

SuDS Design Statement

Rev P02

Rochdale Corner Plot

for



Job No. 14834

March 2024

Contents

Rochdale Corner Plot	2
Introduction	2
Existing Drainage System:	5
Sustainable Drainage System (SuDS) Design Statement:	6
Appendix A – SuDS Design Calculations Brownfield Site	8
Appendix B – SuDS Design Calculations Proposed Site.....	16
Appendix C – Contributing Impermeable Areas Sketch.....	23

Rochdale Corner Plot

Introduction

Development at Rochdale Corner Plot consist of the demolition of an existing single storey commercial unit, renovation of existing 3-storey building at 29-31 Maclure Road and construction of new 6-storey mixed commercial / residential building. Refer to Figure 01 for architectural visuals.



Figure 01 – Proposed Architect 3D Visual

Proposed surface water drainage system to the development is described in BKPL document 'Rochdale Corner Plot – Drainage Strategy Report' (report reference 14834-BKP-V1-XX-RP-C-011-P03, dated March 2024), summarised as follows;

- Building roof drainage system to collect surface water run off and transfer down through the existing / new building via new / existing rain water gutters and downpipes (refer to relevant M+E / Architectural information for details)
- External rear yard area to include gulleys to pick up surface water run off

- Below slab attenuation tank to be provided located below ground floor plant space / amenity space, with related access chambers for future maintenance (located both upstream and downstream of the attenuation tank)
- Separate below ground surface water system to be installed to rear of existing 3-storey building
- Surface water flow rates off site restricted to 5l/s at the site boundary via provision of flow-restricted manhole chamber (including hydrobrake designed to suit off site flow rates)
- Below ground surface water system to combine with new foul water drainage system to the north-east corner of the development site and outfall to existing Rochdale Council Highways owned combined system within Fire Station Yard (with eventual outfall to United Utilities combine sewer within Fire Station Yard car park area)

Proposed foul water drainage system to the development is described in BKPL document 'Rochdale Corner Plot – Drainage Strategy Report' (report reference 14834-BKP-V1-XX-RP-C-011-P03, dated March 2024), summarised as follows;

- Internal above ground foul drainage system to transfer foul drainage down through the existing / new building (refer to relevant M+E / Architectural information for details)
- Separate below ground foul water system to be installed to rear of existing 3-storey building
- Below ground foul water system to combine with new surface water drainage system to the north-east corner of the development site and outfall to existing Rochdale Council Highways owned combined system within Fire Station Yard (with eventual outfall to United Utilities combine sewer within Fire Station Yard car park area)

For details of below ground drainage systems, refer to BKPL drawings 14834-BKP-V1-XX-C-500 and 501.

Existing Drainage System

As noted above, the proposed development currently consists of an existing 3-storey commercial / residential building and an adjacent single storey (multiple occupancy) commercial building.

Existing drainage system to this building is summarised below (refer to BKPL report reference 14834-BKP-V1-XX-RP-C-011-P03, dated March 2024, for further detail);

- Existing foul drainage from both buildings is collected by below ground foul drainage runs to the rear of the building and outfall into an existing combine sewer within Fire Station Yard, with eventual outfall to UU combined sewer within Fire Station Yard car park area
- Existing surface water roof runoff to the existing single storey commercial building is collected by below ground surface water drainage runs to the rear of the building and outfall into an existing combine sewer within Fire Station Yard, with eventual outfall to UU combined sewer within Fire Station Yard car park area
- Existing surface water roof runoff to the existing 3-storey building is collected as follows;
 - Downpipes to the rear of the building outfall to below ground surface water drainage runs to the rear of the building and outfall into an existing combine sewer within Fire Station Yard, with eventual outfall to UU combined sewer within Fire Station Yard car park area
 - Downpipes to the front of the building outfall to existing surface water drainage runs within footpath to Maclure Road; outfall from these is currently unknown, however proposed works does not involve any changes to this roof area / roof drainage system

It is noted that the area within the proposed development site includes only nominal area of hard-standing, in the form of small rear yard to the existing 3-storey building. This yard doesn't appear to include any dedicated drainage infrastructure but is understood to drain via existing building downpipe gulleys.

In addition to the above existing UU combined sewers are present within both Maclure Road (flowing south) and Station Road (flowing west).

Survey information for all existing drainage systems (including UU system and suspected Highways owned system to the rear of the building) are included in BKPL report reference 14834-BKP-V1-XX-RP-C-011-P03, dated March 2024.

Sustainable Drainage Systems (SuDS) Design Statement

Proposed development details include for generally retaining the existing 3-storey building in its current arrangement (with minor lean-to structures to the rear demolished and replaced with similar lean-to structure) and replacement of the single-storey commercial building with new 6-storey mixed commercial / residential building.

Proposed development is contained within the existing site boundary and as such, does not increase overall impermeable area of the site. Proposed external yard space to the rear of the building is nominally increased, with related minor reduction to roof areas contributing to overall impermeable areas.

Consideration of SuDS discharge hierarchy has been given to the development in accordance with Ciria C753 and has concluded that the only feasible option for discharge of surface water to existing combined sewer, via volume controlled system. For further details of consideration on SuDS discharge hierarchy, refer to BKPL report reference 14834-BKP-V1-XX-RP-C-011-P03, dated March 2024, for further detail.

In order to minimise disruption to significant existing services and drainage within both Maclure Road and Station Road, it is proposed that new surface water outfall from the development site is taken to the existing combine sewer to the rear of the existing building (assumed owned by Rochdale Highways) with eventual outfall to UU combined sewer within Fire Station yard car park. This effectively replicated the existing surface water outfall from the site, albeit the proposed system will provide on-site attenuation and restrict surface water flowrates to offer a betterment of the existing arrangement.

SuDS drainage system at Rochdale Corner Plot has been designed in accordance with Ciria C753 'The SuDS Manual' and related best-practice guidance. Design approach has considered the proposed development as a 'brownfield site'; as such, design has considered current surface water outfall rates (QBAR) and proposed outfall rates have been designed to offer a 50% betterment of the existing arrangement for storm events as described in Ciria C753.

An additional + 40% allowance for climate change has been considered for the 1:100 year storm event in accordance with best practice guidance.

Below slab attenuation tank has been adopted due to limited available space on the development site, noting external space is limited to small external yard to the rear of the development building only. Alternative location outside of the site boundary would require third party agreement for installation / future maintenance and would require tank to be installed in close proximity to a significant number of existing services (resulting in potential service diversion requirements in this area); as such this hasn't been considered feasible. Below slab attenuation tank is to be provided installed below the proposed ground floor slab and is to be coordinated with new piled foundations. Future tank maintenance is provided via external access chambers provided both upstream and downstream of the tank to allow future jetting out / rodding where require, along with future surveys of the tank where necessary. Tank system is to be to specialist design and is intended to provide 50 year design life to match the proposed development building.

Appendix A – SuDS Design Calcs Brownfield Site

CAUSEWAY	Booth King Partnership Limited	File: Brownfield.pfd Network: SW Alvaro Ayala 07/11/2023	Page 1
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Design Settings

<table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 50%;">Rainfall Methodology</td><td>FSR</td></tr> <tr><td>Return Period (years)</td><td>2</td></tr> <tr><td>Additional Flow (%)</td><td>0</td></tr> <tr><td>FSR Region</td><td>England and Wales</td></tr> <tr><td>M5-60 (mm)</td><td>20.000</td></tr> <tr><td>Ratio-R</td><td>0.300</td></tr> <tr><td>CV</td><td>0.750</td></tr> <tr><td>Time of Entry (mins)</td><td>5.00</td></tr> </table>	Rainfall Methodology	FSR	Return Period (years)	2	Additional Flow (%)	0	FSR Region	England and Wales	M5-60 (mm)	20.000	Ratio-R	0.300	CV	0.750	Time of Entry (mins)	5.00	<table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 50%;">Maximum Time of Concentration (mins)</td><td>30.00</td></tr> <tr><td>Maximum Rainfall (mm/hr)</td><td>50.0</td></tr> <tr><td>Minimum Velocity (m/s)</td><td>1.00</td></tr> <tr><td>Connection Type</td><td>Level Soffits</td></tr> <tr><td>Minimum Backdrop Height (m)</td><td>0.200</td></tr> <tr><td>Preferred Cover Depth (m)</td><td>1.200</td></tr> <tr><td>Include Intermediate Ground</td><td>✓</td></tr> <tr><td>Enforce best practice design rules</td><td>✓</td></tr> </table>	Maximum Time of Concentration (mins)	30.00	Maximum Rainfall (mm/hr)	50.0	Minimum Velocity (m/s)	1.00	Connection Type	Level Soffits	Minimum Backdrop Height (m)	0.200	Preferred Cover Depth (m)	1.200	Include Intermediate Ground	✓	Enforce best practice design rules	✓
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Include Intermediate Ground	✓																																
Enforce best practice design rules	✓																																

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.062	5.00	140.500	900	100.000	100.000	1.300
2			140.350	900	98.000	100.000	1.350

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	1	2	2.000	0.600	139.200	139.000	0.200	10.0	100	5.01	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	2.458	19.3	8.4	1.200	1.250	0.062	0.0	46	2.382

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	2.000	10.0	100	Circular	140.500	139.200	1.200	140.350	139.000	1.250

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	900	Manhole	Adoptable	2	900	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
1	100.000	100.000	140.500	1.300	900					
							0	1.000	139.200	100
2	98.000	100.000	140.350	1.350	900		1	1.000	139.000	100

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	Booth King Partnership Limited	File: Brownfield.pfd Network: SW Alvaro Ayala 07/11/2023	Page 2
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Simulation Settings

Rainfall Methodology FSR FSR Region England and Wales M5-60 (mm) 20.000 Ratio-R 0.300 Summer CV 0.750 Winter CV 0.840	Analysis Speed Normal Skip Steady State x Drain Down Time (mins) 240 Additional Storage (m³/ha) 20.0 Check Discharge Rate(s) x Check Discharge Volume x	
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Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
30	0	0	0
100	0	0	0
100	40	0	0

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Appendix B – SuDS Design Calcs Proposed Site

	Booth King Partnership Limited	File: Drainage P1.pfd	Page 1
		Network: SW Alvaro Ayala 08/11/2023	

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.300	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.069	5.00	140.500	900	389924.805	412712.071	1.300
2			140.350	1200	389918.167	412724.412	1.350
Combined			140.350	900	389917.096	412725.423	1.400
Existing			140.300	900	389918.127	412733.847	1.435

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	1	2	14.013	0.600	139.200	139.000	0.200	70.1	225	5.15	50.0
1.001	2	Combined	1.473	0.600	139.000	138.950	0.050	29.5	150	5.16	50.0
1.002	Combined	Existing	8.487	0.600	138.950	138.865	0.085	100.0	150	5.30	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.564	62.2	9.4	1.075	1.125	0.069	0.0	58	1.130
1.001	1.862	32.9	9.4	1.200	1.250	0.069	0.0	55	1.609
1.002	1.005	17.8	9.4	1.250	1.285	0.069	0.0	78	1.019

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	14.013	70.1	225	Circular	140.500	139.200	1.075	140.350	139.000	1.125
1.001	1.473	29.5	150	Circular	140.350	139.000	1.200	140.350	138.950	1.250
1.002	8.487	100.0	150	Circular	140.350	138.950	1.250	140.300	138.865	1.285

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	900	Manhole	Adoptable	2	1200	Manhole	Adoptable
1.001	2	1200	Manhole	Adoptable	Combined	900	Manhole	Adoptable
1.002	Combined	900	Manhole	Adoptable	Existing	900	Manhole	Adoptable

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CAUSEWAY 	Booth King Partnership Limited	File: Drainage P1.pfd Network: SW Alvaro Ayala 08/11/2023	Page 2

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	389924.805	412712.071	140.500	1.300	900				
						0	1.000	139.200	225
2	389918.167	412724.412	140.350	1.350	1200		1	1.000	139.000
						0	1.001	139.000	150
Combined	389917.096	412725.423	140.350	1.400	900		1	1.001	138.950
						0	1.002	138.950	150
Existing	389918.127	412733.847	140.300	1.435	900		1	1.002	138.865

Simulation Settings

Rainfall Methodology FSR FSR Region England and Wales M5-60 (mm) 20.000 Ratio-R 0.300 Summer CV 0.750 Winter CV 0.840	Analysis Speed Normal Skip Steady State x Drain Down Time (mins) 240 Additional Storage (m³/ha) 20.0 Check Discharge Rate(s) x Check Discharge Volume x
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Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	0	0	0
100	40	0	0

Node 2 Online Hydro-Brake® Control

Flap Valve x Replaces Downstream Link ✓ Invert Level (m) 139.000 Design Depth (m) 1.350 Design Flow (l/s) 5.0	Objective (HE) Minimise upstream storage Sump Available ✓ Product Number CTL-SHE-0100-5000-1350-5000 Min Outlet Diameter (m) 0.150 Min Node Diameter (mm) 1200
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Node 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr) 0.00000 Side Inf Coefficient (m/hr) 0.00000	Safety Factor 2.0 Porosity 1.00	Invert Level (m) 139.200 Time to half empty (mins) 49
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Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	33.0	0.0	0.500	33.0	0.0	0.501	0.0	0.0

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Appendix C – Contributing Impermeable Area Sketch

