459	0.108	23.664	1.0	0.33	18.9	OK
Pipe (21)	Pipe	EX MH16A	EX MH16	37.020	35.147	0.117	30.303	1.2	0.57	24.3	OK
Pipe (22)	Pipe	EX MH16	EX MH15	37.010	34.946	0.111	36.543	1.2	0.19	29.2	OK
Pipe (23)	Pipe	EX MH15	EX MH13	37.000	34.856	0.113	37.874	1.3	0.25	30.3	OK
Pipe (24)	Pipe	EX MH13	EX MH13A	37.190	34.759	0.105	37.873	1.4	0.23	30.3	OK
Pipe (25)	Pipe	EX MH13A	MH12 (UU MH1102)	37.200	34.650	0.096	37.871	1.6	0.21	30.3	OK
UU SEWER 1	Pipe	MH12 (UU MH1102)	UU MH1103	37.140	27.938	0.125	55.831	1.1	0.1	44.7	OK

Pipe (27)	Pipe	EX MH17	EX MH18	37.130	36.145	0.062	10.848	1.3	0.12	8.7	OK
Pipe (28)	Pipe	EX RWP2	EX MH13	0.100	37.500	0.000	0.000	0.0	0	0.0	OK
Pipe (29)	Pipe	EX RWP1	EX MH11	0.100	37.500	0.000	0.000	0.0	0	0.0	OK

FEH Descriptors: 2 years: Increase Rainfall (%): +0: 60 mins: Winter

Connection	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe	Pipe	EX MH10A	EX MH10	37.210	36.279	0.059	8.578	0.9	0.51	5.5	OK
Pipe (1)	Pipe	EX MH10	EX MH7	37.190	36.139	0.051	11.685	1.4	0.15	7.5	OK
Pipe (2)	Pipe	EX MH7	EX MH6	37.260	34.983	0.071	12.800	1.0	0.29	8.3	OK
Pipe (3)	Pipe	EX MH6	EX MH5	37.230	34.890	0.078	20.124	1.1	0.24	13.0	OK
Pipe (4)	Pipe	EX MH5	EX MH4	37.200	34.726	0.065	20.122	1.3	0.22	13.0	OK
Pipe (5)	Pipe	EX MH3	EX MH4	37.200	34.830	0.027	0.000	0.0	0	0.0	OK
Pipe (6)	Pipe	EX MH4	MH2 (UU MH2102)	37.200	34.575	0.051	20.121	1.9	0.1	13.0	OK
UU SEWER	Pipe	MH2 (UU MH2102)	MH12 (UU MH1102)	37.050	28.398	0.100	20.118	0.8	0.26	13.0	OK
Pipe (8)	Pipe	EX MH11	MH12 (UU MH1102)	37.170	34.770	0.000	0.000	0.0	0	0.0	OK
Pipe (9)	Pipe	BURIED MH	INT MH2	37.200	36.011	0.026	0.000	0.0	0	0.0	OK
Pipe (10)	Pipe	INT MH2	INT MH1	37.240	36.011	0.036	5.734	1.1	0.14	3.7	OK
Pipe (11)	Pipe	INT MH1	EX MH6	37.230	35.882	0.056	7.325	0.8	0.1	4.7	OK
Pipe (12)	Pipe	EX MH8	EX MH7	37.210	34.990	0.032	0.000	0.0	0	0.0	OK
Pipe (13)	Pipe	INT MH3	INT MH1	37.220	36.000	0.016	0.000	0.0	0	0.0	OK
Pipe (14)	Pipe	INT MH6	INT MH7	37.530	35.930	0.000	0.000	0.0	0	0.0	OK
Pipe (15)	Pipe	INT MH7	INT MH8	37.550	35.860	0.029	0.000	0.0	0	0.0	OK
Pipe (16)	Pipe	INT MH8	INT MH9	37.550	35.849	0.060	7.812	0.8	0.29	5.0	OK
Pipe (17)	Pipe	INT MH9	INT MH5	37.550	35.761	0.054	7.809	0.9	0.32	5.0	OK
Pipe (18)	Pipe	INT MH4	INT MH5	37.230	35.754	0.051	3.933	0.6	0.53	2.5	OK
Pipe (19)	Pipe	INT MH5	EX MH18	37.400	35.697	0.066	11.740	0.8	0.1	7.6	OK
Pipe (20)	Pipe	EX MH18	EX MH16A	37.110	35.454	0.102	26.515	1.0	0.3	17.1	OK
Pipe (21)	Pipe	EX MH16A	EX MH16	37.020	35.139	0.109	33.951	1.1	0.51	21.9	OK
Pipe (22)	Pipe	EX MH16	EX MH15	37.010	34.939	0.104	40.929	1.2	0.17	26.3	OK
Pipe (23)	Pipe	EX MH15	EX MH13	37.000	34.849	0.106	42.417	1.2	0.23	27.3	OK
Pipe (24)	Pipe	EX MH13	EX MH13A	37.190	34.753	0.099	42.416	1.3	0.2	27.3	OK
Pipe (25)	Pipe	EX MH13A	MH12 (UU MH1102)	37.200	34.644	0.091	42.414	1.5	0.19	27.3	OK
UU SEWER 1	Pipe	MH12 (UU MH1102)	UU MH1103	37.140	27.931	0.118	62.528	1.0	0.09	40.3	OK

Pipe (27)	Pipe	EX MH17	EX MH18	37.130	36.143	0.058	12.150	1.2	0.11	7.8	OK
Pipe (28)	Pipe	EX RWP2	EX MH13	0.100	37.500	0.000	0.000	0.0	0	0.0	OK
Pipe (29)	Pipe	EX RWP1	EX MH11	0.100	37.500	0.000	0.000	0.0	0	0.0	OK

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

FEH Descriptors: 30 years: Increase Rainfall (%): +0: 15 mins: Summer

Connection	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe	Pipe	EX MH10A	EX MH10	37.210	36.638	0.150	10.320	1.2	1.9	20.6	Surcharged
Pipe (1)	Pipe	EX MH10	EX MH7	37.190	36.182	0.150	14.041	1.6	0.57	28.8	OK
Pipe (2)	Pipe	EX MH7	EX MH6	37.260	35.164	0.150	15.382	1.6	1	28.3	Surcharged
Pipe (3)	Pipe	EX MH6	EX MH5	37.230	34.995	0.173	24.174	1.4	0.87	46.3	OK
Pipe (4)	Pipe	EX MH5	EX MH4	37.200	34.812	0.139	24.161	1.8	0.75	45.0	OK
Pipe (5)	Pipe	EX MH3	EX MH4	37.200	34.830	0.058	0.000	0.0	0	0.0	OK
Pipe (6)	Pipe	EX MH4	MH2 (UU MH2102)	37.200	34.635	0.103	24.152	2.5	0.34	44.3	OK
UU SEWER	Pipe	MH2 (UU MH2102)	MH12 (UU MH1102)	37.050	28.477	0.191	24.116	1.1	0.83	41.3	OK
Pipe (8)	Pipe	EX MH11	MH12 (UU MH1102)	37.170	34.770	0.000	0.000	0.0	0	0.0	OK
Pipe (9)	Pipe	BURIED MH	INT MH2	37.200	36.062	0.077	0.000	0.1	0.02	0.3	OK
Pipe (10)	Pipe	INT MH2	INT MH1	37.240	36.062	0.079	6.886	1.6	0.57	15.3	OK
Pipe (11)	Pipe	INT MH1	EX MH6	37.230	35.916	0.126	8.800	1.2	0.4	19.4	OK
Pipe (12)	Pipe	EX MH8	EX MH7	37.210	35.160	0.100	0.000	0.1	0.06	0.6	Surcharged
Pipe (13)	Pipe	INT MH3	INT MH1	37.220	36.000	0.033	0.000	0.0	0	0.0	OK
Pipe (14)	Pipe	INT MH6	INT MH7	37.530	35.956	0.072	0.000	0.2	0.01	0.2	OK
Pipe (15)	Pipe	INT MH7	INT MH8	37.550	35.977	0.150	0.000	0.3	0.07	1.9	OK
Pipe (16)	Pipe	INT MH8	INT MH9	37.550	35.985	0.150	9.380	0.9	0.82	14.1	Surcharged
Pipe (17)	Pipe	INT MH9	INT MH5	37.550	35.915	0.150	9.382	1.2	0.86	13.5	Surcharged
Pipe (18)	Pipe	INT MH4	INT MH5	37.230	35.976	0.100	4.716	0.8	1.33	6.3	Surcharged
Pipe (19)	Pipe	INT MH5	EX MH18	37.400	35.885	0.225	14.092	0.9	0.27	21.2	Surcharged
Pipe (20)	Pipe	EX MH18	EX MH16A	37.110	35.877	0.225	31.782	1.3	0.88	50.8	Surcharged
Pipe (21)	Pipe	EX MH16A	EX MH16	37.020	35.565	0.225	40.735	1.7	1.55	66.4	Surcharged
Pipe (22)	Pipe	EX MH16	EX MH15	37.010	35.068	0.233	49.103	1.4	0.54	84.8	OK
Pipe (23)	Pipe	EX MH15	EX MH13	37.000	34.977	0.227	50.887	1.5	0.73	87.7	OK
Pipe (24)	Pipe	EX MH13	EX MH13A	37.190	34.866	0.203	50.873	1.7	0.64	86.5	OK
Pipe (25)	Pipe	EX MH13A	MH12 (UU MH1102)	37.200	34.739	0.176	50.853	2.0	0.58	84.8	OK

UU SEWER 1	Pipe	MH12 (UU MH1102)	UU MH1103	37.140	28.034	0.213	74.886	1.4	0.26	121.7	OK
Pipe (27)	Pipe	EX MH17	EX MH18	37.130	36.180	0.150	14.583	1.9	0.45	33.5	OK
Pipe (28)	Pipe	EX RWP2	EX MH13	0.100	37.500	0.000	0.000	0.0	0	0.0	OK
Pipe (29)	Pipe	EX RWP1	EX MH11	0.100	37.500	0.000	0.000	0.0	0	0.0	OK

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

FEH Descriptors: 30 years: Increase Rainfall (%): +0: 15 mins: Winter

Connection	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m^3)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe	Pipe	EX MH10A	EX MH10	37.210	36.694	0.150	11.556	1.2	2.03	21.9	Surcharged
Pipe (1)	Pipe	EX MH10	EX MH7	37.190	36.185	0.150	15.726	1.7	0.6	30.5	OK
Pipe (2)	Pipe	EX MH7	EX MH6	37.260	35.196	0.150	17.230	1.7	1.06	29.9	Surcharged
Pipe (3)	Pipe	EX MH6	EX MH5	37.230	35.005	0.182	27.078	1.4	0.92	48.9	OK
Pipe (4)	Pipe	EX MH5	EX MH4	37.200	34.819	0.144	27.064	1.8	0.79	47.7	OK
Pipe (5)	Pipe	EX MH3	EX MH4	37.200	34.830	0.060	0.000	0.0	0	0.0	OK
Pipe (6)	Pipe	EX MH4	MH2 (UU MH2102)	37.200	34.640	0.107	27.055	2.5	0.36	47.0	OK
UU SEWER	Pipe	MH2 (UU MH2102)	MH12 (UU MH1102)	37.050	28.486	0.199	27.033	1.2	0.88	44.0	OK
Pipe (8)	Pipe	EX MH11	MH12 (UU MH1102)	37.170	34.770	0.000	0.000	0.0	0	0.0	OK
Pipe (9)	Pipe	BURIED MH	INT MH2	37.200	36.066	0.081	0.000	0.1	0.02	0.3	OK
Pipe (10)	Pipe	INT MH2	INT MH1	37.240	36.066	0.082	7.714	1.6	0.6	16.2	OK
Pipe (11)	Pipe	INT MH1	EX MH6	37.230	35.918	0.132	9.855	1.2	0.43	20.5	OK
Pipe (12)	Pipe	EX MH8	EX MH7	37.210	35.192	0.100	0.000	0.2	0.08	0.8	Surcharged
Pipe (13)	Pipe	INT MH3	INT MH1	37.220	36.000	0.034	0.000	0.0	0	0.0	OK
Pipe (14)	Pipe	INT MH6	INT MH7	37.530	36.007	0.115	0.000	0.3	0.11	2.7	OK
Pipe (15)	Pipe	INT MH7	INT MH8	37.550	36.013	0.150	0.000	0.4	0.25	6.8	Surcharged
Pipe (16)	Pipe	INT MH8	INT MH9	37.550	36.022	0.150	10.505	0.9	0.94	16.2	Surcharged
Pipe (17)	Pipe	INT MH9	INT MH5	37.550	35.964	0.150	10.508	1.2	1.27	19.9	Surcharged
Pipe (18)	Pipe	INT MH4	INT MH5	37.230	36.031	0.100	5.285	1.1	1.81	8.6	Surcharged
Pipe (19)	Pipe	INT MH5	EX MH18	37.400	35.941	0.225	15.788	0.8	0.38	29.8	Surcharged
Pipe (20)	Pipe	EX MH18	EX MH16A	37.110	35.933	0.225	35.615	1.3	0.91	52.1	Surcharged
Pipe (21)	Pipe	EX MH16A	EX MH16	37.020	35.609	0.225	45.644	1.7	1.6	68.7	Surcharged
Pipe (22)	Pipe	EX MH16	EX MH15	37.010	35.076	0.241	55.017	1.4	0.57	88.2	OK
Pipe (23)	Pipe	EX MH15	EX MH13	37.000	34.986	0.235	57.023	1.5	0.76	91.5	OK
Pipe (24)	Pipe	EX MH13	EX MH13A	37.190	34.873	0.209	57.009	1.7	0.67	90.5	OK
Pipe (25)	Pipe	EX MH13A	MH12 (UU MH1102)	37.200	34.745	0.182	56.988	2.0	0.61	88.9	OK

UU SEWER 1	Pipe	MH12 (UU MH1102)	UU MH1103	37.140	28.042	0.220	83.925	1.4	0.28	129.5	OK
Pipe (27)	Pipe	EX MH17	EX MH18	37.130	36.183	0.150	16.335	2.0	0.48	35.2	OK
Pipe (28)	Pipe	EX RWP2	EX MH13	0.100	37.500	0.000	0.000	0.0	0	0.0	OK
Pipe (29)	Pipe	EX RWP1	EX MH11	0.100	37.500	0.000	0.000	0.0	0	0.0	OK

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

FEH Descriptors: 100 years: Increase Rainfall (%): +0: 15 mins: Summer

Connection	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m^3)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe	Pipe	EX MH10A	EX MH10	37.210	36.885	0.150	13.075	1.5	2.41	26.0	Surcharged
Pipe (1)	Pipe	EX MH10	EX MH7	37.190	36.196	0.150	17.787	2.1	0.72	36.4	OK
Pipe (2)	Pipe	EX MH7	EX MH6	37.260	35.319	0.150	19.489	1.9	1.2	33.9	Surcharged
Pipe (3)	Pipe	EX MH6	EX MH5	37.230	35.073	0.225	30.627	1.4	1.04	54.8	Surcharged
Pipe (4)	Pipe	EX MH5	EX MH4	37.200	34.837	0.159	30.616	1.8	0.9	54.2	OK
Pipe (5)	Pipe	EX MH3	EX MH4	37.200	34.830	0.065	0.000	0.0	0	0.0	OK
Pipe (6)	Pipe	EX MH4	MH2 (UU MH2102)	37.200	34.651	0.115	30.606	2.6	0.41	53.4	OK
UU SEWER	Pipe	MH2 (UU MH2102)	MH12 (UU MH1102)	37.050	28.512	0.219	30.595	1.2	0.98	48.7	OK
Pipe (8)	Pipe	EX MH11	MH12 (UU MH1102)	37.170	34.770	0.000	0.000	0.0	0	0.0	OK
Pipe (9)	Pipe	BURIED MH	INT MH2	37.200	36.079	0.094	0.000	0.1	0.03	0.3	OK
Pipe (10)	Pipe	INT MH2	INT MH1	37.240	36.079	0.093	8.725	1.7	0.73	19.4	OK
Pipe (11)	Pipe	INT MH1	EX MH6	37.230	35.926	0.150	11.143	1.4	0.51	24.7	OK
Pipe (12)	Pipe	EX MH8	EX MH7	37.210	35.306	0.100	0.000	0.2	0.12	1.1	Surcharged
Pipe (13)	Pipe	INT MH3	INT MH1	37.220	36.000	0.038	0.000	0.0	0	0.0	OK
Pipe (14)	Pipe	INT MH6	INT MH7	37.530	36.222	0.150	0.000	0.2	0.15	3.5	Surcharged
Pipe (15)	Pipe	INT MH7	INT MH8	37.550	36.219	0.150	0.000	0.4	0.29	7.8	Surcharged
Pipe (16)	Pipe	INT MH8	INT MH9	37.550	36.208	0.150	11.883	1.0	1.08	18.5	Surcharged
Pipe (17)	Pipe	INT MH9	INT MH5	37.550	36.107	0.150	11.888	1.3	1.47	23.1	Surcharged
Pipe (18)	Pipe	INT MH4	INT MH5	37.230	36.192	0.100	5.977	1.3	2.09	9.9	Surcharged
Pipe (19)	Pipe	INT MH5	EX MH18	37.400	36.076	0.225	17.862	0.9	0.47	37.1	Surcharged
Pipe (20)	Pipe	EX MH18	EX MH16A	37.110	36.060	0.225	40.289	1.3	0.93	53.3	Surcharged
Pipe (21)	Pipe	EX MH16A	EX MH16	37.020	35.728	0.225	51.640	1.9	1.75	74.7	Surcharged
Pipe (22)	Pipe	EX MH16	EX MH15	37.010	35.106	0.272	62.246	1.5	0.63	98.1	OK
Pipe (23)	Pipe	EX MH15	EX MH13	37.000	35.018	0.261	64.513	1.6	0.85	101.9	OK
Pipe (24)	Pipe	EX MH13	EX MH13A	37.190	34.894	0.228	64.499	1.8	0.75	100.8	OK
Pipe (25)	Pipe	EX MH13A	MH12 (UU MH1102)	37.200	34.762	0.196	64.478	2.0	0.68	99.1	OK

UU SEWER 1	Pipe	MH12 (UU MH1102)	UU MH1103	37.140	28.057	0.235	94.967	1.5	0.31	145.6	OK
Pipe (27)	Pipe	EX MH17	EX MH18	37.130	36.310	0.150	18.483	1.9	0.46	34.2	Surcharged
Pipe (28)	Pipe	EX RWP2	EX MH13	0.100	37.500	0.000	0.000	0.0	0	0.0	OK
Pipe (29)	Pipe	EX RWP1	EX MH11	0.100	37.500	0.000	0.000	0.0	0	0.0	OK

MMU LIBRARY REDESIGN:	Date: 04/03/2025		
	Designed by: NC	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Existing Drainage	BURO HAPPOLD, 2ND FLOOR: EASTGATE, CASTLE STREET MANCHESTER, M3 4LZ		

FEH Descriptors: 100 years: Increase Rainfall (%): +0: 15 mins: Winter

Connection	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m^3)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe	Pipe	EX MH10A	EX MH10	37.210	36.957	0.150	14.649	1.6	2.55	27.6	Flood Risk
Pipe (1)	Pipe	EX MH10	EX MH7	37.190	36.200	0.150	19.932	2.2	0.76	38.5	OK
Pipe (2)	Pipe	EX MH7	EX MH6	37.260	35.384	0.150	21.837	2.0	1.25	35.3	Surcharged
Pipe (3)	Pipe	EX MH6	EX MH5	37.230	35.119	0.225	34.316	1.5	1.12	59.1	Surcharged
Pipe (4)	Pipe	EX MH5	EX MH4	37.200	34.847	0.166	34.305	1.8	0.95	56.9	OK
Pipe (5)	Pipe	EX MH3	EX MH4	37.200	34.830	0.067	0.000	0.0	0	0.0	OK
Pipe (6)	Pipe	EX MH4	MH2 (UU MH2102)	37.200	34.655	0.119	34.295	2.6	0.43	55.9	OK
UU SEWER	Pipe	MH2 (UU MH2102)	MH12 (UU MH1102)	37.050	28.542	0.225	34.282	1.2	0.97	48.6	OK
Pipe (8)	Pipe	EX MH11	MH12 (UU MH1102)	37.170	34.770	0.000	0.000	0.0	0	0.0	OK
Pipe (9)	Pipe	BURIED MH	INT MH2	37.200	36.083	0.098	0.000	0.1	0.03	0.3	OK
Pipe (10)	Pipe	INT MH2	INT MH1	37.240	36.083	0.096	9.778	1.7	0.76	20.4	OK
Pipe (11)	Pipe	INT MH1	EX MH6	37.230	35.929	0.150	12.484	1.5	0.54	26.0	OK
Pipe (12)	Pipe	EX MH8	EX MH7	37.210	35.368	0.100	0.000	0.3	0.21	2.0	Surcharged
Pipe (13)	Pipe	INT MH3	INT MH1	37.220	36.000	0.039	0.000	0.0	0	0.0	OK
Pipe (14)	Pipe	INT MH6	INT MH7	37.530	36.382	0.150	0.000	0.2	0.13	3.0	Surcharged
Pipe (15)	Pipe	INT MH7	INT MH8	37.550	36.379	0.150	0.000	0.4	0.25	6.8	Surcharged
Pipe (16)	Pipe	INT MH8	INT MH9	37.550	36.370	0.150	13.314	1.1	1.09	18.7	Surcharged
Pipe (17)	Pipe	INT MH9	INT MH5	37.550	36.241	0.150	13.318	1.3	1.5	23.6	Surcharged
Pipe (18)	Pipe	INT MH4	INT MH5	37.230	36.336	0.100	6.693	1.3	2.16	10.2	Surcharged
Pipe (19)	Pipe	INT MH5	EX MH18	37.400	36.147	0.225	20.008	1.0	0.48	37.8	Surcharged
Pipe (20)	Pipe	EX MH18	EX MH16A	37.110	36.139	0.225	45.137	1.4	1	57.4	Surcharged
Pipe (21)	Pipe	EX MH16A	EX MH16	37.020	35.775	0.225	57.841	1.9	1.79	76.7	Surcharged
Pipe (22)	Pipe	EX MH16	EX MH15	37.010	35.121	0.287	69.724	1.5	0.65	101.1	OK
Pipe (23)	Pipe	EX MH15	EX MH13	37.000	35.033	0.272	72.264	1.6	0.87	105.1	OK
Pipe (24)	Pipe	EX MH13	EX MH13A	37.190	34.901	0.234	72.250	1.8	0.77	104.2	OK
Pipe (25)	Pipe	EX MH13A	MH12 (UU MH1102)	37.200	34.767	0.201	72.228	2.0	0.7	102.9	OK

UU SEWER 1	Pipe	MH12 (UU MH1102)	UU MH1103	37.140	28.059	0.237	106.404	1.5	0.32	149.4	OK
Pipe (27)	Pipe	EX MH17	EX MH18	37.130	36.442	0.150	20.703	2.2	0.52	38.2	Surcharged
Pipe (28)	Pipe	EX RWP2	EX MH13	0.100	37.500	0.000	0.000	0.0	0	0.0	OK
Pipe (29)	Pipe	EX RWP1	EX MH11	0.100	37.500	0.000	0.000	0.0	0	0.0	OK

Appendix H Inspection and Maintenance of Drainage Features

Copyright © 1976 - 2025 Buro Happold. All rights reserved

Proprietary Treatment Systems		
Maintenance Schedule	**Required Action**	**Typical Frequency**
Routine Maintenance	Remove litter and debris and inspect for sediment, oil and grease accumulation	Six monthly
	Change the filter media	As recommended by manufacturer
	Remove sediment, oil, grease and floatables	As necessary – indicated by system inspections or immediately following significant spill
Remedial Actions	Replace malfunctioning parts or structures	As required
Monitoring	Inspect for evidence of poor operation	Six monthly
	Inspect filter media and establish appropriate replacement frequencies	Six monthly
	Inspect sediment accumulation rates and establish appropriate removal frenquencies	Monthly during first half years of operation, then every six months

Pervious Pavements		
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional Maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphospate applied directly into the weeds by an applicator rather than spraying	As required - once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken clocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Attenuation Storage Tanks		
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall intensities into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary	Annually
	Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required
Remedial Actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

Niamh Cullen
Buro Happold Limited
2nd Floor, Eastgate
2 Castle Street, Castlefield
Manchester
M3 4LZ
UK

