

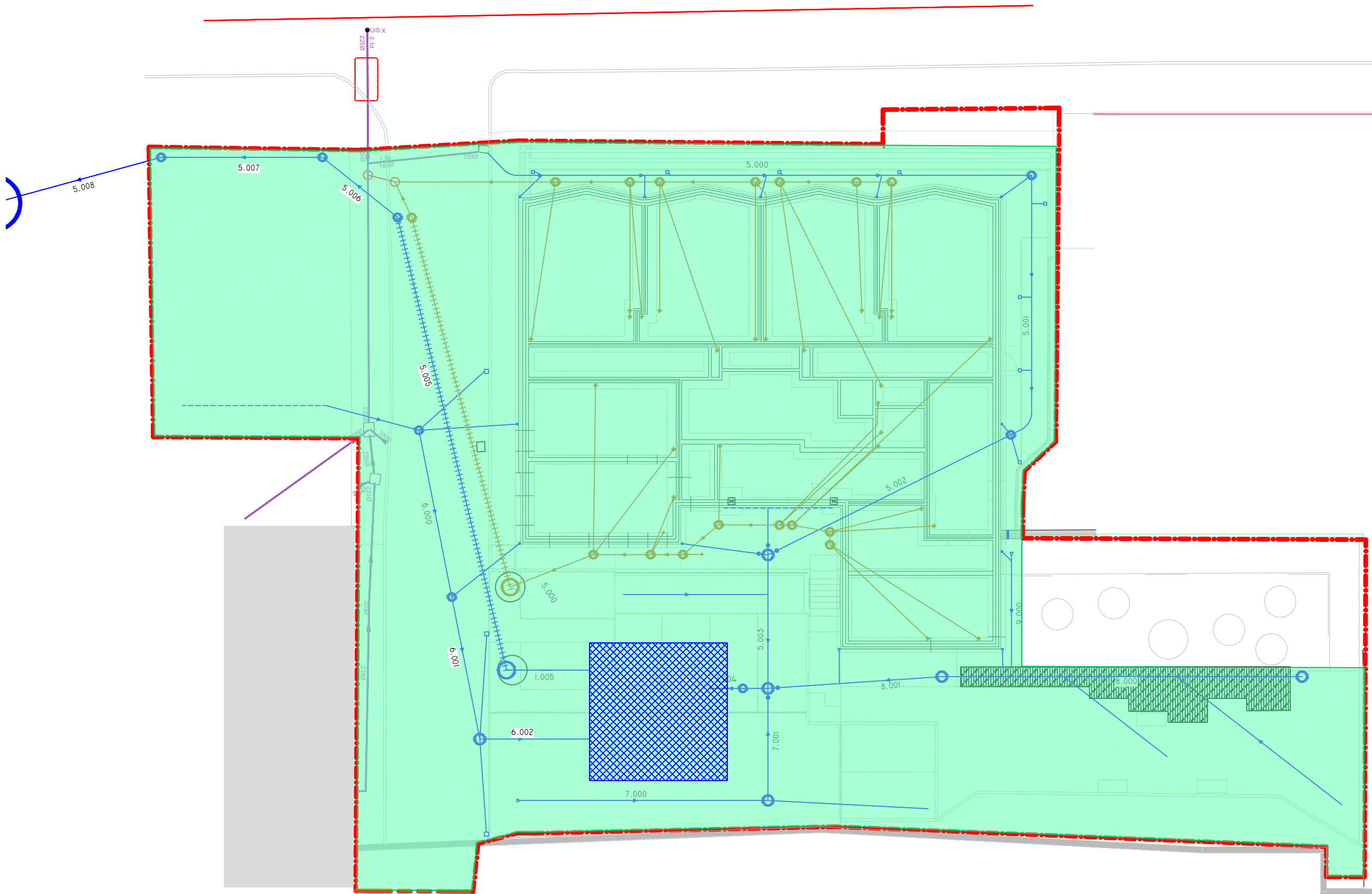


BELL MUNRO CONSULTING LTD.

J8426
Wuerdle Street,
Rochdale
Hydraulic Calculations
Rev A
October 2025

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DRAINAGE REFERENCE DRAWING SHOWING PIPE LOCATIONS AND DRAINED AREAS
1:100 @ A1
1:200 @ A3

A	INITIAL ISSUE	11.05.25	WR
C	INITIAL ISSUE	09.05.25	WR
10	COMMENTS	DATE	BY

BMC

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CLIENT
POSSIBILITIES

PROJECT
WUERDLE STREET, ROCHDALE

FILE
DRAINAGE REFERENCE DRAWING

DRAWN BY WR	CHECKED BY SJB	SCALE 1:100	DATE 06/25
DRAWING NUMBER J8426/D02			REVISION A

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Turing House 5 Archway Manchester M15 5RL		
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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	19.000	Add Flow / Climate Change (%)	45
Ratio R	0.278	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall C. Level Name (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
5.008	155.400	154.195	0.000	150	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	0.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.900	Storm Duration (mins)	30
Ratio R	0.303		

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Online Controls for Storm

Non Return Valve Manhole: 6, DS/PN: 8.001, Volume (m³): 1.2

Pump Manhole: 6, DS/PN: 5.005, Volume (m³): 3.2

Invert Level (m) 150.697

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.0000	0.900	5.0000	1.700	5.0000	2.500	5.0000
0.200	5.0000	1.000	5.0000	1.800	5.0000	2.600	5.0000
0.300	5.0000	1.100	5.0000	1.900	5.0000	2.700	5.0000
0.400	5.0000	1.200	5.0000	2.000	5.0000	2.800	5.0000
0.500	5.0000	1.300	5.0000	2.100	5.0000	2.900	5.0000
0.600	5.0000	1.400	5.0000	2.200	5.0000	3.000	5.0000
0.700	5.0000	1.500	5.0000	2.300	5.0000		
0.800	5.0000	1.600	5.0000	2.400	5.0000		

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Storage Structures for Storm Cellular Storage Manhole: 5, DS/PN: 5.004 Invert Level (m) 151.400 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>49.0</td><td>49.0</td><td>1.300</td><td>0.0</td><td>82.6</td></tr><tr><td>1.200</td><td>49.0</td><td>82.6</td><td></td><td></td><td></td></tr></tbody></table>			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	49.0	49.0	1.300	0.0	82.6	1.200	49.0	82.6			
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)															
0.000	49.0	49.0	1.300	0.0	82.6															
1.200	49.0	82.6																		
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Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 2 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.267
 Region England and Wales Cv (Summer) 0.750
 M5-60 (mm) 19.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status OFF

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 100
 Climate Change (%) 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
5.000	1	15 Winter	100	+45%					153.991
5.001	2	15 Winter	100	+45%					153.665
5.002	3	15 Winter	100	+45%					153.327
5.003	4	15 Winter	100	+45%					152.644
6.000	11	15 Winter	100	+45%					154.231
6.001	12	15 Winter	100	+45%					153.660
6.002	4	15 Winter	100	+45%					153.486
7.000	7	15 Winter	100	+45%					153.566
7.001	8	15 Winter	100	+45%					152.792
8.000	6	120 Winter	100	+45%	100/60 Winter				152.531
9.000	11	120 Winter	100	+45%	100/120 Winter				152.531
8.001	6	120 Winter	100	+45%	100/30 Summer				152.530
5.004	5	120 Winter	100	+45%	100/15 Summer				152.529
5.005	6	120 Winter	100	+45%	100/15 Summer				152.520
5.006	7	600 Winter	100	+45%					154.513

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

US/MH		Return Climate First (X)		First (Y)		First (Z)		Overflow	Water
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	Level (m)
5.007	15	720 Summer	100	+45%					154.449
5.008	16	720 Summer	100	+45%					154.347

US/MH		Surcharged Flooded		Half Drain Pipe		Pipe		Level	
PN	Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Exceeded
5.007	15	-0.095	0.000	0.29			5.0	OK	
5.008	16	-0.095	0.000	0.29			5.0	OK	