Appendix C. PBSA Development Calculations

Upper Brook St: Drainage Calculations I in 2yr Storm event Gateway 2 Submission	Date: 07/08/0025		
	Designed by: AY	Checked by: JT	Approved By:
Report Details: Type: Inflows Storm Phase: Phase	Roscoe :		

Catchment Area Type : Catchment Area

Area (ha)	0.099

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

Catchment Area (1) Type : Catchment Area

Area (ha)	0.062

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

Catchment Area (2) Type : Catchment Area

Area (ha)	0.096

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

Catchment Area (3) Type : Catchment Area

Area (ha)	0.079

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



Catchment Area (4)

Type : Catchment Area

Area (ha)	0.121

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

Upper Brook St: Drainage Calculations I in 2yr Storm event Gateway 2 Submission	Date: 07/08/0025		
	Designed by: AY	Checked by: JT	Approved By:
Report Details: Type: Junctions Storm Phase: Phase	Roscoe :		

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)
MH04	Manhole	384798.559	396856.203	38.400	0.760	37.640	Circular	1.200
MH05	Manhole	384819.838	396871.072	38.530	1.147	37.383	Circular	1.200
MH06	Manhole	384845.030	396888.662	38.540	1.361	37.179	Circular	1.200
MH03	Manhole	384847.899	396896.040	38.580	1.942	36.638	Circular	1.200
Outfall	Manhole	384853.378	396902.338	38.730	3.230	35.500	Circular	1.200
FC01	Manhole	384853.478	396899.551	38.880	3.154	35.726	Circular	1.200
MH02	Manhole	384820.397	396930.846	38.575	1.491	37.084	Circular	1.200
MH01	Manhole	384779.405	396903.605	38.600	1.190	37.410	Circular	1.200

Name	Lock
MH04	None
MH05	None
MH06	None
MH03	None
Outfall	None
FC01	None
MH02	None
MH01	None

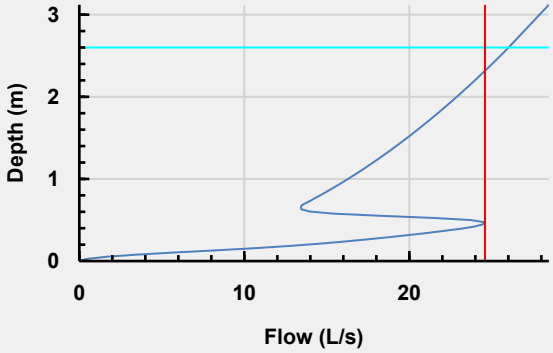
Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
MH04	Inlet	Catchment Area	(None)	No Restriction
MH05	Inlet	04 -> 05	(None)	No Restriction
	Inlet (1)	Catchment Area (1)	(None)	No Restriction
MH06	Inlet	05 -> 06	(None)	No Restriction
	Inlet (1)	Catchment Area (2)	(None)	No Restriction
MH03	Inlet	02 -> 03	(None)	No Restriction
Outfall	Inlet	FC01 -> Outfall	(None)	No Restriction
FC01	Inlet	Tank 1 -> FC01	(None)	No Restriction
MH02	Inlet	01 -> 02	(None)	No Restriction
	Inlet (1)	Catchment Area (4)	(None)	No Restriction
MH01	Inlet	Catchment Area (3)	(None)	No Restriction

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
MH04	Outlet	04 -> 05	Free Discharge
MH05	Outlet	05 -> 06	Free Discharge
MH06	Outlet	06 -> Tank 1	Free Discharge
MH03	Outlet	03 -> Tank 1	Free Discharge
FC01	Outlet	FC01 -> Outfall	Hydro-Brake®

Invert Level (m)	35.726
Design Depth (m)	2.600
Design Flow (L/s)	26.0
Objective	Minimise Upstream Storage Requirements
Application	Surface Water Only
Sump Available	☐
Unit Reference	CHE-0185-2600-2600-2600



MH02	Outlet	02 -> 03	Free Discharge
MH01	Outlet	01 -> 02	Free Discharge



Attenuation tank 1

Type : Tank

Dimensions

Exceedance Level (m)	37.780
Depth (m)	2.000
Base Level (m)	35.780
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:X)	0.00
Total Volume (m³)	130.000

Depth (m)	Area (m²)	Volume (m³)
0.000	65.00	0.000
2.000	65.00	130.000

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	06 -> Tank 1 03 -> Tank 1
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Tank 1 -> FC01
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	13.116

Upper Brook St:	Date:		
Drainage Calculations	07/08/0025		
I in 2yr Storm event	Designed by:	Checked by:	Approved By:
Gateway 2 Submission	AY	JT	
Report Details:	Roscoe :		
Type: Network Design Criteria			
Storm Phase: Phase			

Flow Options

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

Pipe Options

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

Pipe Size Library

Default

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

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

Manhole Options

Apply Offset	☐

Manhole Size Library

Default

Diameter / Width

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

Additional Sizing

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

Depth

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

Access

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

Benching Requirements

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

Outfalls

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

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	☐

Upper Brook St: Drainage Calculations I in 2yr Storm event Gateway 2 Submission	Date: 07/08/0025		
	Designed by: AY	Checked by: JT	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase	Roscoe :		

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

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
Catchment Area	FSR: 2 years: +0 %: 15 mins: Winter	0.10	15.6	7.189
Catchment Area (1)	FSR: 2 years: +0 %: 15 mins: Winter	0.06	9.8	4.537
Catchment Area (2)	FSR: 2 years: +0 %: 15 mins: Winter	0.10	15.0	6.946
Catchment Area (3)	FSR: 2 years: +0 %: 15 mins: Winter	0.08	12.5	5.754
Catchment Area (4)	FSR: 2 years: +0 %: 15 mins: Winter	0.12	19.1	8.807

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
MH04	FSR: 2 years: +0 %: 15 mins: Winter	38.400	37.640	37.725	0.085	15.6	0.097	0.000	15.1	7.191	OK
MH05	FSR: 2 years: +0 %: 15 mins: Winter	38.530	37.383	37.495	0.112	24.9	0.127	0.000	23.6	11.703	OK
MH06	FSR: 2 years: +0 %: 15 mins: Winter	38.540	37.179	37.240	0.061	38.6	0.069	0.000	38.1	18.671	OK
MH03	FSR: 2 years: +0 %: 15 mins: Winter	38.580	36.638	36.691	0.053	28.6	0.059	0.000	28.0	14.535	OK
Outfall	FSR: 2 years: +0 %: 30 mins: Winter	38.730	35.500	35.553	0.053	21.4	0.000	0.000	21.4	39.737	OK
FC01	FSR: 2 years: +0 %: 30 mins: Winter	38.880	35.726	36.139	0.413	21.4	0.467	0.000	21.4	39.766	Surcharged
MH02	FSR: 2 years: +0 %: 15 mins: Winter	38.575	37.084	37.199	0.115	30.8	0.130	0.000	28.6	14.534	OK
MH01	FSR: 2 years: +0 %: 15 mins: Winter	38.600	37.410	37.491	0.081	12.5	0.091	0.000	11.7	5.753	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 (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Attenuation tank 1	FSR: 2 years: +0 %: 30 mins: Winter	36.143	36.143	0.363	0.363	47.5	23.590	0.000	0.000	21.4	39.947	81.854	OK

FSR: 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
04 -> 05	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	MH04	MH05	38.400	37.725	0.099	7.191	0.9	0.29	15.1	OK
05 -> 06	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	MH05	MH06	38.530	37.495	0.087	11.703	1.4	0.26	23.6	OK
06 -> Tank 1	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	MH06	Attenuation tank 1	38.540	37.240	0.180	18.671	2.8	0.09	38.1	OK
Tank 1 -> FC01	FSR: 2 years: +0 %: 30 mins: Winter	Pipe	Attenuation tank 1	FC01	37.780	36.143	0.300	39.947	0.4	0.19	21.4	Surcharged
FC01 -> Outfall	FSR: 2 years: +0 %: 30 mins: Winter	Pipe	FC01	Outfall	38.880	36.139	0.057	39.737	2.3	0.07	21.4	Surcharged
01 -> 02	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	MH01	MH02	38.600	37.491	0.098	5.753	0.7	0.28	11.7	OK
02 -> 03	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	MH02	MH03	38.575	37.199	0.084	14.534	1.8	0.26	28.6	OK
03 -> Tank 1	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	MH03	Attenuation tank 1	38.580	36.691	0.179	14.535	2.2	0.07	28.0	OK

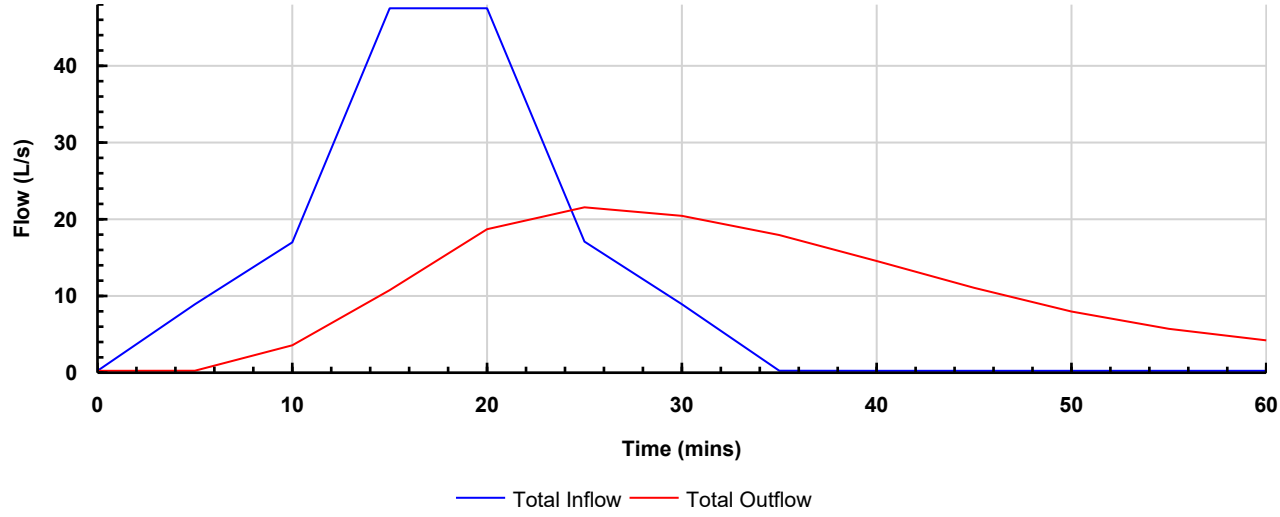
Phase
FSR: 2 years: Increase Rainfall (%): +0: 30 mins: Winter

Tables

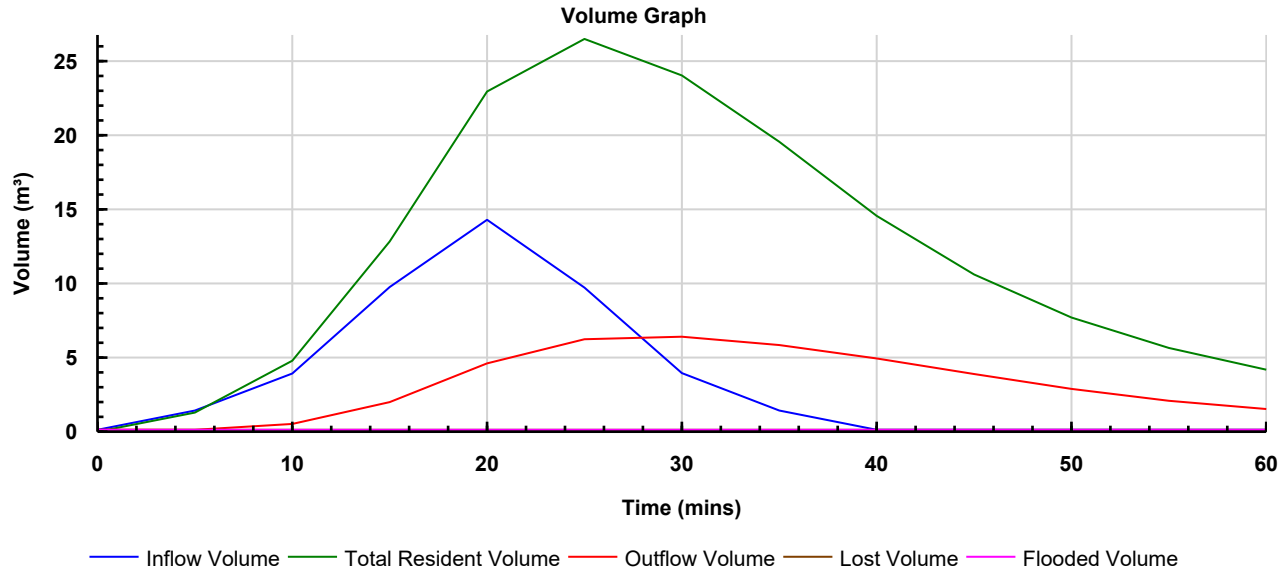
Name	Max. Inflow (L/s)	Total Inflow Volume (m³)	Max. Outflow (L/s)	Total Outflow Volume (m³)
Outfall			21.4	39.737
TOTAL	47.5	43.824	21.4	39.737

Graphs

Flow Graph



Volume Graph





Catchment Area
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Type : Catchment Area

Inflow

Max. Inflow (L/s)	15.6
Total Inflow Volume (m³)	7.189

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	4.2
10	15.6
15	4.2
20	0.0
25	0.0
30	0.0



Catchment Area (1)
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Type : Catchment Area

Inflow

Max. Inflow (L/s)	9.8
Total Inflow Volume (m³)	4.537

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	2.6
10	9.8
15	2.7
20	0.0
25	0.0
30	0.0



Catchment Area (2)
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Type : Catchment Area

Inflow

Max. Inflow (L/s)	15.0
Total Inflow Volume (m³)	6.946

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	4.0
10	15.0
15	4.1
20	0.0
25	0.0
30	0.0



Catchment Area (3)
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Type : Catchment Area

Inflow

Max. Inflow (L/s)	12.5
Total Inflow Volume (m³)	5.754

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	3.3
10	12.5
15	3.4
20	0.0
25	0.0
30	0.0



Catchment Area (4)
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Type : Catchment Area

Inflow

Max. Inflow (L/s)	19.1
Total Inflow Volume (m³)	8.807

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	5.1
10	19.1
15	5.2
20	0.0
25	0.0
30	0.0



MH04 Type : Manhole

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	4.2	0.042	0.047	0.000	3.9
10	15.6	0.085	0.097	0.000	15.1
15	4.2	0.046	0.053	0.000	4.8
20	0.0	0.015	0.017	0.000	0.5
25	0.0	0.003	0.003	0.000	0.0
30	0.0	0.002	0.002	0.000	0.0



MH05

Type : Manhole

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	6.6	0.055	0.062	0.000	5.7
10	24.9	0.112	0.127	0.000	23.6
15	7.5	0.068	0.077	0.000	9.1
20	0.5	0.028	0.032	0.000	1.4
25	0.0	0.008	0.009	0.000	0.1
30	0.0	0.004	0.005	0.000	0.0



MH06 Type : Manhole

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	9.7	0.034	0.038	0.000	9.6
10	38.6	0.061	0.069	0.000	38.1
15	13.2	0.034	0.039	0.000	13.9
20	1.4	0.013	0.015	0.000	1.9
25	0.1	0.004	0.004	0.000	0.1
30	0.0	0.002	0.003	0.000	0.0



MH03 Type : Manhole

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	6.6	0.027	0.031	0.000	6.4
10	28.6	0.053	0.059	0.000	28.0
15	12.0	0.033	0.037	0.000	12.6
20	2.1	0.015	0.017	0.000	2.4
25	0.2	0.005	0.005	0.000	0.2
30	0.1	0.003	0.003	0.000	0.1



Outfall Type : Manhole

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 30 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.0	0.001	0.000	0.000	0.0
10	3.3	0.022	0.000	0.000	3.3
15	10.5	0.037	0.000	0.000	10.6
20	18.5	0.049	0.000	0.000	18.6
25	21.4	0.053	0.000	0.000	21.4
30	20.3	0.051	0.000	0.000	20.3
35	17.8	0.048	0.000	0.000	17.8
40	14.4	0.043	0.000	0.000	14.4
45	10.9	0.038	0.000	0.000	10.9
50	7.8	0.032	0.000	0.000	7.8
55	5.5	0.027	0.000	0.000	5.5
60	4.0	0.024	0.000	0.000	4.0



FC01

Type : Manhole

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 30 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.1	0.003	0.003	0.000	0.0
10	3.8	0.100	0.113	0.000	3.4
15	11.6	0.199	0.225	0.000	10.6
20	19.1	0.344	0.389	0.000	18.6
25	21.4	0.413	0.467	0.000	21.4
30	20.1	0.384	0.435	0.000	20.3
35	17.5	0.327	0.369	0.000	17.8
40	14.0	0.258	0.292	0.000	14.4
45	10.6	0.202	0.228	0.000	10.9
50	7.5	0.160	0.181	0.000	7.7
55	5.3	0.131	0.148	0.000	5.5
60	3.9	0.109	0.123	0.000	4.0



MH02 Type : Manhole

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	8.0	0.055	0.062	0.000	6.6
10	30.8	0.115	0.130	0.000	28.6
15	9.5	0.072	0.082	0.000	12.0
20	0.6	0.031	0.035	0.000	2.1
25	0.0	0.010	0.011	0.000	0.2
30	0.0	0.006	0.006	0.000	0.1



MH01 Type : Manhole

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	3.3	0.040	0.045	0.000	2.9
10	12.5	0.081	0.091	0.000	11.7
15	3.4	0.048	0.055	0.000	4.3
20	0.0	0.019	0.021	0.000	0.6
25	0.0	0.005	0.006	0.000	0.0
30	0.0	0.003	0.003	0.000	0.0

Upper Brook St: Drainage Calculations I in 30yr Storm event Gateway 2 Submission	Date: 07/08/0025		
	Designed by: AY	Checked by: JT	Approved By:
Report Details: Type: Inflows Storm Phase: Phase	Roscoe :		



Catchment Area

Type : Catchment Area

Area (ha)	0.099

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



Catchment Area (1)

Type : Catchment Area

Area (ha)	0.062

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



Catchment Area (2)

Type : Catchment Area

Area (ha)	0.096

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



Catchment Area (3)

Type : Catchment Area

Area (ha)	0.079

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



Catchment Area (4)

Type : Catchment Area

Area (ha)	0.121

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

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)
MH04	Manhole	384798.559	396856.203	38.400	0.760	37.640	Circular	1.200
MH05	Manhole	384819.838	396871.072	38.530	1.147	37.383	Circular	1.200
MH06	Manhole	384845.030	396888.662	38.540	1.361	37.179	Circular	1.200
MH03	Manhole	384847.899	396896.040	38.580	1.942	36.638	Circular	1.200
Outfall	Manhole	384853.378	396902.338	38.730	3.230	35.500	Circular	1.200
FC01	Manhole	384853.478	396899.551	38.880	3.154	35.726	Circular	1.200
MH02	Manhole	384820.397	396930.846	38.575	1.491	37.084	Circular	1.200
MH01	Manhole	384779.405	396903.605	38.600	1.190	37.410	Circular	1.200

Name	Lock
MH04	None
MH05	None
MH06	None
MH03	None
Outfall	None
FC01	None
MH02	None
MH01	None

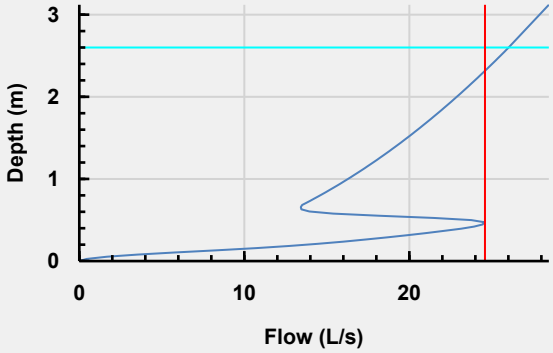
Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
MH04	Inlet	Catchment Area	(None)	No Restriction
MH05	Inlet	04 -> 05	(None)	No Restriction
	Inlet (1)	Catchment Area (1)	(None)	No Restriction
MH06	Inlet	05 -> 06	(None)	No Restriction
	Inlet (1)	Catchment Area (2)	(None)	No Restriction
MH03	Inlet	02 -> 03	(None)	No Restriction
Outfall	Inlet	FC01 -> Outfall	(None)	No Restriction
FC01	Inlet	Tank 1 -> FC01	(None)	No Restriction
MH02	Inlet	01 -> 02	(None)	No Restriction
	Inlet (1)	Catchment Area (4)	(None)	No Restriction
MH01	Inlet	Catchment Area (3)	(None)	No Restriction

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
MH04	Outlet	04 -> 05	Free Discharge
MH05	Outlet	05 -> 06	Free Discharge
MH06	Outlet	06 -> Tank 1	Free Discharge
MH03	Outlet	03 -> Tank 1	Free Discharge
FC01	Outlet	FC01 -> Outfall	Hydro-Brake®

Invert Level (m)	35.726
Design Depth (m)	2.600
Design Flow (L/s)	26.0
Objective	Minimise Upstream Storage Requirements
Application	Surface Water Only
Sump Available	☐
Unit Reference	CHE-0185-2600-2600-2600



MH02	Outlet	02 -> 03	Free Discharge
MH01	Outlet	01 -> 02	Free Discharge



Attenuation tank 1

Type : Tank

Dimensions

Exceedance Level (m)	37.780
Depth (m)	2.000
Base Level (m)	35.780
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:X)	0.00
Total Volume (m³)	130.000

Depth (m)	Area (m²)	Volume (m³)
0.000	65.00	0.000
2.000	65.00	130.000

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	06 -> Tank 1 03 -> Tank 1
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Tank 1 -> FC01
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	13.116

Flow Options

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

Pipe Options

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

Pipe Size Library

Default

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

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

Manhole Options

Apply Offset	☐

Manhole Size Library

Default

Diameter / Width

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

Additional Sizing

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

Depth

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

Access

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

Benching Requirements

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

Outfalls

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

Upper Brook St: Drainage Calculations I in 30yr Storm event Gateway 2 Submission	Date: 07/08/0025		
	Designed by: AY	Checked by: JT	Approved By:
Report Title: Rainfall Analysis Criteria	Roscoe :		

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	☐

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

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
Catchment Area	FSR: 2 years: +0 %: 15 mins: Winter	0.10	15.6	7.189
Catchment Area (1)	FSR: 2 years: +0 %: 15 mins: Winter	0.06	9.8	4.537
Catchment Area (2)	FSR: 2 years: +0 %: 15 mins: Winter	0.10	15.0	6.946
Catchment Area (3)	FSR: 2 years: +0 %: 15 mins: Winter	0.08	12.5	5.754
Catchment Area (4)	FSR: 2 years: +0 %: 15 mins: Winter	0.12	19.1	8.807

Upper Brook St: Drainage Calculations I in 30yr Storm event Gateway 2 Submission	Date: 07/08/0025		
	Designed by: AY	Checked by: JT	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Roscoe : 		

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
MH04	FSR: 2 years: +0 %: 15 mins: Winter	38.400	37.640	37.725	0.085	15.6	0.097	0.000	15.1	7.191	OK
MH05	FSR: 2 years: +0 %: 15 mins: Winter	38.530	37.383	37.495	0.112	24.9	0.127	0.000	23.6	11.703	OK
MH06	FSR: 2 years: +0 %: 15 mins: Winter	38.540	37.179	37.240	0.061	38.6	0.069	0.000	38.1	18.671	OK
MH03	FSR: 2 years: +0 %: 15 mins: Winter	38.580	36.638	36.691	0.053	28.6	0.059	0.000	28.0	14.535	OK
Outfall	FSR: 2 years: +0 %: 30 mins: Winter	38.730	35.500	35.553	0.053	21.4	0.000	0.000	21.4	39.737	OK
FC01	FSR: 2 years: +0 %: 30 mins: Winter	38.880	35.726	36.139	0.413	21.4	0.467	0.000	21.4	39.766	Surcharged
MH02	FSR: 2 years: +0 %: 15 mins: Winter	38.575	37.084	37.199	0.115	30.8	0.130	0.000	28.6	14.534	OK
MH01	FSR: 2 years: +0 %: 15 mins: Winter	38.600	37.410	37.491	0.081	12.5	0.091	0.000	11.7	5.753	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 (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Attenuation tank 1	FSR: 2 years: +0 %: 30 mins: Winter	36.143	36.143	0.363	0.363	47.5	23.590	0.000	0.000	21.4	39.947	81.854	OK

FSR: 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
04 -> 05	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	MH04	MH05	38.400	37.725	0.099	7.191	0.9	0.29	15.1	OK
05 -> 06	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	MH05	MH06	38.530	37.495	0.087	11.703	1.4	0.26	23.6	OK
06 -> Tank 1	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	MH06	Attenuation tank 1	38.540	37.240	0.180	18.671	2.8	0.09	38.1	OK
Tank 1 -> FC01	FSR: 2 years: +0 %: 30 mins: Winter	Pipe	Attenuation tank 1	FC01	37.780	36.143	0.300	39.947	0.4	0.19	21.4	Surcharged
FC01 -> Outfall	FSR: 2 years: +0 %: 30 mins: Winter	Pipe	FC01	Outfall	38.880	36.139	0.057	39.737	2.3	0.07	21.4	Surcharged
01 -> 02	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	MH01	MH02	38.600	37.491	0.098	5.753	0.7	0.28	11.7	OK
02 -> 03	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	MH02	MH03	38.575	37.199	0.084	14.534	1.8	0.26	28.6	OK
03 -> Tank 1	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	MH03	Attenuation tank 1	38.580	36.691	0.179	14.535	2.2	0.07	28.0	OK

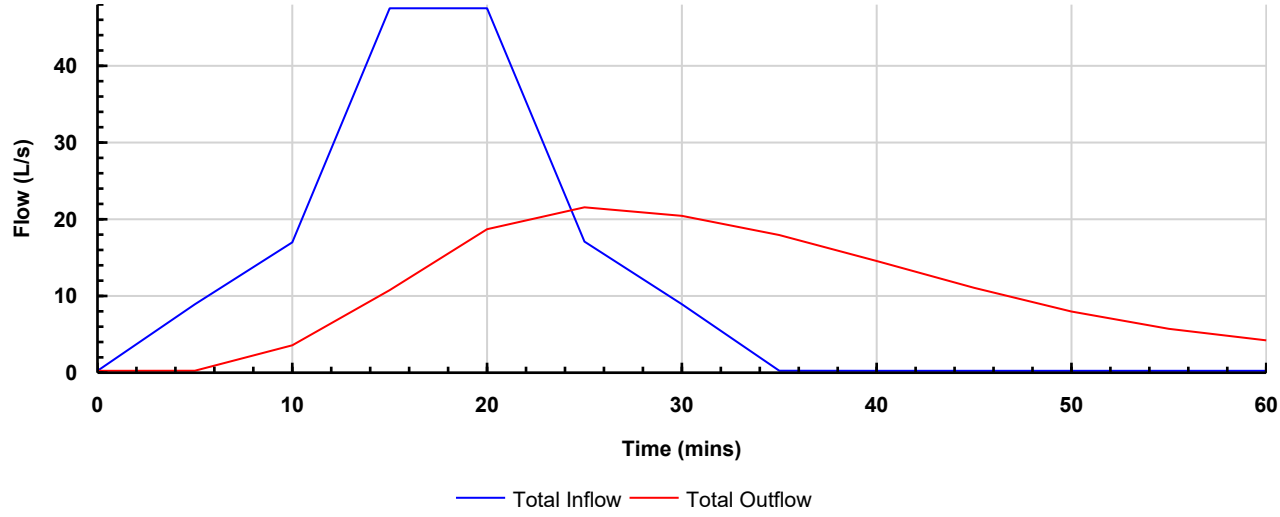
Phase
FSR: 2 years: Increase Rainfall (%): +0: 30 mins: Winter

Tables

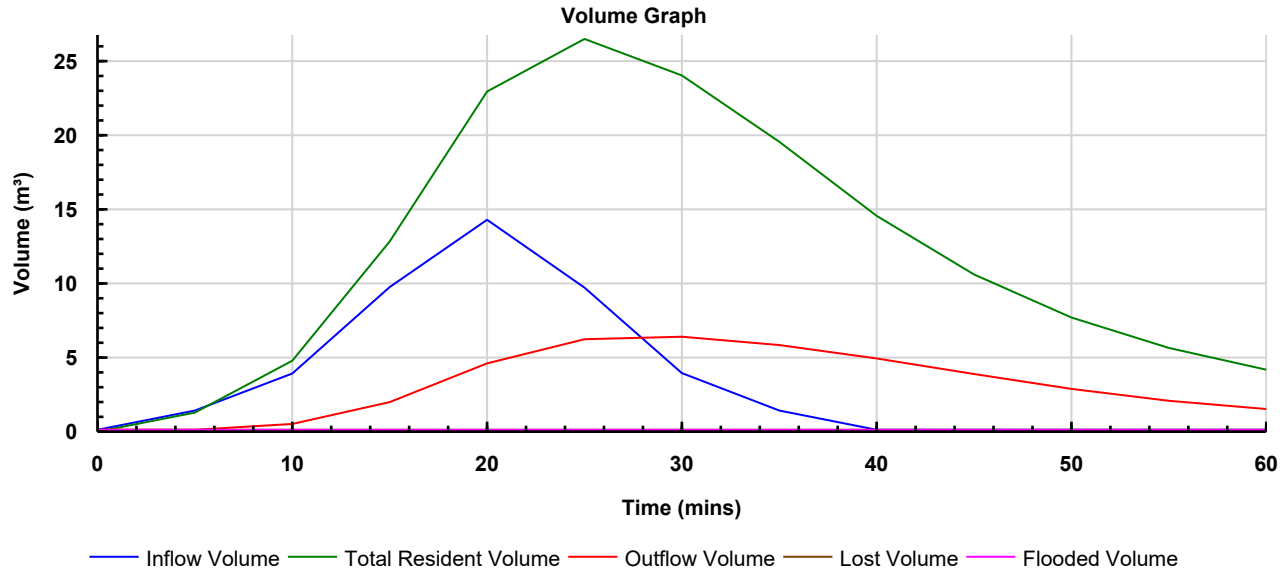
Name	Max. Inflow (L/s)	Total Inflow Volume (m³)	Max. Outflow (L/s)	Total Outflow Volume (m³)
Outfall			21.4	39.737
TOTAL	47.5	43.824	21.4	39.737

Graphs

Flow Graph



Volume Graph





Catchment Area
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Type : Catchment Area

Inflow

Max. Inflow (L/s)	15.6
Total Inflow Volume (m³)	7.189

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	4.2
10	15.6
15	4.2
20	0.0
25	0.0
30	0.0



Catchment Area (1)
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Type : Catchment Area

Inflow

Max. Inflow (L/s)	9.8
Total Inflow Volume (m³)	4.537

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	2.6
10	9.8
15	2.7
20	0.0
25	0.0
30	0.0



Catchment Area (2)
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Type : Catchment Area

Inflow

Max. Inflow (L/s)	15.0
Total Inflow Volume (m³)	6.946

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	4.0
10	15.0
15	4.1
20	0.0
25	0.0
30	0.0



Catchment Area (3)
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Type : Catchment Area

Inflow

Max. Inflow (L/s)	12.5
Total Inflow Volume (m³)	5.754

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	3.3
10	12.5
15	3.4
20	0.0
25	0.0
30	0.0



Catchment Area (4)
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Type : Catchment Area

Inflow

Max. Inflow (L/s)	19.1
Total Inflow Volume (m³)	8.807

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	5.1
10	19.1
15	5.2
20	0.0
25	0.0
30	0.0



MH04

Type : Manhole

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	4.2	0.042	0.047	0.000	3.9
10	15.6	0.085	0.097	0.000	15.1
15	4.2	0.046	0.053	0.000	4.8
20	0.0	0.015	0.017	0.000	0.5
25	0.0	0.003	0.003	0.000	0.0
30	0.0	0.002	0.002	0.000	0.0



MH05

Type : Manhole

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	6.6	0.055	0.062	0.000	5.7
10	24.9	0.112	0.127	0.000	23.6
15	7.5	0.068	0.077	0.000	9.1
20	0.5	0.028	0.032	0.000	1.4
25	0.0	0.008	0.009	0.000	0.1
30	0.0	0.004	0.005	0.000	0.0



MH06 Type : Manhole

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	9.7	0.034	0.038	0.000	9.6
10	38.6	0.061	0.069	0.000	38.1
15	13.2	0.034	0.039	0.000	13.9
20	1.4	0.013	0.015	0.000	1.9
25	0.1	0.004	0.004	0.000	0.1
30	0.0	0.002	0.003	0.000	0.0



MH03

Type : Manhole

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	6.6	0.027	0.031	0.000	6.4
10	28.6	0.053	0.059	0.000	28.0
15	12.0	0.033	0.037	0.000	12.6
20	2.1	0.015	0.017	0.000	2.4
25	0.2	0.005	0.005	0.000	0.2
30	0.1	0.003	0.003	0.000	0.1



Outfall

Type : Manhole

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 30 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.0	0.001	0.000	0.000	0.0
10	3.3	0.022	0.000	0.000	3.3
15	10.5	0.037	0.000	0.000	10.6
20	18.5	0.049	0.000	0.000	18.6
25	21.4	0.053	0.000	0.000	21.4
30	20.3	0.051	0.000	0.000	20.3
35	17.8	0.048	0.000	0.000	17.8
40	14.4	0.043	0.000	0.000	14.4
45	10.9	0.038	0.000	0.000	10.9
50	7.8	0.032	0.000	0.000	7.8
55	5.5	0.027	0.000	0.000	5.5
60	4.0	0.024	0.000	0.000	4.0



FC01 Type : Manhole

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 30 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.1	0.003	0.003	0.000	0.0
10	3.8	0.100	0.113	0.000	3.4
15	11.6	0.199	0.225	0.000	10.6
20	19.1	0.344	0.389	0.000	18.6
25	21.4	0.413	0.467	0.000	21.4
30	20.1	0.384	0.435	0.000	20.3
35	17.5	0.327	0.369	0.000	17.8
40	14.0	0.258	0.292	0.000	14.4
45	10.6	0.202	0.228	0.000	10.9
50	7.5	0.160	0.181	0.000	7.7
55	5.3	0.131	0.148	0.000	5.5
60	3.9	0.109	0.123	0.000	4.0



MH02 Type : Manhole

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	8.0	0.055	0.062	0.000	6.6
10	30.8	0.115	0.130	0.000	28.6
15	9.5	0.072	0.082	0.000	12.0
20	0.6	0.031	0.035	0.000	2.1
25	0.0	0.010	0.011	0.000	0.2
30	0.0	0.006	0.006	0.000	0.1



MH01 Type : Manhole

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	3.3	0.040	0.045	0.000	2.9
10	12.5	0.081	0.091	0.000	11.7
15	3.4	0.048	0.055	0.000	4.3
20	0.0	0.019	0.021	0.000	0.6
25	0.0	0.005	0.006	0.000	0.0
30	0.0	0.003	0.003	0.000	0.0



Catchment Area

Type : Catchment Area

Area (ha)	0.099

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



Catchment Area (1)

Type : Catchment Area

Area (ha)	0.062

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



Catchment Area (2)

Type : Catchment Area

Area (ha)	0.096

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



Catchment Area (3)

Type : Catchment Area

Area (ha)	0.079

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



Catchment Area (4)

Type : Catchment Area

Area (ha)	0.121

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

Upper Brook St: Drainage Calculations 100YR + 45%% CC Gateway 2 Submission	Date: 07/08/0025		
	Designed by: AY	Checked by: JT	Approved By:
Report Details: Type: Junctions Storm Phase: Phase	Roscoe :		

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)
MH04	Manhole	384798.559	396856.203	38.400	0.760	37.640	Circular	1.200
MH05	Manhole	384819.838	396871.072	38.530	1.147	37.383	Circular	1.200
MH06	Manhole	384845.030	396888.662	38.540	1.361	37.179	Circular	1.200
MH03	Manhole	384847.899	396896.040	38.580	1.942	36.638	Circular	1.200
Outfall	Manhole	384853.378	396902.338	38.730	3.230	35.500	Circular	1.200
FC01	Manhole	384853.478	396899.551	38.880	3.154	35.726	Circular	1.200
MH02	Manhole	384820.397	396930.846	38.575	1.491	37.084	Circular	1.200
MH01	Manhole	384779.405	396903.605	38.600	1.190	37.410	Circular	1.200

Name	Lock
MH04	None
MH05	None
MH06	None
MH03	None
Outfall	None
FC01	None
MH02	None
MH01	None

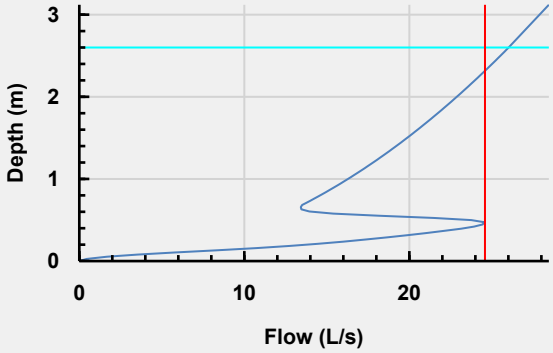
Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
MH04	Inlet	Catchment Area	(None)	No Restriction
MH05	Inlet	04 -> 05	(None)	No Restriction
	Inlet (1)	Catchment Area (1)	(None)	No Restriction
MH06	Inlet	05 -> 06	(None)	No Restriction
	Inlet (1)	Catchment Area (2)	(None)	No Restriction
MH03	Inlet	02 -> 03	(None)	No Restriction
Outfall	Inlet	FC01 -> Outfall	(None)	No Restriction
FC01	Inlet	Tank 1 -> FC01	(None)	No Restriction
MH02	Inlet	01 -> 02	(None)	No Restriction
	Inlet (1)	Catchment Area (4)	(None)	No Restriction
MH01	Inlet	Catchment Area (3)	(None)	No Restriction

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
MH04	Outlet	04 -> 05	Free Discharge
MH05	Outlet	05 -> 06	Free Discharge
MH06	Outlet	06 -> Tank 1	Free Discharge
MH03	Outlet	03 -> Tank 1	Free Discharge
FC01	Outlet	FC01 -> Outfall	Hydro-Brake®

Invert Level (m)	35.726
Design Depth (m)	2.600
Design Flow (L/s)	26.0
Objective	Minimise Upstream Storage Requirements
Application	Surface Water Only
Sump Available	☐
Unit Reference	CHE-0185-2600-2600-2600



MH02	Outlet	02 -> 03	Free Discharge
MH01	Outlet	01 -> 02	Free Discharge



Attenuation tank 1

Type : Tank

Dimensions

Exceedance Level (m)	37.780
Depth (m)	2.000
Base Level (m)	35.780
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:X)	0.00
Total Volume (m³)	130.000

Depth (m)	Area (m²)	Volume (m³)
0.000	65.00	0.000
2.000	65.00	130.000

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	06 -> Tank 1 03 -> Tank 1
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Tank 1 -> FC01
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	13.116

Upper Brook St:	Date:		
Drainage Calculations 100YR + 45%% CC Gateway 2 Submission	07/08/0025		
	Designed by:	Checked by:	Approved By:
	AY	JT	
Report Details: Type: Network Design Criteria Storm Phase: Phase	Roscoe :		

Flow Options

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

Pipe Options

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

Pipe Size Library

Default

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

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

Manhole Options

Apply Offset	☐

Manhole Size Library

Default

Diameter / Width

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

Additional Sizing

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

Depth

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

Access

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

Benching Requirements

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

Outfalls

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

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	☐

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

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
Catchment Area	FSR: 100 years: +45 %: 15 mins: Winter	0.10	55.1	25.446
Catchment Area (1)	FSR: 100 years: +45 %: 15 mins: Winter	0.06	34.7	16.054
Catchment Area (2)	FSR: 100 years: +45 %: 15 mins: Winter	0.10	53.2	24.585
Catchment Area (3)	FSR: 100 years: +45 %: 15 mins: Winter	0.08	44.1	20.360
Catchment Area (4)	FSR: 100 years: +45 %: 15 mins: Winter	0.12	67.5	31.185

Upper Brook St: Drainage Calculations 100YR + 45%% CC Gateway 2 Submission	Date: 07/08/0025 Designed by: AY	Checked by: JT	Approved By:	Roscoe CIVIL & STRUCTURAL ENGINEERS INSPIRING BUILT ENVIRONMENTS
Report Details: Type: Junctions Summary Storm Phase: Phase	Roscoe :			

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
MH04	FSR: 100 years: +45 %: 15 mins: Winter	38.400	37.640	37.911	0.271	55.1	0.306	0.000	50.6	25.450	Surcharged
MH05	FSR: 100 years: +45 %: 60 mins: Winter	38.530	37.383	37.757	0.374	45.9	0.423	0.000	45.9	71.386	Surcharged
MH06	FSR: 100 years: +45 %: 60 mins: Winter	38.540	37.179	37.755	0.576	73.1	0.651	0.000	73.1	113.568	Surcharged
MH03	FSR: 100 years: +45 %: 60 mins: Winter	38.580	36.638	37.754	1.116	55.1	1.262	0.000	54.8	87.069	Surcharged
Outfall	FSR: 100 years: +45 %: 480 mins: Winter	38.730	35.500	35.556	0.056	24.5	0.000	0.000	24.5	355.998	OK
FC01	FSR: 100 years: +45 %: 60 mins: Winter	38.880	35.726	37.748	2.022	25.5	2.287	0.000	24.4	128.725	Surcharged
MH02	FSR: 100 years: +45 %: 60 mins: Winter	38.575	37.084	37.758	0.674	57.0	0.763	0.000	55.1	88.423	Surcharged
MH01	FSR: 100 years: +45 %: 60 mins: Winter	38.600	37.410	37.762	0.352	22.5	0.398	0.000	22.5	34.886	Surcharged

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 1	FSR: 100 years: +45 %: 60 mins: Winter	37.752	37.752	1.972	1.972	126.4	128.206	0.000	0.000	25.5	130.230	1.380	OK

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

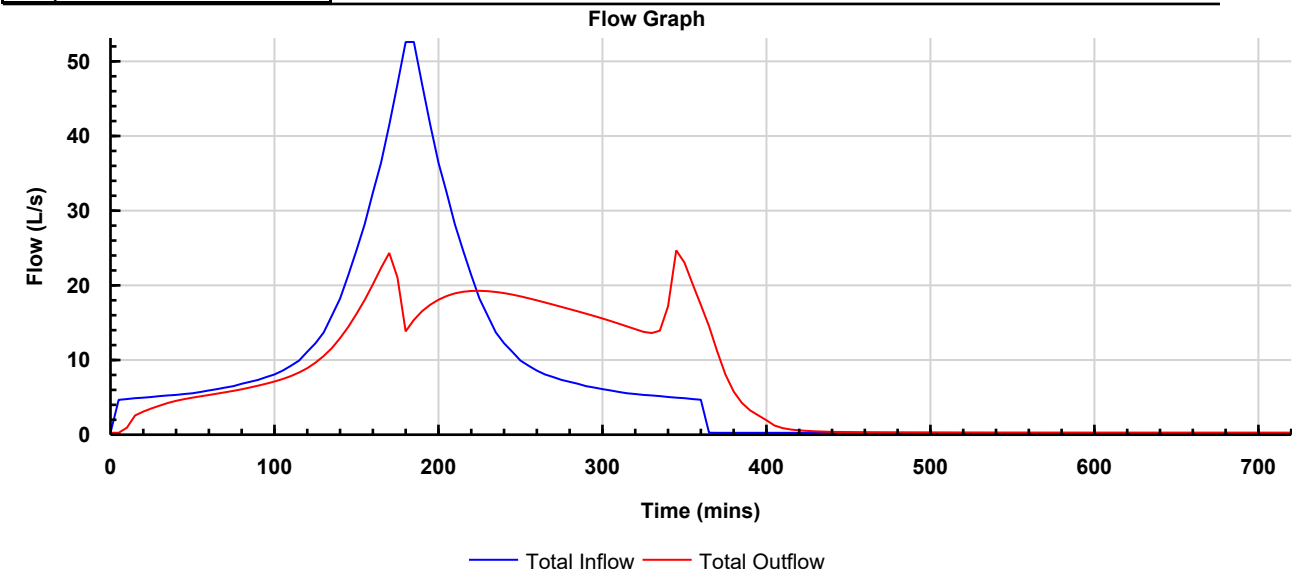
Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
04 -> 05	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	MH04	MH05	38.400	37.911	0.225	25.450	1.3	0.98	50.6	Surcharged
05 -> 06	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	MH05	MH06	38.530	37.616	0.175	41.488	1.9	0.91	82.7	OK
06 -> Tank 1	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	MH06	Attenuation tank 1	38.540	37.295	0.300	66.006	2.4	0.33	135.1	OK
Tank 1 -> FC01	FSR: 100 years: +45 %: 30 mins: Summer	Pipe	Attenuation tank 1	FC01	37.780	37.364	0.300	60.222	0.5	0.23	26.7	Surcharged
FC01 -> Outfall	FSR: 100 years: +45 %: 480 mins: Winter	Pipe	FC01	Outfall	38.880	36.873	0.061	355.998	2.4	0.08	24.5	Surcharged
01 -> 02	FSR: 100 years: +45 %: 15 mins: Summer	Pipe	MH01	MH02	38.600	37.587	0.213	18.183	1.0	0.93	39.1	OK
02 -> 03	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	MH02	MH03	38.575	37.342	0.300	51.172	2.3	0.93	103.2	OK
03 -> Tank 1	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	MH03	Attenuation tank 1	38.580	37.232	0.300	48.651	1.8	0.25	102.3	Surcharged

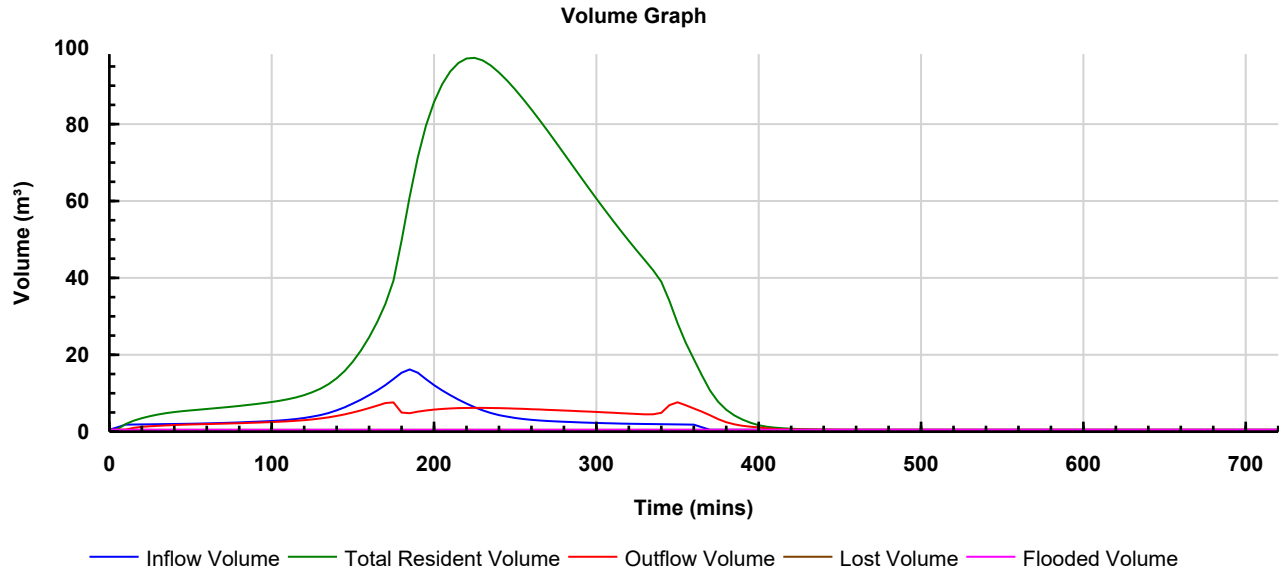
Phase
FSR: 100 years: Increase Rainfall (%): +45: 360 mins: Summer

Tables

Name	Max. Inflow (L/s)	Total Inflow Volume (m³)	Max. Outflow (L/s)	Total Outflow Volume (m³)
Outfall			24.5	296.882
TOTAL	52.6	296.995	24.5	296.882

Graphs







Catchment Area
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Winter

Type : Catchment Area

Inflow

Max. Inflow (L/s)	55.1
Total Inflow Volume (m³)	25.446

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	14.8
10	55.1
15	14.9
20	0.0
25	0.0
30	0.0

Catchment Area (1)
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Winter

Type : Catchment Area

Inflow

Max. Inflow (L/s)	34.7
Total Inflow Volume (m³)	16.054

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	9.3
10	34.7
15	9.4
20	0.0
25	0.0
30	0.0



Catchment Area (2)
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Winter

Type : Catchment Area

Inflow

Max. Inflow (L/s)	53.2
Total Inflow Volume (m³)	24.585

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	14.3
10	53.2
15	14.4
20	0.0
25	0.0
30	0.0



Catchment Area (3)
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Winter

Type : Catchment Area

Inflow

Max. Inflow (L/s)	44.1
Total Inflow Volume (m³)	20.360

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	11.8
10	44.1
15	12.0
20	0.0
25	0.0
30	0.0



Catchment Area (4)
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Winter

Type : Catchment Area

Inflow

Max. Inflow (L/s)	67.5
Total Inflow Volume (m³)	31.185

Tables

Time (mins)	Total Inflow (L/s)
0	0.0
5	18.1
10	67.5
15	18.3
20	0.0
25	0.0
30	0.0



MH04 Type : Manhole

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	14.8	0.083	0.093	0.000	14.1
10	55.1	0.271	0.306	0.000	50.6
15	14.9	0.087	0.099	0.000	16.5
20	0.0	0.023	0.027	0.000	1.2
25	0.0	0.003	0.003	0.000	0.0
30	0.0	0.002	0.002	0.000	0.0



MH05 Type : Manhole

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 60 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	5.2	0.048	0.054	0.000	4.4
10	8.7	0.066	0.074	0.000	8.3
15	10.0	0.072	0.081	0.000	9.9
20	17.1	0.093	0.105	0.000	16.6
25	31.0	0.127	0.144	0.000	30.1
30	45.5	0.158	0.179	0.000	44.7
35	45.9	0.160	0.181	0.000	45.9
40	32.2	0.144	0.163	0.000	26.0
45	17.7	0.302	0.341	0.000	16.9
50	10.0	0.358	0.405	0.000	9.9
55	8.7	0.374	0.423	0.000	8.7
60	5.7	0.362	0.409	0.000	5.9
65	1.1	0.302	0.342	0.000	2.0
70	0.0	0.219	0.248	0.000	1.7
75	0.0	0.140	0.158	0.000	2.0
80	0.0	0.066	0.075	0.000	1.8
85	0.0	0.012	0.013	0.000	0.3
90	0.0	0.005	0.006	0.000	0.0
95	0.0	0.004	0.004	0.000	0.0
100	0.0	0.002	0.003	0.000	0.0
105	0.0	0.002	0.002	0.000	0.0
110	0.0	0.001	0.001	0.000	0.0
115	0.0	0.001	0.001	0.000	0.0
120	0.0	0.001	0.001	0.000	0.0



MH06 Type : Manhole

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 60 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	7.6	0.031	0.035	0.000	7.5
10	13.5	0.037	0.041	0.000	13.4
15	15.9	0.039	0.044	0.000	15.9
20	26.8	0.049	0.055	0.000	26.6
25	48.7	0.065	0.074	0.000	48.3
30	71.9	0.082	0.092	0.000	71.6
35	73.1	0.083	0.093	0.000	73.1
40	44.6	0.323	0.366	0.000	41.0
45	27.2	0.499	0.564	0.000	26.7
50	15.9	0.560	0.633	0.000	15.8
55	13.9	0.576	0.651	0.000	13.8
60	9.1	0.565	0.639	0.000	9.2
65	2.0	0.507	0.573	0.000	2.3
70	1.7	0.422	0.478	0.000	2.2
75	2.0	0.344	0.389	0.000	2.9
80	1.8	0.270	0.306	0.000	3.0
85	0.3	0.197	0.223	0.000	2.0
90	0.0	0.122	0.138	0.000	1.5
95	0.0	0.051	0.057	0.000	1.2
100	0.0	0.003	0.003	0.000	0.0
105	0.0	0.002	0.002	0.000	0.0
110	0.0	0.002	0.002	0.000	0.0
115	0.0	0.001	0.001	0.000	0.0
120	0.0	0.001	0.001	0.000	0.0



MH03 Type : Manhole

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 60 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	5.1	0.024	0.027	0.000	4.8
10	10.2	0.032	0.036	0.000	10.0
15	12.2	0.034	0.038	0.000	12.2
20	20.3	0.042	0.047	0.000	20.1
25	36.9	0.056	0.064	0.000	36.5
30	55.1	0.071	0.080	0.000	54.8
35	54.5	0.510	0.577	0.000	52.3
40	35.3	0.855	0.967	0.000	34.4
45	21.0	1.035	1.170	0.000	20.5
50	12.5	1.099	1.243	0.000	12.4
55	10.9	1.116	1.262	0.000	10.9
60	7.0	1.105	1.250	0.000	7.1
65	0.8	1.048	1.185	0.000	1.1
70	1.3	0.963	1.089	0.000	1.6
75	1.4	0.885	1.001	0.000	1.7
80	1.9	0.811	0.917	0.000	2.2
85	1.5	0.738	0.835	0.000	1.8
90	1.9	0.663	0.750	0.000	2.2
95	2.3	0.592	0.669	0.000	2.7
100	2.3	0.520	0.588	0.000	2.8
105	0.5	0.447	0.505	0.000	1.5
110	0.1	0.370	0.418	0.000	1.2
115	0.0	0.296	0.334	0.000	1.3
120	0.0	0.225	0.255	0.000	1.8



Outfall Type : Manhole

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 480 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.0	0.000	0.000	0.000	0.0
10	0.0	0.000	0.000	0.000	0.0
15	0.1	0.003	0.000	0.000	0.1
20	0.9	0.011	0.000	0.000	0.9
25	2.1	0.017	0.000	0.000	2.1
30	2.6	0.019	0.000	0.000	2.6
35	3.0	0.021	0.000	0.000	3.0
40	3.5	0.022	0.000	0.000	3.5
45	3.9	0.023	0.000	0.000	3.9
50	4.3	0.024	0.000	0.000	4.3
55	4.7	0.025	0.000	0.000	4.7
60	4.9	0.026	0.000	0.000	4.9
65	5.1	0.026	0.000	0.000	5.1
70	5.2	0.026	0.000	0.000	5.2
75	5.3	0.027	0.000	0.000	5.3
80	5.3	0.027	0.000	0.000	5.3
85	5.4	0.027	0.000	0.000	5.4
90	5.4	0.027	0.000	0.000	5.4
95	5.5	0.027	0.000	0.000	5.5
100	5.6	0.027	0.000	0.000	5.6
105	5.7	0.028	0.000	0.000	5.7
110	5.9	0.028	0.000	0.000	5.9
115	6.1	0.029	0.000	0.000	6.1
120	6.4	0.029	0.000	0.000	6.4
125	6.8	0.030	0.000	0.000	6.8
130	7.2	0.031	0.000	0.000	7.2
135	7.7	0.032	0.000	0.000	7.7
140	8.3	0.033	0.000	0.000	8.3
145	8.9	0.034	0.000	0.000	8.9
150	9.6	0.036	0.000	0.000	9.6
155	10.4	0.037	0.000	0.000	10.4
160	11.2	0.038	0.000	0.000	11.2
165	12.1	0.040	0.000	0.000	12.1
170	13.0	0.041	0.000	0.000	13.0
175	13.9	0.043	0.000	0.000	13.9
180	14.8	0.044	0.000	0.000	14.8
185	15.8	0.045	0.000	0.000	15.8
190	16.7	0.047	0.000	0.000	16.7
195	17.7	0.048	0.000	0.000	17.7
200	18.7	0.049	0.000	0.000	18.7
205	19.7	0.050	0.000	0.000	19.7
210	20.7	0.052	0.000	0.000	20.7
215	21.7	0.053	0.000	0.000	21.7
220	22.6	0.054	0.000	0.000	22.6
225	23.5	0.055	0.000	0.000	23.5
230	24.1	0.056	0.000	0.000	24.1
235	24.5	0.056	0.000	0.000	24.5

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
240	24.1	0.056	0.000	0.000	24.1
245	20.5	0.051	0.000	0.000	20.5
250	13.7	0.042	0.000	0.000	13.7
255	13.6	0.042	0.000	0.000	13.6
260	14.2	0.043	0.000	0.000	14.2
265	14.8	0.044	0.000	0.000	14.8
270	15.3	0.045	0.000	0.000	15.3
275	15.7	0.045	0.000	0.000	15.7
280	16.1	0.046	0.000	0.000	16.1
285	16.3	0.046	0.000	0.000	16.3
290	16.6	0.046	0.000	0.000	16.6
295	16.7	0.047	0.000	0.000	16.7
300	16.9	0.047	0.000	0.000	16.9
305	16.9	0.047	0.000	0.000	16.9
310	17.0	0.047	0.000	0.000	17.0
315	17.0	0.047	0.000	0.000	17.0
320	17.0	0.047	0.000	0.000	17.0
325	16.9	0.047	0.000	0.000	16.9
330	16.8	0.047	0.000	0.000	16.8
335	16.7	0.047	0.000	0.000	16.7
340	16.5	0.046	0.000	0.000	16.5
345	16.4	0.046	0.000	0.000	16.4
350	16.2	0.046	0.000	0.000	16.2
355	15.9	0.045	0.000	0.000	15.9
360	15.7	0.045	0.000	0.000	15.7
365	15.4	0.045	0.000	0.000	15.4
370	15.1	0.044	0.000	0.000	15.1
375	14.8	0.044	0.000	0.000	14.8
380	14.5	0.043	0.000	0.000	14.5
385	14.2	0.043	0.000	0.000	14.2
390	13.8	0.042	0.000	0.000	13.8
395	13.5	0.042	0.000	0.000	13.5
400	13.4	0.042	0.000	0.000	13.4
405	13.8	0.042	0.000	0.000	13.8
410	17.4	0.048	0.000	0.000	17.4
415	24.5	0.056	0.000	0.000	24.5
420	23.0	0.054	0.000	0.000	23.0
425	20.3	0.051	0.000	0.000	20.2
430	17.6	0.048	0.000	0.000	17.6
435	15.2	0.044	0.000	0.000	15.2
440	13.0	0.041	0.000	0.000	13.0
445	11.0	0.038	0.000	0.000	11.0
450	9.4	0.035	0.000	0.000	9.4
455	8.1	0.033	0.000	0.000	8.1
460	7.0	0.030	0.000	0.000	7.0
465	6.1	0.028	0.000	0.000	6.1
470	5.3	0.027	0.000	0.000	5.3
475	4.5	0.025	0.000	0.000	4.5
480	3.7	0.023	0.000	0.000	3.7
485	2.9	0.020	0.000	0.000	2.9
490	2.3	0.018	0.000	0.000	2.3
495	1.7	0.016	0.000	0.000	1.7
500	1.0	0.012	0.000	0.000	1.0
505	0.6	0.010	0.000	0.000	0.6
510	0.4	0.008	0.000	0.000	0.4

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
515	0.3	0.007	0.000	0.000	0.3
520	0.3	0.007	0.000	0.000	0.3
525	0.2	0.006	0.000	0.000	0.2
530	0.2	0.005	0.000	0.000	0.2
535	0.1	0.005	0.000	0.000	0.1
540	0.1	0.004	0.000	0.000	0.1
545	0.1	0.004	0.000	0.000	0.1
550	0.1	0.004	0.000	0.000	0.1
555	0.1	0.004	0.000	0.000	0.1
560	0.1	0.004	0.000	0.000	0.1
565	0.1	0.004	0.000	0.000	0.1
570	0.1	0.003	0.000	0.000	0.1
575	0.1	0.003	0.000	0.000	0.1
580	0.1	0.003	0.000	0.000	0.1
585	0.1	0.003	0.000	0.000	0.1
590	0.0	0.003	0.000	0.000	0.0
595	0.0	0.003	0.000	0.000	0.0
600	0.0	0.003	0.000	0.000	0.0
605	0.0	0.003	0.000	0.000	0.0
610	0.0	0.003	0.000	0.000	0.0
615	0.0	0.002	0.000	0.000	0.0
620	0.0	0.002	0.000	0.000	0.0
625	0.0	0.002	0.000	0.000	0.0
630	0.0	0.002	0.000	0.000	0.0
635	0.0	0.002	0.000	0.000	0.0
640	0.0	0.002	0.000	0.000	0.0
645	0.0	0.002	0.000	0.000	0.0
650	0.0	0.002	0.000	0.000	0.0
655	0.0	0.002	0.000	0.000	0.0
660	0.0	0.002	0.000	0.000	0.0
665	0.0	0.002	0.000	0.000	0.0
670	0.0	0.002	0.000	0.000	0.0
675	0.0	0.002	0.000	0.000	0.0
680	0.0	0.002	0.000	0.000	0.0
685	0.0	0.001	0.000	0.000	0.0
690	0.0	0.001	0.000	0.000	0.0
695	0.0	0.001	0.000	0.000	0.0
700	0.0	0.001	0.000	0.000	0.0
705	0.0	0.001	0.000	0.000	0.0
710	0.0	0.001	0.000	0.000	0.0
715	0.0	0.001	0.000	0.000	0.0
720	0.0	0.001	0.000	0.000	0.0
725	0.0	0.001	0.000	0.000	0.0
730	0.0	0.001	0.000	0.000	0.0
735	0.0	0.001	0.000	0.000	0.0
740	0.0	0.001	0.000	0.000	0.0
745	0.0	0.001	0.000	0.000	0.0
750	0.0	0.001	0.000	0.000	0.0
755	0.0	0.001	0.000	0.000	0.0
760	0.0	0.001	0.000	0.000	0.0
765	0.0	0.001	0.000	0.000	0.0
770	0.0	0.001	0.000	0.000	0.0
775	0.0	0.001	0.000	0.000	0.0
780	0.0	0.001	0.000	0.000	0.0
785	0.0	0.001	0.000	0.000	0.0

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
790	0.0	0.001	0.000	0.000	0.0
795	0.0	0.001	0.000	0.000	0.0
800	0.0	0.001	0.000	0.000	0.0
805	0.0	0.001	0.000	0.000	0.0
810	0.0	0.001	0.000	0.000	0.0
815	0.0	0.001	0.000	0.000	0.0
820	0.0	0.001	0.000	0.000	0.0
825	0.0	0.001	0.000	0.000	0.0
830	0.0	0.001	0.000	0.000	0.0
835	0.0	0.001	0.000	0.000	0.0
840	0.0	0.001	0.000	0.000	0.0
845	0.0	0.001	0.000	0.000	0.0
850	0.0	0.001	0.000	0.000	0.0
855	0.0	0.001	0.000	0.000	0.0
860	0.0	0.001	0.000	0.000	0.0
865	0.0	0.001	0.000	0.000	0.0
870	0.0	0.001	0.000	0.000	0.0
875	0.0	0.001	0.000	0.000	0.0
880	0.0	0.001	0.000	0.000	0.0
885	0.0	0.001	0.000	0.000	0.0
890	0.0	0.001	0.000	0.000	0.0
895	0.0	0.001	0.000	0.000	0.0
900	0.0	0.001	0.000	0.000	0.0
905	0.0	0.001	0.000	0.000	0.0
910	0.0	0.001	0.000	0.000	0.0
915	0.0	0.001	0.000	0.000	0.0
920	0.0	0.001	0.000	0.000	0.0
925	0.0	0.001	0.000	0.000	0.0
930	0.0	0.001	0.000	0.000	0.0
935	0.0	0.001	0.000	0.000	0.0
940	0.0	0.001	0.000	0.000	0.0
945	0.0	0.001	0.000	0.000	0.0
950	0.0	0.001	0.000	0.000	0.0
955	0.0	0.001	0.000	0.000	0.0
960	0.0	0.001	0.000	0.000	0.0



FC01 Type : Manhole

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 60 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.7	0.014	0.016	0.000	0.2
10	6.3	0.135	0.152	0.000	5.8
15	12.1	0.214	0.242	0.000	11.6
20	17.8	0.314	0.355	0.000	17.2
25	25.5	0.511	0.578	0.000	24.4
30	17.1	0.916	1.035	0.000	15.2
35	20.6	1.393	1.576	0.000	18.8
40	22.0	1.751	1.981	0.000	21.1
45	22.6	1.939	2.193	0.000	22.2
50	22.6	2.006	2.268	0.000	22.5
55	22.7	2.022	2.287	0.000	22.6
60	22.5	2.013	2.277	0.000	22.6
65	21.9	1.956	2.212	0.000	22.3
70	21.5	1.871	2.116	0.000	21.8
75	21.0	1.793	2.028	0.000	21.3
80	20.6	1.719	1.945	0.000	20.9
85	20.1	1.646	1.862	0.000	20.4
90	19.7	1.572	1.778	0.000	19.9
95	19.2	1.500	1.697	0.000	19.5
100	18.7	1.429	1.616	0.000	19.0
105	18.2	1.356	1.533	0.000	18.5
110	17.7	1.279	1.447	0.000	18.0
115	17.2	1.205	1.363	0.000	17.4
120	16.6	1.135	1.283	0.000	16.9



MH02 Type : Manhole

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 60 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	6.3	0.048	0.054	0.000	5.1
10	10.7	0.067	0.076	0.000	10.2
15	12.4	0.074	0.084	0.000	12.2
20	21.2	0.096	0.109	0.000	20.3
25	38.4	0.132	0.150	0.000	36.9
30	56.5	0.166	0.188	0.000	55.1
35	57.0	0.155	0.175	0.000	54.5
40	36.4	0.458	0.518	0.000	35.3
45	21.3	0.604	0.683	0.000	21.0
50	12.5	0.658	0.744	0.000	12.5
55	10.9	0.674	0.763	0.000	10.9
60	6.9	0.661	0.748	0.000	7.0
65	0.4	0.601	0.679	0.000	0.8
70	0.9	0.518	0.586	0.000	1.3
75	1.0	0.439	0.496	0.000	1.4
80	1.2	0.366	0.414	0.000	1.9
85	0.1	0.292	0.330	0.000	1.5
90	0.0	0.217	0.246	0.000	1.9
95	0.0	0.146	0.165	0.000	2.3
100	0.0	0.074	0.083	0.000	2.3
105	0.0	0.014	0.016	0.000	0.5
110	0.0	0.007	0.007	0.000	0.1
115	0.0	0.005	0.006	0.000	0.0
120	0.0	0.004	0.005	0.000	0.0



MH01 Type : Manhole

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 60 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	2.6	0.035	0.040	0.000	2.3
10	4.3	0.047	0.054	0.000	4.1
15	4.9	0.051	0.058	0.000	4.9
20	8.5	0.067	0.076	0.000	8.2
25	15.4	0.092	0.104	0.000	14.9
30	22.5	0.115	0.130	0.000	22.0
35	22.5	0.117	0.133	0.000	22.5
40	15.4	0.163	0.185	0.000	12.8
45	8.5	0.290	0.327	0.000	8.3
50	5.0	0.336	0.380	0.000	4.9
55	4.3	0.352	0.398	0.000	4.3
60	2.7	0.336	0.380	0.000	2.8
65	0.0	0.274	0.310	0.000	0.4
70	0.0	0.193	0.218	0.000	0.9
75	0.0	0.113	0.128	0.000	1.0
80	0.0	0.041	0.046	0.000	1.2
85	0.0	0.008	0.009	0.000	0.1
90	0.0	0.006	0.006	0.000	0.0
95	0.0	0.004	0.005	0.000	0.0
100	0.0	0.004	0.004	0.000	0.0
105	0.0	0.003	0.003	0.000	0.0
110	0.0	0.002	0.003	0.000	0.0
115	0.0	0.002	0.002	0.000	0.0
120	0.0	0.001	0.002	0.000	0.0

Appendix D. Sci-Tech Catchment Plan

NORTH

KINCARDINE ROAD

KINCARDINE ROAD

WHITEKIRK CLOSE

CABOT STREET

COTTENHAM STREET

UPPER BROOK STREET

UPPER BROOK STREET

Attenuation Tank 2 - Cover Slab
CL: 38.600
Top of Tank IL: 37.350
Bottom of Tank IL: 36.098
Indicatively shown at 1.2m depth x 8m width x 25.5m length to provide a storage volume of 230m³

HYDRO-BRAKE MANHOLE
DISCHARGE RATE: 5.0 l/s
SWMH57
CL:38.657
IL:36.085

EX CWMH 9805
CL 38.53
IL 32.81

BD IL
35.285

ATT TANK 02
AREA 2
Area 0.051ha

ATT TANK 02
AREA 1
Area 0.045ha

SWMH59
Area 0.069ha

SWMH55
Area 0.02ha

SWMH53
Area 0.02ha

SWMH64 Area
0.068ha

SWMH53
Area 0.59ha

SWMH51
Area 0.042ha

SWMH52 Area
0.038ha

SWMH54
0.024ha

SWMH58 Area
0.063ha

Cycle Entrance

Delivery / Waste

Fire Exit

Secondary Entrance

Business Lounge

PBSA Building

S2.003 Ø300mm
L=6.1m @ 1.81

S1.002 Ø225mm
L=19.4m @ 1:150

S1.003 Ø300mm
L=83.4m @ 1:150

S1.004 Ø150mm
L=3.2m @ 1:10

S1.005 Ø300mm
L=6.0m @ 1.86

S1.006 Ø300mm
L=106m @ 1:100

S1.007 Ø225mm
L=19.6m @ 1:60

S1.008 Ø150mm
L=3.2m @ 1:10

S2.000 Ø225mm
L=36.6m @ 1:40

S1.001 Ø225mm
L=31.2m @ 1:150

S1.000 Ø225mm
L=25.6m @ 1:60

IL 38.150

IL 38.159

IL 38.190

IL 38.160

IL 38.170

IL 38.180

IL 38.150

IL 36.098

Rev	Description	Date
P01	FIRST ISSUE	07/08/25

Drawing Status: STAGE 4 ISSUE
Suitability: S3

240 BLACKFRIARS ROAD
LONDON.
SE1 8NW
UNITED KINGDOM

t: +44 (0) 20 7429 3333
e: info@hdrinc.com
w: www.hdrinc.com

Client: KADANS SCIENCE PARTNER

Architect: SHEPPARD ROBSON

Project: UPPER BROOK STREET MANCHESTER

Title: CATCHMENT AREA PLAN

HDR Project Number: 10369928

Cad File Name: UBS-HDR-BB-XX-DR-C-102110

Drawn:	Chkd/Appd:	Date:	Scale @ A1:
MFP	SA	07.08.25	1:250

Drawing Number: UBS-HDR-BB-XX-DR-C-102110
Revision: P01

File: \\LHRP--FS01\WEWORKMA\7600661\10369928\6.0_CAD_BIM\6.2_WIP\6.2.2_CAD\CIVIL\UBS--HDR-BB-XX-DR-C-102110.DWG
User: Ferry-Patel, Meera Sheet: 102300 Plot Date: 07/08/2025 18:42:05

Appendix E. PSBA Catchment Plan

DO NOT SCALE



REV	DATE	BY	DESCRIPTION	CHK	APP
P01	07.08.25	AY	FOR INFORMATION	JT	JC

DRAWING STATUS:
FOR INFORMATION

Roscoe
CIVIL & STRUCTURAL ENGINEERS
INSPIRING BUILT ENVIRONMENTS

CLIENT:
McLAREN PROPERTY

ARCHITECT:
SHEPPARD ROBSON

PROJECT:
UPPER BROOK STREET
MANCHESTER

TITLE:
CATCHMENT PLAN
GENERAL LAYOUT

SCALE @ A0	CHECKED	APPROVED
1:200	JT	JC

PROJECT NUMBER	DESIGNED	DRAWN	DATE
24359	AY	AY	JULY 2024

DRAWING No:	REV:
MAUBS-ROS-ZZ-00-DR-CV-01000	P01

Appendix F. Existing Impermeable Areas

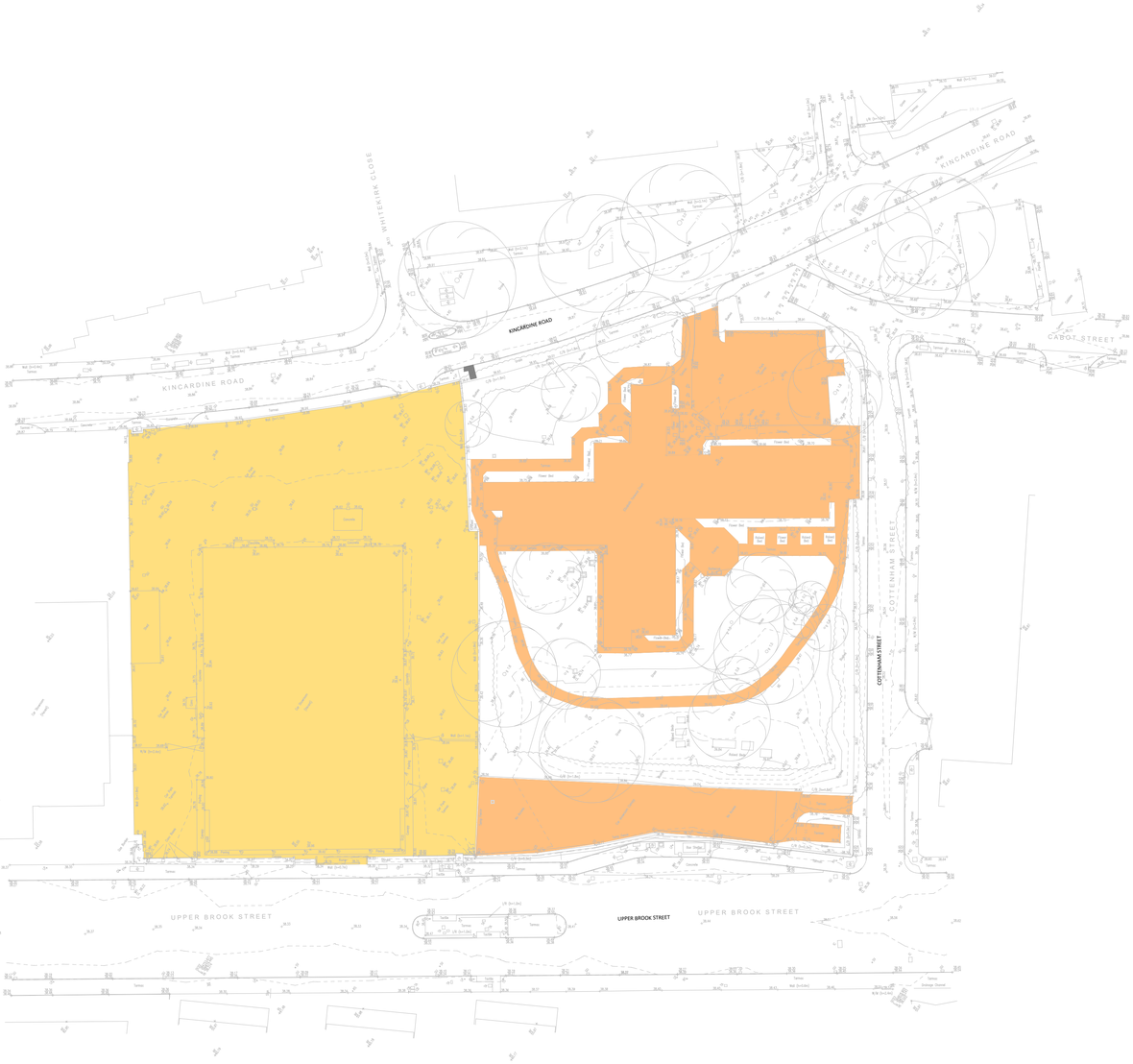
NOTES:

1. DO NOT SCALE FROM THIS DRAWING, WORK TO DIMENSIONS OR CO-ORDINATES PROVIDED.
2. THIS DRAWING IS BASED ON:
   - TOPOGRAPHICAL SURVEY: 'ND OLIVER&CO' DWG 11766/001A/1 REV A.

LEGEND

EXISTING PSBA CATCHMENT AREA=4437m^2

EXISTING SCI-TECH CATCHMENT AREA=2712m^2



Rev	Description	Date
P02	UPDATED TO LATEST LAYOUT	07.08.25
P01	ISSUED TO DISCHARGE PLANNING CONDITIONS	03.04.24

Drawing Status: FOR PLANNING PURPOSES

Suitability: S2

240 BLACKFRIARS ROAD
LONDON.
SE1 8NW
UNITED KINGDOM

t: +44 (0) 20 7429 3333
e: info@hdrinc.com
w: www.hdrinc.com

Client: KADANS SCIENCE PARTNER

Architect: SHEPPARD ROBSON

Project: UPPER BROOK STREET MANCHESTER

Title: IMPERMEABLE AREAS PLAN

HDR Project Number: 10369928

Cad File Name: UBS-HDR-BB-XX-DR-C-102000

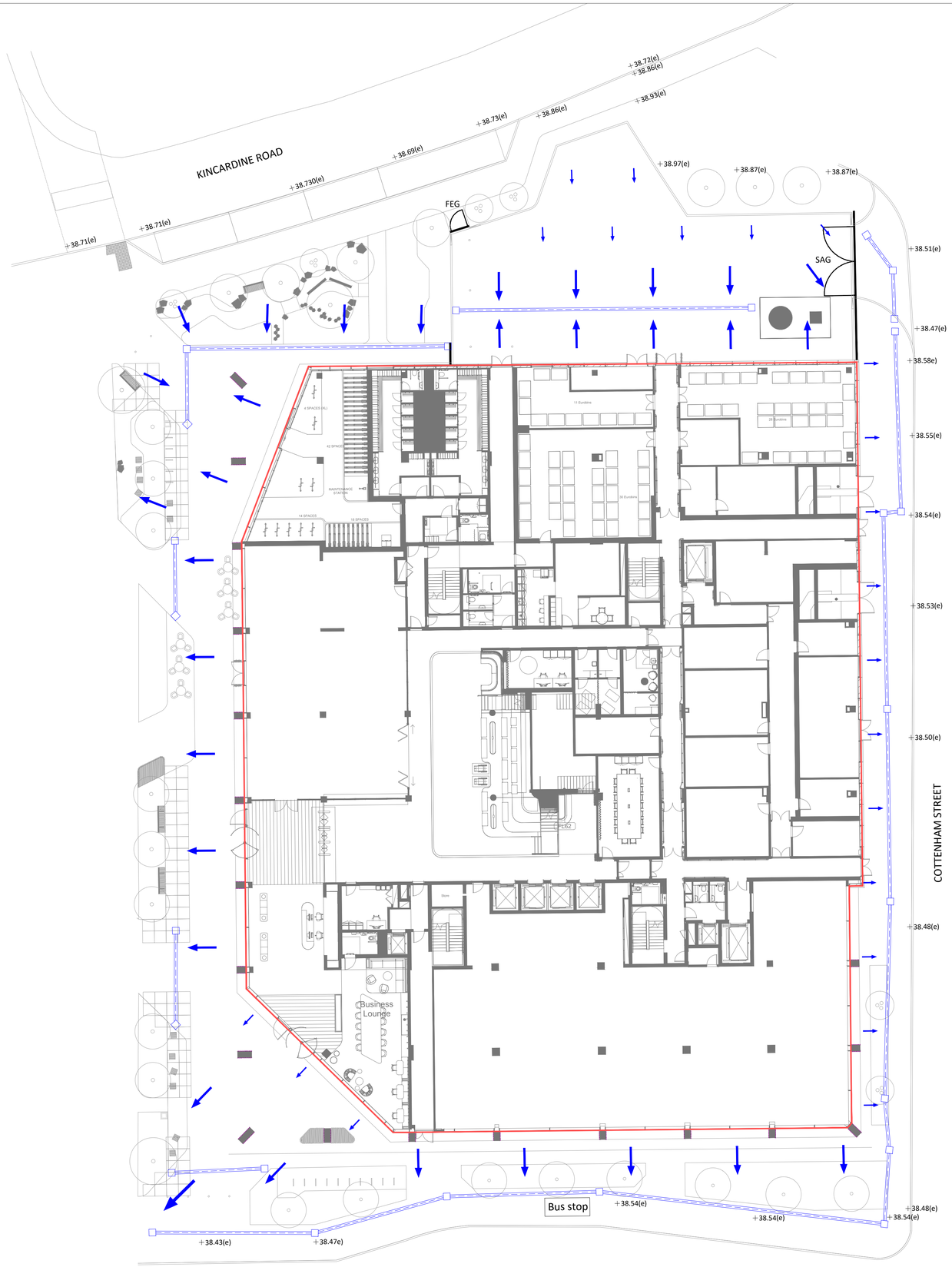
Drawn:	Chkd/Appd:	Date:	Scale @ A1:
BS	SM	03.04.24	1:500

Drawing Number: UBS-HDR-BB-XX-DR-C-102000

Revision: P02

File: \\UHRPI-FS01\NEWINFORMA\760066\10369928\6.0_CAD_BIM\6.2_MEP\6.2.2_CAD\CIVIL\UBS-HDR-BB-XX-DR-C-102000.DWG User: Ferry-Patel, Meera Sheet: 102000 Plot Date: 21/08/2025 12:26:16

Appendix G. Sci-Tech Flow Exceedance



NOTES:

1. DO NOT SCALE FROM THIS DRAWING, WORK TO DIMENSIONS OR CO-ORDINATES PROVIDED.
2. THIS DRAWING IS BASED ON:
   - LANDSCAPE LAYOUT: 'RE-FORM LANDSCAPE ARCHITECTURE' DWG NO.: 0000-RFM-XX-00-DR-L-0101-P06.

LEGEND

- PROPERTY BOUNDARY
- EXCEEDANCE FLOW ARROW
- DRAINAGE CHANNEL

Rev	Description	Date
P02	UPDATED TO LATEST LAYOUT	07.08.25
P01	ISSUED TO DISCHARGE PLANNING CONDITIONS	03.04.24

Drawing Status: FOR PLANNING PURPOSES
Suitability: S2

240 BLACKFRIARS ROAD
LONDON.
SE1 8NW
UNITED KINGDOM

t: +44 (0) 20 7429 3333
e: info@hdrinc.com
w: www.hdrinc.com

Client: KADANS SCIENCE PARTNER

Architect: SHEPPARD ROBSON

Project: UPPER BROOK STREET MANCHESTER

Title: FLOW EXCEEDANCE PLAN

HDR Project Number: 10369928
Cad File Name: UBS-HDR-BB-XX-DR-C-102001

Drawn:	Chkd/Appd:	Date:	Scale @ A1:
BS	SM	03.04.24	1:200

Drawing Number: UBS-HDR-BB-XX-DR-C-102001
Revision: P02

File: \\UKRDF-FS01\NEWFORMA\760056\10369928\6.0_CAD_BIM\6.2_WIP\6.2.2_CAD\CIVIL\UBS-HDR-BB-XX-DR-C-102001.DWG
User: Ferry-Patel, Meera Sheet: 102001 Plot Date: 07/08/2025 18:39:43

Appendix H. PSBA Flow Exceedance



DO NOT SCALE

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEER'S DRAWINGS AND SPECIFICATIONS.
2. EXISTING LEVELS BASED UPON LAYER SURVEYS TOPOGRAPHICAL SURVEY '1556', DATED JAN 2023.
3. TO BE READ IN CONJUNCTION WITH ROSCOE DRAWING 'MAUBS-ROS-ZZ-XX-DR-CV-09000'.

DRAINAGE LEGEND:

- PROPOSED WATER FLOW ROUTE
- EXISTING WATER FLOW ROUTE
- ?? ??? PROPOSED GROUND LEVEL
- ?? ??? EXISTING GROUND LEVEL

REV	DATE	BY	DESCRIPTION	CHK	APP
P01	07.08.25	AY	FOR INFORMATION	JT	JC

DRAWING STATUS: FOR INFORMATION

Roscoe
CIVIL & STRUCTURAL ENGINEERS
INSPIRING BUILT ENVIRONMENTS

CLIENT: McLAREN PROPERTY

ARCHITECT: SHEPPARD ROBSON

PROJECT: UPPER BROOK STREET MANCHESTER

TITLE: FLOW EXCEEDANCE GENERAL LAYOUT

SCALE @ A0	CHECKED	APPROVED
1:200	JT	JC

PROJECT NUMBER	DESIGNED	DRAWN	DATE
24359	AY	AY	JULY 2024

DRAWING No: MAUBS-ROS-ZZ-00-DR-CV-09300 REV: P01

Appendix I. United Utilities Correspondence

Marks, Simon

From: Gillanders, Gregor
Sent: 14 March 2024 15:25
To: Gillanders, Gregor
Subject: FW: Pre Development Enquiry for: Elizabeth Yarwood Court M13 9SY UU Reference Number : 04091995

Gregor Gillanders, BEng, MSc
Associate Director

HDR
240 Blackfriars Road
London, SE1 8NW
[redacted]

hdrinc.com/follow-us

From: wastewaterdeveloperservices@uuplc.co.uk <wastewaterdeveloperservices@uuplc.co.uk>
Sent: Thursday, June 8, 2023 4:09 PM
Subject: Pre Development Enquiry for: Elizabeth Yarwood Court M13 9SY UU Reference Number : 04091995

Good afternoon Tom,
Pre Development Enquiry for: Elizabeth Yarwood Court M13 9SY UU Reference Number : 04091995
We have carried out an assessment of your application which is based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your drainage strategy will need to be reviewed by other competent authorities as part of the planning process, and we advise that you carry out the necessary site investigations to confirm the viability of your proposals.
If your investigations require access to our public sewer network, we ask that you contact our network engineers with a request for an access certificate via our main contact telephone number 0345 6723 723 or refer to the link below:
https://www.unitedutilities.com/builders-developers/working-near-our-assets/

Foul Water
Foul flow from this site will be allowed to drain into the public foul water/combined sewer system.
United Utilities would not object to the proposed foul connection to the 590 x 730mm diameter public combined sewer within Cottenham Street located to the South of your proposed development at an unrestricted rate.
In accordance with our infrastructure plans we may ask you to change your point of connection. Therefore please contact us when you are ready to formalise your drainage proposals, we would suggest before you submit for Full Planning.

Surface Water
All surface water flow from the proposed development should drain in-line with the drainage hierarchy, as outlined in Paragraph 80, (Reference ID: 7-080-20150323), of the National Planning Practice Guidance. We also recommend you prioritise the use of multi-functional sustainable drainage systems for the management of surface water in accordance with national planning policy.
Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable.
This is outlined as follows, in order of priority:

1. **into the ground (infiltration);**

2. **to a surface waterbody;**
3. **to a surface water sewer or highway drain;**
4. **to a combined sewer.**

For guidance, The **North West SuDS Pro-Forma** provides information on the appropriate evidence required at each stage of the hierarchy, to demonstrate how each level has been discounted.
The Lead Local Flood Authority has responsibility for all surface water drainage concerns and their input to your proposal is critical. You should also consider whether it is necessary to discuss your proposal with the Environment Agency, or Internal Drainage Board (if operating in your area).
The Local Planning Authority are the determining authority for any application for planning permission and the appropriate authority for determining cost viability of a proposed drainage scheme, such assessments are outside of the jurisdiction of United Utilities.

Infiltration
Surface water runoff generated from this development should discharge to the ground via infiltration system where feasible.
A detailed evidence based feasibility assessment must be carried out in line with Chapter 25 of the CIRIA SuDS Manual 2015 to determine whether infiltration is a suitable method of surface water disposal.
Particular attention must be paid to Ground Water Source Protection Zones to ensure that the risk of pollution to these valuable resources is not compromised. Details can be obtained from the government website:
https://www.gov.uk/guidance/groundwater-source-protection-zones-spzs#find-groundwater-spzs
If your site is in a Groundwater Source Protection Zone, you should have regard to the Environment Agency's approach to Groundwater Protection. Information on this is available via the link below:
https://www.gov.uk/government/publications/groundwater-protection-position-statements
Please note that such a location could have implications for the principle of your development and the need for additional mitigating measures to protect the groundwater environment and public water supply in the detailed design of your site.

Highway Drainage
If an evidence based assessment has been carried out and confirms that infiltration is not feasible, we recommend that you investigate the possibility of draining surface water to the highway drain where this ultimately discharges to a watercourse, by contacting the relevant Highway Authority.
We note there is a highway drain located in the West of the proposed development, we would request that surface water discharge to here is investigated with the highways authority.

Public Sewer
In accordance with the hierarchy of drainage options within the National Planning Practice Guidance, both discharge to ground via infiltration and discharge to a waterbody should be discounted prior to consideration of discharging surface water to the public sewer system. Evidence should be provided to demonstrate how these have been discounted, as outlined in the North West SuDS pro-forma.
Once evidence is provided as outlined above, United Utilities will consider the proposed connection to the 590 x 730mm diameter public combined sewer within Cottenham Street located South of the proposed site at a pass forward flow to be agreed by the Lead Local Flood Authority. United Utilities request that any agreed rate does not exceed 5l/s, I note the proposed drainage strategy states 2.5 l/s however United Utilities would not request lower than 5 l/s however would not object to this proposal.
As a Water Company, we have no obligation to accept highway drainage into our public sewer network. However, should your proposals include runoff from highways, we would request that consideration is given to SuDS components that deliver source control are incorporated within the design of the scheme to reduce the volume and frequency of discharges of these flows to the public sewer.

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

your drainage scheme.

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

Existing Wastewater Assets Crossing the Site
We have reviewed our records and can confirm that there does not appear to be any charted public sewers located within the boundary of proposed development. However, due to the accuracy of the records and the public sewer transfer legislation in 2011, not all public sewers are shown on our records so we would ask that you proceed with caution and carry out your own site investigation works. If any uncharted sewers are identified while carrying out your works we would ask that you contact United Utilities at the earliest opportunity so that we can offer guidance and update our records.

Existing Water Assets Crossing the Site
It is the developer responsibility to identify utilities on-site. Where clean water assets are shown on our records, we recommend that you contact our Water Pre-Development Team, via the following email address: DeveloperServicesWater@uuplc.co.uk. Further information for this service can be found on our website via the link below:
https://www.unitedutilities.com/builders-developers/larger-developments/pre-development/water-pre-dev/

Connection Application
Although we may discuss and agree discharge points and rates in principle, please be aware that you will have to apply for a formal sewer connection. This is so that we can assess the method of construction, Health & Safety requirements and to ultimately inspect the connection when it is made. Details of the application process and the form itself can be obtained from our website by following the link below:
https://www.unitedutilities.com/builders-developers/wastewater-services/sewer-connections/sewer-connection/
We recommend that the detailed design should confirm the locations of all utilities in the area and ensure that any proposed drainage solution considers routing and clash checks where required.
If we can be of any further assistance please don't hesitate to contact us further.

Many thanks and kind regards,

United Utilities
Water for the North West

Ashleigh Bellerby
Assistant Developer Engineer
Developer Services & Metering
Customer Services
T: 07826891650
unitedutilities.com

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

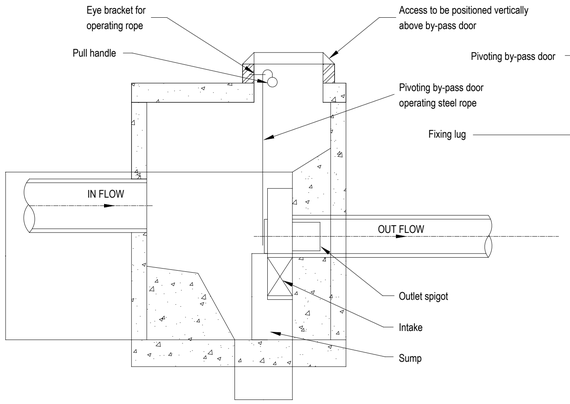
The information contained in this e-mail is intended only for the individual to whom it is addressed. It may contain legally privileged or confidential information or otherwise be exempt from disclosure. If you have received this Message in error or there are any problems, please notify the sender immediately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

this message by a third party.

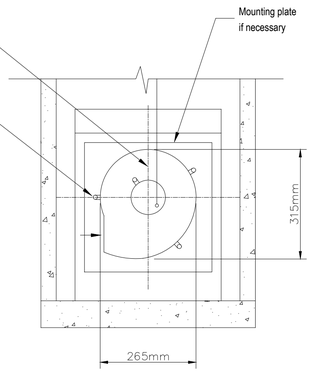
United Utilities Group PLC, Haweswater House, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP
Registered in England and Wales. Registered No 6559020

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

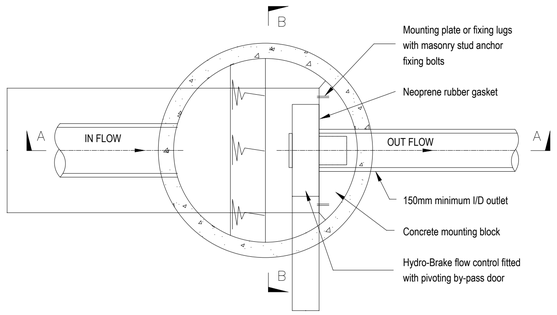
Appendix J. Typical SuDS Details



SECTION A-A.

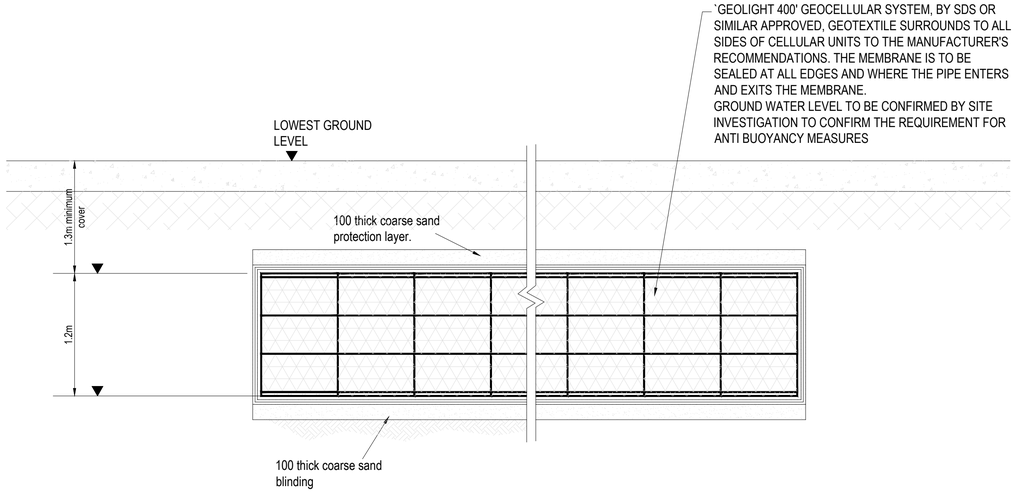


SECTION B-B.

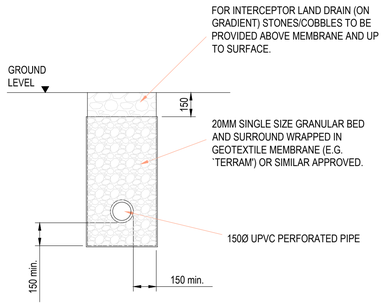


PLAN.

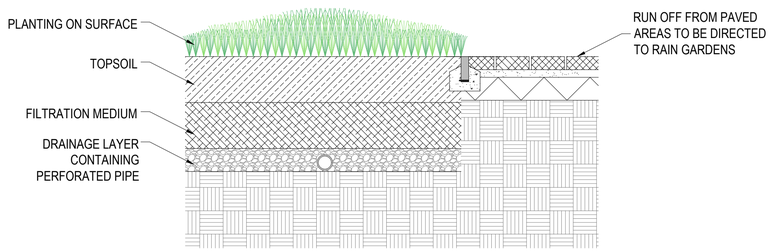
HYDRO-BRAKE FLOW CONTROL
(N.T.S)



SECTION THROUGH CELLULAR STORAGE SYSTEM (NTS)



TYPICAL FILTER DRAIN DETAIL
(N.T.S)



RAIN GARDEN DETAIL
(N.T.S)

Rev	Description	Date
P02	FILTER DRAIN AND RAIN GARDEN ADDED	21.08.25
P01	ISSUED TO DISCHARGE PLANNING CONDITIONS	07.08.25

Drawing Status: FOR PLANNING PURPOSES
Suitability: S2

240 BLACKFRIARS ROAD
LONDON.
SE1 8NW
UNITED KINGDOM

t: +44 (0) 20 7429 3333
e: info@hdrinc.com
w: www.hdrinc.com

Client: KADANS SCIENCE PARTNER

Architect: SHEPPARD ROBSON

Project: UPPER BROOK STREET MANCHESTER

Title: SuDS DETAILS

HDR Project Number: 10369928
Cad File Name: UBS-HDR-BB-XX-DR-C-102002

Drawn:	Chkd/Appd:	Date:	Scale @ A1:
MFP	SA	07.08.25	NTS

Drawing Number: UBS-HDR-BB-XX-DR-C-102002
Revision: P02

File: \\LHRPI-FS01\NEWFORMA\760066\10369928\6.0_CAD_BIM\6.2_WIP\6.2.2_CAD\CIVIL\UBS-HDR-BB-XX-DR-C-102002.DWG User: Ferry-Patel, Meera Sheet: 102002 Plot Date: 21/08/2025 12:29:58