Drainage Strategy Technical Note

Upper Brook Street, Manchester

UBS-HDR-BB-XX-DN-C-100001

240 Blackfriars Road

August 7, 2025

Document Control

Issue	Date	Status	HDR Author	HDR Approval	Notes
P01	08.05.2025	Issued for planning condition discharge	I McLean	S Marks	
P02	07.08.2025	Issued for planning condition discharge	M Ferry-Patel	S Marks	

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1 Introduction

HDR have been appointed by Kadans Science Partner Ltd to provide drainage services in relation to a McLaren/Kadans development of the Upper Brook Street Masterplan which consists of a Sci-Tech development in the southern half of the site (Block B) and a PBSA development in the northern half.

Separate drainage strategies have been developed for the Sci-Tech and PBSA developments. This technical note presents both strategies together to facilitate a single submission to be made to discharge planning conditions.

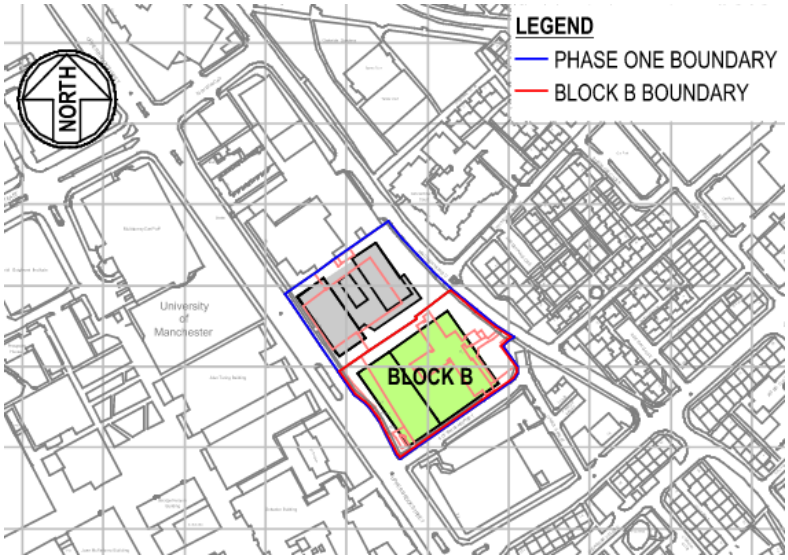
This note has been prepared, alongside a combined drainage strategy drawing (UBS-HDR-BB-XX-DR-C-102100 included in Appendix A) and associated calculations (UBS-HDR-BB-XX-CA-C-100001 included in Appendix B and MAUBS-ROS-ZZ-XX-RP-C-00001 included in Appendix C).

1.1 Site Description

The McLaren/Kadans development forms one element of the wider Upper Brook Street Illustrative Masterplan which can be seen within the submitted Supporting Planning Statement.

The masterplan proposals are being brought forward by Kadans Science Partner, McLaren Property, Property Alliance Group and Moda Living. The masterplan intends to transform the currently vacant sites, re-establishing their important role in the area by re-introducing permeability, public realm, and active community-facing uses at ground floor. The emerging masterplan includes 2.9 acres of new public realm and green spaces, a new public square, as well as a series of high-quality new buildings of varying heights to provide for approximately 700,000ft2 of sci-tech accommodation, 1,800 purpose-built student accommodation beds, and 25,000ft2 of active ground floor uses.

Figure 1. Site Location and Boundary



The McLaren/Kadans Site (Figure 1) is approximately 1.084 hectares (ha) in size and is located in Manchester, between Upper Brook Street to the southwest, Kincardine Road to the northeast and Cottenham Street to the southeast.

The Site is partially in use as a temporary paid car park. The paid car park is located on a section of the Site which was formerly in use as a Citroën car dealership and is accessed from both Upper Brook Street (UBS) to the southwest and Kincardine Road to the northeast. On this section of the site a PBSA building is proposed, as previously mentioned.

The remainder of the Site designated as Block B and allocated for a Sci-Tech development comprises the former sheltered housing scheme that ceased to be operational in June 2021 and associated landscape and parking areas. The far southwest of the Site is covered by a canopy associated with a disused car showroom.

2 Proposed Surface Water Drainage

2.1 Sci-Tech Development

The Sci-Tech development drainage strategy is based on a betterment of the existing site discharge rate. Through correspondence with UU in March 2024 a rate of 5l/s was agreed to be appropriate for the proposed development. The site will discharge to a new combined sewer manhole via a vortex flow control device set to restrict flows to 5l/s. The site's surface and foul water will then be discharged together into the existing UU combined sewer manhole located in the junction between Cottenham Street and Cabot Street.

Storm water attenuation has been sized using Infodrainage analysis for a 1 in 100-year storm plus an additional 45% allowance for climate change. The attenuation volume required to restrict the site discharge to a rate of 5l/s whilst preventing flooding on site is 240m^3.

2.2 PBSA Development

The PBSA drainage strategy is based upon betterment on existing site flow rate, as agreed with both the LLFA and UU at an early stage in design. A flow rate was stipulated by UU at 26l/s, a betterment on existing flow rate. The 26l/s flow rate is to be capped utilising a vortex flow control.

The storm water attenuation has been sized using Infodrainage analysis for a 1 in 100-year storm plus 45% climate change. The attenuation required consists of two below ground attenuation tanks, with potential for ground level raingardens within the landscape. An attenuation tank, totalling 130m^3 of storage will serve the proposed development.

The surface water networks discharge to a 525mm dia. combined sewer within the site, the 525mm combined sewer ultimately exits the site via Kincardine Road.

3 Summary

The proposed network has been designed using sustainable techniques while addressing all environmental considerations in conjunction with the landscaping proposals, to provide a robust, sustainable, compliant design. This network developed in agreement with the LLFA provides a betterment to the existing situation but ensures that no neighbouring properties will be affected by the runoff generated by the proposed development.

Appendix A. Combined Drainage Strategy

NOTES:

1. DO NOT SCALE FROM THIS DRAWING, WORK TO DIMENSIONS OR CO-ORDINATES PROVIDED.
2. THE CONTRACTOR IS ADVISED TO CHECK THE ACCURACY OF DRAWING INFORMATION TO ACTUAL ON-SITE CONDITIONS. I.E. THE LOCATION, LEVELS, SIZES, CONDITION OF EXISTING SEWERS TO BE RE-USED AND/OR CONNECTED INTO.
3. CONTRACTOR SHOULD INSTALL FINAL DRAINAGE CONNECTION PRIOR TO INSTALLING ANY UPSTREAM DRAINAGE TO AVOID POTENTIAL LEVEL ISSUES.
4. REPORT CONFLICTS TO ENGINEER IMMEDIATELY.
5. THE GROUND PENETRATION RADAR SURVEY NO. 612791 BY 'MIDLAND SURVEY LTD' HAS BEEN USED TO ASCERTAIN TYPE, LOCATION, AND DEPTH TO BURIED SERVICES AND/OR OBSTRUCTIONS. THE CONTRACTOR IS TO ENSURE THEY ARE SATISFIED AS TO THE LOCATION OF ALL BELOW GROUND SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORKS.
6. CONTRACTOR IS RESPONSIBLE FOR PROTECTING RETAINED SERVICES AND MAKING CONTACT WITH OWNERS OF APPARATUS TO OBTAIN NECESSARY CONSENT FOR EXCAVATION, PROTECTION AND/OR DIVERTING.
7. BURIED OBSTRUCTIONS ENCOUNTERED DURING EXCAVATION THAT CONFLICT WITH PROPOSED WORKS SHOULD BE BROKEN OUT AND REMOVED. RESIDUAL VOIDS TO BE BACKFILLED AND COMPACTED AS PER SPECIFICATION.
8. THIS DRAWING IS BASED ON:
   - SITE PLAN: 'SHEPPARD ROBSON' DWG NO.: UBS-SRA-ZZ-00-DR-A-201000 REV P07.
   - TOPOGRAPHICAL SURVEY: 'ND OLIVER&CO' DWG 11766/001A/1 REV A.
9. SURFACE WATER NETWORK ANALYSIS IS BASED ON FSR METHOD, SIZING OF THE DRAINAGE COMPONENTS FOR 1 IN 100 YRS +45% CLIMATE CHANGE STORM EVENT.
10. SURFACE WATER FLOW FROM SERVICE YARD IS COLLECTED VIA CHANNEL DRAINS.
11. PROPOSED TREE LOCATIONS TO BE REVIEWED AGAINST THE PROPOSED DRAINAGE.
12. ALL DOWN PIPES TO HAVE RODDING ACCESS BEFORE ENTERING BELOW GROUND.
13. ALL PIPES WITH DIAMETERS NOT SHOWN ARE NOMINAL MINIMUM 150mm DIA.
14. ALL INTERNAL MANHOLES TO HAVE RECESSED COVERS AND TO BE DOUBLE SEALED AND LOCKED. ALL MANHOLES WITHIN HARD PAVED AREAS TO HAVE RECESSED COVERS.

LEGEND

- PROPERTY BOUNDARY
- PROPOSED SW PIPE
- PROPOSED RAIN GARDEN UNDERDRAIN (PERFORATED PIPE)
- RWP — PROPOSED RAIN WATER PIPE
- PROPOSED SW INSPECTION CHAMBER
- PROPOSED SW MANHOLE
- CP — PROPOSED SW CATCHPIT MANHOLE
- HB — PROPOSED HYDRO-BRAKE MANHOLE
- ATTENUATION TANK - GEOCELL UNITS
- LINEAR DRAINAGE CHANNEL
- RAIN GARDEN (TO ARCHITECT'S SPECIFICATION)
- PROPOSED FOUL WATER INSPECTION CHAMBER
- PROPOSED FOUL WATER MANHOLE
- PROPOSED FOUL WATER PIPE
- FG — PROPOSED FOUL GULLY
- SS/SVP — SUB-STACK / SOIL VENT PIPE
- WP — WASTE PIPE
- BD — BACKDROP
- PROPOSED COMBINED WATER SEWER
- EXISTING MANHOLE
- EXISTING COMBINED SEWER
- FILTER DRAIN

Rev	Description	Date
P03	MH REFERENCES UPDATED	20/08/25
P02	UPDATED TO LATEST LAYOUTS	07/08/25
P01	FIRST ISSUE	24/03/25

Drawing Status: STAGE 4 ISSUE — Suitability: S3

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Client: KADANS SCIENCE PARTNER

Architect: SHEPPARD ROBSON

Project: UPPER BROOK STREET MANCHESTER

Title: DRAINAGE LAYOUT

HDR Project Number: 10369928

Cad File Name: UBS-HDR-BB-XX-DR-C-102100

Drawn:	Chkd/Appd:	Date:	Scale @ A1:
IJM	SM	24.03.25	1:250

Drawing Number: UBS-HDR-BB-XX-DR-C-102100 — Revision: P03

File: \\UHRP-FS01\NEWFORMA\76006A\10369928\6.0_CAD_BIM\6.2_CAD\CIVIL\UBS-HDR-BB-XX-DR-C-102100.DWG
User: Ferry-Potel, Meera Sheet: 102300 Plot Date: 21/08/2025 16:11:10

Appendix B. Sci-Tech Development Calculations

FSR: 1 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
SWMH51	FSR: 1 years: +0 %: 30 mins: Winter	38.588	36.967	37.025	0.058	6.4	0.016	0.000	6.2	5.965	OK
SWMH52	FSR: 1 years: +0 %: 30 mins: Winter	38.594	37.394	37.426	0.032	3.1	0.009	0.000	3.0	2.834	OK
SWMH54	FSR: 1 years: +0 %: 15 mins: Winter	38.618	36.489	36.528	0.039	2.9	0.011	0.000	2.9	1.352	OK
SWMH63	FSR: 1 years: +0 %: 15 mins: Winter	38.612	36.433	36.499	0.066	7.5	0.019	0.000	7.2	4.682	OK
SWMH55	FSR: 1 years: +0 %: 360 mins: Winter	38.562	36.167	36.375	0.208	2.5	0.235	0.000	2.4	21.212	OK
SWMH56	FSR: 1 years: +0 %: 360 mins: Winter	38.605	36.190	36.375	0.185	2.4	0.209	0.000	2.3	21.211	OK
SWMH58	FSR: 1 years: +0 %: 15 mins: Winter	38.497	36.759	36.830	0.071	9.2	0.020	0.000	9.1	7.914	OK
SWMH59	FSR: 1 years: +0 %: 30 mins: Winter	38.583	36.302	36.410	0.108	18.4	0.031	0.000	18.1	20.848	OK
SWMH60	FSR: 1 years: +0 %: 360 mins: Winter	38.579	36.173	36.375	0.202	5.5	0.229	0.000	5.4	48.086	OK
SWMH57	FSR: 1 years: +0 %: 360 mins: Winter	38.657	36.088	36.375	0.287	2.9	0.507	0.000	2.9	73.886	Surcharged
CWMH51	FSR: 1 years: +0 %: 120 mins: Summer	38.730	35.283	35.300	0.017	2.9	0.000	0.000	2.9	29.481	OK
SWMH53	FSR: 1 years: +0 %: 15 mins: Winter	38.600	36.319	36.378	0.059	8.8	0.017	0.000	8.4	5.808	OK
SWMH64	FSR: 1 years: +0 %: 15 mins: Winter	38.570	36.495	36.584	0.089	13.4	0.025	0.000	13.2	11.642	OK

Upper Brook St:: Drainage Calculations	Date: 17/03/2025		
	Designed by: IJM	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	HDR: 240 Blackfriars Road London		

FSR: 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
SWMH51	FSR: 30 years: +0 %: 30 mins: Winter	38.588	36.967	37.063	0.096	15.8	0.027	0.000	15.4	14.647	OK
SWMH52	FSR: 30 years: +0 %: 30 mins: Winter	38.594	37.394	37.444	0.050	7.5	0.014	0.000	7.5	6.959	OK
SWMH54	FSR: 30 years: +0 %: 480 mins: Winter	38.618	36.489	36.826	0.337	0.9	0.095	0.000	0.9	9.817	Surcharged
SWMH63	FSR: 30 years: +0 %: 480 mins: Winter	38.612	36.433	36.826	0.393	3.0	0.111	0.000	2.9	33.848	Surcharged
SWMH55	FSR: 30 years: +0 %: 480 mins: Winter	38.562	36.167	36.826	0.659	4.0	0.745	0.000	3.8	48.465	Surcharged
SWMH56	FSR: 30 years: +0 %: 480 mins: Winter	38.605	36.190	36.826	0.636	3.8	0.719	0.000	3.6	47.834	Surcharged
SWMH58	FSR: 30 years: +0 %: 30 mins: Winter	38.497	36.759	36.877	0.118	23.3	0.033	0.000	22.6	26.161	OK
SWMH59	FSR: 30 years: +0 %: 480 mins: Winter	38.583	36.302	36.826	0.524	10.0	0.148	0.000	9.8	114.070	Surcharged
SWMH60	FSR: 30 years: +0 %: 480 mins: Winter	38.579	36.173	36.826	0.653	9.8	0.738	0.000	9.7	112.995	Surcharged
SWMH57	FSR: 30 years: +0 %: 480 mins: Winter	38.657	36.088	36.825	0.737	2.9	1.303	0.000	2.8	118.972	Surcharged
CWMH51	FSR: 30 years: +0 %: 1440 mins: Winter	38.730	35.283	35.300	0.017	2.9	0.000	0.000	2.9	266.679	OK
SWMH53	FSR: 30 years: +0 %: 480 mins: Winter	38.600	36.319	36.826	0.507	3.6	0.143	0.000	3.2	41.245	Surcharged
SWMH64	FSR: 30 years: +0 %: 480 mins: Winter	38.570	36.495	36.826	0.331	7.6	0.094	0.000	7.6	86.667	Surcharged

Upper Brook St:: Drainage Calculations	Date: 17/03/2025		
	Designed by: IJM	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	HDR: 240 Blackfriars Road London		

FSR: 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
SWMH51	FSR: 100 years: +45 %: 480 mins: Winter	38.588	36.967	38.529	1.562	5.4	0.442	0.000	5.4	61.773	Flood Risk
SWMH52	FSR: 100 years: +45 %: 480 mins: Winter	38.594	37.394	38.529	1.135	3.6	0.321	0.000	2.6	29.431	Flood Risk
SWMH54	FSR: 100 years: +45 %: 360 mins: Winter	38.618	36.489	38.539	2.050	2.2	0.580	0.000	1.8	17.111	Flood Risk
SWMH63	FSR: 100 years: +45 %: 360 mins: Winter	38.612	36.433	38.539	2.106	6.8	0.596	0.000	6.6	58.917	Flood Risk
SWMH55	FSR: 100 years: +45 %: 360 mins: Winter	38.562	36.167	38.538	2.371	9.8	2.682	0.000	9.6	84.902	Flood Risk
SWMH56	FSR: 100 years: +45 %: 360 mins: Winter	38.605	36.190	38.538	2.348	9.6	2.656	0.000	9.3	84.633	Flood Risk
SWMH58	FSR: 100 years: +45 %: 480 mins: Winter	38.497	36.759	38.529	1.770	14.0	32.200	31.708	9.2	121.962	Flood
SWMH59	FSR: 100 years: +45 %: 360 mins: Winter	38.583	36.302	38.531	2.229	22.3	0.631	0.000	22.0	204.168	Flood Risk
SWMH60	FSR: 100 years: +45 %: 360 mins: Winter	38.579	36.173	38.537	2.364	22.0	2.674	0.000	21.8	199.032	Flood Risk
SWMH57	FSR: 100 years: +45 %: 360 mins: Winter	38.657	36.088	38.538	2.450	6.1	4.329	0.000	4.7	143.205	Flood Risk
CWMH51	FSR: 100 years: +45 %: 360 mins: Winter	38.730	35.283	35.304	0.021	4.7	0.000	0.000	4.7	143.183	OK
SWMH53	FSR: 100 years: +45 %: 360 mins: Winter	38.600	36.319	38.539	2.220	8.2	0.628	0.000	8.0	71.613	Flood Risk
SWMH64	FSR: 100 years: +45 %: 480 mins: Winter	38.570	36.495	38.528	2.033	13.8	0.575	0.000	13.6	179.612	Flood Risk

FSR: 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
SWMH51	FSR: 2 years: +0 %: 30 mins: Winter	38.588	36.967	37.034	0.067	8.3	0.019	0.000	8.0	7.693	OK
SWMH52	FSR: 2 years: +0 %: 30 mins: Winter	38.594	37.394	37.431	0.037	4.0	0.010	0.000	3.9	3.653	OK
SWMH54	FSR: 2 years: +0 %: 15 mins: Winter	38.618	36.489	36.534	0.045	3.8	0.013	0.000	3.7	1.751	OK
SWMH63	FSR: 2 years: +0 %: 15 mins: Winter	38.612	36.433	36.508	0.075	9.7	0.021	0.000	9.4	6.063	OK
SWMH55	FSR: 2 years: +0 %: 360 mins: Winter	38.562	36.167	36.458	0.291	3.0	0.329	0.000	2.8	25.683	OK
SWMH56	FSR: 2 years: +0 %: 360 mins: Winter	38.605	36.190	36.458	0.268	2.8	0.303	0.000	2.7	25.572	OK
SWMH58	FSR: 2 years: +0 %: 30 mins: Winter	38.497	36.759	36.840	0.081	12.2	0.023	0.000	11.8	13.737	OK
SWMH59	FSR: 2 years: +0 %: 360 mins: Winter	38.583	36.302	36.458	0.156	6.8	0.044	0.000	6.8	58.659	OK
SWMH60	FSR: 2 years: +0 %: 360 mins: Winter	38.579	36.173	36.458	0.285	6.8	0.322	0.000	6.6	58.398	OK
SWMH57	FSR: 2 years: +0 %: 360 mins: Winter	38.657	36.088	36.458	0.370	2.9	0.653	0.000	2.9	74.223	Surcharged
CWMH51	FSR: 2 years: +0 %: 1440 mins: Summer	38.730	35.283	35.300	0.017	2.9	0.000	0.000	2.9	137.273	OK
SWMH53	FSR: 2 years: +0 %: 360 mins: Winter	38.600	36.319	36.458	0.139	2.5	0.039	0.000	2.5	21.576	OK
SWMH64	FSR: 2 years: +0 %: 15 mins: Winter	38.570	36.495	36.598	0.103	17.4	0.029	0.000	17.1	15.096	OK

FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Attenuation Tank 2	FSR: 1 years: +0 %: 360 mins: Winter	36.375	36.375	0.277	0.277	9.6	53.697	0.000	0.000	2.9	74.018	77.039	OK

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

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Attenuation Tank 2	FSR: 30 years: +0 %: 480 mins: Winter	36.826	36.826	0.728	0.728	16.7	141.017	0.000	0.000	2.9	119.755	39.701	OK

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

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Attenuation Tank 2	FSR: 100 years: +45 %: 360 mins: Winter	38.538	38.538	2.440	2.440	39.2	233.806	0.000	0.000	6.1	149.120	0.024	OK

Upper Brook St:: Drainage Calculations	Date: 17/03/2025		
	Designed by: IJM	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	HDR: 240 Blackfriars Road London		

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

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Attenuation Tank 2	FSR: 2 years: +0 %: 360 mins: Winter	36.458	36.458	0.360	0.360	11.7	69.742	0.000	0.000	2.9	74.531	70.178	OK



SWMH64

Type : Catchment Area

Area (ha)	0.04

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	15
Percentage Impervious (%)	100



SWMH59

Type : Catchment Area

Area (ha)	0.056

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100



SWMH13

Type : Catchment Area

Area (ha)	0.036

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	10
Percentage Impervious (%)	100



ATT TANK 02 AREA 1

Type : Catchment Area

Area (ha)	0.086

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100



SWMH55

Type : Catchment Area

Area (ha)	0.029

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	10
Percentage Impervious (%)	100



ATT TANK 02 AREA 2

Type : Catchment Area

Area (ha)	0.057

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100



SWMH53

Type : Catchment Area

Area (ha)	0.017

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	10
Percentage Impervious (%)	100

Upper Brook St:: Drainage Calculations	Date: 07/08/2025		
	Designed by: IJM	Checked by: MFP	Approved By:
Report Details: Type: Junctions Storm Phase: Phase	HDR: 240 Blackfriars Road London		

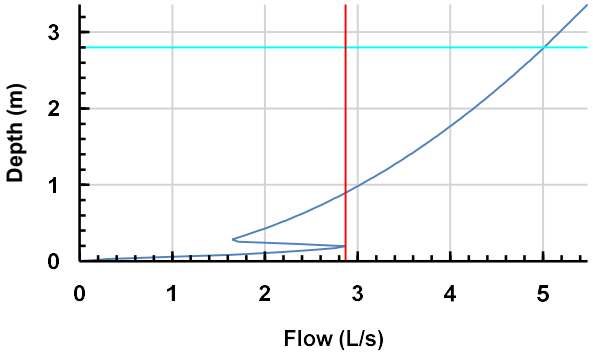
Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)
SWMH51	Manhole	384823.179	396821.166	38.588	1.621	36.967	Circular	0.600
SWMH52	Manhole	384837.922	396800.261	38.594	1.200	37.394	Circular	0.600
SWMH54	Manhole	384858.755	396814.413	38.618	2.129	36.489	Circular	0.600
SWMH63	Manhole	384865.652	396819.106	38.612	2.179	36.433	Circular	0.600
SWMH55	Manhole	384896.104	396839.870	38.562	2.395	36.167	Circular	1.200
SWMH56	Manhole	384895.753	396845.822	38.605	2.415	36.190	Circular	1.200
SWMH58	Manhole	384805.163	396846.661	38.497	1.738	36.759	Circular	0.600
SWMH59	Manhole	384861.525	396885.380	38.583	2.281	36.302	Circular	0.600
SWMH60	Manhole	384875.351	396871.843	38.579	2.406	36.173	Circular	1.200
SWMH57	Manhole	384897.386	396846.870	38.657	2.569	36.088	Circular	1.500
CWMH51	Manhole	384901.102	396847.336	38.730	3.447	35.283	Circular	1.200
SWMH53	Manhole	384879.774	396828.682	38.600	2.281	36.319	Circular	0.600
SWMH64	Manhole	384837.514	396869.275	38.570	2.075	36.495	Circular	0.600

Name	Lock
SWMH51	None
SWMH52	None
SWMH54	None
SWMH63	None
SWMH55	None
SWMH56	None
SWMH58	None
SWMH59	None
SWMH60	None
SWMH57	None
CWMH51	None
SWMH53	None
SWMH64	None

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
SWMH51	Outlet	S1.001	Free Discharge
SWMH52	Outlet	S1.000	Free Discharge
SWMH54	Outlet	S1.002	Free Discharge
SWMH63	Outlet	S1.003	Free Discharge
SWMH55	Outlet	S1.005	Free Discharge
SWMH56	Outlet	S1.006a	Free Discharge
SWMH58	Outlet	S2.000	Free Discharge
SWMH59	Outlet	S2.002	Free Discharge
SWMH60	Outlet	S2.003	Free Discharge
SWMH57	Outlet	S1.007	Hydro-Brake®

Invert Level (m)	36.088
Design Depth (m)	2.800
Design Flow (L/s)	5.0
Objective	Minimise Upstream Storage Requirements
Application	Surface Water Only
Sump Available	☐
Unit Reference	CHE-0079-5000-2800-5000



SWMH53	Outlet	S1.004	Free Discharge
SWMH64	Outlet	S2.001	Free Discharge



Attenuation Tank 2

Type : Cellular Storage

Dimensions

Exceedance Level (m)	38.600
Depth (m)	1.200
Base Level (m)	36.098
Number of Crates Long	51
Number of Crates Wide	8
Number of Crates High	3
Porosity (%)	95
Crate Length (m)	0.5
Crate Width (m)	1
Crate Height (m)	0.4
Total Volume (m^3)	233.862

Outlets

Outlet

Outgoing Connection	1.006b
Outlet Type	Free Discharge

Upper Brook St:: Drainage Calculations	Date: 07/08/2025		
	Designed by: IJM	Checked by: MFP	Approved By:
Report Details: Type: Inflow Summary Storm Phase: Phase	HDR: 240 Blackfriars Road London		

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
ATT TANK 02 AREA 1	Attenuation Tank 2		Time of Concentration	0.086	100	0	100	0.086
ATT TANK 02 AREA 2	Attenuation Tank 2		Time of Concentration	0.057	100	0	100	0.057
SWMH13	SWMH63		Time of Concentration	0.036	100	0	100	0.036
SWMH51	SWMH51		Time of Concentration	0.037	100	0	100	0.037
SWMH52	SWMH52		Time of Concentration	0.054	100	0	100	0.054
SWMH53	SWMH53		Time of Concentration	0.017	100	0	100	0.017
SWMH54	SWMH54		Time of Concentration	0.023	100	0	100	0.023
SWMH55	SWMH55		Time of Concentration	0.029	100	0	100	0.029
SWMH58	SWMH58		Time of Concentration	0.049	100	0	100	0.049
SWMH59	SWMH59		Time of Concentration	0.056	100	0	100	0.056
SWMH64	SWMH64		Time of Concentration	0.040	100	0	100	0.040
TOTAL		**0.0**		**0.484**				**0.484**

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

FSR

Type: FSR

Region	England And Wales
M5-60 (mm)	18.0
Ratio R	0.364
Summer	☑
Winter	☑

Return Period

Return Period (years)	Increase Rainfall (%)
1.0	0.000
30.0	0.000
100.0	45.000
2.0	0.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
360	720
480	960
960	1920
1440	2880

FSR: 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
SWMH51	FSR: 30 years: +0 %: 30 mins: Winter	38.588	36.967	37.071	0.104	17.9	0.029	0.000	17.5	16.660	OK
SWMH52	FSR: 30 years: +0 %: 30 mins: Winter	38.594	37.394	37.454	0.060	10.7	0.017	0.000	10.6	9.884	OK
SWMH54	FSR: 30 years: +0 %: 480 mins: Winter	38.618	36.489	36.799	0.310	0.8	0.088	0.000	0.8	9.457	Surcharged
SWMH63	FSR: 30 years: +0 %: 480 mins: Winter	38.612	36.433	36.799	0.366	2.1	0.103	0.000	2.1	24.123	Surcharged
SWMH55	FSR: 30 years: +0 %: 480 mins: Winter	38.562	36.167	36.799	0.632	3.4	0.714	0.000	3.2	40.917	Surcharged
SWMH56	FSR: 30 years: +0 %: 480 mins: Winter	38.605	36.190	36.799	0.609	3.2	0.688	0.000	3.1	40.313	Surcharged
SWMH58	FSR: 30 years: +0 %: 30 mins: Winter	38.497	36.759	36.881	0.122	23.7	0.034	0.000	22.9	25.621	OK
SWMH59	FSR: 30 years: +0 %: 480 mins: Winter	38.583	36.302	36.799	0.497	8.5	0.141	0.000	8.2	96.077	Surcharged
SWMH60	FSR: 30 years: +0 %: 480 mins: Winter	38.579	36.173	36.799	0.626	8.2	0.708	0.000	8.1	95.030	Surcharged
SWMH57	FSR: 30 years: +0 %: 480 mins: Winter	38.657	36.088	36.798	0.710	2.9	1.255	0.000	2.8	116.793	Surcharged
CWMH51	FSR: 30 years: +0 %: 360 mins: Summer	38.730	35.283	35.300	0.017	2.9	0.000	0.000	2.9	83.239	OK
SWMH53	FSR: 30 years: +0 %: 480 mins: Winter	38.600	36.319	36.799	0.480	2.7	0.136	0.000	2.4	30.347	Surcharged
SWMH64	FSR: 30 years: +0 %: 480 mins: Winter	38.570	36.495	36.799	0.304	6.4	0.086	0.000	6.5	73.939	Surcharged

FSR: 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
SWMH51	FSR: 100 years: +45 %: 480 mins: Winter	38.588	36.967	38.518	1.551	6.2	0.439	0.000	6.2	70.342	Flood Risk
SWMH52	FSR: 100 years: +45 %: 480 mins: Winter	38.594	37.394	38.518	1.124	3.7	0.318	0.000	3.7	41.729	Flood Risk
SWMH54	FSR: 100 years: +45 %: 480 mins: Winter	38.618	36.489	38.530	2.041	1.7	0.578	0.000	1.4	17.566	Flood Risk
SWMH63	FSR: 100 years: +45 %: 480 mins: Winter	38.612	36.433	38.529	2.096	3.8	0.593	0.000	3.7	44.865	Flood Risk
SWMH55	FSR: 100 years: +45 %: 480 mins: Winter	38.562	36.167	38.525	2.358	6.6	2.667	0.000	6.4	77.449	Flood Risk
SWMH56	FSR: 100 years: +45 %: 480 mins: Winter	38.605	36.190	38.524	2.334	6.4	2.640	0.000	6.3	77.312	Flood Risk
SWMH58	FSR: 100 years: +45 %: 480 mins: Winter	38.497	36.759	38.518	1.759	9.4	21.446	20.954	9.0	113.840	Flood
SWMH59	FSR: 100 years: +45 %: 480 mins: Winter	38.583	36.302	38.519	2.217	15.1	0.627	0.000	14.9	184.132	Flood Risk
SWMH60	FSR: 100 years: +45 %: 480 mins: Winter	38.579	36.173	38.523	2.350	14.9	2.658	0.000	14.8	179.980	Flood Risk
SWMH57	FSR: 100 years: +45 %: 480 mins: Winter	38.657	36.088	38.524	2.436	5.8	4.304	0.000	4.7	182.829	Flood Risk
CWMH51	FSR: 100 years: +45 %: 480 mins: Winter	38.730	35.283	35.304	0.021	4.7	0.000	0.000	4.7	182.808	OK
SWMH53	FSR: 100 years: +45 %: 480 mins: Winter	38.600	36.319	38.527	2.208	4.8	0.625	0.000	4.7	56.785	Flood Risk
SWMH64	FSR: 100 years: +45 %: 480 mins: Winter	38.570	36.495	38.518	2.023	11.6	0.572	0.000	11.5	147.351	Flood Risk

FSR: 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
SWMH51	FSR: 2 years: +0 %: 30 mins: Winter	38.588	36.967	37.039	0.072	9.4	0.020	0.000	9.1	8.748	OK
SWMH52	FSR: 2 years: +0 %: 30 mins: Winter	38.594	37.394	37.438	0.044	5.6	0.012	0.000	5.6	5.192	OK
SWMH54	FSR: 2 years: +0 %: 15 mins: Winter	38.618	36.489	36.533	0.044	3.6	0.013	0.000	3.6	1.679	OK
SWMH63	FSR: 2 years: +0 %: 15 mins: Winter	38.612	36.433	36.497	0.064	7.2	0.018	0.000	6.9	4.307	OK
SWMH55	FSR: 2 years: +0 %: 360 mins: Winter	38.562	36.167	36.444	0.277	2.6	0.314	0.000	2.4	21.827	OK
SWMH56	FSR: 2 years: +0 %: 360 mins: Winter	38.605	36.190	36.444	0.254	2.4	0.288	0.000	2.3	21.754	OK
SWMH58	FSR: 2 years: +0 %: 15 mins: Winter	38.497	36.759	36.842	0.083	12.1	0.024	0.000	12.1	10.065	OK
SWMH59	FSR: 2 years: +0 %: 360 mins: Winter	38.583	36.302	36.444	0.142	5.7	0.040	0.000	5.7	49.476	OK
SWMH60	FSR: 2 years: +0 %: 360 mins: Winter	38.579	36.173	36.444	0.271	5.7	0.307	0.000	5.5	49.288	OK
SWMH57	FSR: 2 years: +0 %: 360 mins: Winter	38.657	36.088	36.444	0.356	2.9	0.629	0.000	2.9	74.922	Surcharged
CWMH51	FSR: 2 years: +0 %: 480 mins: Summer	38.730	35.283	35.300	0.017	2.9	0.000	0.000	2.9	89.896	OK
SWMH53	FSR: 2 years: +0 %: 360 mins: Winter	38.600	36.319	36.444	0.125	1.9	0.035	0.000	1.9	15.959	OK
SWMH64	FSR: 2 years: +0 %: 15 mins: Winter	38.570	36.495	36.591	0.096	15.3	0.027	0.000	15.2	12.872	OK

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

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m^3)	Max. Flooded Volume (m^3)	Total Lost Volume (m^3)	Max. Outflow (L/s)	Total Discharge Volume (m^3)	Percentage Available (%)	Status
Attenuation Tank 2	FSR: 30 years: +0 %: 480 mins: Winter	36.799	36.799	0.701	0.701	16.2	135.772	0.000	0.000	2.9	117.541	41.943	OK

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

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m^3)	Max. Flooded Volume (m^3)	Total Lost Volume (m^3)	Max. Outflow (L/s)	Total Discharge Volume (m^3)	Percentage Available (%)	Status
Attenuation Tank 2	FSR: 100 years: +45 %: 480 mins: Winter	38.524	38.524	2.426	2.426	30.5	233.793	0.000	0.000	5.8	188.588	0.029	OK

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

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m^3)	Max. Flooded Volume (m^3)	Total Lost Volume (m^3)	Max. Outflow (L/s)	Total Discharge Volume (m^3)	Percentage Available (%)	Status
Attenuation Tank 2	FSR: 2 years: +0 %: 360 mins: Winter	36.444	36.444	0.346	0.346	11.3	67.105	0.000	0.000	2.9	75.194	71.306	OK