

St Michael's Place

Drainage Strategy

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0054419

27 July 2026

Revision P03

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author **Helen Erskine**

date **27/07/2026**

approved **Allan Hoodless**

signature 

date **27/07/2026**

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Glossary

Term	Definition
AEP	Annual Exceedance Probability
BGS	British Geological Society
BH	Buro Happold
CHQ	Council Headquarters
DN	Diameter Nominal
EA	Environmental Agency
FRA	Flood Risk Assessment
GKRL	Genr8 Kajima Regeneration Limited
KC	Knowsley Council
LLFA	Lead Local Flood Authority
MH	Manhole
RWP	Rainwater Pipe
SSG	Sewer Sector Guidance
SuDS	Sustainable Drainage Systems
UU	United Utilities

1 Executive Summary

Buro Happold has been instructed by Genr8 Kajima Regeneration Limited to prepare a surface water drainage strategy in support of a hybrid planning application comprising: (Part A) Detailed application for the erection of a new Council Headquarters, hotel, public realm, change of use of Cavendish Walk to flexible Class E and/or F1 uses, site-wide enabling and associated works following demolition of existing buildings. (Part B) Outline application for a mixed-use development comprising residential (Classes C2 and C3) uses, commercial and community uses (Classes E and F1), replacement car parking provision at Lathom Road, public realm and associated works, with provision for meanwhile uses.

The drainage strategy has been undertaken in accordance with local and national standards, best practice and the requirements of KC and United Utilities.

The site encompassing Civic Way, Cavendish Walk and Lathom Road in Huyton is currently occupied by the existing Knowsley Council Headquarters, Huyton Village Library, car parks associated to these buildings, and existing hardstanding areas. The immediate surrounding area comprises mainly of the Huyton Village Shopping Centre to the east, Asda petrol station to the west, and residential areas to the north. The majority of the existing site is drained via an existing private drainage network which discharges into a public sewer to the north of the site in Archway Road.

The proposed surface water drainage strategy will begin with the use of permeable paving in appropriate hardstanding areas, allowing rainfall to infiltrate directly through the surface and into the underlying sub-base. This initial SuDS feature provides source control by reducing surface runoff, filtering pollutants, and promoting infiltration. Where infiltration is not feasible or where additional attenuation is required, excess flows will be conveyed via a traditional gravity drainage network to a geocellular storage tank located within the central soft landscaping area of the development. From there, water will be discharged offsite at an agreed allowable discharge rate. A swale will also be incorporated into the landscape design to manage exceedance flows, providing an additional conveyance route and temporary storage during extreme rainfall events. The overall drainage design incorporates a range of SuDS elements to manage water quality, conveyance, and attenuation in a sustainable and integrated manner.

The foul water drainage strategy will comprise a traditional gravity drainage network sized to convey flows from connection points within the office building and hotel building and using existing connections where feasible.

2 Introduction

2.1 Appointment and Brief

Buro Happold has been instructed by Genr8 Kajima Regeneration Limited (GKRL) to prepare a surface water drainage strategy in support of a hybrid planning application comprising: (Part A) Detailed application for the erection of a new Council Headquarters, hotel, public realm, change of use of Cavendish Walk to flexible Class E and/or F1 uses, site-wide enabling and associated works following demolition of existing buildings. (Part B) Outline application for a mixed-use development comprising residential (Classes C2 and C3) uses, commercial and community uses (Classes E and F1), replacement car parking provision at Lathom Road, public realm and associated works, with provision for meanwhile uses, herein referred to as the site. This report is to be read in conjunction with all other documents submitted as part of the application.

This report will review and document the following;

- Site constraints;
- Existing drainage regime; and
- Proposed surface and foul water drainage strategy.

The drainage strategy has been undertaken in accordance with local and national standards, best practice and the requirements of KC and United Utilities.

2.2 Limitations

This report is based on the interpretation and assessment of data provided by third parties. 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 is subject to design development and outcomes from consultation with relative authorities. Operation and maintenance of all SuDS (including proprietary systems) is outlined but will need to be considered further once the proposed development has been finalised with all specific information being presented to those responsible for the maintenance of the facility. 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. The conclusions and findings of this report may change if the proposed development is amended or updated after the date of publishing.

3 Existing Site

3.1 Site Location and Description

The site is located within the land at Civic Way, Cavendish Walk and Lathom Road within the village of Huyton to the east of Liverpool. It is approximately 3.8ha and is bordered by the Huyton Village Shopping Centre to the east, Asda petrol station to the west, residential areas to the north, and the rail line to the south.

The main site area is approximately 3.1ha and is currently occupied by the existing Knowsley Council Headquarters, Huyton Village Library, car parks associated to these buildings, and existing hardstanding areas. The vast majority of the existing site is considered to be impermeable, with only small areas of soft landscaping. The majority of the existing site is drained via an existing private drainage network which discharges into separate foul and surface water sewers to the north of the site in Archway Road.

Figure 3-1 shows the boundary of the site and its relative location.



Figure 3-1 Site Location Plan

The area east of the proposed site relates to an existing multi-storey car park on Lathom Road to the east of the main site. The proposed drainage strategy for this area is to be developed and documented separately to this report at a later date.

3.2 Topography and Existing Levels

The site has a slight slope. The highest point of the site is located in the northeastern side of the site within the existing Archway Road with an approximate level of +39.20mAOD. The site slopes down towards the northwest to a low point in Archway Road at a level of approximate +29.96m AOD. Refer to **Appendix A** for Topographical survey.

3.3 Watercourses

The nearest watercourse to the site is the River Alt, approximately 585m to the north of the site and is designated as a Statutory Main River.

3.4 Existing Drainage Regime

Record information obtained from UU (see Figure 3-2) indicates the following drainage systems are present in the vicinity of the site:

- DN300 vitrified clay into a DN375 concrete surface water sewer running east to west to the north of the site in Archway Road;
- DN225 vitrified clay into an DN825 concrete combined sewer running from east to west to the north of the site in Archway Road;
- DN225 into a DN300 vitrified clay surface water sewer running from south to the north to the west of the site in Poplar Bank;
- DN225 vitrified clay combined sewer running from south to north to the west of the site in Poplar Bank;
- DN225 vitrified clay surface water sewer running from east to west to south to the south of the site in Westmorland Road and Griffith's Road;
- DN225 vitrified clay foul water sewer running from west to east to the south of the site in Westmorland Road;
- DN150 vitrified clay surface water sewer running from south to north to east to the east of the site in Westmorland Road and Derby Road;
- DN150 vitrified clay foul water sewer running from south to north to east to the east of the site in Westmorland Road and Derby Road.
- DN300 vitrified clay surface water sewer running from south to north to the east of the car park site in Lathom Road.
- DN300 vitrified clay foul water sewer running from north to south to the east of the car park site in Lathom Road.

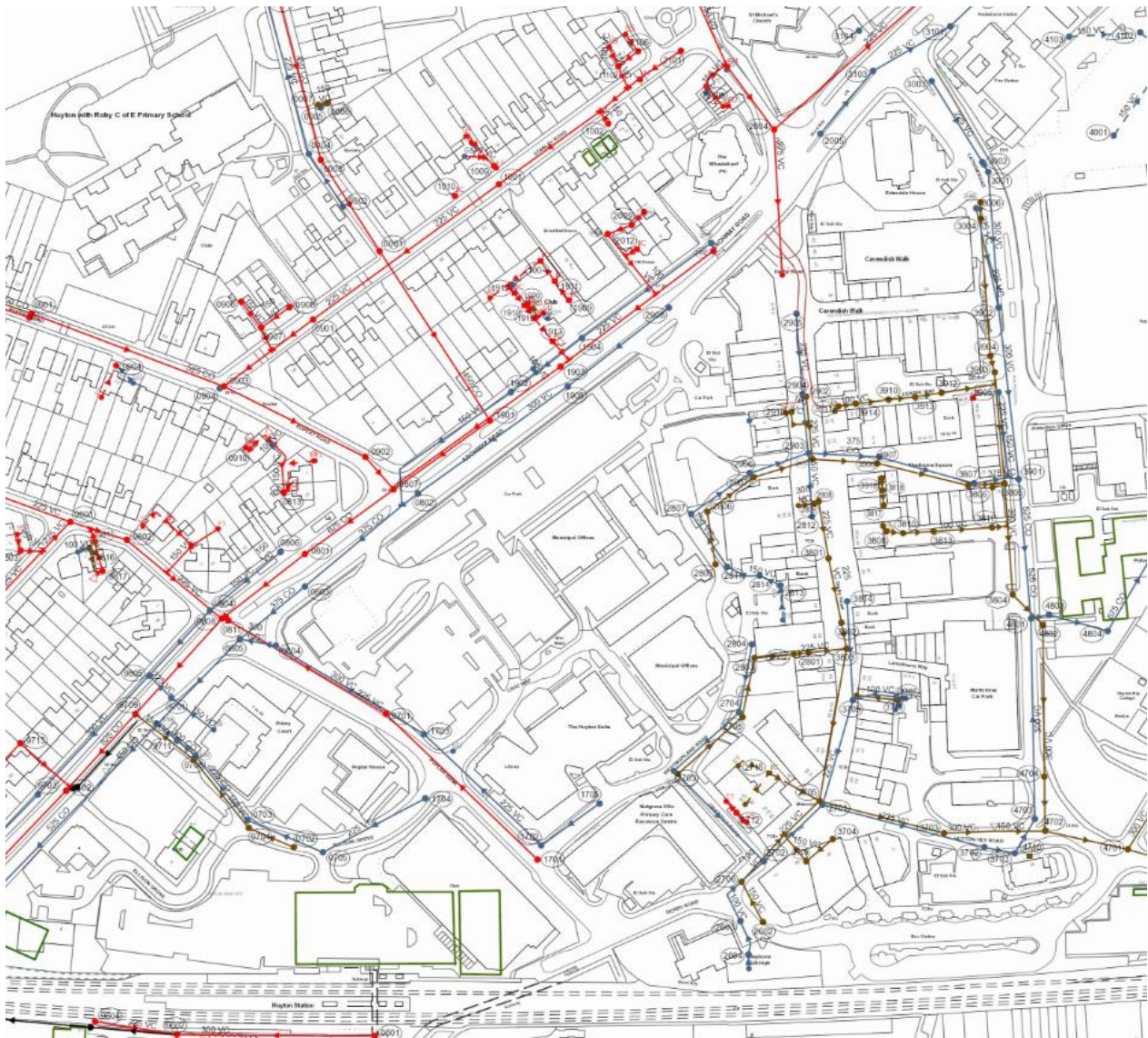


Figure 3-2 Local Existing Public Sewer Network

3.4.1 Existing Private Foul Water Drainage

Foul water flows from the existing Municipal Tower and computer centre building and associated infrastructure drain via private drains running north and east, discharging into UU sewers.

The completed CCTV surveys, refer to **Appendix B**, indicate the following private foul water sewers are present within the site boundary:

1. A DN150 foul sewer running from the existing Municipal Tower to the existing UU sewer in the north of the site in Archway Road;
2. A DN100 into a DN150 foul sewer running from the west to the east of the site into the existing UU foul sewer to the east of the site;

3.4.2 Existing Private Surface Water Drainage

Surface water flows from the existing hardstanding areas drain via private surface water drains running west, discharging into the UU surface water sewer to the north of the site in Archway Road. Surface water flows from the existing Municipal Tower and Computer Centre drain via private surface water drains running east, discharging into the UU surface water sewer to the east of the site in Westmorland Road.

The completed CCTV surveys, refer to **Appendix B**, indicate the following private surface water sewers are present within the site boundary:

- Four DN150 sewer runs convey flows from the office roof and adjacent hardstanding areas such as car parking to a UU surface water sewer to the northwest of the site in Archway Road;
- A DN225 sewer conveys flows from the Municipal Tower and adjacent hardstanding areas to a UU surface water sewer to the east of the site in Westmorland Road;
- A DN150 sewer conveys flows from the computer centre to a UU surface water sewer to the east of the site in Westmorland Road.

3.5 Local stakeholders and approving authorities

With regard to development planning and permissions, and residual flood risk and drainage related matters, there are two principal stakeholders and/or approving authorities associated with the site. They are as follows:

Knowsley Council are the local governing planning authority and Lead Local Flood Authority (LLFA), having responsibility for:

- Leading the management of risk of flooding from ordinary watercourses, canals, ponds and reservoirs in its area; and
- Surface water flood risk in relation to planning applications, under The Flood and Water Management Act.
- This scheme aligns with the requirements of Policy CS24 of the Knowsley Local Plan: Core Strategy, demonstrating compliance with local flood risk management objectives through the integration of appropriate sustainable drainage measures.

United Utilities (UU) are the statutory sewerage undertaker with powers under The Water Industry Act 1991.

Preliminary enquiries have been made to KC and UU and are reported on herein. Consultation with the Environment Agency has not been deemed necessary as the site does not lie within a Groundwater Protection Zone and discharge is not to the ground or a main river. For further details, refer to the Flood Risk Assessment (FRA) 0054419-BHE-XX-XX-RP-CW-0001 submitted alongside this Drainage Strategy.

3.6 Flood Risk

The site is located entirely within Flood Zone 1 as designated by the Environment Agency (EA) and shown in Figure 3-3. The site is considered to be at low risk of flooding from rivers and the sea.

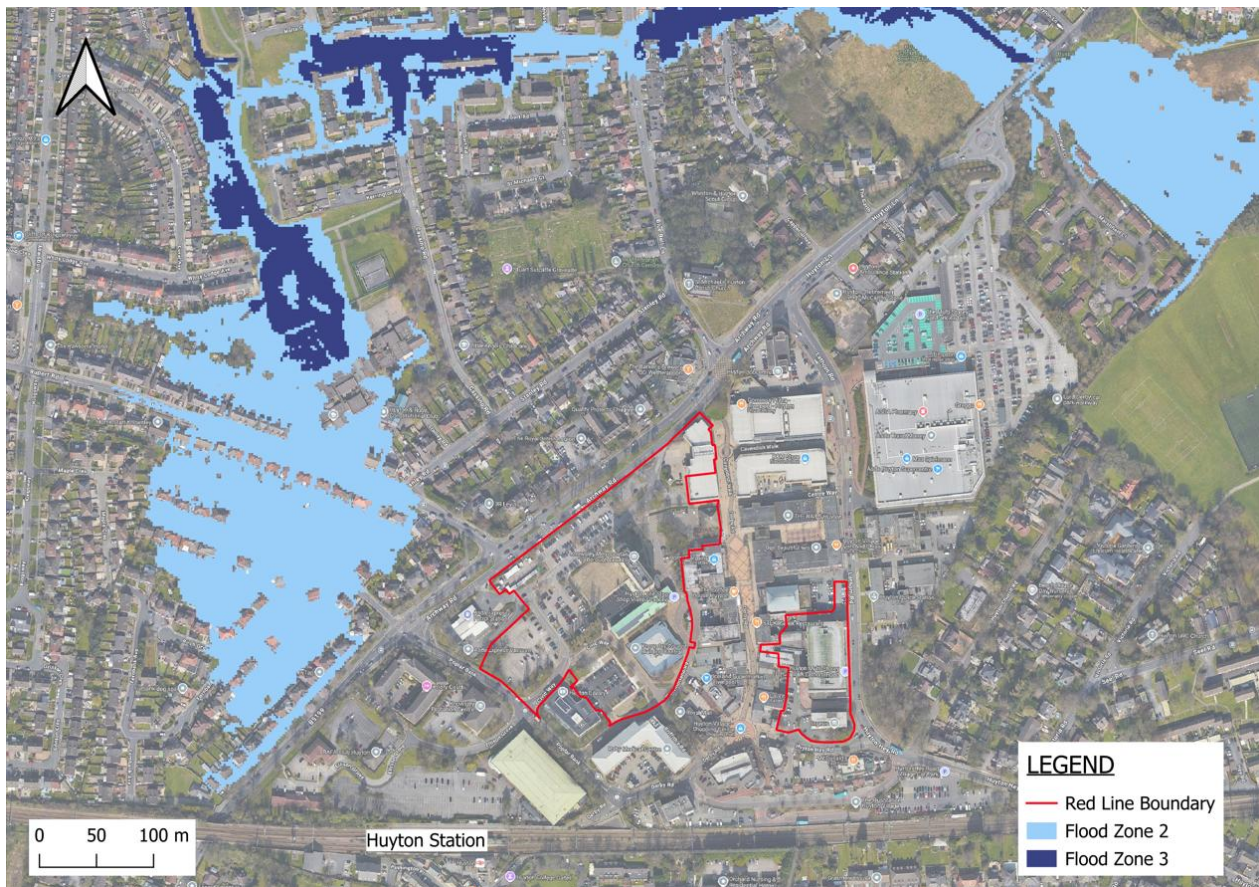


Figure 3-3 Environment Agency Flood Zone map (© Environment Agency copyright and / or database rights 2025. All rights reserved. © Crown Copyright and database right 2025.)

Only a small area of the main site area is at risk from surface water flooding as per EA Flood Risk from Surface Water Mapping, as shown in Figure 3-4. This area includes the hardstanding area between the council office building and the Huyton Village shopping centre building. However, the flooding extent is considered low risk with an annual chance of occurring between the 1% Annual Exceedance Probability (AEP) storm event and the 0.1% AEP storm event in any given year.

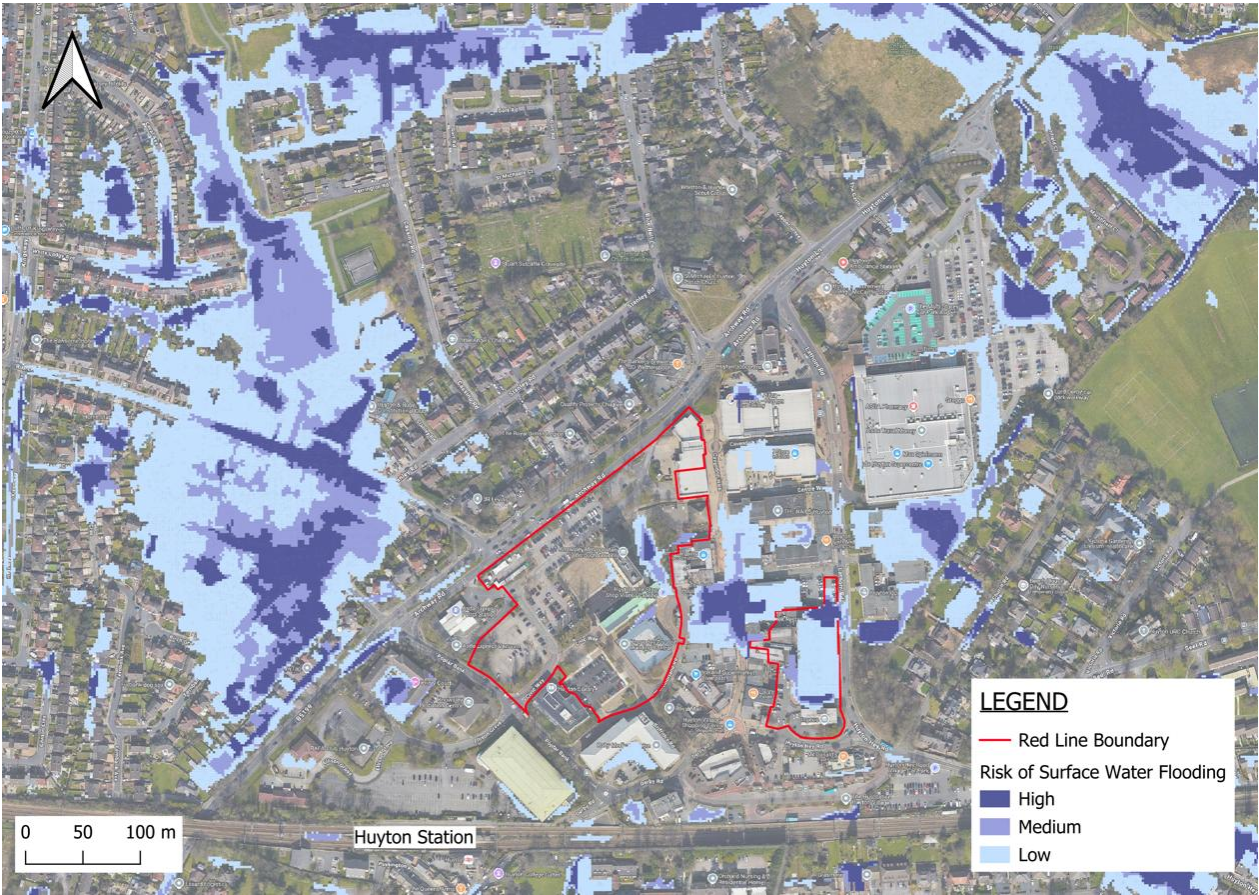


Figure 3-4 Environment Agency Surface Water flood map (© Environment Agency copyright and / or database rights 2025. All rights reserved. © Crown Copyright and database right 2025.)

For further details on flood risk management and mitigation measures, including for the Lathom Road site area, refer to BH Flood Risk Assessment (FRA) document number 0054419-BHE-XX-XX-RP-W-0001.

4 Proposed Development

The proposed development comprises: (Part A) Detailed application for the erection of a new Council Headquarters, hotel, public realm, re-development of Lathom Road multi-storey car park to form a surface level car park, change of use of Cavendish Walk to flexible Class E and/or F1 uses, site-wide enabling and associated works following demolition of existing buildings. (Part B) Outline application for a mixed-use development comprising residential (Classes C2 and C3) uses, commercial and community uses (Classes E and F1), public realm and associated works, with provision for meanwhile uses. See Figure 4-1 below for a plan of the proposed development, including the plot numbers which are referenced within this report hereafter.



Figure 4-1 Proposed Development, extract from Lucid's drawing Public Realm – General Arrangement Plan, drawing number SMP-LUD-MP-ZZ-DR-L-91-02-00 rev 09, dated 14/07/26.

5 Proposed Surface Water Drainage Strategy

The proposed surface water strategy is presented within this section. It will set out the existing site catchments and the associated brownfield runoff rates, the discharge methodology in line with the discharge hierarchy, the climate change allowances to be used within the drainage design, an explanation of the SuDS to be used onsite, where they will be located and how they will be utilised, a summary of the surface water strategy for the site, the water quality management design methods and calculations for the site and the exceedance flow strategy.

The proposed drainage strategy for Lathom Road car park is to be developed at a later date and will meet the requirements of the Knowsley Council Sustainable Drainage & Surface Water Management Technical Guidance for Developers.

5.1 Existing Site

The main site existing site area measures 3.1ha and is all positively drained hardstanding and buildings. The site's drainage is split into different catchment areas based on private below ground drainage systems and site levels. These areas are shown in Figure 5-1 below. Areas which are not coloured are assumed to be collected by gullies and public UU sewers within the highways. Refer to **Appendix C** for more detail on the existing catchment plan.

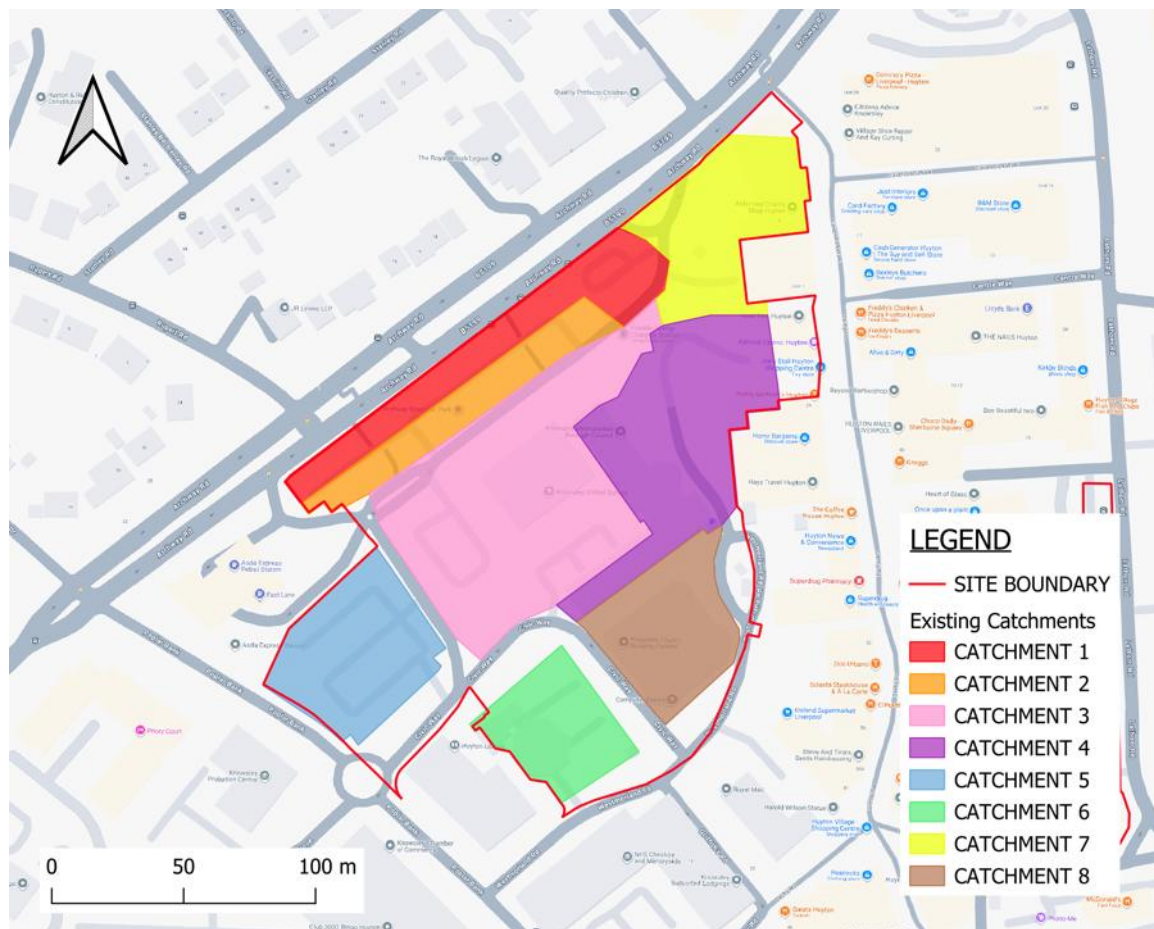


Figure 5-1- Existing Surface Water Catchment Areas

The existing site conditions were modelled using Infodrainage, with the brownfield discharge rate for each positively drained catchment determined from the simulation results of a 50% AEP, 60-minute winter storm event.

These results are detailed in **Table 5-1** below.

Table 5-1 Existing Discharge Rates

Existing Catchment	Discharge Rate (l/s)
1	17.2
2	14.4
3	41.9
4	29.5
5	17.6
6	5.00*
7	29.1
8	16.4

* An existing 5 l/s restricted outfall has been identified from review of design information from this catchment, supported by an attenuation tank during site surveys. This is understood to arise from the Venue car park development from 2021.

A full-bore capacity assessment was undertaken for the outfall pipes using pipe size and gradient information taken from site surveys, which are shown in **Appendix B**. The assessment was undertaken to ensure that the results obtained from the hydraulic analysis did not provide unrealistically high discharge rates. The results of this assessment are summarised in Table 5-2 below.

Table 5-2 Full Bore Pipe Analysis

Catchment	Full Bore Analysis (l/s)	Assessment
1	114.0	PASS
2	69.0	PASS
3	96.0	PASS
4	76.1	PASS
5	30.6	PASS
6	5.0	PASS
7	41.8	PASS
8	42.4	PASS

5.2 Drainage Hierarchy

Planning guidance requires drainage strategies for new developments to discharge surface water in line with the following hierarchy:

1. Infiltration
2. Existing Watercourse

3. Existing sewer

Infiltration is deemed unsuitable for this site due to ground conditions identified during the site investigation, which revealed the presence of Made Ground, refer to document CCG-C-23-14178.

There are no existing watercourses onsite to receive flows from the development.

It is therefore proposed to discharge into the UU public surface water sewers surrounding the site in Archway Road, Poplar Bank, and Westmorland Road.

5.3 Climate Change

The stormwater network will ensure no property flooding in the 1% AEP storm event. The site is modelled using FEH22 rainfall data.

In accordance with the Alt and Crossens Management Catchment peak rainfall allowance, for a 1% annual exceedance event, an uplift in rainfall intensity of 45% is proposed to account for the future effects of climate change across the lifespan of the development.

Table 5-3 Peak Rainfall Allowances

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

5.4 SuDS Feasibility

Sustainable Drainage Systems (SuDS) are implemented to manage surface water runoff from storm events in a way that reduces environmental impact. These systems aim to replicate the site's natural drainage patterns and treat pollutants at the source. The SuDS Manual (CIRIA C753) outlines a variety of approaches, including surface features like swales and ponds, subsurface options such as storage tanks and soakaways, and roof-based systems like green and blue roofs.

The proposed development aligns with local policy by incorporating sustainable drainage measures. According to CIRIA SuDS Manual, there is a preferred hierarchy for managing rainwater – starting with infiltration into the ground and progressing to water resource recharge. Where infiltration is not viable, surface water should be retained in open features and discharged gradually. If necessary, underground storage solutions such as tanks and cellular systems may be used.

An overview of the proposed SuDS techniques including their suitability for the development is provided in Table 5-4 below.

Table 5-4 SuDS Techniques and Feasibility

	SUDS Technique	Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit	Suitability for the Proposed Development	Comments
Most Sustainable ↑ ↓ Least Sustainable	Living roofs	√	√	√	Yes	An area of green roof is considered for both the Plot 4 - Hotel and Plot 1 CHQ office buildings.
	Basins & ponds	√	√	√	No	Not considered feasible due to the setting of the site within an urban environment alongside the aspirations for the public realm areas, which are proposed as community spaces for local people and visitors alike and as such are not able to accommodate open-water SuDS features.
	-Constructed Wetlands				No	
	-Balancing ponds				No	
	-Detention basins				No	
	-Retention ponds				No	
	Filter strips & swales	√	√	√	No	
	Rain Gardens	√	√	√	Yes	Raingardens are included in soft landscaped areas within the landscape design.
	Infiltration devices	√	√	√	No	Infiltration techniques should be avoided following review of the ground investigation results.
	-soakaways					
	-infiltration trenches & basins					
	Permeable surfaces	√	√		Yes	Parking bays and areas of hardstanding are proposed to incorporate permeable surfacing to allow for attenuation storage.
	-gravelled areas				No	Subject to landscape design
	-solid paving blocks				No	Unsuited to landscape design
	-porous pavers				No	Unsuited to landscape design
	Tanked systems	√			Yes	Underground attenuation tanks can be implemented within hardstand areas subject to coordination of services and other constraints.
	-over-sized pipes/tanks				No	Due to limited space and site constraints, oversized pipes are not considered suitable.
	-attenuation cells				Yes	Attenuation cells can potentially be accommodated under hardstand areas.

5.5 SuDS selection

The following Sustainable Drainage Systems (SuDS) are considered appropriate for the development.

5.5.1 Green roofs

Areas of green roof are proposed within the designs of both the Plot 1 - CHQ and the Plot 4 - Hotel buildings. These areas are designed to provide source control through intercepting and retaining precipitation, therefore reducing the volume of runoff and attenuating peak flows.

5.5.2 Permeable Paving

Permeable paving offers a durable surface for both pedestrian and vehicular use, while enabling rainwater to infiltrate through the surface layers into the underlying structure. This system temporarily stores water beneath the surface before gradually releasing it downstream. As part of the St Michael's Place development, permeable paving is being considered to facilitate water conveyance, provide attenuation, and support water treatment within hardstanding areas. Given the site's relatively flat topography, the subsurface storage capacity can help reduce the overall volume required for the attenuation tank.

5.5.3 Bioretention System

Bioretention systems, commonly known as rain gardens, are shallow, landscaped depressions designed to capture and treat surface water runoff. They use layers of soil, sand, and gravel, along with carefully selected vegetation, to slow down water flow and filter out pollutants. These systems are proposed within soft landscaped areas to help reduce flood risk, improve water quality, and enhance biodiversity.

5.5.4 Swale

Swales are shallow, broad and vegetated channels designed to store and/or convey runoff and remove pollutants. They may be used as conveyance structures to pass the runoff to the next stage of the treatment train and can be designed to promote infiltration where soil and groundwater conditions allow. A section of swale is proposed in the village green to provide management of exceedance flows, and also to provide biodiversity and amenity benefits.

5.5.5 Geocellular Storage System

Geocellular storage systems consist of modular plastic units with a high porosity (approximately 95%), designed to efficiently form underground structures for the temporary storage of surface water prior to controlled discharge. Given the limited external space that isn't being used as permeable paving, geocellular storage will be incorporated into the design as a method of attenuation.

5.6 Pollution Control

The suitability of the proposed SuDS for the development has been assessed using the Simple Index Approach from the CIRIA SuDS Manual (2015). Pollution hazard indices for various land uses were sourced from Table 26.2, while mitigation indices were determined using Table 26.3. To be effective, the mitigation index must meet or exceed the pollution hazard index. Where a single component is insufficient, multiple components are combined, with a reduction factor of 0.5 applied to secondary or tertiary components to reflect lower inflow concentrations.

$$\begin{array}{ccc} \text{Total SuDS mitigation index} & \geq & \text{pollution hazard index} \\ \text{(for each contaminant type)} & & \text{(for each contaminant type)} \end{array}$$

$$\text{Total SuDS mitigation index} = \text{mitigation index}_1 + 0.5(\text{mitigation index}_2)$$

Where;

$$\text{mitigation index}_n = \text{mitigation index for component } n$$

Table 5-5 Pollution Hazard Indices and Proposed Mitigation Methods

Land Use	Pollution Hazard Level	Total Suspended Solids	Metals	Hydrocarbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs	Low	0.3	0.2	0.05
Low traffic roads	Low	0.5	0.4	0.4
Non-residential car parking with infrequent use	Low	0.5	0.4	0.4

Table 5-6 Mitigation Indices of Proposed SuDS Components

Type of SuDS	Mitigation Indices		
	TSS	Metals	Hydrocarbons
Permeable Pavement	0.7	0.6	0.7
Bioretention System	0.8	0.8	0.8

To ensure adequate water quality treatment before offsite discharge, the SuDS design has been developed in accordance with Section 26 of the CIRIA C753 SuDS Manual.

It is anticipated that the goods drop off zone to the east of Plot 1 – CHQ and to the south of Plot 4 - Hotel will both average less than 300 traffic movements per day. Table 26.2 of the Ciria C753 SuDS notes that pollution hazard levels for low traffic roads are as follows:

TSS is 0.5; Metals is 0.4; Hydrocarbons is 0.4.

Treatment will be provided via permeable paving which provide the following mitigation indices

TSS = 0.7; Metals = 0.6; Hydrocarbons = 0.7.

The pollutant levels associated with the proposed site usage are below the thresholds identified in the guidance. Therefore, the implementation of bioretention systems and permeable paving will provide sufficient pre-treatment where applied across the development.

The roofs of Plot 4 - Hotel and Plot 1 - CHQ office are non-residential roofs and have been assessed to pose an extremely low risk of introducing metals and hydrocarbons into the drainage network, meaning minimal contamination from surface runoff. To further enhance water quality management, the design incorporates catchpits installed on manholes located upstream of the proposed geocellular storage tank. These catchpits will effectively facilitate the settlement of solids, thereby preventing debris and sediment from entering the system and maintaining the efficiency and longevity of the drainage infrastructure.

5.7 Surface Water Drainage Network

The surface water strategy below has been devised to reduce flood risk and provide a betterment to the existing surface water flows discharging from the site. Refer to drawing 0054419-BHE-XX-XX-DR-C-3050 in **Appendix D** for more details on the general arrangement of the network.

5.7.1 Design Principles

SuDS will be incorporated into this development, following a conceptual strategy based on the principles set out in the CIRIA C753 SuDS Manual and BS 8582:2013 – Code of Practice for Surface Water Management on Development Sites.

The scheme will make use of the proposed topography and natural drainage catchments. This site will be re-profiled to channel surface water runoff away from the planned structures and towards the central soft landscaping areas, thereby reducing the risk of flooding to buildings.

In the proposed model, the impermeable area of the catchments has been assumed to encompass the entire site, with a volumetric runoff coefficient of 0.75 applied to account for the contribution from permeable surfaces. Given the limited scope for additional hardstanding to be added at a later date, it is considered suitable to make no allowance for urban creep.

The proposed piped drainage system should be designed to ensure no surcharging occurs during the 50% AEP storm event, no surface flooding during the 3.33% AEP storm event, and no property flooding during the 1% AEP storm event including allowances for climate change. The system must comply with the requirements of Building Regulations Part H.

5.7.2 Design Infrastructure

The surface water drainage strategy will consist of a conventional gravity-fed network, designed to convey runoff from hardstanding areas and buildings to a geocellular storage tank situated within the central soft landscaped area. From there, flows will be discharged offsite to a UU public surface water sewer at a pre-agreed allowable rate. Pipe gradients will be set to maintain a self-cleansing velocity of 1 m/s. The proposed outline plots will have their own storage tank and outfall location.

Permeable paving will be installed adjacent to buildings and along all pathways within the site to provide attenuation, reduce peak flood flows, and treat surface runoff. Any additional hardstanding will be graded to direct runoff towards the permeable paving before connecting flows to the geocellular storage tank.

Rainwater from the office, hotel, and all other proposed building roofs will be collected via multiple rainwater pipes (RWPs). These RWPs will discharge into the proposed gravity drainage network, which will convey the flow to the geocellular storage tank. It should be noted that the locations of the RWPs have not yet been determined and will be defined during the next design stage.

The existing drainage arrangement for Civic Way will remain unchanged, even with a minor surface re-profiling, as it continues to discharge into the current highway drainage infrastructure. The proposed development will not affect the existing highway drainage outflows.

5.7.3 Design Summary

In accordance with the Knowsley Council Sustainable Drainage and Surface Water Management guidance, a 50% betterment is required for brownfield sites, this was applied to the existing flow rates. The final allowable discharge rate for each catchment was then established by comparing the calculated betterment values with United Utilities' discharge

rate acceptance criteria, ensuring compliance with both local and statutory requirements and ensuring the rate does not exceed the outfall pipe capacity. Refer to Table 5-7 for the proposed rates.

Table 5-7 Proposed Discharge Rates

Existing Catchment	Proposed Plot/Catchment	Existing Discharge Rate (l/s)	Full Bore Check	UU Accepted Discharge Rate (l/s)	Proposed Discharge Rate (l/s)	% Betterment
1, 2, 3	Plot 1 – CHQ Plot 4 – Hotel Plot 5	73.5	279.0 = PASS	56.7	36.7	50%
4	Plot 2A	29.5	76.1 = PASS	18.9	14.8	50%
5	Plot 6	17.6	30.6 = PASS	6.4	6.4	64%
6	Plot 3	5.0*	5.0 = PASS	5.0	5.0	N/A*
7	Cavendish Walk	29.1	41.8 = PASS	N/A**	N/A**	N/A
8	Plot 2B	16.4	42.4 = PASS	5.0	5.0	70%

* An existing 5 l/s restricted outfall, identified via an attenuation tank during site surveys, will continue to be utilised.

** UU has accepted the existing discharge rate for this catchment, as the proposed works involve only refurbishment and landscaping improvement. These enhancements are expected to reduce surface water flood risk, supporting the overall drainage strategy.

The attenuation volume for each plot applied for within the outline elements of this application have been calculated using the InfoDrainage Quick Storage Estimate tool, while the main scheme including CHQ and Hotel plots has been calculated using a detailed InfoDrainage model. Refer to Table 5-8 for the required attenuation volumes per plot, with calculations provided in **Appendix E**. Attenuation will be achieved through a combination of geocellular storage tanks and available permeable paving. The geocellular tanks have been sized based on a 95% void ratio and are designed to accommodate rainfall events up to an including the critical 1% AEP storm event, incorporating a 45% allowance for climate change. Permeable paving has been designed with a 30% void ratio and a 300mm storage depth, with a 130mm paving layer.

Table 5-8 Attenuation Volumes

Proposed Plot/Catchment	Catchment Area (ha)	Proposed Discharge Rate (l/s)	Approximate Total Volume (m ³)
Plot 1 – CHQ Plot 4 – Hotel	1.447	31.7	689
Plot 2A	0.197	14.8	66
Plot 2B	0.136	5.0	55
Plot 3	0.248	5.0	121
Plot 5*	0.186	5.0	83
Plot 6	0.306	6.4	147
Cavendish Walk	0.346	29.1	N/A**

* An allowance of 5 l/s has been allocated for the outline application of Plot 5, as it shares the same outfall location as the detailed application areas for Plot 1 and 4, including the associated public realm.

** No geocellular storage tank nor other storage system is required for Cavendish Walk, as the majority of this catchment, including the existing drainage network, is proposed to be retained as existing. The proposed landscaping strategy

includes for the addition of several areas of soft landscaping, which will lead to a reduction in impermeable areas and therefore a betterment on the existing scenario.

The proposed outfall locations have been confirmed with UU, due to all discharging into their assets – refer to **Appendix F** for records of correspondence. Refer to Table 5-9 below for the agreed outfall locations and to the general arrangement plan 0054419-BHE-XX-XX-DR-C-3050 in **Appendix D** for all further information.

Table 5-9 Surface Water Outfall Locations

Proposed Plot/Catchment	Outfall Location
Plot 1 – CHQ Plot 4 – Hotel	DN300 public SW sewer under Archway Road
Plot 2A	DN225 public SW sewer under Westmorland Road
Plot 2B	DN300 public SW sewer under Archway Road
Plot 3	DN225 public SW sewer under Westmorland Road
Plot 5	DN300 public SW sewer under Archway Road
Plot 6	DN225 public SW sewer under Poplar Bank

5.8 Designing for Exceedance

The proposed site levels have been carefully designed to accommodate exceedance flow paths, ensuring that overland surface water is safely conveyed during extreme rainfall events. Ground levels are proposed to direct flows toward the central soft-landscaped zone and low-impact areas, minimizing the risk to buildings and infrastructure. See Figure 5-2 below for the exceedance routes.



Figure 5-2 Exceedance Flow Routes

5.9 Consultation

5.9.1 Lead Local Flood Authority (LLFA)

Two pre-application meetings have been held with the LLFA to ensure early engagement and alignment on the surface water drainage strategy.

The first meeting focused on establishing the key principles of the design, including agreement on the hydraulic modelling criteria to be used for assessing the proposed drainage network. This early agreement provided a solid foundation for the development of a robust and compliant drainage solution.

The second meeting built upon this by presenting the detailed strategy for the proposed SuDS, including layout, function, and integration of SuDS features within the site. Feedback from the LLFA was incorporated into the evolving design to ensure that the proposed measures meet both regulatory expectations and site-specific requirements.

5.9.2 United Utilities (UU)

UU have been consulted regarding the proposed points of discharge and the associated discharge rates. This consultation was essential to confirm the acceptability of the discharge locations and to ensure that the proposed rates align with the capacity of the receiving network. The outcomes of these discussions have been documented and are included in the records of correspondence provided in **Appendix F**, which should be referred to for further detail.

This collaborative approach with both the LLFA and UU has helped to shape a drainage strategy that is technically sound, environmentally responsible, and aligned with local policy and infrastructure constraints.

5.10 SuDS Operation and Maintenance Manual

5.10.1 Maintenance

Regular maintenance of the SuDS is crucial to ensure its continued performance. An Operation and Maintenance Manual will be developed in line with the CIRIA guidance C753, Section 32. This manual will be incorporated into the Health & Safety File and Building Manual for the development.

The manual will detail the location of all SuDS components on-site, along with a concise explanation of their design intent, functionality, purpose, and associated performance risks. It will also include a tailored maintenance schedule for each feature, aligned with the specifications of the selected attenuation system supplier. Additionally, the manual will provide a maintenance plan and record template, outlining the objectives of the proposed maintenance activities and the potential consequences of failing to meet these objectives.

5.10.2 Management

An estate management strategy will ensure the long-term performance and sustainability of the development, with a particular emphasis on maintaining high-quality standards in the public realm and the effective operation of SuDS. This approach will support the ongoing success of the completed development and enable future growth.

The strategy will be delivered through an Estate Management Company ("Manco"), which will assume overarching responsibility for the stewardship of the estate, including the management and maintenance of SuDS infrastructure. As no SuDS features are proposed within private curtilages, the long-term management strategy, and the company, can focus solely on the public realm, ensuring effective maintenance in perpetuity.

Manco will be established and appointed under a formal legal agreement, supported by a detailed Schedule of Services. GKRL will act on behalf of the Council to negotiate and agree the terms of this appointment, ensuring that SuDS responsibilities are clearly defined and embedded within the service framework.

A comprehensive maintenance strategy will be developed and implemented by Manco, ensuring that all elements of the public realm—including SuDS features such as green roofs, permeable paving, and attenuation tanks—are maintained to the highest standards. This strategy will be informed by the detailed hard and soft landscaping maintenance plan prepared by the Landscape Architect ("Lucid"). The strategy will be aligned with the delivered public realm design, ensuring that SuDS components function as intended and contribute to water quality, biodiversity, and flood resilience.

The Manco will procure and manage specialist contractors through a competitive tendering process to deliver maintenance services in line with the agreed strategy. This will include routine inspection, cleaning, and performance monitoring of SuDS features to ensure long-term effectiveness and regulatory compliance.

A service charge regime will be implemented and managed by the Manco, based on principles of good estate management. Each occupier will contribute proportionally, typically based on the size of their premises, with the overall cost burden reducing as the estate becomes more fully occupied. This approach ensures fair cost distribution while supporting the sustainable operation of the estate's infrastructure, including SuDS.

To support community engagement and placemaking, the Manco will also coordinate events and activities that promote awareness of the estate's sustainable features, including SuDS, and foster a vibrant, resilient town centre environment.

6 Proposed Foul Water Drainage Strategy

The foul water strategy is included on the general arrangement plan, 0054419-BHE-XX-XX-DR-C-3050, and can be found in **Appendix D**.

All areas of the site will be connected to a private foul water drainage system, which will be designed in compliance with Part H of the Building Regulations.

The system will primarily consist of a conventional gravity-fed drainage network, designed to carry flows from designated connection points within both the hotel and office buildings to an existing private connection on-site, before ultimately discharging into the UU public combined sewer located in Archway Road. However, due to site levels, a separate pumped system will be required solely for the cycle store within Plot 1 - CHQ. Anticipated flows from this area are expected to be low, and any flows from higher levels will be directed to the gravity-fed network. Each outline plot will be served by its own dedicated drainage network and outfall point. For details on the outfall location for each plot, refer to Table 6-1 below.

Table 6-1 Foul Water Outfall Locations

Proposed Plot/Catchment	Outfall Location
Plot 1 – CHQ Plot 4 – Hotel	Private manhole connection into DN450 public CW sewer under Archway Road
Plot 2A	DN150 public FW sewer under Westmorland Road
Plot 2B	DN225 public FW sewer under Westmorland Road
Plot 3	DN225 public FW sewer under Westmorland Road
Plot 5	DN825 public CW sewer under Archway Road
Plot 6	DN225 public CW sewer under Poplar Bank

The peak foul discharge flow for the detailed application area of the site has been calculated using established benchmarks specific to each building type. For the hotel, a usage rate of 250 litres per person per day was applied, based on guidance from CIBSE'S Flows and Loads, and adjusted using a peaking factor of 3 to reflect peak demand conditions. For the office, the calculation followed the Sewerage Sector Guidance (SSG), using a benchmark of 0.6 litres per second per hectare of developable land, which is standard for commercial developments and does not rely on occupancy figures, and was always adjusted using a peaking factor of 3. Refer to table below for the peak discharge flow rate for Plot 4 - Hotel and Plot 1 - CHQ office.

Table 6-2 Peak Foul Water Discharge Rates

Plot	Peak Discharge Rate (l/s)
Plot 4 - Hotel	2.26
Plot 1 - CHQ Office	0.97
Total	3.23

As this calculation is based on preliminary estimates, it will be reviewed, refined, and coordinated further as the design progresses into the next stage; however, for this development, it is reasonable to assume that the individual buildings will not discharge at peak flow simultaneously. As such, the calculated total site discharge rate is likely to represent a conservative estimate.

UU have agreed to accept flows from the site at an unrestricted rate to their network – refer to **Appendix F** for correspondence.

Appendix A Topographic Survey

Appendix B CCTV Survey

GRID
NORTH

NOTES

1. BACKGROUND PLAN INFORMATION IS BASED ON TOPOGRAPHIC SURVEY DATA CREATED BY OTHERS AND SUPPLIED TO US FOR THE PURPOSES OF PRESENTING OUR SURVEY OUTPUT. WE CANNOT BE HELD RESPONSIBLE FOR THE CONTENT, COMPLETENESS AND ACCURACY OF DATA CREATED BY OTHERS.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS/DOCUMENTATION. PLEASE REFER TO TOPOGRAPHIC SURVEY DRAWING: 23F248. PLEASE REFER TO CCTV REPORT: TS-2645 Huyton Town Centre Regeneration CCTV Report_303_Issue01.
3. DO NOT SCALE FROM THIS DRAWING.
4. IF IN DOUBT ASK.

SERVICES LEGEND

BT QL-B2	UNDERGROUND BT CABLES
CB QL-B2	UNDERGROUND COMMUNICATIONS CABLES
CATV QL-B2	UNDERGROUND CABLE TV CABLES
E QL-B2	UNDERGROUND ELECTRIC CABLES
FO QL-B2	UNDERGROUND ELECTRIC CABLES
G QL-B2	FIBEROPTIC CABLES
HW QL-B2	GAS MAIN
HT QL-B2	HOT WATER PIPE
OE	OVERHEAD BT CABLES
OE	OVERHEAD ELECTRIC CABLES
OE	OVERHEAD WATER CABLES
OE	UNIDENTIFIED OVERHEAD CABLES
UD QL-B2	UNIDENTIFIED PIPE
SEC QL-B2	SECURITY CABLEING
SL QL-B2	LIGHTING CIRCUIT (WHERE IDENTIFIED)
TS QL-B2	TRAFFIC SIGNAL CABLES
W QL-B2	WATER MAIN
FW QL-B2	FOUL SEWER
SW QL-B2	SURFACE WATER SEWER
CW QL-B2	COMBINED SEWER
HW QL-B2	RISING MAIN
E QL-B4	ASSUMED ROUTES
E QL-B4	SERVICES TAKEN FROM RECORDS

UTILITIES COMMENT BOX
DEPTH TO SERVICE (H)

INFORMATION SHOWN AS TFR HAS NOT BEEN PROVEN ON SITE AND HAS BEEN OVERLAIN ONTO THIS DRAWING BY BEST FIT METHODS USING COMMON DATA. INFORMATION SHOWN AS AR HAS NOT BEEN PROVEN ON SITE. ASSUMED ROUTES ARE SHOWN WHERE WE SUSPECT SERVICES TO BE PRESENT BUT THEY WERE NOT LOCATED.

UTILITIES ABBREVIATIONS

10 SC	1 DUCT 5 CABLES	DTB	DEPTH TO SOFTT
AR	ASSUMED ROUTE	EDT	EXTERNAL BACKDROP
ACP	ASSUMED CONNECTION POINT	EOT	END OF TRACE
BL	BASE LEVEL	FW	FOUL WATER SEWER
CB	CONCRETE BENCHING	IBD	INTERNAL BACKDROP
CBC	CIRCULAR BRICK CHAMBER	I	INVERT LEVEL
COP	CABLE DRAW PIT	PCC	PRECAST CONCRETE CHAMBER
CL	COVER LEVEL	RBC	RECTANGULAR BRICK CHAMBER
CPC	CIRCULAR PLASTIC CHAMBER	SL	SOFTT LEVEL
CO	CROWN LEVEL	SW	SURFACE WATER SEWER
DL	DEPTH TO CROWN	TR	TAKEN FROM RECORDS
DI	DIAMETER	UTL	UNABLE TO LIFT
DTB	DEPTH TO BASE	UTS	UNABLE TO SURVEY
DTI	DEPTH TO INVERT	UT	UNABLE TO TRACE

AVAILABILITY OF STATUTORY UNDERTAKERS RECORDS DRAWINGS

TYPE	COMMENTS	TYPE	COMMENTS
SEWER	YES	CABLE TV	YES
WATER MAIN	YES	ELECTRICITY	YES
GAS MAIN	YES	OL PIPELINES	NO
BT	YES	OTHER	NO

SERVICE LOCATION

ELECTRODETECTION AND/OR GROUND PROBING RADAR (GPR) TECHNIQUES HAVE BEEN USED TO LOCATE UNDERGROUND SERVICES SHOWN ON THIS PLAN. THESE ARE INTERPRETIVE METHODS AND IT IS THEREFORE RECOMMENDED THAT TRAIL LOCATIONS OF SERVICES ARE CORROBORATED BY OTHER METHODS. LOCATION AND DEPTH OF SERVICES ARE RECORDED ON THE DRAWING. THE COMPLETENESS OF SERVICES AVAILABLE TO TOWER SURVEYS CCTV LTD CANNOT BE GUARANTEED. IT SHOULD BE NOTED THAT CERTAIN TYPES OF SERVICES, SUCH AS PLASTIC OR BURIED SERVICES SHOWN ON THIS DRAWING MAY BE ASSUMED ROUTES AND WILL NORMALLY BE OF UNKNOWN CONDITION. CONTRACTORS SHOULD UNDERTAKE SUITABLE VALIDATION WORK AND TAKE PARTICULAR CARE DURING EXCAVATION WORK. SAFE DIGGING PRACTICES SHOULD BE FOLLOWED. SHOULD THERE BE ANY CONFLICT BETWEEN THE DETAILS INDICATED ON THIS DRAWING AND THOSE INDICATED ON OTHER DRAWINGS, THEN TOWER SURVEYS CCTV LTD SHOULD BE INFORMED PRIOR TO CONSTRUCTION ON SITE. IT IS IMPORTANT TO NOTE THAT THE SAME ACCURACIES IMPLIED BY THE PLOTTING SCALE ARE EQUALLY APPLICABLE TO DIGITAL DATA SUPPLIED FOR CAD. EVERY EFFORT IS MADE TO IDENTIFY ALL VISIBLE ABOVE-GROUND FEATURES. HOWEVER, IT SHOULD BE BORNE IN MIND THAT THERE MAY BE ITEMS OBLSCURED AT THE TIME OF SURVEY. VISIBLE FEATURES IN THE VICINITY OF THE RECORDS ARE SHOWN ON THIS SURVEY. MAY NOT REPRESENT THE EXTENT OF LEGALLY CONVEYED OWNERSHIP.

GENERAL

- NO ALLOWANCE HAS BEEN MADE FOR SUB-SURFACE ENTRY INTO MANHOLES OR OTHER CHAMBERS OR VOIDS BELOW GROUND LEVEL. THEREFORE ANY DETAILS RELATING TO DEPTHS, SIZES ETC. ARE TAKEN FROM ABOVE GROUND AND AS SUCH WILL BE APPROXIMATE ONLY.
- THE CONTRACTOR IS TO CHECK AND VERIFY ALL CRITICAL DIMENSIONS AND LEVELS BEFORE WORK STARTS.
- BURIED SERVICES SHOWN ON THIS DRAWING MAY BE ASSUMED ROUTES AND WILL NORMALLY BE OF UNKNOWN CONDITION. CONTRACTORS SHOULD UNDERTAKE SUITABLE VALIDATION WORK AND TAKE PARTICULAR CARE DURING EXCAVATION WORK. SAFE DIGGING PRACTICES SHOULD BE FOLLOWED.
- SHOULD THERE BE ANY CONFLICT BETWEEN THE DETAILS INDICATED ON THIS DRAWING AND THOSE INDICATED ON OTHER DRAWINGS, THEN TOWER SURVEYS CCTV LTD SHOULD BE INFORMED PRIOR TO CONSTRUCTION ON SITE.
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- VISIBLE FEATURES IN THE VICINITY OF THE RECORDS ARE SHOWN ON THIS SURVEY. MAY NOT REPRESENT THE EXTENT OF LEGALLY CONVEYED OWNERSHIP.

DESCRIPTION	REV	DATE	DRWN	CHKD	APPR
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DRAWING STATUS

INFORMATION

Tower Surveys Tower Surveys CCTV Ltd Sui-wyoni - CCTV Drainage - Utilities - Land - Buildings Associates in Nottingham Stoke-on-Trent Milton Keynes Farnham	40 ORCHARD DRIVE NOTTINGHAM NG12 3TP TEL: 01773 435 897 info@tower-surveys.co.uk www.tower-surveys.co.uk
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CLIENT

GENR8 KAJIMA REGENERATION (HUYTON) LIMITED

PROJECT TITLE

HUYTON TOWN CENTRE REGENERATION

DRAWING DETAIL

CCTV DRAINAGE AND UTILITY SURVEY (PAS128)
AS OF 08/05/25 - SHEET 1 OF 2

DRAWN	NJ/L	DATE
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MAY 2025

PROJECT ENGINEER	DW	SCALE
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1:500 (WHEN PLOTTED @ A1)

APPROVED	DW
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DRAWING NUMBER	TS-2645_301
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REVISION

CAD REFERENCE
\\2025Projects\TS-2645\TS-2645_301-302_Issue01

CTB REFERENCE
\\CTB-files\TS-Utils-v02.ctb

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SERVICES LEGEND

BT Q-L-B2	UNDERGROUND BY CABLE(S)
COMT Q-L-B2	UNDERGROUND COMMUNICATIONS CABLE(S)
CTV Q-L-B2	UNDERGROUND CABLE TV CABLE(S)
E Q-L-B2	UNDERGROUND ELECTRIC CABLE(S)
G Q-L-B2	GAS MAIN
HW Q-L-B2	HOT WATER PIPE
OBT	OVERHEAD BY CABLE(S)
OE	OVERHEAD ELECTRIC CABLE(S)
OE-CTV	OVERHEAD CABLE TV CABLE(S)
UD Q-L-B2	UNIDENTIFIED PIPE
SEC Q-L-B2	SECURITY CABLEING
SL Q-L-B2	LIGHTING CIRCUIT (WHERE IDENTIFIED)
TS Q-L-B2	TRAFFIC SIGNAL CABLE(S)
W Q-L-B2	WATER MAIN
FW Q-L-B2	FOUL SEWER
SW Q-L-B2	SEWAGE/STORM SEWER
CW Q-L-B2	COMBINED SEWER
RW Q-L-B2	RISING MAIN
E Q-L-B4	ASSUMED ROUTES
E Q-L-B4	SERVICES TAKEN FROM RECORDS

10 6C	1 DUCT 5 CABLES	DT8	DEPTH TO SO
AR	ASSUMED ROUTE	EDD	EXTERNAL BL

AVAILABILITY OF STATUTO
UNDERTAKERS RECORDS DRAW

ELECTRODECTION AND/OR GROUND PROBING RADAR (GPR) TECHNIQUES HAVE BEEN USED TO LOCATE UNDERGROUND SERVICES SHOWN ON THIS PLAN. THESE ARE INTERFERED BY THE PRESENCE OF REINFORCING BARS AND ARE THEREFORE NOT USED IN EXCAVATIONS OR SIMILAR ARE CARRIED OUT TO CONFIRM CONFIGURATION, LOCATION AND DEPTH OF SERVICES. THE INFORMATION IS NOT GUARANTEED TO BE ACCURATE. THE SEARCHING AVAILABLE SERVICES RECORD INFORMATION, HOWEVER, THE COMPLETE RECORD OF ALL SERVICES IS NOT AVAILABLE. THE INFORMATION IS NOT TO BE USED FOR AN ALTERNATIVE MEANS OF OBTAINING THE INFORMATION USED.

IT SHOULD BE NOTED THAT CERTAIN TYPES OF SERVICES, SUCH AS PLASTIC OR CONCRETE PIPES OR CONDUITS WHERE THERE IS NO DIRECT ACCESS TO THE PIPE, ARE NOT TRACEABLE BY CONVENTIONAL ELECTRODETECTION METHODS. FOR THE LOCATION OF THESE SERVICES EITHER RECORD DRAWINGS SHOULD BE Sought OR AN ALTERNATIVE MEANS OF OBTAINING THE INFORMATION USED.

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Tower Surveys
Tower Surveys CCTV Ltd
Surveyors - CCTV Drainage - Utilities
Associates in Nottingham | Stoke-on-Trent

40 ORCHARD DRIVE
NOTTINGHAM
NG12 3TP
TEL: 07917 435 897
@towersurveysoctv.co.uk
www.towersurveysoctv.co.uk
ham

PROJECT TITLE

WYTON TOWN CENTRE REGENERATION

WN	NJ/IL	DATE MAY 2025
JECT	DW	

DRAWING NUMBER	REVISION
TS-2645 302	

Diagram illustrating the components of a sewer survey area:

- FOUL SEWER
- SURFACE WATER SEWER
- COMBINED SEWER
- RIISING MAIN
- SW AR
- FW TFR
- ASSUMED ROUTES
- SERVICES TAKEN FROM
- SERVICES SURVEY AREA

TO SC	1 DUCT x 3 CABLES	DTB	DEPTH TO SOFFIT
AS	ASSUMED RISE	ERD	EXTERNAL BACKSIGHT
ACP	ASSUMED CONNECTION POINT	EOT	END OF TRACE
CS	CONCRETE BENCHING	FW	FOUL WATER SEW
CBC	CIRCULAR BRICK CHAMBER	IBD	INTERNAL BACKSIGHT
COP	CABLE DRAW PIT	IL	INVERT LEVEL
CL	CURVE LEVEL	PPC	PRECAST CONCRETE
CPC	CIRCULAR PLASTIC CHAMBER	RBC	RECTANGULAR BRICK CHAMBER
CR	CROWN LEVEL	SL	SOFFIT LEVEL
DCr	DEPTH TO CROWN	SW	SURFACE WATER
dia	DIAMETER	7FR	TAKEN FROM REVERSE
DTB	DEPTH TO BASE	UTL	UNABLE TO LIFT
DTI	DEPTH TO INVERT	UTS	UNABLE TO SURVEY

SERVICE LOCATION[illegible]

QUB-8

QU-04
A UTILITY SEGMENT WHICH IS SUSPECTED TO EXIST BUT HAS NOT BEEN DETECTED BY A THEREFORE SHOWN AS AN ASSUMED ROW.
HORIZONTAL ACCURACY = UNDEFINED
VERTICAL ACCURACY = UNDEFINED

QU-03
HORIZONTAL LOCATION ONLY OF THE UTILITY DETECTED BY ONE OF THE GEOPHYSICAL TECHNIQUES USED.
HORIZONTAL ACCURACY = ±50mm
VERTICAL ACCURACY = UNDEFINED

QU-02
AS ABOVE WITH THE ALLOWANCE OF POST PROCESSING SURVEY DATA.

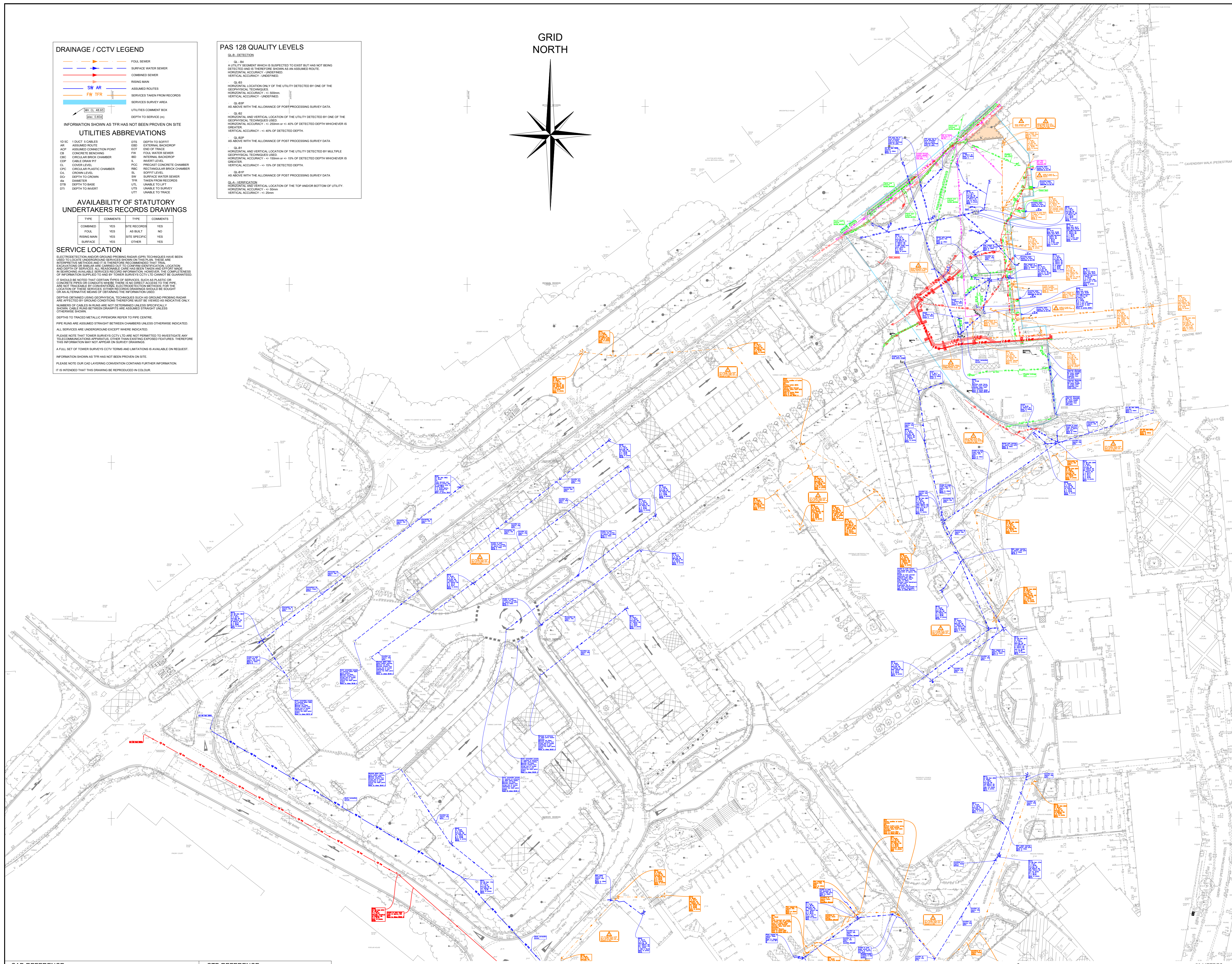
QU-01
HORIZONTAL AND VERTICAL LOCATION OF THE UTILITY DETECTED BY ONE OF THE GEOPHYSICAL TECHNIQUES USED.
HORIZONTAL ACCURACY = ±25mm or less + 40% OF DETECTED DEPTH OR WHATEVER IS GREATER
VERTICAL ACCURACY = ±40% OF DETECTED DEPTH

QU-00
AS ABOVE WITH THE ALLOWANCE OF POST PROCESSING SURVEY DATA

QU-0P
HORIZONTAL AND VERTICAL LOCATION OF THE UTILITY DETECTED BY ONE OF THE GEOPHYSICAL TECHNIQUES USED.
HORIZONTAL ACCURACY = ±150mm or less + 15% OF DETECTED DEPTH WHEN GREATER
VERTICAL ACCURACY = ±15% OF DETECTED DEPTH

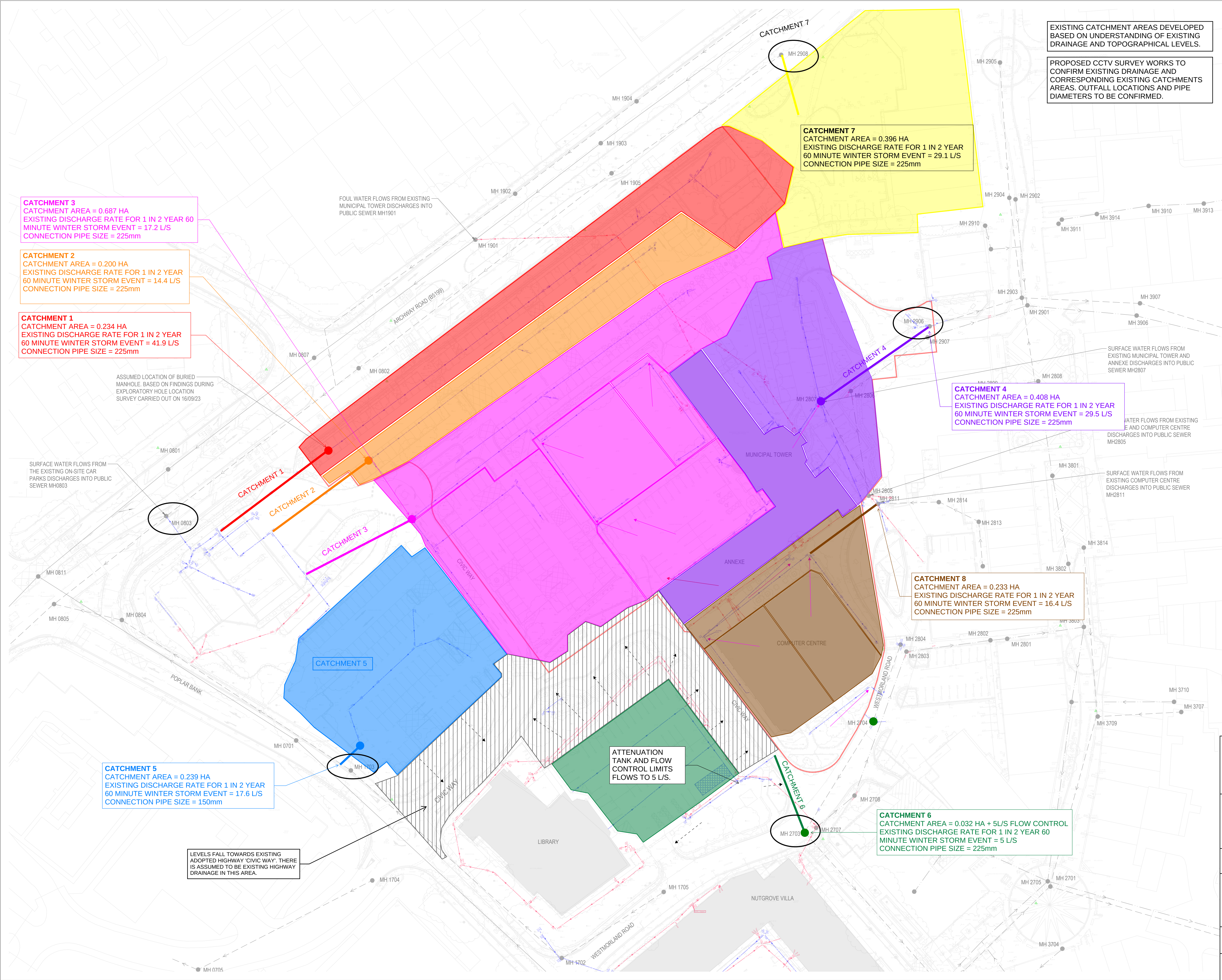
QU-0IP
AS ABOVE WITH THE ALLOWANCE OF POST PROCESSING SURVEY DATA

QLA-VERIFICATION
THE HORIZONTAL AND VERTICAL LOCATION OF THE TOP AND/OR BOTTOM OF THE UTILITY.
HORIZONTAL ACCURACY = ±50mm
VERTICAL ACCURACY = ±25mm

CTB REFERENCE
\\CTB-files\TS-Utills-v02.ctb

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Appendix C Existing Catchments Plan



EXISTING CATCHMENT AREAS DEVELOPED
BASED ON UNDERSTANDING OF EXISTING
DRAINAGE AND TOPOGRAPHICAL LEVELS.

PROPOSED CCTV SURVEY WORKS TO
CONFIRM EXISTING DRAINAGE AND
CORRESPONDING EXISTING CATCHMENTS
AREAS. OUTFALL LOCATIONS AND PIPE
DIAMETERS TO BE CONFIRMED.

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CONSTRUCTION

MAINTENANCE/CLEANING/OPERATION

DECOMMISSIONING/DEMOLITION

NOTES:

- THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL
OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.
- DRAWINGS BASED ON THE FOLLOWING BACKGROUND
INFORMATION:
 - TOPOGRAPHICAL & GPR SURVEY AS PER SURVEY
OPERATIONS DRAWING 23F247, RECEIVED 27/09/23
 - UNITED UTILITIES SEWER RECORDS
 - KNOWSLEY COUNCIL PROPOSED TENDER PLAN DRAWING 002,
DATED 12/05/21, HIGHLIGHTING THE EXISTING DRAINAGE
WITHIN THE LIBRARY CAR PARK.
 - THE COMPLETENESS OF THE UNDERGROUND SERVICE
INFORMATION CANNOT BE GUARANTEED AND THEREFORE
OTHER SERVICES MAY EXIST.
 - ALL DIMENSIONS ARE IN METERS UNLESS STATED OTHERWISE

KEY

ENABLING WORK
SITE BOUNDARY

EXISTING PUBLIC COMBINED SEWER

EXISTING PUBLIC FOUL WATER SEWER

EXISTING PUBLIC SURFACE WATER SEWER

FW — FW EXISTING PRIVATE FOUL WATER DRAIN

SW — SW EXISTING PRIVATE SURFACE WATER DRAIN

SURFACE WATER
CATCHMENTS ASSUMED TO
DRAIN VIA PRIVATE
DRAINAGE NETWORK TO
PUBLIC DRAINAGE NETWORK

P0 PRELIMINARY ISSUE 21/11/23 LD AD AD

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

Project Stage

INFORMATION

Status of Drawing

**BUROHAPPOLD
ENGINEERING**

Project:
SMP Huyton

Project Number:
P054419

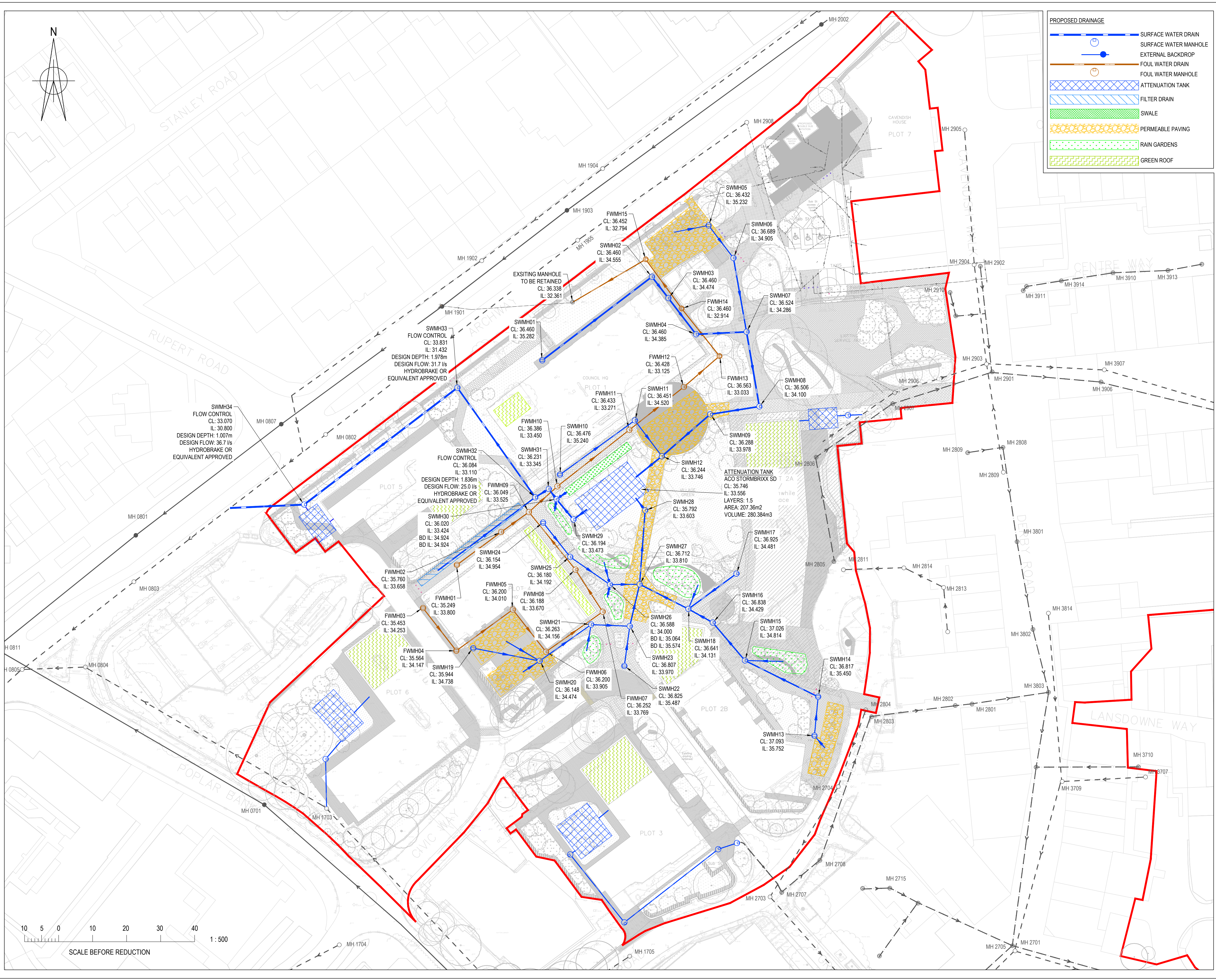
Sketch Title:
Existing Drainage and
Catchments

Sketch Number:

Date: OCT 2025	Initials: HE	Revision: P04
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Appendix D Proposed General Arrangement Network Plan



PROPOSED DRAINAGE

- SURFACE WATER DRAIN
- SURFACE WATER MANHOLE
- EXTERNAL BACKDROP
- FOUL WATER DRAIN
- FOUL WATER MANHOLE
- ATTENUATION TANK
- FILTER DRAIN
- SWALE
- PERMEABLE PAVING
- RAIN GARDENS
- GREEN ROOF

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DO NOT SCALE THIS DRAWING.

HEALTH AND SAFETY INFORMATION

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

CONSTRUCTION

- WORKS WITHIN POTENTIAL CONFINED SPACE CONDITIONS
- WORKS IN PROXIMITY TO LIVE SERVICES
- WORKS ADJACENT TO LIVE ROADS & PEDESTRIAN ROUTES
- WORKS IN PROXIMITY TO EXISTING TREES TO BE RETAINED

MAINTENANCE/CLEANING/OPERATION

- WORKS WITHIN POTENTIAL CONFINED SPACE CONDITIONS
- WORKS IN PROXIMITY TO LIVE SERVICES
- WORKS ADJACENT TO LIVE ROADS & PEDESTRIAN ROUTES
- WORKS IN PROXIMITY TO EXISTING TREES TO BE RETAINED

DECOMMISSIONING/DEMOLITION

- WORKS WITHIN POTENTIAL CONFINED SPACE CONDITIONS
- WORKS IN PROXIMITY TO LIVE SERVICES
- WORKS ADJACENT TO LIVE ROADS & PEDESTRIAN ROUTES
- WORKS IN PROXIMITY TO EXISTING TREES TO BE RETAINED

NOTES:

- THIS DRAWING IS BASED ON:
 - CCTV AND UTILITY SURVEY INFORMATION IN CAD FORMAT, DRAWING NO. TS-2045_301_1ssue01 RECEIVED FROM TOWER SURVEYS DATED MAY 25
 - UTILITY SURVEY INFORMATION IN CAD FORMAT, DRAWING NO. 23F248 RECEIVED FROM SURVEY OPERATIONS DATED AUG 23.
 - TOPOGRAPHICAL SURVEY INFORMATION IN CAD FORMAT, DRAWING NO. 23F247 RECEIVED FROM SURVEY OPERATIONS DATED AUG 23.
 - UNITED UTILITIES SEWER RECORDS DATED 06/11/2018.
 - OS MAP RECEIVED 29/04/25.
- PROPOSED FULL SITE LANDSCAPE PLAN FROM LANDSCAPE ARCHITECT LUCID DRAWING NO. L0016_SK19_FullSite_Software.dwg RECEIVED 23/07/26.
- PROPOSED PLOT DEVELOPMENT BUILDINGS FROM LANDSCAPE ARCHITECT LUCID DRAWING NO. L0016_WORKING_OUTLINE DATED 16/04/25.
- PUBLIC REALM BOUNDARY AS PER LUCID DRAWING NO. SMP-LUD-MP-ZZ-DRL-36-00-01 DATED 25/04/25.
- ALL DIMENSIONS ARE IN METRES UNLESS STATED OTHERWISE.
- THIS DRAWING IS INDICATIVE ONLY PRODUCED FOR PLANNING SUBMISSION. DESIGN SUBJECT TO DETAILED DESIGN.
- THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.
- POSITION AND LOCATION OF LINEAR CHANNEL DRAINS SUBJECT TO COORDINATION WITH LANDSCAPE ARCHITECTS AND DETAILED DESIGN OF LEVELS STRATEGY.

LEGEND:

EXISTING DRAINAGE

- UNITED UTILITIES PUBLIC SURFACE WATER SEWER
- UNITED UTILITIES PUBLIC FOUL WATER SEWER
- UNITED UTILITIES PUBLIC COMBINED WATER SEWER
- PRIVATE SURFACE WATER DRAIN
- PRIVATE FOUL WATER DRAIN
- SURFACE WATER MANHOLE
- FOUL WATER MANHOLE
- COMBINED WATER MANHOLE

P01 ISSUED FOR INFORMATION 27.07.2026 HE AH AH

Rev	Description	Date	Iss'd	Rev'd	App'd
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RIBA STAGE 2

Project Stage

INFORMATION

Status of Drawing



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

Tel: +44 (0)161 233 5000
Fax: +44 (0)870 787 4143
Email: 0054419@burohappold.com
Web: www.burohappold.com

Client: GENR8 KAJIMA REGENERATION LTD
Architect: 5PLUS
Project: Huyton Town Centre Regeneration
Drg Title: PROPOSED BELOW GROUND DRAINAGE SITE WIDE GENERAL ARRANGEMENT

Job No: 0054419 Scale: A1
Drawn/Designed By: H.Erskine Checked By: A.Hoodless Approved By: A.Hoodless
Drawing No: 0054419-BHE-XX-DR-C-3050

Revision: P01

Appendix E Quick Storage Estimates for Outline Plots

Rainfall Design Parameters

Rainfall Manager

File Edit



Rainfall Manager Items

Rainfall

Design Storms

FSR

FEH

FEH

User Defined Rainfall

Known Rainfall

Temporal Pattern

IDF

Select from the following

Label FEH

Parameters

Return Periods

Storm Durations

Parameters

Version 2022 Point

Site Location GB 344151 390873 SJ 44151

Storm Profile ☒ Summer ☒ Winter

OK

Cancel

Help

Rainfall Manager

File Edit



Rainfall Manager Items

Rainfall

Design Storms

FSR

FEH

FEH

User Defined Rainfall

Known Rainfall

Temporal Pattern

IDF

Select from the following

Label FEH

Parameters

Return Periods

Storm Durations

Return Periods

Use	Return Period (years)	Increase Rainfall (%)
☒	100	45

Add

Delete

Clear All

Deselect All

Select All

OK

Cancel

Help

Rainfall Manager

File Edit



Rainfall Manager Items

 Rainfall

 Design Storms

 FSR

 FEH

 FEH

 FEH

 User Defined Rainfall

 Known Rainfall

 Temporal Pattern

 IDF

Select from the following

Label FEH

Parameters

Return Periods

Storm Durations

Storm Durations

Use	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

Add

Delete

Clear All

Deselect All

Select All

Default

OK

Cancel

Select to use for analysis

 Help

Plot 2A Catchment

Quick Storage Estimate

Input

Input Type

User Input

Area (ha)

0.197

Volumetric Runoff Coefficient

0.750

Discharge Rate (L/s)

14.8

Infiltration Rate (m/hr)

0.0

Safety Factor

2.0

Quick

Calculate

Create New

From Library

All

FEH

...

Method

FEH

Number of Storms

18

Max. Run Time (mins)

2880

Input

Results

2D Graph

OK

Cancel

Create New

Help

Quick Storage Estimate

Results

Quick Storage Estimate variables require approximate storage of between 40m³ - 66m³.

These values are estimates only and should not be used for final design purposes.

Plot 3 Catchment

Quick Storage Estimate

Input

Input Type

User Input

Area (ha)

0.248

Volumetric Runoff Coefficient

0.750

Discharge Rate (L/s)

5.0

Infiltration Rate (m/hr)

0.0

Safety Factor

2.0

Quick

Calculate

☐ Create New ☒ From Library

☒ All

☒ FEH

...

Method

FEH

Number of Storms

18

Max. Run Time (mins)

2880

Input

Results

2D Graph

OK

Cancel

Create New

Help

Quick Storage Estimate

Results

Quick Storage Estimate variables require approximate storage of between 85m³ - 121m³.

These values are estimates only and should not be used for final design purposes.

Plot 5 Catchment

Quick Storage Estimate

Input

Input Type

User Input

Area (ha)

0.186

Volumetric Runoff Coefficient

0.750

Discharge Rate (L/s)

5.0

Infiltration Rate (m/hr)

0.0

Safety Factor

2.0

Quick

Calculate

Create New

From Library

All

FEH

Method

FEH

Number of Storms

18

Max. Run Time (mins)

2880

Input

Results

2D Graph

OK

Cancel

Create New

Help

Quick Storage Estimate

Results

Quick Storage Estimate variables require approximate storage of between 60m³ - 83m³.

These values are estimates only and should not be used for final design purposes.

Plot 6 Catchment

Quick Storage Estimate

Input

Input Type

User Input

Area (ha)

0.306

Volumetric Runoff Coefficient

0.750

Discharge Rate (L/s)

6.44

Infiltration Rate (m/hr)

0.0

Safety Factor

2.0

Quick

Calculate

Create New

From Library

All

FEH

Method

FEH

Number of Storms

18

Max. Run Time (mins)

2880

Input

Results

2D Graph

OK

Cancel

Create New

Help

Quick Storage Estimate

Results

Quick Storage Estimate variables require approximate storage of between 104m³ - 147m³.

These values are estimates only and should not be used for final design purposes.

Appendix F United Utilities Correspondence

United Utilities Grasmere House, 2nd Floor
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP

06.06.25

Dear Helen,

Pre-Development Enquiry for **SMP Huyton**

UU Reference Number: **07249922**

We have assessed your application based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your strategy will need review by other authorities as part of the planning process. We advise conducting necessary site investigations to confirm viability of your proposals.

Modelled Flood Risk [Please see the image on page 3 for details](#)

I can confirm that we have modelled flood risk within the vicinity of the proposed development.

Please note that our modelling data is indicative, and only representative of the 1:100year storm event.

[Please see comment 2 of the attached guidance sheet](#)

Asset Protection

According to our public sewer records, there are public sewers located within your site boundary. This requires an easement of 6m. If you cannot achieve the required clearance, you may wish to consider diverting and or abandoning the public sewer.

[Please see comment 3 of the attached guidance sheet and Working Near Our Pipelines Guidance document](#)

Foul Water

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

Our preferred point of discharge would be as per the below:

1. Plot 1 and Plot 4 as part of the detailed application to discharge to the UU combined water sewer MH1901 at an unrestricted rate.
2. Plot 2A to discharge to the UU foul water sewer MH2806 and MH2805 at an unrestricted rate.
3. Plot 2B to discharge to the UU foul water sewer MH2803 at an unrestricted rate.
4. Plot 3 to discharge to the UU foul water sewer MH2707 at an unrestricted rate.
5. Plot 5 to discharge to the UU combined water sewer MH0807 at an unrestricted rate.
6. Plot 6 to discharge to the UU combined water sewer MH0701 at an unrestricted rate.
7. Northeast catchment to discharge to the UU foul water MH2902 using existing connection at an unrestricted rate.

[Please see the images on page 3 for clarification](#)

Surface Water

Follow the National Planning Policy Guidance drainage hierarchy and Provide evidence for discounting higher options before considering public sewer discharge. Consult the Lead Local Flood Authority regarding surface water concerns.

[Please see comment 4 within the guidance sheet](#)

Public Sewer

United Utilities will permit connections as per the below:

1. Proposed catchment encompassing Plot 1, Plot 4, Plot 5, and proposed landscaping, to discharge to the UU surface water sewer in Archway Road at a combined rate of 56.70l/s between MH0802 and MH0803.
2. Plot 2A to discharge to UU surface water MH2811 at a rate of 5.0l/s
3. Plot 2B to discharge to UU surface water MH2806 at a rate of 18.90l/s
4. Plot 3 to discharge to UU surface water MH2703 at a rate of 5.0l/s
5. Plot 6 to discharge to UU surface water MH1703 at a rate of 6.44l/s
6. Northeast catchment current connection to MH 2908 be retained with reduction in impermeable area.

[Please see images on page 3 for clarification](#)

Water for the North West

Helen Erskine

From: Helen Erskine
Sent: 16 April 2025 11:17
To: Helen Erskine
Subject: FW: 07249922 - SMP Huyton - UU PDE
Attachments: Proposed strategy - April 25.pdf; Existing Drainage - Catchments Sketch P02.pdf

From: seweradoptions@uuplc.co.uk <seweradoptions@uuplc.co.uk>
Sent: 15 April 2025 15:18
To: Niamh Cullen <niamh.cullen@burohappold.com>; Phil Anwyl <phil.anwyl@burohappold.com>
Subject: 07249922 - SMP Huyton - UU PDE

****External Email. This email originated from outside Buro Happold.****

Hi Phil & Niamh

I have reviewed the information sent over, please see below:

Catchment 1

Assumed 225mm connection at 1/400 gradient max capacity would be 25.212l/s at 75% capacity this is 18.90l/s
Final connection point is MH 0803 however this is via an indirect connection so you would need to obtain permission from the owners of the sewers and check condition

Catchment 2

Assumed 225mm connection at 1/400 gradient max capacity would be 25.212l/s at 75% capacity this is 18.90l/s
Final connection point is MH 0803 however this is via an indirect connection so you would need to obtain permission from the owners of the sewers and check condition

Catchment 3

Assumed 225mm connection at 1/400 gradient max capacity would be 25.212l/s at 75% capacity this is 18.90l/s
Final connection point is MH 0803 however this is via an indirect connection so you would need to obtain permission from the owners of the sewers and check condition

Catchment 4

Assumed 225mm connection at 1/400 gradient max capacity would be 25.212l/s at 75% capacity this is 18.90l/s
Connection point MH 2906
MH 2807 falls within the boundary of this site and is subject to flooding 80m³ in the 100 year event

Catchment 5

Assumed 150mm connection at 1/400 gradient max capacity would be 8.589/s at 75% capacity this is 6.44l/s
Connection to MH1703

Catchment 6

Connection to MH2703 Restrict at 5L/S

Are you saying there is a connection at 5l/s to MH2074? We would want to reduce connections at this point, it currently shows flooding 104m³ in the 100 year event

Catchment 7

Assumed 225mm connection at 1/400 gradient max capacity would be 25.212l/s at 75% capacity this is 18.90l/s
Connection at MH 2908

Kind regards



Nicola Pilkington
Developer Engineer
Developer Services & Metering
Customer Services
T: 01925 429 096
unitedutilities.com

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From: Phil Anwyl <Phil.Anwyl@BuroHappold.com>
Sent: 11 April 2025 17:41
To: Pilkington, Nicola <Nicola.Pilkington@uuplc.co.uk>
Cc: Niamh Cullen <Niamh.Cullen@BuroHappold.com>
Subject: RE: SMP Huyton - UU PDE

Hi Nicola

Thanks for your time today. Please find attached the drawings shared in our discussion showing existing catchments and flow rates, and proposed drainage connections. I'm afraid we don't have any asset records that show manhole references on file.

If you have any comments or questions, please let me know.

Thanks

Phil

Phil Anwyl
Associate Director
Buro Happold | Cities - Infrastructure
T: +44 (0)1612335000

M: +44 (0)7845512202

E: phil.anwyl@burohappold.com
www.burohappold.com | [LinkedIn](#) | [Twitter](#) | [Instagram](#)

[Image is no longer available]

-----Original Appointment-----

From: Niamh Cullen <Niamh.Cullen@BuroHappold.com>

Sent: 09 April 2025 08:34

To: Niamh Cullen; nicola.pilkington@uuplc.co.uk; Phil Anwyl

Subject: SMP Huyton - UU PDE

When: 11 April 2025 15:00-16:00 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.

Where: Microsoft Teams Meeting

Meeting to discuss SMP Huyton proposals with UU

Microsoft Teams [Need help?](#)

[Join the meeting now](#)

Meeting ID: 324 249 241 564

Passcode: qN6qz2yW

Join on a video conferencing device

Tenant key: teams@vc.burohappold.com

Video ID: 129 193 200 7

[More info](#)

For organisers: [Meeting options](#)

[Org help](#)

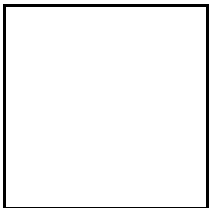
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Helen Erskine

From: seweradoptions@uuplc.co.uk
Sent: 25 April 2025 08:08
To: Phil Anwyl
Cc: Helen Erskine; Niamh Cullen; nicola.pilkington@uuplc.co.uk
Subject: RE: 07249922 - SMP Huyton - UU PDE

****External Email. This email originated from outside Buro Happold.****

Hi Phil

Next week I have the below availability:

Monday 11am
Tuesday – All day
Wed 10am
Thurs – All day

If you want to send a teams invite to my email address copied in for whatever suits you

Kind regards



Nicola Pilkington
Developer Engineer
Developer Services & Metering
Customer Services
T: 01925 429 096
unitedutilities.com

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

From: Phil Anwyl [phil.anwyl@burohappold.com]
Sent: 22/04/2025 16:36
To: seweradoptions@uuplc.co.uk
Cc: helen.erskine@burohappold.com; nicola.pilkington@uuplc.co.uk; niamh.cullen@burohappold.com
Subject: RE: 07249922 - SMP Huyton - UU PDE

Hi Nicola

Thank you for your email following our call on the 11th. If possible we'd really appreciate a follow up call to run through the connections/discharge rates, and provide clarifications on the questions in your email. We can also provide more detail on our proposed design strategy, for example we'd certainly be proposing connections at steeper gradients than those noted in your email. Please could you advise of your availability for a call?

Thanks

Phil

Phil Anwyl
Associate Director
Buro Happold | Cities - Infrastructure
T: +44 (0)1612335000

M: +44 (0)7845512202

E: phil.anwyl@burohappold.com
www.burohappold.com | [LinkedIn](#) | [Twitter](#) | [Instagram](#)

BURO HAPPOLD

From: seweradoptions@uuplc.co.uk <seweradoptions@uuplc.co.uk>
Sent: 15 April 2025 15:18
To: Niamh Cullen <niamh.cullen@burohappold.com>; Phil Anwyl <phil.anwyl@burohappold.com>
Subject: 07249922 - SMP Huyton - UU PDE

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Catchment 3

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Connection to MH2703 Restrict at 5L/S

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Connection at MH 2908

Kind regards



Nicola Pilkington
Developer Engineer
Developer Services & Metering
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T: 01925 429 096
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From: Phil Anwyl <Phil.Anwyl@BuroHappold.com>

Sent: 11 April 2025 17:41

To: Pilkington, Nicola <Nicola.Pilkington@uuplc.co.uk>

Cc: Niamh Cullen <Niamh.Cullen@BuroHappold.com>

Subject: RE: SMP Huyton - UU PDE

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If you have any comments or questions, please let me know.

Thanks

Phil

Phil Anwyl
Associate Director
Buro Happold | Cities - Infrastructure
T: +44 (0)1612335000

M: +44 (0)7845512202

E: phil.anwyl@burohappold.com
www.burohappold.com | [LinkedIn](#) | [Twitter](#) | [Instagram](#)

[Image is no longer available]

-----Original Appointment-----

From: Niamh Cullen <Niamh.Cullen@BuroHappold.com>

Sent: 09 April 2025 08:34

To: Niamh Cullen; nicola.pilkington@uuplc.co.uk; Phil Anwyl

Subject: SMP Huyton - UU PDE

When: 11 April 2025 15:00-16:00 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.

Where: Microsoft Teams Meeting

Meeting to discuss SMP Huyton proposals with UU

Microsoft Teams [Need help?](#)

[Join the meeting now](#)

Meeting ID: 324 249 241 564

Passcode: qN6qz2yW

Join on a video conferencing device

Tenant key: teams@vc.burohappold.com

Video ID: 129 193 200 7

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For organisers: [Meeting options](#)

[Org help](#)

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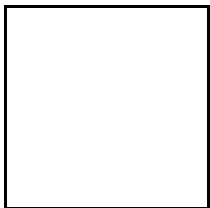
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Helen Erskine

From: Helen Erskine
Sent: 28 May 2025 15:17
To: seweradoptions@uuplc.co.uk
Cc: Niamh Cullen; Phil Anwyl
Subject: RE: 07249922 - SMP Huyton - UU PDE

Hi Nicola,

To clarify what we mean by unrestricted, we are proposing to retain the existing network with a reduced impermeable catchment area. This will effectively provide a betterment on the current scenario.

Please could you provide a formal PDE response which we could append to our drainage strategy for planning?

Many thanks,

Helen Erskine

Graduate Infrastructure Engineer
Buro Happold | Cities - Infrastructure
www.burohappold.com | [Twitter](https://twitter.com/burohappold) | [Instagram](https://www.instagram.com/burohappold)

BURO HAPPOLD

From: seweradoptions@uuplc.co.uk <seweradoptions@uuplc.co.uk>
Sent: 28 May 2025 12:48
To: Helen Erskine <helen.erskine@burohappold.com>
Cc: Niamh Cullen <niamh.cullen@burohappold.com>; Phil Anwyl <phil.anwyl@burohappold.com>
Subject: RE: 07249922 - SMP Huyton - UU PDE

****External Email. This email originated from outside Buro Happold.****

Hi Helen

This is all fine, my only issue is with point 6, We wouldn't agree to an unrestricted rate however as discussed this is an internal refurbishment so we can agree to continue with the current discharge rate and existing connections.

Kind regards



Nicola Pilkington
Developer Engineer
Developer Services & Metering
Customer Services
T: 01925 429 096
unitedutilities.com

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

From: Helen Erskine [helen.erskine@burohappold.com]

Sent: 23/05/2025 16:47

To: seweradoptions@uuplc.co.uk

Cc: phil.anwyl@burohappold.com; niamh.cullen@burohappold.com

Subject: RE: 07249922 - SMP Huyton - UU PDE

Good afternoon,

Following on from our previous meeting, I wanted to confirm proposed connection points and rates which we agreed over the phone on 28/04.

Please see link below for survey information we have received from Tower Surveys.

 [TS-2645_301_Provisional.dwg](#)

Our proposals for surface water are as follows:

1. Proposed catchment encompassing Plot 1, Plot 4, Plot 5, and proposed landscaping, to discharge to the UU surface water sewer in Archway Road at a combined rate of 56.70l/s between MH0802 and MH0803.
 1. *Outfall pipe from existing Catchment 1 sized at 225mmØ and surveyed at 1:21 gradient.*
 2. *Outfall pipe from existing Catchment 2 sized at 225mmØ and surveyed at 1:56 gradient.*
 3. *Outfall pipe from existing Catchment 3 sized at 225mmØ and surveyed at 1:29 gradient.*
2. Plot 2A to discharge to UU surface water MH2811 at a rate of 5.0l/s
3. Plot 2B to discharge to UU surface water MH2806 at a rate of 18.90l/s
 1. *Outfall from existing Catchment 4 sized at 225mmØ and surveyed at 1:141 gradient.*
4. Plot 3 to discharge to UU surface water MH2703 at a rate of 5.0l/s
 1. *Outfall from existing Catchment 6 sized at 150mmØ and surveyed at 1:34 gradient.*

5. Plot 6 to discharge to UU surface water MH1703 at a rate of 6.44l/s
 1. *Outfall pipe from existing Catchment 5 sized at 150mmØ and surveyed at 1:34 gradient.*
6. Northeast catchment to discharge at an unrestricted rate to UU surface water MH2908 (refurbishment building and minor resurfacing in external areas, to reuse existing drainage connections).
 1. *Outfall pipe from existing Catchment 7 sized at 225mmØ and surveyed at 1:154 gradient.*

Our proposals for foul water are as follows:

1. Plot 1 and Plot 4 as part of the detailed application to discharge to the UU combined water sewer MH1901 at an unrestricted rate.
2. Plot 2A to discharge to the UU foul water sewer MH2806 and MH2805 at an unrestricted rate.
3. Plot 2B to discharge to the UU foul water sewer MH2803 at an unrestricted rate.
4. Plot 3 to discharge to the UU foul water sewer MH2707 at an unrestricted rate.
5. Plot 5 to discharge to the UU combined water sewer MH0807 at an unrestricted rate.
6. Plot 6 to discharge to the UU combined water sewer MH0701 at an unrestricted rate.
7. Northeast catchment to discharge to the UU foul water MH2902 using existing connection at an unrestricted rate.

Furthermore, see attached for a draft of the proposed surface water network and foul water network.

Many thanks,

Helen Erskine

Graduate Infrastructure Engineer
Buro Happold | Cities - Infrastructure
www.burohappold.com | [Twitter](#) | [Instagram](#)

BURO HAPPOLD

From: Phil Anwyl <phil.anwyl@burohappold.com>
Sent: 15 May 2025 12:59
To: seweradoptions@uuplc.co.uk
Cc: Helen Erskine <Helen.Erskine@BuroHappold.com>; Niamh Cullen <Niamh.Cullen@BuroHappold.com>
Subject: RE: 07249922 - SMP Huyton - UU PDE

Hi Nicola

Thanks for the update. As an update, we are expecting to receive CCTV survey data at the end of next week, after which we can update you on both these and the surface water proposals (regarding both the connections and the discharge rate).

Thanks

Phil

From: seweradoptions@uuplc.co.uk <seweradoptions@uuplc.co.uk>
Sent: 06 May 2025 13:26
To: Phil Anwyl <phil.anwyl@burohappold.com>
Cc: Helen Erskine <helen.erskine@burohappold.com>; Niamh Cullen <niamh.cullen@burohappold.com>
Subject: RE: 07249922 - SMP Huyton - UU PDE

****External Email. This email originated from outside Buro Happold.****

Hi Phil

Further to our meeting last week, please see below confirmation on connection points for foul at an unrestricted rate:

SJ44902708 & SJ44902707 on westmorland road

SJ44900701 on Poplar Bank

SJ44900801, SJ44900807, SJ44901901 on Archway road

Kind regards



Nicola Pilkington
Developer Engineer
Developer Services & Metering
Customer Services
T: 01925 429 096
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Appendix G Hydraulic Model Calculations

St Michael's Place: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Junctions Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		



Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)
SWMH32	Manhole	344160.205	390874.659	36.084	2.974	33.110	Circular	1.200
SWMH34	Manhole	344092.274	390872.507	33.070	2.270	30.800	Circular	1.200
SWMH05	Manhole	344211.168	390954.593	36.420	1.189	35.232	Circular	1.200
SWMH08	Manhole	344226.093	390901.354	36.506	2.406	34.100	Circular	1.200
SWMH09	Manhole	344211.652	390899.060	36.288	2.310	33.978	Circular	1.200
SWMH23	Manhole	344188.010	390836.748	36.807	2.837	33.970	Circular	1.200
SWMH21	Manhole	344176.654	390837.226	36.263	2.107	34.156	Circular	1.200
SWMH29	Manhole	344171.440	390868.109	36.194	2.721	33.473	Circular	1.200
SWMH31	Manhole	344164.195	390877.097	36.231	2.886	33.345	Circular	1.200
SWOutfall	Simple Junction	344070.547	390871.502					
SWMH07	Manhole	344222.333	390923.304	36.524	2.238	34.286	Circular	1.200
SWMH06	Manhole	344218.482	390945.029	36.689	1.784	34.905	Circular	1.200
SWMH28	Manhole	344192.535	390870.825	35.792	2.189	33.603	Circular	1.200
SWMH18	Manhole	344205.231	390841.818	36.641	2.510	34.131	Circular	1.200
SWMH27	Manhole	344190.904	390849.092	36.712	2.902	33.810	Circular	1.200
SWMH03	Manhole	344199.349	390933.230	36.460	1.986	34.474	Circular	1.200
SWMH04	Manhole	344207.485	390922.593	36.460	2.075	34.385	Circular	1.200
SWMH12	Manhole	344197.448	390886.720	36.244	2.498	33.746	Circular	1.200
SWMH30	Manhole	344166.466	390874.105	35.964	2.540	33.424	Circular	1.200
SWMH20	Manhole	344161.528	390826.547	36.148	1.675	34.474	Circular	1.200
SWMH13	Manhole	344242.298	390804.551	37.093	1.340	35.752	Circular	1.200
SWMH22	Manhole	344186.417	390825.065	36.825	1.338	35.487	Circular	1.200
SWMH19	Manhole	344141.977	390830.285	35.944	1.206	34.738	Circular	1.200
SWMH02	Manhole	344194.522	390939.504	36.460	1.905	34.555	Circular	1.200
SWMH33	Manhole	344137.341	390906.884	33.831	2.399	31.432	Circular	1.200
SWMH01	Manhole	344162.275	390914.936	36.460	1.178	35.282	Circular	1.200
SWMH17	Manhole	344219.361	390852.195	36.925	2.444	34.481	Circular	1.200
SWMH24	Manhole	344162.532	390867.232	36.154	1.200	34.954	Circular	1.200
SWMH25	Manhole	344170.510	390857.117	36.180	1.988	34.192	Circular	1.200
SWMH26	Manhole	344182.186	390848.992	36.259	2.259	34.000	Circular	1.200
SWMH14	Manhole	344243.379	390815.990	36.817	1.367	35.450	Circular	1.200
SWMH15	Manhole	344221.862	390826.659	37.026	2.212	34.814	Circular	1.200
SWMH16	Manhole	344212.409	390837.825	36.838	2.409	34.429	Circular	1.200
SWMH10	Manhole	344167.478	390881.320	36.476	1.236	35.240	Circular	1.200
SWMH11	Manhole	344189.497	390897.273	36.451	1.931	34.520	Circular	1.200

St Michael's Place: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Junctions Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		



Name	Lock	Part Family
SWMH32	None	SSG - TypeB - 1.5 -3m Depth
SWMH34	Levels	SSG - TypeB - 1.5 -3m Depth
SWMH05	Levels	
SWMH08	None	SSG - TypeB - 1.5 -3m Depth
SWMH09	None	SSG - TypeB - 1.5 -3m Depth
SWMH23	None	SSG - TypeB - 1.5 -3m Depth
SWMH21	None	
SWMH29	None	
SWMH31	None	
SVWOutfall		
SWMH07	All	SSG - TypeB - 1.5 -3m Depth
SWMH06	None	
SWMH28	None	
SWMH18	None	
SWMH27	Levels	
SWMH03	None	
SWMH04	None	
SWMH12	None	
SWMH30	None	
SWMH20	None	
SWMH13	None	
SWMH22	Levels	
SWMH19	None	
SWMH02	None	
SWMH33	None	
SWMH01	Levels	
SWMH17	None	
SWMH24	None	
SWMH25	None	
SWMH26	None	
SWMH14	None	
SWMH15	None	
SWMH16	None	
SWMH10	None	
SWMH11	None	

Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
SWMH32	Inlet (1)	35	(None)	No Restriction
	Inlet (2)	34	(None)	No Restriction
SWMH34	Inlet	Plot 5	(None)	No Restriction
	Inlet (2)	38	(None)	No Restriction
SWMH05	Inlet (3)	Pipe (7)	(None)	No Restriction
	Inlet	C6	(None)	No Restriction
SWMH08	Inlet (1)	10	(None)	No Restriction
	Inlet (2)	C10	(None)	No Restriction
SWMH09	Inlet	11	(None)	No Restriction
	Inlet	C16	(None)	No Restriction

St Michael's Place: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Junctions Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		



Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
SWMH23	Inlet (1)	23	(None)	No Restriction
	Inlet (3)	24	(None)	No Restriction
SWMH21	Inlet	R5	(None)	No Restriction
	Inlet (1)	22	(None)	No Restriction
	Inlet (2)	CHotel3	(None)	No Restriction
SWMH29	Inlet	31	(None)	No Restriction
SWMH31	Inlet (1)	33	(None)	No Restriction
SWOutfall	Inlet	53	(None)	No Restriction
SWMH07	Inlet	C5	(None)	No Restriction
	Inlet (1)	9	(None)	No Restriction
	Inlet (2)	Pipe (4)	(None)	No Restriction
SWMH06	Inlet (3)	C4.4	(None)	No Restriction
	Inlet	8	(None)	No Restriction
	Inlet (1)	C4.3	(None)	No Restriction
SWMH28	Inlet (3)	C4.2	(None)	No Restriction
	Inlet	P6	(None)	No Restriction
SWMH18	Inlet (1)	29	(None)	No Restriction
	Inlet (1)	C15	(None)	No Restriction
	Inlet (2)	19	(None)	No Restriction
SWMH27	Inlet (4)	18	(None)	No Restriction
	Inlet	25	(None)	No Restriction
	Inlet (1)	R3	(None)	No Restriction
	Inlet (3)	20	(None)	No Restriction
SWMH03	Inlet (4)	28	(None)	No Restriction
	Inlet (1)	2	(None)	No Restriction
	Inlet (2)	C1.3	(None)	No Restriction
SWMH04	Inlet (1)	3	(None)	No Restriction
	Inlet (1)	CHQ3	(None)	No Restriction
SWMH12	Inlet (1)	P5	(None)	No Restriction
	Inlet (2)	Pipe (1)	(None)	No Restriction
	Inlet (3)	Pipe (2)	(None)	No Restriction
	Inlet (4)	Pipe (3)	(None)	No Restriction
SWMH30	Inlet	32	(None)	No Restriction
	Inlet (1)	S1	(None)	No Restriction
	Inlet (2)	R1	(None)	No Restriction
SWMH20	Inlet (2)	21	(None)	No Restriction
	Inlet (3)	P7	(None)	No Restriction
	Inlet (4)	P8	(None)	No Restriction
SWMH13	Inlet	P9	(None)	No Restriction
SWMH22	Inlet	C20	(None)	No Restriction
SWMH19	Inlet (1)	Catchment Area (6)	(None)	No Restriction
	Inlet (2)	CHotel2	(None)	No Restriction
SWMH02	Inlet	CHQ2	(None)	No Restriction
	Inlet (2)	Pipe (6)	(None)	No Restriction
SWMH33	Inlet (1)	C31	(None)	No Restriction
	Inlet (2)	Green Roof CHQ	(None)	No Restriction
	Inlet (3)	36	(None)	No Restriction
SWMH01	Inlet (1)	CHQ1	(None)	No Restriction
SWMH17	Inlet	C11	(None)	No Restriction
SWMH24	Inlet	CHotel1	(None)	No Restriction
	Inlet (1)	Green Roof	(None)	No Restriction
SWMH25	Inlet	26	(None)	No Restriction
SWMH26	Inlet	27	(None)	No Restriction
	Inlet (1)	R2	(None)	No Restriction
	Inlet (2)	Pipe (5)	(None)	No Restriction
SWMH14	Inlet	15	(None)	No Restriction
	Inlet	16	(None)	No Restriction

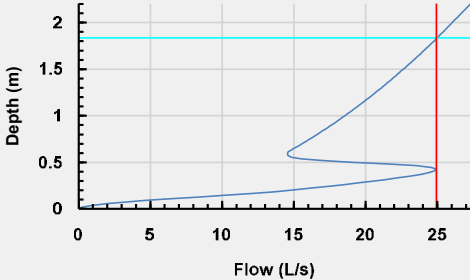
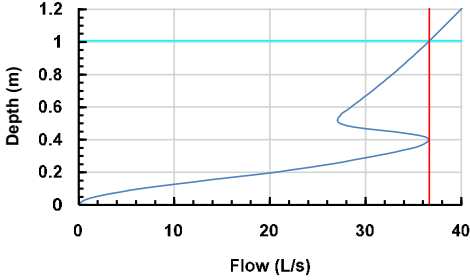
St Michael's Place:: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Junctions Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		

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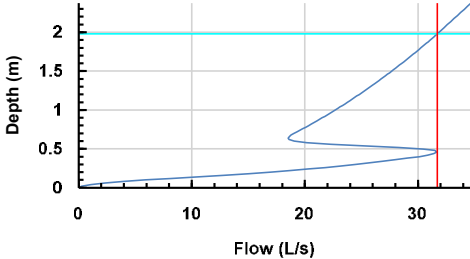
Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
SWMH15	Inlet (1)	R4	(None)	No Restriction
SWMH16	Inlet	17	(None)	No Restriction
SWMH10	Inlet (1)	CHQ4	(None)	No Restriction
SWMH11	Inlet	Pipe	(None)	No Restriction

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
SWMH32	Outlet	36	Hydro-Brake®
	Invert Level (m)	33.110	
	Design Depth (m)	1.836	
	Design Flow (L/s)	25.0	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☐	
	Unit Reference	CHE-0193-2500-1836-2500	
			
SWMH34	Outlet	53	Hydro-Brake®
	Invert Level (m)	30.800	
	Design Depth (m)	1.007	
	Design Flow (L/s)	36.7	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☐	
	Unit Reference	CHE-0246-3670-1007-3670	
			
SWMH05	Outlet	8	Free Discharge
SWMH08	Outlet	11	Free Discharge
SWMH09	Outlet	Pipe (1)	Free Discharge
SWMH23	Outlet	25	Free Discharge
SWMH21	Outlet	23	Free Discharge
SWMH29	Outlet	32	Free Discharge

St Michael's Place: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Junctions Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		



Junction	Outlet Name	Outgoing Connection	Outlet Type
SWMH31	Outlet	34	Free Discharge
SWMH07	Outlet	10	Free Discharge
SWMH06	Outlet	9	Free Discharge
SWMH28	Outlet	30	Free Discharge
SWMH18	Outlet	20	Free Discharge
SWMH27	Outlet	29	Free Discharge
SWMH03	Outlet	3	Free Discharge
SWMH04	Outlet	Pipe (4)	Free Discharge
SWMH12	Outlet	14	Free Discharge
SWMH30	Outlet	33	Free Discharge
SWMH20	Outlet	22	Free Discharge
SWMH13	Outlet	15	Free Discharge
SWMH22	Outlet	24	Free Discharge
SWMH19	Outlet	21	Free Discharge
SWMH02	Outlet	2	Free Discharge
SWMH33	Outlet	38	Hydro-Brake®
	Invert Level (m)	31.432	
	Design Depth (m)	1.978	
	Design Flow (L/s)	31.7	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☐	
	Unit Reference	CHE-0213-3170-1978-3170	
			
SWMH01	Outlet	Pipe (6)	Free Discharge
SWMH17	Outlet	19	Free Discharge
SWMH24	Outlet	26	Free Discharge
SWMH25	Outlet	27	Free Discharge
SWMH26	Outlet	28	Free Discharge
SWMH14	Outlet	16	Free Discharge
SWMH15	Outlet	17	Free Discharge
SWMH16	Outlet	18	Free Discharge
SWMH10	Outlet	Pipe	Free Discharge
SWMH11	Outlet	Pipe (2)	Free Discharge

St Michael's Place:: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Stormwater Controls Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		



RG2

Type : Bioretention

Ponding Area

Exceedance Level (m)	36.068
Depth (m)	0.100
Base Level (m)	35.968
Top Area (m²)	40.11
Side Slope (1:X)	3.00
Base Area (m²)	30.81
Freeboard (mm)	0
Porosity (%)	100
Length (m)	15.489
Long. Slope (1:X)	300.00
Filtration Rate (m/hr)	0.3
Friction Scheme	Colebrook-White Roughness
Roughness (mm)	0.6
Total Volume (m³)	10.671

Filter Area

Base Level (m)	35.218
----------------	--------

Under Drain

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

Filtration Layers

Use	Name	Filtration Layer Depth (mm)	Porosity (%)	Conductivity (m/hr)	Soil Type
☒	Soil	450	30	50.0	Soil Type
	Storage	300	30	300.0	

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	C26
Bypass Destination	C27
Inlet Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	R2
Outlet Type	Free Discharge

St Michael's Place:: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Stormwater Controls Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		



Advanced

Ponding Area

Base Perimeter (m)	34.958
Top Perimeter (m)	36.158



RG1

Type : Bioretention

Ponding Area

Exceedance Level (m)	35.850
Depth (m)	0.100
Base Level (m)	35.750
Top Area (m²)	19.74
Side Slope (1:X)	3.00
Base Area (m²)	13.12
Freeboard (mm)	0
Porosity (%)	100
Length (m)	11.041
Long. Slope (1:X)	300.00
Filtration Rate (m/hr)	0.3
Friction Scheme	Colebrook-White Roughness
Roughness (mm)	0.6
Total Volume (m³)	4.732

Filter Area

Base Level (m)	35.000
----------------	--------

Under Drain

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

Filtration Layers

Use	Name	Filtration Layer Depth (mm)	Porosity (%)	Conductivity (m/hr)	Soil Type
☒	Soil	450	30	50.0	Soil Type
	Storage	300	30	300.0	

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	C29
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

St Michael's Place: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Stormwater Controls Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		



Outlets

Outlet	
Outgoing Connection	R1
Outlet Type	Free Discharge

Advanced

Ponding Area	
Base Perimeter (m)	24.458
Top Perimeter (m)	25.658



RG3

Type : Bioretention

Ponding Area	
Exceedance Level (m)	36.300
Depth (m)	0.100
Base Level (m)	36.200
Top Area (m²)	86.10
Side Slope (1:X)	3.00
Base Area (m²)	77.29
Freeboard (mm)	0
Porosity (%)	100
Length (m)	14.681
Long. Slope (1:X)	300.00
Filtration Rate (m/hr)	0.3
Friction Scheme	Colebrook-White Roughness
Roughness (mm)	0.6
Total Volume (m³)	25.741

Filter Area	
Base Level (m)	35.450

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

Filtration Layers					
Use	Name	Filtration Layer Depth (mm)	Porosity (%)	Conductivity (m/hr)	Soil Type
☒	Soil	450	30	50.0	Soil Type
	Storage	300	30	300.0	

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Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	C14
	C13
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	R3
Outlet Type	Free Discharge

Advanced

Ponding Area

Base Perimeter (m)	39.890
Top Perimeter (m)	41.090



RG5

Type : Bioretention

St Michael's Place: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Stormwater Controls Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		



Ponding Area

Exceedance Level (m)	36.430
Depth (m)	0.100
Base Level (m)	36.330
Top Area (m²)	29.45
Side Slope (1:X)	3.00
Base Area (m²)	24.49
Freeboard (mm)	0
Porosity (%)	100
Length (m)	8.269
Long. Slope (1:X)	300.00
Filtration Rate (m/hr)	0.3
Friction Scheme	Colebrook-White Roughness
Roughness (mm)	0.6
Total Volume (m³)	8.310

Filter Area

Base Level (m)	35.580
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Under Drain

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

Filtration Layers

Use	Name	Filtration Layer Depth (mm)	Porosity (%)	Conductivity (m/hr)	Soil Type
☒	Soil	450	30	50.0	Soil Type
	Storage	300	30	300.0	

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	C21
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Catchment Area (4)
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	R5
Outlet Type	Free Discharge

St Michael's Place: Proposed Surface Water Drainage	Date: 27/07/2026		
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Advanced

Ponding Area

Base Perimeter (m)	22.461
Top Perimeter (m)	23.661



Type : Bioretention

Ponding Area

Exceedance Level (m)	36.760
Depth (m)	0.100
Base Level (m)	36.660
Top Area (m²)	76.92
Side Slope (1:X)	3.00
Base Area (m²)	66.81
Freeboard (mm)	0
Porosity (%)	100
Length (m)	16.862
Long. Slope (1:X)	300.00
Filtration Rate (m/hr)	0.3
Friction Scheme	Colebrook-White Roughness
Roughness (mm)	0.6
Total Volume (m³)	22.427

Filter Area

Base Level (m)	35.910
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Under Drain

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

Filtration Layers

Use	Name	Filtration Layer Depth (mm)	Porosity (%)	Conductivity (m/hr)	Soil Type
☒	Soil	450	30	50.0	Soil Type
	Storage	300	30	300.0	

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	C17
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

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Outlets

Outlet	
Outgoing Connection	R4
Outlet Type	Free Discharge

Advanced

Ponding Area	
Base Perimeter (m)	41.649
Top Perimeter (m)	42.849



RG4

Type : Bioretention

Ponding Area	
Exceedance Level (m)	36.210
Depth (m)	0.100
Base Level (m)	36.110
Top Area (m²)	28.84
Side Slope (1:X)	3.00
Base Area (m²)	23.62
Freeboard (mm)	0
Porosity (%)	100
Length (m)	8.689
Long. Slope (1:X)	300.00
Filtration Rate (m/hr)	0.3
Friction Scheme	Colebrook-White Roughness
Roughness (mm)	0.6
Total Volume (m³)	8.046

Filter Area	
Base Level (m)	35.360

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

Filtration Layers					
Use	Name	Filtration Layer Depth (mm)	Porosity (%)	Conductivity (m/hr)	Soil Type
☒	Soil	450	30	50.0	Soil Type
	Storage	300	30	300.0	

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Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	C22
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (5)
Outlet Type	Under Drain

Advanced

Ponding Area

Base Perimeter (m)	22.816
Top Perimeter (m)	24.016

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PP4

Type : Porous Paving

Dimensions

Exceedance Level (m)	36.171
Depth (m)	0.430
Base Level (m)	35.741
Paving Layer Depth (mm)	130
Membrane Percolation (m/hr)	2.5
Porosity (%)	30
Length (m)	28.354
Long. Slope (1:X)	200.00
Width (m)	9.291
Total Volume (m³)	23.857

Under Drain

Height Above Base (m)	0.100
Diameter (mm)	100
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)	C8
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (3)
Outlet Type	Under Drain

Advanced

Conductivity (m/hr)	300.0
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St Michael's Place: Proposed Surface Water Drainage	Date: 27/07/2026		
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PP7

Type : Porous Paving

Dimensions

Exceedance Level (m)	35.813
Depth (m)	0.430
Base Level (m)	35.383
Paving Layer Depth (mm)	130
Membrane Percolation (m/hr)	2.5
Porosity (%)	30
Length (m)	17.364
Long. Slope (1:X)	200.00
Width (m)	6.141
Total Volume (m³)	9.692

Under Drain

Height Above Base (m)	0.100
Diameter (mm)	100
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 (2)
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	(None)
Outlet Type	Under Drain

Outlet (1)

Outgoing Connection	P7
Outlet Type	Free Discharge

Advanced

Conductivity (m/hr)	300.0
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PP5

Type : Porous Paving

Dimensions

Exceedance Level (m)	36.208
Depth (m)	0.430
Base Level (m)	35.778
Paving Layer Depth (mm)	130
Membrane Percolation (m/hr)	2.5
Porosity (%)	30
Length (m)	24.308
Long. Slope (1:X)	200.00
Width (m)	3.929
Total Volume (m³)	8.728

Under Drain

Height Above Base (m)	0.100
Diameter (mm)	100
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 (1)
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	P5
Outlet Type	Free Discharge

Advanced

Conductivity (m/hr)	300.0
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PP9

Type : Porous Paving

Dimensions

Exceedance Level (m)	36.806
Depth (m)	0.430
Base Level (m)	36.376
Paving Layer Depth (mm)	130
Membrane Percolation (m/hr)	2.5
Porosity (%)	30
Length (m)	22.505
Long. Slope (1:X)	200.00
Width (m)	5.178
Total Volume (m³)	10.611

Under Drain

Height Above Base (m)	0.100
Diameter (mm)	100
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)	C18
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	P9
Outlet Type	Free Discharge

Advanced

Conductivity (m/hr)	300.0
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PP8

Type : Porous Paving

Dimensions

Exceedance Level (m)	35.856
Depth (m)	0.430
Base Level (m)	35.426
Paving Layer Depth (mm)	130
Membrane Percolation (m/hr)	2.5
Porosity (%)	30
Length (m)	21.325
Long. Slope (1:X)	200.00
Width (m)	6.635
Total Volume (m³)	12.852

Under Drain

Height Above Base (m)	0.100
Diameter (mm)	100
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 (3)
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	P8
Outlet Type	Free Discharge

Advanced

Conductivity (m/hr)	300.0
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PP6

Type : Porous Paving

Dimensions

Exceedance Level (m)	36.364
Depth (m)	0.430
Base Level (m)	35.934
Paving Layer Depth (mm)	130
Membrane Percolation (m/hr)	2.5
Porosity (%)	30
Length (m)	27.195
Long. Slope (1:X)	200.00
Width (m)	6.465
Total Volume (m³)	15.968

Under Drain

Height Above Base (m)	0.100
Diameter (mm)	100
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
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	P6
Outlet Type	Free Discharge

Advanced

Conductivity (m/hr)	300.0
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PP1

Type : Porous Paving

Dimensions

Exceedance Level (m)	36.420
Depth (m)	0.430
Base Level (m)	35.990
Paving Layer Depth (mm)	130
Membrane Percolation (m/hr)	2.5
Porosity (%)	30
Length (m)	25.734
Long. Slope (1:X)	200.00
Width (m)	9.803
Total Volume (m³)	22.843

Under Drain

Height Above Base (m)	0.100
Diameter (mm)	100
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)	C4.1
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (7)
Outlet Type	Under Drain

Advanced

Conductivity (m/hr)	300.0
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Infiltration Trench

Type : Infiltration Trench

Dimensions

Exceedance Level (m)	34.856
Depth (m)	1.300
Base Level (m)	33.556
Freeboard (mm)	15
Porosity (%)	20
Length (m)	37.549
Long. Slope (1:X)	200.00
Width (m)	2.061
Total Volume (m³)	20.123

Under Drain

Height Above Base (m)	0.100
Diameter (mm)	100
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)	C30
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	35
Outlet Type	Free Discharge

Advanced

Conductivity (m/hr)	300.0
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Swale

Type : Swale

Swale

Exceedance Level (m)	36.415
Depth (m)	0.300
Base Level (m)	36.115
Top Width (m)	2.300
Side Slope (1:X)	3.00
Base Width (m)	0.500
Freeboard (mm)	0
Length (m)	22.895
Long. Slope (1:X)	200.00
Filtration Rate (m/hr)	0.1
Friction Scheme	Colebrook-White Roughness
Roughness (mm)	0.6
Total Volume (m³)	12.475

Trench

Trench Depth (m)	0.750
Trench Porosity (%)	30

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)	C9
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	S1
Outlet Type	Under Drain

Advanced

Swale

Porosity (%)	100
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Trench

Trench Conductivity (m/hr)	50.0
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Cellular Storage

Type : Cellular Storage

Dimensions

Exceedance Level (m)	36.333
Depth (m)	1.390
Base Level (m)	33.556
Number of Crates Long	16
Number of Crates Wide	18
Number of Crates High	1
Porosity (%)	97
Crate Length (m)	1.2
Crate Width (m)	0.6
Crate Height (m)	1.39
Total Volume (m³)	280.970

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	30
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

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

Outlets

Outlet

Outgoing Connection	31
Outlet Type	Free Discharge

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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)
38	56.682	Pipe	89.649		0.6	375	33.831	31.432
P8	5.825	Pipe	6.119		0.6	150	35.962	35.426
3	13.393	Pipe	150.480		0.6	300	36.460	34.474
11	14.622	Pipe	119.856		0.6	300	36.506	34.100
25	12.678	Pipe	79.238		0.6	225	36.807	33.970
34	4.676	Pipe	19.897		0.6	300	36.231	33.345
53	21.750	Pipe	39.331		0.6	375	33.070	30.800
10	22.270	Pipe	119.731		0.6	300	36.524	34.286
19	17.531	Pipe	50.089		0.6	225	36.925	34.481
8	12.040	Pipe	47.829		0.6	150	36.420	35.232
33	3.756	Pipe	47.550		0.6	300	35.964	33.424
P5	19.877	Pipe	9.781		0.6	150	36.330	35.778
Pipe (3)	9.816	Pipe	4.685		0.6	100	36.313	35.841
29	21.794	Pipe	105.284		0.6	225	36.712	33.810
32	7.791	Pipe	158.991		0.6	300	36.194	33.473
Pipe (1)	18.816	Pipe	81.103		0.6	300	36.288	33.978
31	4.759	Pipe	57.338		0.6	300	36.333	33.556
27	14.225	Pipe	74.089		0.6	150	36.180	34.192
Pipe (4)	14.865	Pipe	150.151		0.6	300	36.460	34.385
2	7.916	Pipe	97.723		0.6	300	36.460	34.555
22	18.516	Pipe	58.273		0.6	150	36.148	34.474
S1	4.298	Pipe	2.214		0.6	225	36.529	35.365
16	24.017	Pipe	37.784		0.6	225	36.817	35.450
14	9.572	Pipe	50.380		0.6	300	36.244	33.746
24	11.792	Pipe	7.772		0.6	150	36.825	35.487
20	16.068	Pipe	50.056		0.6	225	36.641	34.131
9	22.064	Pipe	35.655		0.6	225	36.689	34.905
Pipe (7)	10.192	Pipe	11.875		0.6	100	36.549	36.090
30	4.576	Pipe	97.365		0.6	225	35.792	33.603
P7	11.308	Pipe	12.435		0.6	150	35.900	35.383
23	11.367	Pipe	61.111		0.6	150	36.263	34.156
P9	4.578	Pipe	7.334		0.6	150	36.919	36.376
28	8.719	Pipe	75.813		0.6	150	36.259	34.000
35	35.699	Pipe	80.043		0.6	225	35.044	33.556
15	11.490	Pipe	38.025		0.6	150	37.093	35.752
36	39.512	Pipe	23.551		0.6	300	36.084	33.110
26	12.882	Pipe	16.908		0.6	150	36.154	34.954
17	14.630	Pipe	38.000		0.6	225	37.026	34.814
18	8.213	Pipe	27.531		0.6	225	36.838	34.429
P6	7.556	Pipe	3.242		0.6	150	36.500	35.934
R3	12.398	Pipe	7.560		0.6	150	36.349	35.450
R2	6.634	Pipe	5.447		0.6	150	36.120	35.218
R1	3.429	Pipe	2.176		0.6	225	35.887	35.000
R5	7.296	Pipe	5.124		0.6	150	36.458	35.580
R4	11.162	Pipe	10.187		0.6	150	36.816	35.910
21	19.905	Pipe	75.310		0.6	150	35.944	34.738
Pipe	27.190	Pipe	37.765		0.6	150	36.476	35.240
Pipe (2)	13.213	Pipe	17.071		0.6	150	36.451	34.520
Pipe (5)	6.042	Pipe	4.441		0.6	150	36.239	35.360
Pipe (6)	40.540	Pipe	55.773		0.6	300	36.460	35.282

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Name	Downstream Cover Level (m)	Downstream Invert Level (m)	Part Family	Lock	Flow Restriction (L/s)	Culvert Type	Culvert Entrance	Wall Thickness (mm)
38	33.070	30.800		None	34.7	(None)	(None)	0
P8	36.148	34.474		None		(None)	(None)	0
3	36.460	34.385		None		(None)	(None)	0
11	36.288	33.978	PE Pipe Drainage (Generic)	None		(None)	(None)	0
25	36.712	33.810	PE Pipe Drainage (Generic)	None		(None)	(None)	0
34	36.084	33.110		None		(None)	(None)	0
53	32.120	30.247		Levels	40.1	(None)	(None)	0
10	36.506	34.100		None		(None)	(None)	0
19	36.641	34.131		None		(None)	(None)	0
8	36.689	34.980		None		(None)	(None)	0
33	36.231	33.345		None		(None)	(None)	0
P5	36.244	33.746		None		(None)	(None)	0
Pipe (3)	36.244	33.746		None	0.0	(None)	(None)	0
29	35.792	33.603		None		(None)	(None)	0
32	35.964	33.424		None		(None)	(None)	0
Pipe (1)	36.244	33.746		None		(None)	(None)	0
31	36.194	33.473		None		(None)	(None)	0
27	36.259	34.000		None		(None)	(None)	0
Pipe (4)	36.524	34.286		None		(None)	(None)	0
2	36.460	34.474		None		(None)	(None)	0
22	36.263	34.156		None		(None)	(None)	0
S1	35.964	33.424		None	0.0	(None)	(None)	0
16	37.026	34.814		None		(None)	(None)	0
14	36.333	33.556		None		(None)	(None)	0
24	36.807	33.970		None		(None)	(None)	0
20	36.712	33.810		None		(None)	(None)	0
9	36.524	34.286		None		(None)	(None)	0
Pipe (7)	36.420	35.232		None	0.0	(None)	(None)	0
30	36.333	33.556		None		(None)	(None)	0
P7	36.148	34.474		None		(None)	(None)	0
23	36.807	33.970		None		(None)	(None)	0
P9	37.093	35.752		None		(None)	(None)	0
28	36.712	33.885		None		(None)	(None)	0
35	36.084	33.110		None		(None)	(None)	0
15	36.817	35.450		None		(None)	(None)	0
36	33.831	31.432		None	27.3	(None)	(None)	0
26	36.180	34.192		None		(None)	(None)	0
17	36.838	34.429		None		(None)	(None)	0
18	36.641	34.131		None		(None)	(None)	0
P6	35.792	33.603		None		(None)	(None)	0
R3	36.712	33.810		None		(None)	(None)	0
R2	36.259	34.000		None		(None)	(None)	0
R1	35.964	33.424		None		(None)	(None)	0
R5	36.263	34.156		None		(None)	(None)	0
R4	37.026	34.814		None		(None)	(None)	0
21	36.148	34.474		None		(None)	(None)	0
Pipe	36.451	34.520		None		(None)	(None)	0
Pipe (2)	36.244	33.746		None		(None)	(None)	0
Pipe (5)	36.259	34.000		None	0.0	(None)	(None)	0
Pipe (6)	36.460	34.555		None		(None)	(None)	0

St Michael's Place: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Connections Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		



Name	Material	Trench Width (mm)	Bedding Material	Surrounding Material
38		0		
P8		0		
3		0		
11		0		
25		0		
34		0		
53		0		
10		0		
19		0		
8		0		
33		0		
P5		0		
Pipe (3)		0		
29		0		
32		0		
Pipe (1)		0		
31		0		
27		0		
Pipe (4)		0		
2		0		
22		0		
S1		0		
16		0		
14		0		
24		0		
20		0		
9		0		
Pipe (7)		0		
30		0		
P7		0		
23		0		
P9		0		
28		0		
35		0		
15		0		
36		0		
26		0		
17		0		
18		0		
P6		0		
R3		0		
R2		0		
R1		0		
R5		0		
R4		0		
21		0		
Pipe		0		
Pipe (2)		0		
Pipe (5)		0		
Pipe (6)		0		

St Michael's Place: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Inflow Summary Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		



Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (m²)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (m²)
C1.3	SWMH03		Time of Concentration	47.227	100	0	100	47.227
C4.1	PP1		Time of Concentration	252.324	100	0	100	252.324
C4.2	SWMH06		Time of Concentration	173.096	100	0	100	173.096
C4.3	SWMH06		Time of Concentration	128.455	100	0	100	128.455
C4.4	SWMH07		Time of Concentration	121.285	100	0	100	121.285
C5	SWMH07		Time of Concentration	96.991	100	0	100	96.991
C6	SWMH08		Time of Concentration	199.023	100	0	100	199.023
C8	PP4		Time of Concentration	385.417	100	0	100	385.417
C9	Swale		Time of Concentration	141.419	100	0	100	141.419
C10	SWMH08		Time of Concentration	1251.003	100	0	100	1251.003
C11	SWMH17		Time of Concentration	752.123	100	0	100	752.123
C13	RG3		Time of Concentration	58.887	100	0	100	58.887
C14	RG3		Time of Concentration	279.372	100	0	100	279.372
C15	SWMH18		Time of Concentration	660.672	100	0	100	660.672
C16	SWMH23		Time of Concentration	697.563	100	0	100	697.563
C17	RG6 (1)		Time of Concentration	299.506	100	0	100	299.506
C18	PP9		Time of Concentration	167.759	100	0	100	167.759
C20	SWMH22		Time of Concentration	91.691	100	0	100	91.691
C21	RG5		Time of Concentration	97.673	100	0	100	97.673
C22	RG4		Time of Concentration	138.877	100	0	100	138.877
C26	RG2		Time of Concentration	164.701	100	0	100	164.701
C27	RG2		Time of Concentration	33.646	100	0	100	33.646
C28	RG1		Time of Concentration	22.030	100	0	100	22.030
C29	RG1		Time of Concentration	59.225	100	0	100	59.225
C30	Infiltration Trench		Time of Concentration	160.050	100	0	100	160.050
C31	SWMH33		Time of Concentration	186.055	100	0	100	186.055
Catchment Area	PP6		Time of Concentration	175.816	100	0	100	175.816
Catchment Area (1)	PP5		Time of Concentration	95.603	100	0	100	95.603
Catchment Area (2)	PP7		Time of Concentration	158.535	100	0	100	158.535
Catchment Area (3)	PP8		Time of Concentration	262.961	100	0	100	262.961
Catchment Area (4)	RG5		Time of Concentration	41.340	100	0	100	41.340
Catchment Area (6)	SWMH22		Time of Concentration	64.396	100	0	100	64.396

St Michael's Place: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Inflow Summary Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		



CHotel1	SWMH24		Time of Concentration	219.094	100	0	100	219.094
CHotel2	SWMH19		Time of Concentration	308.437	100	0	100	308.437
CHotel3	SWMH21		Time of Concentration	319.858	100	0	100	319.858
CHQ1	SWMH01		Time of Concentration	418.291	100	0	100	418.291
CHQ2	SWMH02		Time of Concentration	338.461	100	0	100	338.461
CHQ3	SWMH04		Time of Concentration	348.389	100	0	100	348.389
CHQ4	SWMH10		Time of Concentration	534.602	100	0	100	534.602
Green Roof	SWMH24		Green Roof	59.662		0		59.662
Green Roof	SWMH33		Green Roof	60.575		0		60.575
CHQ								
Plot 5	SWMH34		Time of Concentration	1219.537	100	0	100	1219.537
TOTAL		0.0		11291.625				11291.625

St Michael's Place: Proposed Surface Water Drainage	Date: 27/07/2026			
	Designed by: HE	Checked by: AH	Approved By: AH	
Report Details: Type: Outfall Details Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ			

Outfalls

Outfall	Outfall Type	Gated	Fixed Surcharged Level (m)	Level Curve
PP7	Free Discharge			
SWOutfall	Free Discharge			

St Michael's Place:: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Title: Rainfall Analysis Criteria	Buro Happold: 2 Castle Street Manchester M3 4LZ		



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	Type: FEH
Site Location	GB 344151 390873 SJ 44151 90873
Rainfall Version	2022
Summer	☒
Winter	☒

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

Storm Durations	
Duration (hrs)	Run Time (hrs)
0.25	0.50
0.50	1.00
1.00	2.00
2.00	4.00
4.00	8.00
6.00	12.00
8.00	16.00
16.00	32.00
24.00	48.00

St Michael's Place: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Junctions Summary Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		





FEH: 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
SWMH32	FEH: 2 years: +0 %: 1.00 hrs: Winter	36.084	33.110	33.771	0.661	27.3	0.747	0.000	23.3	84.235	Surcharged
SWMH34	FEH: 2 years: +0 %: 1.00 hrs: Winter	33.070	30.800	31.194	0.394	34.6	0.446	0.000	31.9	98.442	Surcharged
SWMH05	FEH: 2 years: +0 %: 24.00 hrs: Winter	36.420	35.232	35.238	0.007	0.1	0.007	0.000	0.1	4.234	OK
SWMH08	FEH: 2 years: +0 %: 0.25 hrs: Winter	36.506	34.100	34.251	0.151	45.3	0.170	0.000	43.7	22.614	OK
SWMH09	FEH: 2 years: +0 %: 0.25 hrs: Winter	36.288	33.978	34.109	0.131	43.7	0.149	0.000	42.3	22.586	OK
SWMH23	FEH: 2 years: +0 %: 0.25 hrs: Winter	36.807	33.970	34.068	0.098	22.3	0.111	0.000	21.7	11.303	OK
SWMH21	FEH: 2 years: +0 %: 0.25 hrs: Winter	36.263	34.156	34.225	0.069	9.4	0.078	0.000	8.9	5.110	OK
SWMH29	FEH: 2 years: +0 %: 1.00 hrs: Winter	36.194	33.473	33.777	0.304	33.5	0.343	0.000	30.7	81.665	Surcharged
SWMH31	FEH: 2 years: +0 %: 1.00 hrs: Winter	36.231	33.345	33.773	0.428	28.8	0.484	0.000	27.3	83.220	Surcharged
SWOutfall	FEH: 2 years: +0 %: 1.00 hrs: Winter		30.247	30.327	0.080	31.8			31.8	98.394	OK
SWMH07	FEH: 2 years: +0 %: 0.25 hrs: Winter	36.524	34.286	34.382	0.096	23.9	0.109	0.000	22.5	12.090	OK
SWMH06	FEH: 2 years: +0 %: 0.25 hrs: Winter	36.689	34.905	34.939	0.034	4.7	0.039	0.000	4.6	2.197	OK
SWMH28	FEH: 2 years: +0 %: 1.00 hrs: Winter	35.792	33.603	33.782	0.179	28.0	0.202	0.000	27.6	45.860	OK
SWMH18	FEH: 2 years: +0 %: 0.25 hrs: Winter	36.641	34.131	34.214	0.083	22.0	0.094	0.000	21.4	11.058	OK
SWMH27	FEH: 2 years: +0 %: 0.25 hrs: Winter	36.712	33.810	33.986	0.176	46.3	0.199	0.000	43.3	26.354	OK
SWMH03	FEH: 2 years: +0 %: 0.25 hrs: Winter	36.460	34.474	34.549	0.075	11.6	0.085	0.000	11.1	5.828	OK
SWMH04	FEH: 2 years: +0 %: 0.25 hrs: Winter	36.460	34.385	34.477	0.092	16.6	0.104	0.000	15.9	8.350	OK
SWMH12	FEH: 2 years: +0 %: 0.25 hrs: Winter	36.244	33.746	33.875	0.129	50.2	0.146	0.000	48.6	26.455	OK
SWMH30	FEH: 2 years: +0 %: 1.00 hrs: Winter	35.964	33.424	33.774	0.350	31.4	0.396	0.000	28.8	83.240	Surcharged
SWMH20	FEH: 2 years: +0 %: 0.25 hrs: Winter	36.148	34.474	34.518	0.044	4.7	0.050	0.000	4.4	2.232	OK
SWMH13	FEH: 2 years: +0 %: 8.00 hrs: Winter	37.093	35.752	35.760	0.008	0.2	0.009	0.000	0.2	2.924	OK
SWMH22	FEH: 2 years: +0 %: 0.25 hrs: Winter	36.825	35.487	35.506	0.019	2.5	0.021	0.000	2.4	1.136	OK
SWMH19	FEH: 2 years: +0 %: 0.25 hrs: Winter	35.944	34.738	34.789	0.051	4.8	0.058	0.000	4.7	2.241	OK
SWMH02	FEH: 2 years: +0 %: 0.25 hrs: Winter	36.460	34.555	34.624	0.069	11.6	0.078	0.000	10.9	5.497	OK
SWMH33	FEH: 2 years: +0 %: 2.00 hrs: Summer	33.831	31.432	31.837	0.405	26.2	0.458	0.000	25.7	105.907	Surcharged
SWMH01	FEH: 2 years: +0 %: 0.25 hrs: Winter	36.460	35.282	35.324	0.042	6.6	0.047	0.000	6.3	3.045	OK
SWMH17	FEH: 2 years: +0 %: 0.25 hrs: Winter	36.925	34.481	34.541	0.060	11.8	0.068	0.000	11.6	5.467	OK
SWMH24	FEH: 2 years: +0 %: 0.25 hrs: Winter	36.154	34.954	34.983	0.029	3.7	0.033	0.000	3.6	1.849	OK
SWMH25	FEH: 2 years: +0 %: 0.25 hrs: Winter	36.180	34.192	34.235	0.043	3.6	0.049	0.000	3.4	1.835	OK

St Michael's Place:: Proposed Surface Water Drainage				Date: 27/07/2026							
Report Details: Type: Junctions Summary Storm Phase: SW Proposed Drainage				Designed by:	Checked by:	Approved By:					
				HE	AH	AH					
				Buro Happold: 2 Castle Street Manchester M3 4LZ							
SWMH26	FEH: 2 years: +0 %: 1.00 hrs: Winter	36.25 9	34.00 0	34.045	0.045	3.8	0.051	0.000	3.7	5.992	OK
SWMH14	FEH: 2 years: +0 %: 8.00 hrs: Winter	36.81 7	35.45 0	35.457	0.007	0.2	0.008	0.000	0.2	2.918	OK
SWMH15	FEH: 2 years: +0 %: 0.50 hrs: Winter	37.02 6	34.81 4	34.841	0.027	2.0	0.030	0.000	2.4	1.535	OK
SWMH16	FEH: 2 years: +0 %: 0.50 hrs: Winter	36.83 8	34.42 9	34.454	0.025	2.4	0.028	0.000	2.6	1.524	OK
SWMH10	FEH: 2 years: +0 %: 0.25 hrs: Winter	36.47 6	35.24 0	35.298	0.058	8.4	0.066	0.000	8.2	3.886	OK
SWMH11	FEH: 2 years: +0 %: 0.25 hrs: Winter	36.45 1	34.52 0	34.563	0.043	8.2	0.049	0.000	7.9	3.881	OK

St Michael's Place: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Junctions Summary Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		





FEH: 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
SWMH32	FEH: 30 years: +0 %: 1.00 hrs: Winter	36.08 4	33.11 0	34.106	0.996	25.1	1.127	0.000	21.9	112.759	Surcharged
SWMH34	FEH: 30 years: +0 %: 0.50 hrs: Winter	33.07 0	30.80 0	31.734	0.934	41.7	1.057	0.000	33.7	71.619	Surcharged
SWMH05	FEH: 30 years: +0 %: 16.00 hrs: Winter	36.42 0	35.23 2	35.243	0.011	0.3	0.013	0.000	0.3	6.818	OK
SWMH08	FEH: 30 years: +0 %: 0.25 hrs: Winter	36.50 6	34.10 0	34.342	0.242	89.8	0.274	0.000	86.5	44.468	OK
SWMH09	FEH: 30 years: +0 %: 0.25 hrs: Winter	36.28 8	33.97 8	34.185	0.207	86.5	0.234	0.000	84.0	44.464	OK
SWMH23	FEH: 30 years: +0 %: 0.50 hrs: Winter	36.80 7	33.97 0	34.360	0.390	29.4	0.441	0.000	28.2	31.667	Surcharged
SWMH21	FEH: 30 years: +0 %: 0.25 hrs: Winter	36.26 3	34.15 6	34.443	0.287	18.5	0.325	0.000	13.3	10.062	Surcharged
SWMH29	FEH: 30 years: +0 %: 1.00 hrs: Winter	36.19 4	33.47 3	34.115	0.642	28.5	0.727	0.000	27.9	111.345	Surcharged
SWMH31	FEH: 30 years: +0 %: 1.00 hrs: Winter	36.23 1	33.34 5	34.109	0.764	27.6	0.864	0.000	25.1	111.772	Surcharged
SWOutfall	FEH: 30 years: +0 %: 1.00 hrs: Summer		30.24 7	30.332	0.085	36.6			36.6	126.772	OK
SWMH07	FEH: 30 years: +0 %: 0.25 hrs: Winter	36.52 4	34.28 6	34.432	0.146	47.6	0.165	0.000	45.0	23.781	OK
SWMH06	FEH: 30 years: +0 %: 0.25 hrs: Winter	36.68 9	34.90 5	34.953	0.048	9.3	0.054	0.000	9.1	4.309	OK
SWMH28	FEH: 30 years: +0 %: 1.00 hrs: Winter	35.79 2	33.60 3	34.126	0.523	51.1	0.592	0.000	50.6	99.446	Surcharged
SWMH18	FEH: 30 years: +0 %: 0.50 hrs: Winter	36.64 1	34.13 1	34.369	0.238	30.9	0.270	0.000	27.6	30.742	Surcharged
SWMH27	FEH: 30 years: +0 %: 0.50 hrs: Winter	36.71 2	33.81 0	34.311	0.501	62.6	0.566	0.000	61.4	76.075	Surcharged
SWMH03	FEH: 30 years: +0 %: 0.25 hrs: Winter	36.46 0	34.47 4	34.586	0.112	23.0	0.127	0.000	22.2	11.445	OK
SWMH04	FEH: 30 years: +0 %: 0.25 hrs: Winter	36.46 0	34.38 5	34.523	0.138	33.0	0.156	0.000	31.7	16.406	OK
SWMH12	FEH: 30 years: +0 %: 1.00 hrs: Winter	36.24 4	33.74 6	34.119	0.373	54.3	0.422	0.000	53.1	83.831	Surcharged
SWMH30	FEH: 30 years: +0 %: 1.00 hrs: Winter	35.96 4	33.42 4	34.112	0.688	28.4	0.778	0.000	27.6	112.678	Surcharged
SWMH20	FEH: 30 years: +0 %: 0.25 hrs: Winter	36.14 8	34.47 4	34.537	0.063	9.2	0.072	0.000	8.7	4.462	OK
SWMH13	FEH: 30 years: +0 %: 2.00 hrs: Winter	37.09 3	35.75 2	35.771	0.019	0.9	0.022	0.000	0.9	2.375	OK
SWMH22	FEH: 30 years: +0 %: 0.25 hrs: Winter	36.82 5	35.48 7	35.513	0.026	4.8	0.030	0.000	4.8	2.224	OK
SWMH19	FEH: 30 years: +0 %: 0.25 hrs: Winter	35.94 4	34.73 8	34.813	0.075	9.5	0.085	0.000	9.2	4.402	OK
SWMH02	FEH: 30 years: +0 %: 0.25 hrs: Winter	36.46 0	34.55 5	34.658	0.103	22.9	0.116	0.000	21.6	10.786	OK
SWMH33	FEH: 30 years: +0 %: 0.50 hrs: Winter	33.83 1	31.43 2	31.983	0.550	25.8	0.622	0.000	20.6	51.689	Surcharged
SWMH01	FEH: 30 years: +0 %: 0.25 hrs: Winter	36.46 0	35.28 2	35.340	0.058	12.9	0.066	0.000	12.4	5.969	OK
SWMH17	FEH: 30 years: +0 %: 0.25 hrs: Winter	36.92 5	34.48 1	34.566	0.085	23.2	0.097	0.000	23.1	10.732	OK
SWMH24	FEH: 30 years: +0 %: 0.25 hrs: Winter	36.15 4	34.95 4	34.995	0.041	7.2	0.046	0.000	7.1	3.628	OK

St Michael's Place:: Proposed Surface Water Drainage		Date: 27/07/2026			
		Designed by: HE	Checked by: AH	Approved By: AH	
Report Details: Type: Junctions Summary Storm Phase: SW Proposed Drainage		Buro Happold: 2 Castle Street Manchester M3 4LZ			

SWMH25	FEH: 30 years: +0 %: 0.50 hrs: Winter	36.18 0	34.19 2	34.319	0.127	4.9	0.144	0.000	4.6	4.925	OK
SWMH26	FEH: 30 years: +0 %: 0.50 hrs: Winter	36.25 9	34.00 0	34.315	0.315	6.5	0.357	0.000	7.7	9.990	Surcharged
SWMH14	FEH: 30 years: +0 %: 2.00 hrs: Winter	36.81 7	35.45 0	35.467	0.017	0.9	0.019	0.000	0.9	2.361	OK
SWMH15	FEH: 30 years: +0 %: 1.00 hrs: Winter	37.02 6	34.81 4	34.845	0.031	3.3	0.035	0.000	3.2	7.052	OK
SWMH16	FEH: 30 years: +0 %: 1.00 hrs: Winter	36.83 8	34.42 9	34.457	0.027	3.2	0.031	0.000	3.1	7.037	OK
SWMH10	FEH: 30 years: +0 %: 0.25 hrs: Winter	36.47 6	35.24 0	35.326	0.086	16.5	0.098	0.000	16.1	7.629	OK
SWMH11	FEH: 30 years: +0 %: 0.25 hrs: Winter	36.45 1	34.52 0	34.582	0.062	16.1	0.070	0.000	15.7	7.621	OK

St Michael's Place: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Junctions Summary Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		





FEH: 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
SWMH32	FEH: 100 years: +45 %: 2.00 hrs: Winter	36.084	33.110	34.708	1.598	29.7	1.808	0.000	24.9	290.748	Surcharged
SWMH34	FEH: 100 years: +45 %: 0.50 hrs: Winter	33.070	30.800	33.077	2.277	66.5	9.458	6.891	40.1	102.518	Flood
SWMH05	FEH: 100 years: +45 %: 4.00 hrs: Winter	36.420	35.232	35.257	0.025	1.6	0.029	0.000	1.6	6.542	OK
SWMH08	FEH: 100 years: +45 %: 2.00 hrs: Winter	36.506	34.100	34.727	0.627	51.5	0.709	0.000	50.5	154.329	Surcharged
SWMH09	FEH: 100 years: +45 %: 2.00 hrs: Winter	36.288	33.978	34.727	0.749	50.5	0.847	0.000	49.8	153.194	Surcharged
SWMH23	FEH: 100 years: +45 %: 0.50 hrs: Winter	36.807	33.970	35.281	1.311	48.5	1.483	0.000	46.3	59.589	Surcharged
SWMH21	FEH: 100 years: +45 %: 0.50 hrs: Winter	36.263	34.156	35.392	1.236	20.3	1.398	0.000	21.4	31.828	Surcharged
SWMH29	FEH: 100 years: +45 %: 2.00 hrs: Winter	36.194	33.473	34.722	1.249	30.0	1.412	0.000	29.6	282.901	Surcharged
SWMH31	FEH: 100 years: +45 %: 2.00 hrs: Winter	36.231	33.345	34.712	1.367	30.0	1.547	0.000	29.7	285.256	Surcharged
SWOutfall	FEH: 100 years: +45 %: 0.25 hrs: Winter		30.247	30.337	0.090	40.3			40.3	53.898	OK
SWMH07	FEH: 100 years: +45 %: 0.25 hrs: Winter	36.524	34.286	34.745	0.459	57.4	0.519	0.000	64.2	42.980	Surcharged
SWMH06	FEH: 100 years: +45 %: 0.25 hrs: Winter	36.689	34.905	34.970	0.065	16.7	0.073	0.000	16.5	7.731	OK
SWMH28	FEH: 100 years: +45 %: 2.00 hrs: Winter	35.792	33.603	34.730	1.127	61.0	1.275	0.000	60.6	224.764	Surcharged
SWMH18	FEH: 100 years: +45 %: 0.50 hrs: Winter	36.641	34.131	35.298	1.167	49.2	1.320	0.000	44.7	58.916	Surcharged
SWMH27	FEH: 100 years: +45 %: 0.50 hrs: Winter	36.712	33.810	35.161	1.351	98.6	1.528	0.000	96.3	136.388	Surcharged
SWMH03	FEH: 100 years: +45 %: 0.25 hrs: Winter	36.460	34.474	34.744	0.270	24.9	0.305	0.000	33.6	20.661	OK
SWMH04	FEH: 100 years: +45 %: 0.25 hrs: Winter	36.460	34.385	34.748	0.363	38.9	0.410	0.000	48.9	29.617	Surcharged
SWMH12	FEH: 100 years: +45 %: 2.00 hrs: Winter	36.244	33.746	34.726	0.980	58.5	1.109	0.000	57.3	189.663	Surcharged
SWMH30	FEH: 100 years: +45 %: 2.00 hrs: Winter	35.964	33.424	34.716	1.292	30.3	1.462	0.000	30.0	286.566	Surcharged

St Michael's Place: Proposed Surface Water Drainage		Date: 27/07/2026		
		Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Junctions Summary Storm Phase: SW Proposed Drainage		Buro Happold: 2 Castle Street Manchester M3 4LZ		



SWMH20	FEH: 100 years: +45 %: 0.50 hrs: Winter	36.14 8	34.47 4	35.469	0.996	15.0	1.126	0.000	15.6	19.436	Surcharged
SWMH13	FEH: 100 years: +45 %: 1.00 hrs: Winter	37.09 3	35.75 2	35.791	0.039	3.8	0.044	0.000	3.8	4.539	OK
SWMH22	FEH: 100 years: +45 %: 0.25 hrs: Winter	36.82 5	35.48 7	35.523	0.036	8.7	0.040	0.000	8.6	4.004	OK
SWMH19	FEH: 100 years: +45 %: 0.50 hrs: Winter	35.94 4	34.73 8	35.480	0.742	11.3	0.840	0.000	11.2	10.378	Surcharged
SWMH02	FEH: 100 years: +45 %: 0.25 hrs: Winter	36.46 0	34.55 5	34.745	0.190	41.7	0.215	0.000	24.2	19.440	OK
SWMH33	FEH: 100 years: +45 %: 1.00 hrs: Winter	33.83 1	31.43 2	33.352	1.920	25.9	2.172	0.000	29.4	139.596	Surcharged
SWMH01	FEH: 100 years: +45 %: 0.25 hrs: Winter	36.46 0	35.28 2	35.360	0.078	23.2	0.088	0.000	22.9	10.751	OK
SWMH17	FEH: 100 years: +45 %: 0.50 hrs: Winter	36.92 5	34.48 1	35.345	0.864	27.5	0.977	0.000	25.0	25.345	Surcharged
SWMH24	FEH: 100 years: +45 %: 0.25 hrs: Winter	36.15 4	34.95 4	35.236	0.282	13.0	0.319	0.000	12.8	6.526	Surcharged
SWMH25	FEH: 100 years: +45 %: 0.25 hrs: Winter	36.18 0	34.19 2	35.214	1.022	12.8	1.156	0.000	8.9	6.382	Surcharged
SWMH26	FEH: 100 years: +45 %: 0.25 hrs: Winter	36.25 9	34.00 0	35.175	1.175	11.5	1.328	0.000	13.8	8.669	Surcharged
SWMH14	FEH: 100 years: +45 %: 1.00 hrs: Winter	36.81 7	35.45 0	35.480	0.030	3.8	0.034	0.000	3.8	4.512	OK
SWMH15	FEH: 100 years: +45 %: 0.50 hrs: Winter	37.02 6	34.81 4	35.298	0.483	6.0	0.547	0.000	10.4	11.049	Surcharged
SWMH16	FEH: 100 years: +45 %: 0.50 hrs: Winter	36.83 8	34.42 9	35.298	0.869	10.4	0.982	0.000	11.4	13.413	Surcharged
SWMH10	FEH: 100 years: +45 %: 0.25 hrs: Winter	36.47 6	35.24 0	35.381	0.141	29.7	0.160	0.000	28.1	13.741	OK
SWMH11	FEH: 100 years: +45 %: 2.00 hrs: Winter	36.45 1	34.52 0	34.726	0.206	8.8	0.233	0.000	8.8	25.806	Surcharged

St Michael's Place: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Stormwater Controls Summary Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		





FEH: 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. Residual Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Velocity (m/s)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)
Cellular Storage	FEH: 2 years: +0 %: 1.00 hrs: Winter	33.779	33.779	0.223	0.223	54.4	44.800	0.000	0.000		33.5	81.740	84.055
Swale	FEH: 2 years: +0 %: 2.00 hrs: Winter	36.236	36.233	0.757	0.868	0.7	1.109	0.000	0.000	0.2	0.2	1.789	91.108
PP4	FEH: 2 years: +0 %: 24.00 hrs: Winter	35.998	35.856	0.116	0.115	0.4	8.905	0.000	0.000		0.2	8.446	62.674
PP7	FEH: 2 years: +0 %: 8.00 hrs: Winter	35.584	35.390	0.114	0.007	0.3	2.388	0.000	0.000		0.2	3.101	75.356
PP5	FEH: 2 years: +0 %: 16.00 hrs: Winter	36.005	35.781	0.105	0.003	0.1	1.919	0.000	0.000		0.1	2.437	78.012
Infiltration Trench	FEH: 2 years: +0 %: 1.00 hrs: Winter	33.880	33.771	0.136	0.215	3.8	2.298	0.000	0.000		0.6	1.437	88.579
PP9	FEH: 2 years: +0 %: 8.00 hrs: Winter	36.605	36.382	0.116	0.005	0.3	2.876	0.000	0.000		0.2	2.929	72.895
RG2	FEH: 2 years: +0 %: 0.25 hrs: Winter	36.027	36.003	0.758	0.785	3.1	1.559	0.000	0.000		1.2	0.837	85.386
RG1	FEH: 2 years: +0 %: 0.25 hrs: Winter	35.793	35.779	0.756	0.779	1.3	0.610	0.000	0.000		0.5	0.353	87.104
RG3	FEH: 2 years: +0 %: 0.25 hrs: Winter	36.254	36.212	0.755	0.762	5.3	3.070	0.000	0.000		2.0	0.914	88.073
RG5	FEH: 2 years: +0 %: 0.25 hrs: Winter	36.361	36.351	0.753	0.771	2.2	1.092	0.000	0.000		0.9	0.565	86.854
RG6 (1)	FEH: 2 years: +0 %: 0.25 hrs: Winter	36.722	36.674	0.756	0.764	4.7	2.696	0.000	0.000		1.9	0.849	87.977
PP8	FEH: 2 years: +0 %: 6.00 hrs: Winter	35.656	35.434	0.124	0.008	0.6	3.842	0.000	0.000		0.4	4.074	70.103
PP6	FEH: 2 years: +0 %: 16.00 hrs: Winter	36.179	35.937	0.109	0.003	0.2	3.680	0.000	0.000		0.1	4.341	76.952
RG4	FEH: 2 years: +0 %: 0.25 hrs: Winter	36.143	36.133	0.754	0.773	2.2	1.119	0.000	0.000		0.8	0.571	86.093
PP1	FEH: 2 years: +0 %: 24.00 hrs: Winter	36.223	36.098	0.105	0.108	0.2	7.019	0.000	0.000		0.1	4.355	69.272

St Michael's Place:: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Stormwater Controls Summary Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		

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St Michael's Place: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Stormwater Controls Summary Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		





FEH: 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. Residual Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Velocity (m/s)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)
Cellular Storage	FEH: 30 years: +0 %: 1.00 hrs: Winter	34.118	34.118	0.562	0.562	103.7	113.089	0.000	0.000		28.5	112.299	59.751
Swale	FEH: 30 years: +0 %: 2.00 hrs: Winter	36.300	36.300	0.821	0.935	1.3	2.739	0.000	0.000	0.2	0.2	2.081	78.045
PP4	FEH: 30 years: +0 %: 6.00 hrs: Winter	36.022	35.876	0.139	0.135	1.6	10.316	0.000	0.000		0.9	6.827	56.759
PP7	FEH: 30 years: +0 %: 1.00 hrs: Winter	35.617	35.398	0.147	0.015	2.4	3.014	0.000	0.000		1.0	1.694	68.903
PP5	FEH: 30 years: +0 %: 6.00 hrs: Winter	36.018	35.784	0.119	0.006	0.4	2.473	0.000	0.000		0.2	2.258	71.663
Infiltration Trench	FEH: 30 years: +0 %: 1.00 hrs: Winter	34.107	34.106	0.363	0.550	7.0	7.076	0.000	0.000		1.0	3.230	64.839
PP9	FEH: 30 years: +0 %: 2.00 hrs: Winter	36.628	36.389	0.139	0.013	1.5	3.509	0.000	0.000		0.9	2.383	66.933
RG2	FEH: 30 years: +0 %: 0.50 hrs: Winter	36.045	36.046	0.776	0.828	4.0	2.795	0.000	0.000		1.3	2.988	73.808
RG1	FEH: 30 years: +0 %: 0.50 hrs: Winter	35.815	35.815	0.778	0.815	1.6	1.109	0.000	0.000		0.5	1.274	76.561
RG3	FEH: 30 years: +0 %: 0.25 hrs: Winter	36.258	36.253	0.759	0.803	10.4	5.070	0.000	0.000		3.2	2.587	80.305
RG5	FEH: 30 years: +0 %: 0.50 hrs: Winter	36.387	36.387	0.779	0.807	2.8	1.913	0.000	0.000		1.0	2.140	76.979
RG6 (1)	FEH: 30 years: +0 %: 0.25 hrs: Winter	36.726	36.716	0.760	0.806	9.2	4.474	0.000	0.000		2.8	2.247	80.049
PP8	FEH: 30 years: +0 %: 1.00 hrs: Winter	35.701	35.444	0.169	0.018	3.9	4.946	0.000	0.000		2.2	3.018	61.516
PP6	FEH: 30 years: +0 %: 6.00 hrs: Winter	36.194	35.940	0.125	0.006	0.7	4.712	0.000	0.000		0.4	3.950	70.488

St Michael's Place:: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Stormwater Controls Summary Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		

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St Michael's Place:: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Stormwater Controls Summary Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		



RG4	FEH: 30 years: +0 %: 0.50 hrs: Winter	36.170	36.170	0.781	0.810	2.8	1.977	0.000	0.000		1.0	2.139	75.427
PP1	FEH: 30 years: +0 %: 16.00 hrs: Winter	36.238	36.107	0.119	0.117	0.5	8.643	0.000	0.000		0.3	6.943	62.162

St Michael's Place: Proposed Surface Water Drainage	Date: 27/07/2026		
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St Michael's Place: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Stormwater Controls Summary Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		





FEH: 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. Residual Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Velocity (m/s)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)
Cellular Storage	FEH: 100 years: +45 %: 2.00 hrs: Winter	34.726	34.726	1.170	1.170	115.6	235.269	0.000	0.000		30.0	284.178	16.265
Swale	FEH: 100 years: +45 %: 4.00 hrs: Winter	36.387	36.387	0.908	1.022	1.4	5.782	0.000	0.000	0.2	0.2	3.609	53.653
PP4	FEH: 100 years: +45 %: 0.50 hrs: Winter	36.314	35.915	0.432	0.174	14.1	13.001	0.106	0.000		2.8	2.906	45.504
PP7	FEH: 100 years: +45 %: 0.50 hrs: Winter	35.662	35.481	0.192	0.098	7.5	4.687	0.000	0.000		4.7	3.500	51.642
PP5	FEH: 100 years: +45 %: 1.00 hrs: Winter	36.054	35.795	0.154	0.017	2.6	3.113	0.000	0.000		1.7	1.962	64.327
Infiltration Trench	FEH: 100 years: +45 %: 2.00 hrs: Winter	34.709	34.708	0.965	1.152	10.7	16.390	0.000	0.000		1.3	8.034	18.552
PP9	FEH: 100 years: +45 %: 0.50 hrs: Winter	36.692	36.399	0.203	0.023	6.1	4.771	0.000	0.000		3.4	2.879	55.032
RG2	FEH: 100 years: +45 %: 0.50 hrs: Winter	36.116	36.117	0.847	0.899	7.3	5.504	0.956	0.000		1.3	3.664	48.414
RG1	FEH: 100 years: +45 %: 0.50 hrs: Winter	35.876	35.876	0.839	0.876	3.0	2.211	0.229	0.000		0.6	1.576	53.276
RG3	FEH: 100 years: +45 %: 0.50 hrs: Winter	36.300	36.300	0.801	0.850	12.4	9.065	0.011	0.000		3.2	8.458	64.784
RG5	FEH: 100 years: +45 %: 0.50 hrs: Winter	36.452	36.452	0.844	0.872	5.1	3.747	0.327	0.000		1.0	2.907	54.913
RG6 (1)	FEH: 100 years: +45 %: 0.50 hrs: Winter	36.766	36.766	0.800	0.856	11.0	8.034	0.154	0.000		2.8	7.332	64.178
PP8	FEH: 100 years: +45 %: 0.50 hrs: Winter	35.802	35.478	0.270	0.052	9.6	7.576	0.000	0.000		6.0	5.596	41.050
PP6	FEH: 100 years: +45 %: 1.00 hrs: Winter	36.248	35.949	0.179	0.015	4.8	6.272	0.000	0.000		2.5	3.442	60.721

St Michael's Place:: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Stormwater Controls Summary Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		



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St Michael's Place:: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Stormwater Controls Summary Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		



RG4	FEH: 100 years: +45 %: 0.50 hrs: Winter	36.237	36.237	0.848	0.877	5.1	3.821	0.389	0.000		1.0	2.749	52.506
PP1	FEH: 100 years: +45 %: 4.00 hrs: Winter	36.270	36.142	0.151	0.152	2.5	10.787	0.000	0.000		1.6	7.376	52.777

St Michael's Place:: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Stormwater Controls Summary Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		

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St Michael's Place: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Connections Summary Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		





FEH: 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 (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
38	FEH: 2 years: +0 %: 2.00 hrs: Winter	Pipe	SWMH33	SWMH34	33.831	31.836	0.235	119.701	0.4	0.12	25.7	Surcharged
P8	FEH: 2 years: +0 %: 6.00 hrs: Winter	Pipe	PP8	SWMH20	35.962	35.516	0.015	4.074	0.5	0.01	0.4	OK
3	FEH: 2 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH03	SWMH04	36.460	34.549	0.084	5.828	0.7	0.12	11.1	OK
11	FEH: 2 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH08	SWMH09	36.506	34.251	0.141	22.614	1.3	0.43	43.7	OK
25	FEH: 2 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH23	SWMH27	36.807	34.068	0.137	11.303	0.9	0.37	21.7	OK
34	FEH: 2 years: +0 %: 1.00 hrs: Summer	Pipe	SWMH31	SWMH32	36.231	33.742	0.300	74.225	0.5	0.12	29.1	Surcharged
53	FEH: 2 years: +0 %: 1.00 hrs: Winter	Pipe	SWMH34	SWOutfall	33.070	31.194	0.081	98.394	1.8	0.1	31.8	Surcharged
10	FEH: 2 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH07	SWMH08	36.524	34.382	0.123	12.090	0.8	0.22	22.5	OK
19	FEH: 2 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH17	SWMH18	36.925	34.541	0.072	5.467	1.1	0.16	11.6	OK
8	FEH: 2 years: +0 %: 24.00 hrs: Winter	Pipe	SWMH05	SWMH06	36.420	35.238	0.006	4.234	0.3	0	0.1	OK
33	FEH: 2 years: +0 %: 0.50 hrs: Winter	Pipe	SWMH30	SWMH31	35.964	33.761	0.300	46.483	1.4	0.19	30.7	Surcharged
P5	FEH: 2 years: +0 %: 6.00 hrs: Winter	Pipe	PP5	SWMH12	36.330	35.841	0.024	1.059	0.5	0	0.1	OK
Pipe (3)	FEH: 2 years: +0 %: 24.00 hrs: Winter	Pipe	PP4	SWMH12	36.313	35.854	0.016	8.328	0.4	0.01	0.2	OK
29	FEH: 2 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH27	SWMH28	36.712	33.986	0.164	26.354	1.4	0.85	43.3	OK
32	FEH: 2 years: +0 %: 0.25 hrs: Summer	Pipe	SWMH29	SWMH30	36.194	33.697	0.247	24.782	0.9	0.38	33.5	OK
Pipe (1)	FEH: 2 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH09	SWMH12	36.288	34.109	0.130	22.586	1.4	0.34	42.3	OK
31	FEH: 2 years: +0 %: 0.25 hrs: Summer	Pipe	Cellular Storage	SWMH29	36.333	33.701	0.184	25.268	0.9	0.24	35.2	OK
27	FEH: 2 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH25	SWMH26	36.180	34.235	0.041	1.835	0.9	0.17	3.4	OK
Pipe (4)	FEH: 2 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH04	SWMH07	36.460	34.477	0.094	8.350	0.8	0.18	15.9	OK

St Michael's Place: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Connections Summary Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		



2	FEH: 2 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH0 2	SWMH0 3	36.460	34.624	0.072	5.497	0.8	0.1	10.9	OK
22	FEH: 2 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH2 0	SWMH2 1	36.148	34.518	0.057	2.232	0.7	0.19	4.4	OK
S1	FEH: 2 years: +0 %: 0.50 hrs: Summer	Pipe	Swale	SWMH3 0	36.529	36.167	0.154	0.460	0.3	0	0.2	Surcharged
16	FEH: 2 years: +0 %: 8.00 hrs: Winter	Pipe	SWMH1 4	SWMH1 5	36.817	35.457	0.009	2.918	0.3	0	0.2	OK
14	FEH: 2 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH1 2	Cellular Storage	36.244	33.875	0.120	26.455	2.3	0.31	48.6	OK
24	FEH: 2 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH2 2	SWMH2 3	36.825	35.506	0.059	1.136	0.4	0.04	2.4	OK
20	FEH: 2 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH1 8	SWMH2 7	36.641	34.214	0.129	11.058	0.9	0.29	21.4	OK
9	FEH: 2 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH0 6	SWMH0 7	36.689	34.939	0.065	2.197	0.5	0.05	4.6	OK
Pipe (7)	FEH: 2 years: +0 %: 24.00 hrs: Winter	Pipe	PP1	SWMH0 5	36.549	36.083	0.006	4.236	0.6	0	0.1	OK
30	FEH: 2 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH2 8	Cellular Storage	35.792	33.755	0.150	25.982	2.1	0.8	42.0	OK
P7	FEH: 2 years: +0 %: 8.00 hrs: Winter	Pipe	PP7	SWMH2 0	35.900	35.458	0.013	3.101	0.3	0	0.2	OK
23	FEH: 2 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH2 1	SWMH2 3	36.263	34.225	0.084	5.110	0.9	0.39	8.9	OK
P9	FEH: 2 years: +0 %: 8.00 hrs: Winter	Pipe	PP9	SWMH1 3	36.919	36.459	0.007	2.929	0.5	0	0.2	OK
28	FEH: 2 years: +0 %: 0.50 hrs: Winter	Pipe	SWMH2 6	SWMH2 7	36.259	34.045	0.058	4.616	0.8	0.19	3.8	OK
35	FEH: 2 years: +0 %: 0.50 hrs: Summer	Pipe	Infiltratio n Trench	SWMH3 2	35.044	33.682	0.225	0.000	0.0	0.03	1.7	OK
15	FEH: 2 years: +0 %: 8.00 hrs: Winter	Pipe	SWMH1 3	SWMH1 4	37.093	35.760	0.008	2.924	0.4	0.01	0.2	OK
36	FEH: 2 years: +0 %: 2.00 hrs: Summer	Pipe	SWMH3 2	SWMH3 3	36.084	33.741	0.234	102.858	0.5	0.11	24.9	Surcharged
26	FEH: 2 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH2 4	SWMH2 5	36.154	34.983	0.036	1.849	1.1	0.08	3.6	OK
17	FEH: 2 years: +0 %: 0.50 hrs: Winter	Pipe	SWMH1 5	SWMH1 6	37.026	34.841	0.026	1.535	1.0	0.03	2.4	OK
18	FEH: 2 years: +0 %: 0.50 hrs: Winter	Pipe	SWMH1 6	SWMH1 8	36.838	34.454	0.038	1.524	0.6	0.03	2.6	OK
P6	FEH: 2 years: +0 %: 16.00 hrs: Winter	Pipe	PP6	SWMH2 8	36.500	36.003	0.028	4.341	0.2	0	0.1	OK
R3	FEH: 2 years: +0 %: 1.00 hrs: Winter	Pipe	RG3	SWMH2 7	36.349	36.202	0.072	2.787	0.3	0.03	2.1	Surcharged
R2	FEH: 2 years: +0 %: 1.00 hrs: Winter	Pipe	RG2	SWMH2 6	36.120	35.972	0.029	1.725	0.5	0.02	1.3	Surcharged

St Michael's Place:: Proposed Surface Water Drainage		Date: 27/07/2026		
		Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Connections Summary Storm Phase: SW Proposed Drainage		Buro Happold: 2 Castle Street Manchester M3 4LZ		



R1	FEH: 2 years: +0 %: 1.00 hrs: Winter	Pipe	RG1	SWMH3 0	35.887	35.754	0.177	0.701	0.1	0	0.5	Surch arged
R5	FEH: 2 years: +0 %: 0.50 hrs: Summer	Pipe	RG5	SWMH2 1	36.458	36.336	0.032	0.719	0.5	0.01	1.0	Surch arged
R4	FEH: 2 years: +0 %: 0.50 hrs: Winter	Pipe	RG6 (1)	SWMH1 5	36.816	36.663	0.023	1.542	1.2	0.04	2.0	Surch arged
21	FEH: 2 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH1 9	SWMH2 0	35.944	34.789	0.048	2.241	1.0	0.23	4.7	OK
Pipe	FEH: 2 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH1 0	SWMH1 1	36.476	35.298	0.051	3.886	1.6	0.28	8.2	OK
Pipe (2)	FEH: 2 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH1 1	SWMH1 2	36.451	34.563	0.086	3.881	0.8	0.18	7.9	OK
Pipe (5)	FEH: 2 years: +0 %: 0.50 hrs: Winter	Pipe	RG4	SWMH2 6	36.239	36.119	0.028	0.876	0.5	0.01	1.0	Surch arged
Pipe (6)	FEH: 2 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH0 1	SWMH0 2	36.460	35.324	0.055	3.045	0.7	0.04	6.3	OK

St Michael's Place: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Connections Summary Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		



FEH: 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 (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
38	FEH: 30 years: +0 %: 1.00 hrs: Summer	Pipe	SWMH33	SWMH34	33.831	31.914	0.375	103.744	0.4	0.12	26.2	Surcharged
P8	FEH: 30 years: +0 %: 1.00 hrs: Winter	Pipe	PP8	SWMH20	35.962	35.542	0.032	3.018	0.8	0.03	2.2	OK
3	FEH: 30 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH03	SWMH04	36.460	34.586	0.125	11.445	0.8	0.25	22.2	OK
11	FEH: 30 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH08	SWMH09	36.506	34.342	0.225	44.468	1.5	0.85	86.5	OK
25	FEH: 30 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH23	SWMH27	36.807	34.358	0.225	22.201	0.9	0.62	36.5	Surcharged
34	FEH: 30 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH31	SWMH32	36.231	33.924	0.300	27.095	0.5	0.12	29.6	Surcharged
53	FEH: 30 years: +0 %: 1.00 hrs: Summer	Pipe	SWMH34	SWOutfall	33.070	31.692	0.087	126.772	1.9	0.11	36.6	Surcharged
10	FEH: 30 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH07	SWMH08	36.524	34.432	0.194	23.781	0.9	0.44	45.0	OK
19	FEH: 30 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH17	SWMH18	36.925	34.566	0.151	10.732	0.9	0.31	23.1	OK
8	FEH: 30 years: +0 %: 16.00 hrs: Winter	Pipe	SWMH05	SWMH06	36.420	35.243	0.011	6.818	0.5	0.01	0.3	OK
33	FEH: 30 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH30	SWMH31	35.964	33.927	0.300	28.030	1.1	0.22	35.2	Surcharged
P5	FEH: 30 years: +0 %: 6.00 hrs: Winter	Pipe	PP5	SWMH12	36.330	35.864	0.089	2.258	0.2	0	0.2	OK
Pipe (3)	FEH: 30 years: +0 %: 6.00 hrs: Winter	Pipe	PP4	SWMH12	36.313	35.872	0.092	6.597	0.7	0.03	0.9	OK
29	FEH: 30 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH27	SWMH28	36.712	34.268	0.225	51.987	1.7	1.32	67.0	Surcharged

St Michael's Place: Proposed Surface Water Drainage		Date: 27/07/2026		
		Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Connections Summary Storm Phase: SW Proposed Drainage		Buro Happold: 2 Castle Street Manchester M3 4LZ		



32	FEH: 30 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH2 9	SWMH3 0	36.194	33.931	0.300	28.412	1.2	0.45	39.4	Surcharged
Pipe (1)	FEH: 30 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH0 9	SWMH1 2	36.288	34.185	0.203	44.464	1.6	0.68	84.0	OK
31	FEH: 30 years: +0 %: 0.25 hrs: Winter	Pipe	Cellular Storage	SWMH2 9	36.333	33.935	0.300	29.380	1.2	0.28	41.6	Surcharged
27	FEH: 30 years: +0 %: 0.25 hrs: Summer	Pipe	SWMH2 5	SWMH2 6	36.180	34.250	0.148	3.269	0.7	0.27	5.6	OK
Pipe (4)	FEH: 30 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH0 4	SWMH0 7	36.460	34.523	0.142	16.406	1.0	0.35	31.7	OK
2	FEH: 30 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH0 2	SWMH0 3	36.460	34.658	0.108	10.786	0.9	0.19	21.6	OK
22	FEH: 30 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH2 0	SWMH2 1	36.148	34.537	0.150	4.462	0.6	0.37	8.7	OK
S1	FEH: 30 years: +0 %: 1.00 hrs: Summer	Pipe	Swale	SWMH3 0	36.529	36.229	0.225	0.945	0.3	0	0.2	Surcharged
16	FEH: 30 years: +0 %: 2.00 hrs: Winter	Pipe	SWMH1 4	SWMH1 5	36.817	35.467	0.021	2.361	0.5	0.01	0.9	OK
14	FEH: 30 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH1 2	Cellular Storage	36.244	33.945	0.284	50.923	2.6	0.62	97.0	OK
24	FEH: 30 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH2 2	SWMH2 3	36.825	35.513	0.150	2.224	0.3	0.07	4.8	OK
20	FEH: 30 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH1 8	SWMH2 7	36.641	34.347	0.225	22.197	0.8	0.43	31.7	OK
9	FEH: 30 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH0 6	SWMH0 7	36.689	34.953	0.097	4.309	0.6	0.1	9.1	OK
Pipe (7)	FEH: 30 years: +0 %: 16.00 hrs: Winter	Pipe	PP1	SWMH0 5	36.549	36.104	0.010	6.823	0.7	0.02	0.3	OK
30	FEH: 30 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH2 8	Cellular Storage	35.792	33.975	0.225	50.997	2.5	1.25	65.9	Surcharged
P7	FEH: 30 years: +0 %: 1.00 hrs: Winter	Pipe	PP7	SWMH2 0	35.900	35.477	0.031	1.694	0.4	0.02	1.0	OK
23	FEH: 30 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH2 1	SWMH2 3	36.263	34.443	0.150	10.062	0.8	0.59	13.3	Surcharged

St Michael's Place: Proposed Surface Water Drainage		Date: 27/07/2026		
		Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Connections Summary Storm Phase: SW Proposed Drainage		Buro Happold: 2 Castle Street Manchester M3 4LZ		



P9	FEH: 30 years: +0 %: 2.00 hrs: Winter	Pipe	PP9	SWMH1 3	36.919	36.477	0.016	2.383	0.9	0.01	0.9	OK
28	FEH: 30 years: +0 %: 0.25 hrs: Summer	Pipe	SWMH2 6	SWMH2 7	36.259	34.237	0.150	5.395	0.8	0.5	10.2	Surcharged
35	FEH: 30 years: +0 %: 4.00 hrs: Winter	Pipe	Infiltration Trench	SWMH3 2	35.044	33.910	0.225	3.138	0.0	0.03	1.6	Surcharged
15	FEH: 30 years: +0 %: 2.00 hrs: Winter	Pipe	SWMH1 3	SWMH1 4	37.093	35.771	0.018	2.375	0.8	0.03	0.9	OK
36	FEH: 30 years: +0 %: 8.00 hrs: Summer	Pipe	SWMH3 2	SWMH3 3	36.084	33.843	0.231	302.072	0.5	0.11	24.9	Surcharged
26	FEH: 30 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH2 4	SWMH2 5	36.154	34.995	0.069	3.628	1.1	0.16	7.1	OK
17	FEH: 30 years: +0 %: 1.00 hrs: Winter	Pipe	SWMH1 5	SWMH1 6	37.026	34.845	0.029	7.052	1.1	0.04	3.2	OK
18	FEH: 30 years: +0 %: 1.00 hrs: Winter	Pipe	SWMH1 6	SWMH1 8	36.838	34.457	0.071	7.037	0.7	0.03	3.1	OK
P6	FEH: 30 years: +0 %: 6.00 hrs: Winter	Pipe	PP6	SWMH2 8	36.500	36.023	0.150	3.950	0.3	0	0.4	OK
R3	FEH: 30 years: +0 %: 1.00 hrs: Winter	Pipe	RG3	SWMH2 7	36.349	36.217	0.150	6.430	0.2	0.05	3.3	Surcharged
R2	FEH: 30 years: +0 %: 1.00 hrs: Summer	Pipe	RG2	SWMH2 6	36.120	36.008	0.115	3.545	0.6	0.02	1.4	Surcharged
R1	FEH: 30 years: +0 %: 1.00 hrs: Summer	Pipe	RG1	SWMH3 0	35.887	35.786	0.225	1.445	0.1	0	0.6	Surcharged
R5	FEH: 30 years: +0 %: 2.00 hrs: Winter	Pipe	RG5	SWMH2 1	36.458	36.340	0.036	3.319	0.4	0.01	1.0	Surcharged
R4	FEH: 30 years: +0 %: 1.00 hrs: Winter	Pipe	RG6 (1)	SWMH1 5	36.816	36.678	0.027	5.726	1.4	0.05	2.8	Surcharged
21	FEH: 30 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH1 9	SWMH2 0	35.944	34.813	0.069	4.402	1.2	0.45	9.2	OK
Pipe	FEH: 30 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH1 0	SWMH1 1	36.476	35.326	0.074	7.629	1.8	0.55	16.1	OK
Pipe (2)	FEH: 30 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH1 1	SWMH1 2	36.451	34.582	0.131	7.621	1.0	0.36	15.7	OK

St Michael's Place: Proposed Surface Water Drainage	Date: 27/07/2026		
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Report Details: Type: Connections Summary Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		



Pipe (5)	FEH: 30 years: +0 %: 2.00 hrs: Winter	Pipe	RG4	SWMH2 6	36.239	36.122	0.072	3.319	0.4	0.01	1.0	Surcharged
Pipe (6)	FEH: 30 years: +0 %: 0.25 hrs: Winter	Pipe	SWMH0 1	SWMH0 2	36.460	35.340	0.081	5.969	0.8	0.08	12.4	OK

St Michael's Place: Proposed Surface Water Drainage	Date: 27/07/2026		
	Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Connections Summary Storm Phase: SW Proposed Drainage	Buro Happold: 2 Castle Street Manchester M3 4LZ		



FEH: 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 (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
38	FEH: 100 years: +45 %: 0.50 hrs: Summer	Pipe	SWMH33	SWMH34	33.831	33.326	0.375	60.770	0.4	0.16	33.3	Surcharged
P8	FEH: 100 years: +45 %: 0.50 hrs: Winter	Pipe	PP8	SWMH20	35.962	35.604	0.150	5.409	0.8	0.08	6.0	Surcharged
3	FEH: 100 years: +45 %: 0.25 hrs: Winter	Pipe	SWMH03	SWMH04	36.460	34.744	0.300	20.661	0.7	0.37	33.6	OK
11	FEH: 100 years: +45 %: 0.25 hrs: Winter	Pipe	SWMH08	SWMH09	36.506	34.683	0.300	79.450	1.8	1.29	130.6	Surcharged
25	FEH: 100 years: +45 %: 0.25 hrs: Winter	Pipe	SWMH23	SWMH27	36.807	35.189	0.225	42.150	1.4	0.92	53.8	Surcharged
34	FEH: 100 years: +45 %: 0.25 hrs: Summer	Pipe	SWMH31	SWMH32	36.231	34.156	0.300	36.259	0.5	0.14	34.6	Surcharged
53	FEH: 100 years: +45 %: 0.25 hrs: Winter	Pipe	SWMH34	SWOutfall	33.070	33.074	0.092	53.898	1.9	0.13	40.3	Flood
10	FEH: 100 years: +45 %: 0.25 hrs: Winter	Pipe	SWMH07	SWMH08	36.524	34.745	0.300	42.980	0.9	0.63	64.2	Surcharged
19	FEH: 100 years: +45 %: 0.25 hrs: Winter	Pipe	SWMH17	SWMH18	36.925	35.222	0.225	19.306	1.1	0.51	37.5	Surcharged
8	FEH: 100 years: +45 %: 4.00 hrs: Winter	Pipe	SWMH05	SWMH06	36.420	35.257	0.025	6.542	0.8	0.06	1.6	OK
33	FEH: 100 years: +45 %: 0.25 hrs: Summer	Pipe	SWMH30	SWMH31	35.964	34.162	0.300	37.469	0.7	0.23	37.1	Surcharged
P5	FEH: 100 years: +45 %: 1.00 hrs: Winter	Pipe	PP5	SWMH12	36.330	35.887	0.150	1.962	0.1	0.03	1.7	OK
Pipe (3)	FEH: 100 years: +45 %: 1.00 hrs: Winter	Pipe	PP4	SWMH12	36.313	35.931	0.100	7.320	0.5	0.15	4.2	OK
29	FEH: 100 years: +45 %: 0.50 hrs: Winter	Pipe	SWMH27	SWMH28	36.712	35.161	0.225	136.225	2.4	1.9	96.3	Surcharged

St Michael's Place: Proposed Surface Water Drainage		Date: 27/07/2026		
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Report Details: Type: Connections Summary Storm Phase: SW Proposed Drainage		Buro Happold: 2 Castle Street Manchester M3 4LZ		



32	FEH: 100 years: +45 %: 0.25 hrs: Summer	Pipe	SWMH29	SWMH30	36.194	34.169	0.300	38.109	0.6	0.44	38.6	Surcharged
Pipe (1)	FEH: 100 years: +45 %: 0.25 hrs: Winter	Pipe	SWMH09	SWMH12	36.288	34.398	0.300	78.080	1.8	1.02	126.4	Surcharged
31	FEH: 100 years: +45 %: 0.25 hrs: Summer	Pipe	Cellular Storage	SWMH29	36.333	34.174	0.300	39.361	0.7	0.27	39.7	Surcharged
27	FEH: 100 years: +45 %: 0.25 hrs: Winter	Pipe	SWMH25	SWMH26	36.180	35.214	0.150	6.348	0.8	0.43	8.9	Surcharged
Pipe (4)	FEH: 100 years: +45 %: 0.25 hrs: Winter	Pipe	SWMH04	SWMH07	36.460	34.748	0.300	29.617	0.8	0.54	48.9	Surcharged
2	FEH: 100 years: +45 %: 0.25 hrs: Summer	Pipe	SWMH02	SWMH03	36.460	34.702	0.185	17.354	0.8	0.3	34.1	OK
22	FEH: 100 years: +45 %: 0.50 hrs: Winter	Pipe	SWMH20	SWMH21	36.148	35.469	0.150	18.834	0.9	0.67	15.6	Surcharged
S1	FEH: 100 years: +45 %: 2.00 hrs: Summer	Pipe	Swale	SWMH30	36.529	36.309	0.225	1.658	0.3	0	0.2	Surcharged
16	FEH: 100 years: +45 %: 1.00 hrs: Winter	Pipe	SWMH14	SWMH15	36.817	35.480	0.191	4.512	0.6	0.04	3.8	OK
14	FEH: 100 years: +45 %: 0.25 hrs: Winter	Pipe	SWMH12	Cellular Storage	36.244	34.252	0.300	89.672	2.8	0.96	150.3	Surcharged
24	FEH: 100 years: +45 %: 0.25 hrs: Winter	Pipe	SWMH22	SWMH23	36.825	35.523	0.150	4.004	0.5	0.13	8.6	OK
20	FEH: 100 years: +45 %: 0.25 hrs: Summer	Pipe	SWMH18	SWMH27	36.641	35.055	0.225	35.467	1.2	0.63	46.7	Surcharged
9	FEH: 100 years: +45 %: 0.25 hrs: Winter	Pipe	SWMH06	SWMH07	36.689	34.970	0.225	7.731	0.5	0.19	16.5	OK
Pipe (7)	FEH: 100 years: +45 %: 4.00 hrs: Winter	Pipe	PP1	SWMH05	36.549	36.133	0.023	6.558	1.2	0.09	1.6	OK
30	FEH: 100 years: +45 %: 0.50 hrs: Winter	Pipe	SWMH28	Cellular Storage	35.792	34.537	0.225	136.208	2.4	1.8	94.9	Surcharged
P7	FEH: 100 years: +45 %: 0.25 hrs: Winter	Pipe	PP7	SWMH20	35.900	35.520	0.150	1.529	0.4	0.1	4.8	OK
23	FEH: 100 years: +45 %: 0.50 hrs: Winter	Pipe	SWMH21	SWMH23	36.263	35.392	0.150	31.828	1.2	0.94	21.4	Surcharged

St Michael's Place: Proposed Surface Water Drainage		Date: 27/07/2026		
		Designed by: HE	Checked by: AH	Approved By: AH
Report Details: Type: Connections Summary Storm Phase: SW Proposed Drainage		Buro Happold: 2 Castle Street Manchester M3 4LZ		



P9	FEH: 100 years: +45 %: 1.00 hrs: Winter	Pipe	PP9	SWMH1 3	36.919	36.510	0.032	4.549	1.4	0.06	3.8	OK
28	FEH: 100 years: +45 %: 0.25 hrs: Winter	Pipe	SWMH2 6	SWMH2 7	36.259	35.175	0.150	8.130	0.8	0.68	13.8	Surcharged
35	FEH: 100 years: +45 %: 4.00 hrs: Summer	Pipe	Infiltration Trench	SWMH3 2	35.044	34.401	0.225	0.124	0.0	0.03	1.6	Surcharged
15	FEH: 100 years: +45 %: 1.00 hrs: Winter	Pipe	SWMH1 3	SWMH1 4	37.093	35.791	0.035	4.539	1.2	0.13	3.8	OK
36	FEH: 100 years: +45 %: 16.00 hrs: Summer	Pipe	SWMH3 2	SWMH3 3	36.084	34.199	0.234	664.632	0.5	0.11	24.9	Surcharged
26	FEH: 100 years: +45 %: 0.25 hrs: Winter	Pipe	SWMH2 4	SWMH2 5	36.154	35.236	0.150	6.526	1.1	0.29	12.8	Surcharged
17	FEH: 100 years: +45 %: 0.50 hrs: Winter	Pipe	SWMH1 5	SWMH1 6	37.026	35.298	0.225	10.109	1.1	0.12	10.4	Surcharged
18	FEH: 100 years: +45 %: 0.25 hrs: Summer	Pipe	SWMH1 6	SWMH1 8	36.838	35.064	0.225	3.267	0.7	0.12	12.3	Surcharged
P6	FEH: 100 years: +45 %: 1.00 hrs: Winter	Pipe	PP6	SWMH2 8	36.500	36.053	0.150	3.442	0.1	0.02	2.5	OK
R3	FEH: 100 years: +45 %: 0.25 hrs: Winter	Pipe	RG3	SWMH2 7	36.349	36.269	0.150	3.222	0.2	0.05	3.4	Surcharged
R2	FEH: 100 years: +45 %: 0.25 hrs: Winter	Pipe	RG2	SWMH2 6	36.120	36.072	0.150	1.431	0.1	0.02	1.7	Flood
R1	FEH: 100 years: +45 %: 0.25 hrs: Winter	Pipe	RG1	SWMH3 0	35.887	35.843	0.225	0.641	0.0	0	0.6	Flood
R5	FEH: 100 years: +45 %: 0.25 hrs: Winter	Pipe	RG5	SWMH2 1	36.458	36.422	0.150	1.172	0.1	0.01	1.1	Flood
R4	FEH: 100 years: +45 %: 0.25 hrs: Winter	Pipe	RG6 (1)	SWMH1 5	36.816	36.730	0.150	2.801	1.2	0.05	2.9	Surcharged
21	FEH: 100 years: +45 %: 0.50 hrs: Winter	Pipe	SWMH1 9	SWMH2 0	35.944	35.480	0.150	10.378	0.9	0.54	11.2	Surcharged
Pipe	FEH: 100 years: +45 %: 0.25 hrs: Winter	Pipe	SWMH1 0	SWMH1 1	36.476	35.381	0.115	13.741	1.9	0.97	28.1	OK
Pipe (2)	FEH: 100 years: +45 %: 0.25 hrs: Winter	Pipe	SWMH1 1	SWMH1 2	36.451	34.609	0.150	13.701	1.6	0.64	27.8	OK

St Michael's Place:: Proposed Surface Water Drainage	Date: 27/07/2026			
Report Details: Type: Connections Summary Storm Phase: SW Proposed Drainage	Designed by: HE	Checked by: AH	Approved By: AH	
	Buro Happold: 2 Castle Street Manchester M3 4LZ			

Pipe (5)	FEH: 100 years: +45 %: 4.00 hrs: Summer	Pipe	RG4	SWMH2 6	36.239	36.151	0.150	6.508	0.4	0.01	1.0	Surcharged
Pipe (6)	FEH: 100 years: +45 %: 0.25 hrs: Winter	Pipe	SWMH0 1	SWMH0 2	36.460	35.360	0.134	10.751	0.7	0.15	22.9	OK

Appendix H SuDS Proforma

PRO-FORMA 1: Sustainable Drainage System: Planning Permission

This pro-forma is a requirement of the Planning Validation Checklist. You **must complete all white boxes in full** and submit this pro-forma along with your supporting evidence to the Local Planning Authority for any application which seeks planning permission for major development (as defined in section 2 of [Statutory Instrument 2015 No. 595](#)).

This pro-forma supports developers and regulators in **summarising and confirming** how surface water from a development will be managed sustainably under current and future conditions. It should be completed in conjunction with the Council's 'Completing your Pro Forma' document and your sustainable drainage system should be designed in accordance with [CIRIA The SuDS Manual C753](#).

The pro-forma follows Policy CS24 of [Knowsley MBC's Local Plan](#), [National Planning Policy Framework](#), [House of Commons Written Statement \(HWSW 161\) on SuDS](#), [Planning Practice Guidance](#) and [Defra's Non-Statutory Technical Standards for Sustainable Drainage Systems](#). It is supported by the [Defra/EA Guidance on Rainfall Runoff Management](#) and can be completed using freely available tools such as [Tools for Sustainable Drainage Systems](#) or approved Industry Standard surface water management design software. The Council's [Sustainable Drainage & Surface Water Management Technical Guidance document](#) also provides further information.

Section 1: Development Details					
Development Name		St Michael's Place			
Development Address (including postcode)		Civic Way, L36 9BB	Planning Application Reference (if available)		
Development Grid Reference	Northings	390850	Expected lifetime of development (years)		50
	Eastings	344158	Have you submitted a Flood Risk Assessment?		Yes ☒ No ☐
Total Development Site Area (Ha)		3.1	Type of Planning Application (✓)	Outline	☐
Site area served by proposed drainage system (excluding open space) (Ha)*		1.7		Full	☐
Is your surface water drainage system designed to a (tick all that apply):				Hybrid	☒
Greenfield Standard		☒		Reserved Matters	☐
Previously Developed Standard		☐			

PRO-FORMA 1: Sustainable Drainage System: Planning Permission

Section 2: Impermeable Area and Existing Drainage For outline or reserved matters applications, go to Section 3

	Existing (E)	Proposed (P)	Difference (P – E)	Evidence Checklist	
Impermeable Area (Ha)	1.12	0.71	0.41	☐	Plans showing development layout of site with existing and proposed impermeable areas.
State Drainage Method	Piped	SuDS and piped	N/A	☐	Plans showing current and proposed locations of sustainable drainage system.
Are there existing sewers, watercourses, water bodies, highway drains, soakaways or filter drains on the site?			Yes ☐ No ☐	☒	Plans showing existing layout to include: • Watercourses, open or culverted • Water bodies – ponds, swales etc. • Sewers, including manholes • Highway drains, include manholes • Soakaways, filter drains

Section 3: Surface Water Discharge Hierarchy – Planning Practice Guidance

Surface Water Discharge Method	Proposed?	If YES - Evidence Checklist		If NO - Evidence Checklist	
1. Infiltration to ground	Yes ☐ No ☒	☐	Completed Infiltration Checklist from CIRIA The SuDS Manual C753 Appendix B <i>An editable version of this form is available on SusDrain website.</i>	☒	Geotechnical Survey, including Soil Permeability Testing stating Percolation Coefficient, in accordance with BRE 365 AND Statement providing justification in your Sustainable Drainage Strategy
2. Discharge to watercourse or surface water body (Main River or Ordinary)	Yes ☐ No ☒	☐	Watercourse and/or Water Body Survey Report	☒	Plan showing nearby watercourses and water bodies AND Statement providing justification in your Sustainable Drainage Strategy
3. Discharge to surface water sewer	Yes ☒ No ☐	☒	Water and Sewerage Company written agreement for the Right to Connect.	☐	Plan showing nearby sewers AND Statement providing justification in your Sustainable Drainage Strategy
4. Discharge to combined sewer	Yes ☐ No ☒				

PRO-FORMA 1: Sustainable Drainage System: Planning Permission

Section 4: Calculate Peak Discharge Rates – Technical Standards S2 and S3 (unless S1 applies)

Rainfall Event	Existing Rate (l/s)	Greenfield Rate (l/s)	Proposed Rate (l/s) <i>Brownfield sites must reduce discharge rates by 50%</i>	Evidence Checklist	
Qbar				☒	MicroDrainage (or equivalent) calculations
1:1 Year Event	73.5 (1:2)	11.2 (1:2)	36.7 (1:2)		
1:30 Year Event	150.1	20.5	36.7		
1:100 Year Event	173.2	25.0	36.7		

Section 5: Calculate Discharge Volume – Technical Standards S4 and S6 (unless S1 applies)

Rainfall Event	Existing Volume (m ³)	Greenfield Volume (m ³)	Proposed Volume (m ³)	Evidence Checklist	
1:100 Year 6 Hour Event	452.2	N/A	418.1	☒	MicroDrainage (or equivalent) calculations

Section 6: Infiltration

Site Information	✓	Evidence Checklist	
Do your sustainable drainage proposals include any infiltration?	Yes ☐ No ☒ <i>If NO, please move on to Section 7</i>	☐	Proposed sustainable drainage plans
You should submit an alternative 'Plan B' sustainable drainage design utilising an alternative discharge method if site specific ground conditions are unknown at this stage. This will become the default design in the event infiltration proposals are not feasible upon site specific ground investigation. Have you submitted an alternative 'Plan B' sustainable drainage design?	Yes ☐ No ☐	☐	'Plan B' conceptual sustainable drainage plans and statement of approach

PRO-FORMA 1: Sustainable Drainage System: Planning Permission

Section 7: Storage – Technical Standards S7, S8 and S9

Storage Details	Details	Evidence Checklist	
State climate change allowance used (%)	45	☒	State / use in MicroDrainage
State storage volume provided (m ³) (excluding non-void spaces) <i>Must include an allowance for climate change and urban creep.</i>	Tank = 280 Permeable paving = 397	☒	Drainage plans showing location of attenuation and all flow control devices and any supporting calculations
Summarise how storage will be provided for 1:30 year event on site. <i>Storage must be designed to ensure that at no flooding occurs onsite in a 1 in 30 year event except in designed areas and no flooding occurs offsite in a 1 in 100 year (+ climate change allowance) event.</i>	Surface water will be managed using permeable paving and a storage tank. The paving allows infiltration, while the tank stores excess runoff, preventing flooding during moderate storms.	☒	Plans showing size and location of storage and supporting calculations
Summarise how storage will be provided for 1:100 year (+ climate change) 6 hour event on site. <i>Where storage above the 1:30 year rainfall event is provided in designated areas designed to accommodate excess surface water volumes, plans showing storage locations and surface water depths and supported by MicroDrainage (or equivalent) calculations.</i>	In addition to the above, exceedance flows will be directed away from properties to soft landscaping including a proposed swale, which provides storage for extreme events.	☒	Plans showing size and location of storage and supporting calculations

Section 8: Operation and Maintenance – Technical Standard S12 and HCWS161

Consideration	Select <u>ALL</u> that apply (✓)		Evidence Checklist	
State how <u>ALL</u> components of the sustainable drainage system will be maintained for the design life of the development.	Sustainable drainage features are at property level	☒	☐	Statement provided within your Sustainable Drainage Strategy
	Sustainable drainage system to be adopted by Water and Sewerage Company through a Section 104 agreement (Water Industry Act 1991)	☐		
	Applicant to secure maintenance of sustainable drainage features by entering into a Section 106 agreement (Town and Country Planning Act 1990)	☐		

PRO-FORMA 1: Sustainable Drainage System: Planning Permission

Declaration and Submission

This pro-forma has been completed using evidence from information which has been submitted with my planning application.

The information submitted in the Sustainable Drainage Strategy and site-specific Flood Risk Assessment (FRA), where submitted, is proportionate to the site conditions, flood risks and magnitude of development and I agree that this information can be used as evidence to this sustainable drainage approach.

Submitter Details

Form <u>completed</u> by	Helen Erskine	Email Address	helen.erskine@burohappold.com
		Daytime Telephone	01612335000
Form <u>signed off</u> by	Phil Anwyl	Accreditation(s) and/or Qualification(s) of Signatory	CEng MICE
Date (dd/mm/yyyy)	20/06/2025	Company	Buro Happold Engineers Ltd

Client Details

Name	Alan Hall	Company	Genr8 Kajima Regeneration Limited
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Helen Erskine
Buro Happold Limited
2nd Floor, Eastgate
2 Castle Street, Castlefield
Manchester
M3 4LZ
UK

T: +44 (0)161 233 5000

Email: helen.erskine@burohappold.com