

Mucklow & Harris Ltd		Page 1
Studio 313 Scott House The Custard Factory, Gibb St... Birmingham, B9 4AA	Fole Diary CB COLLIER Network C	
Date 10/07/2024 09:08 File Storm C 02.07.24.MDX	Designed by Riaz Alam Checked by	
Innovyze	Network 2019.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model	
Return Period (years)	2
FEH Rainfall Version	2013
Site Location	GB 404500 337500 SK 04500 37500
Data Type	Point
Maximum Rainfall (mm/hr)	0
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.041	4-8	0.007

Total Area Contributing (ha) = 0.048

Total Pipe Volume (m³) = 1.480

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	12.975	0.200	64.9	0.010	6.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	4.144	0.150	27.6	0.027	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	7.500	0.100	75.0	0.006	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	6.17	110.600	0.010	0.0	0.0	0.0	1.25	22.1	0.0
1.001	0.00	6.21	110.400	0.037	0.0	0.0	0.0	1.92	34.0	0.0
1.002	0.00	6.32	110.250	0.043	0.0	0.0	0.0	1.16	20.5	0.0

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The Custard Factory, Gibb St...	CB COLLIER	
Birmingham, B9 4AA	Network C	
Date 10/07/2024 09:08	Designed by Riaz Alam	
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Manhole Schedules for Storm											
MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
30	111.400	0.800	Open Manhole	475	1.000	110.600	150				
31	111.650	1.250	Open Manhole	475	1.001	110.400	150	1.000	110.400	150	
32	111.600	1.350	Open Manhole	475	1.002	110.250	150	1.001	110.250	150	
33	111.200	1.050	Open Manhole	475	1.003	110.150	150	1.002	110.150	150	
ATT TANK	111.200	1.100	Open Manhole	1200	2.000	110.100	225				
FCC C	111.000	1.000	Open Manhole	1800	1.004	110.000	225	1.003	110.075	150	
								2.000	110.000	225	
OUTFALL	111.000	1.085	Open Manhole	0		OUTFALL		1.004	109.915	225	

No coordinates have been specified, layout information cannot be produced.

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	150	30	111.400	110.600	0.650	Open Manhole	475
1.001	o	150	31	111.650	110.400	1.100	Open Manhole	475
1.002	o	150	32	111.600	110.250	1.200	Open Manhole	475
1.003	o	150	33	111.200	110.150	0.900	Open Manhole	475
2.000	o	225	ATT TANK	111.200	110.100	0.875	Open Manhole	1200
1.004	o	225	FCC C	111.000	110.000	0.775	Open Manhole	1800

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	12.975	64.9	31	111.650	110.400	1.100	Open Manhole	475
1.001	4.144	27.6	32	111.600	110.250	1.200	Open Manhole	475
1.002	7.500	75.0	33	111.200	110.150	0.900	Open Manhole	475
1.003	6.351	84.7	FCC C	111.000	110.075	0.775	Open Manhole	1800
2.000	15.000	150.0	FCC C	111.000	110.000	0.775	Open Manhole	1800
1.004	8.457	99.5	OUTFALL	111.000	109.915	0.860	Open Manhole	0

Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
---------------------	--------------	--------------	--------------	------------------	----------	--------

1.004 OUTFALL 111.000 109.915 0.000 0 0

Datum (m) 0.000 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	0.350	11	0.350	21	0.350	31	0.350	41	0.350	51	0.350
2	0.350	12	0.350	22	0.350	32	0.350	42	0.350	52	0.350
3	0.350	13	0.350	23	0.350	33	0.350	43	0.350	53	0.350
4	0.350	14	0.350	24	0.350	34	0.350	44	0.350	54	0.350
5	0.350	15	0.350	25	0.350	35	0.350	45	0.350	55	0.350
6	0.350	16	0.350	26	0.350	36	0.350	46	0.350	56	0.350
7	0.350	17	0.350	27	0.350	37	0.350	47	0.350	57	0.350
8	0.350	18	0.350	28	0.350	38	0.350	48	0.350	58	0.350
9	0.350	19	0.350	29	0.350	39	0.350	49	0.350	59	0.350
10	0.350	20	0.350	30	0.350	40	0.350	50	0.350	60	0.350

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Innovyze				Network 2019.1							
<u>Surcharged Outfall Details for Storm</u>											
Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
61	0.350	111	0.350	161	0.350	211	0.350	261	0.350	311	0.350
62	0.350	112	0.350	162	0.350	212	0.350	262	0.350	312	0.350
63	0.350	113	0.350	163	0.350	213	0.350	263	0.350	313	0.350
64	0.350	114	0.350	164	0.350	214	0.350	264	0.350	314	0.350
65	0.350	115	0.350	165	0.350	215	0.350	265	0.350	315	0.350
66	0.350	116	0.350	166	0.350	216	0.350	266	0.350	316	0.350
67	0.350	117	0.350	167	0.350	217	0.350	267	0.350	317	0.350
68	0.350	118	0.350	168	0.350	218	0.350	268	0.350	318	0.350
69	0.350	119	0.350	169	0.350	219	0.350	269	0.350	319	0.350
70	0.350	120	0.350	170	0.350	220	0.350	270	0.350	320	0.350
71	0.350	121	0.350	171	0.350	221	0.350	271	0.350	321	0.350
72	0.350	122	0.350	172	0.350	222	0.350	272	0.350	322	0.350
73	0.350	123	0.350	173	0.350	223	0.350	273	0.350	323	0.350
74	0.350	124	0.350	174	0.350	224	0.350	274	0.350	324	0.350
75	0.350	125	0.350	175	0.350	225	0.350	275	0.350	325	0.350
76	0.350	126	0.350	176	0.350	226	0.350	276	0.350	326	0.350
77	0.350	127	0.350	177	0.350	227	0.350	277	0.350	327	0.350
78	0.350	128	0.350	178	0.350	228	0.350	278	0.350	328	0.350
79	0.350	129	0.350	179	0.350	229	0.350	279	0.350	329	0.350
80	0.350	130	0.350	180	0.350	230	0.350	280	0.350	330	0.350
81	0.350	131	0.350	181	0.350	231	0.350	281	0.350	331	0.350
82	0.350	132	0.350	182	0.350	232	0.350	282	0.350	332	0.350
83	0.350	133	0.350	183	0.350	233	0.350	283	0.350	333	0.350
84	0.350	134	0.350	184	0.350	234	0.350	284	0.350	334	0.350
85	0.350	135	0.350	185	0.350	235	0.350	285	0.350	335	0.350
86	0.350	136	0.350	186	0.350	236	0.350	286	0.350	336	0.350
87	0.350	137	0.350	187	0.350	237	0.350	287	0.350	337	0.350
88	0.350	138	0.350	188	0.350	238	0.350	288	0.350	338	0.350
89	0.350	139	0.350	189	0.350	239	0.350	289	0.350	339	0.350
90	0.350	140	0.350	190	0.350	240	0.350	290	0.350	340	0.350
91	0.350	141	0.350	191	0.350	241	0.350	291	0.350	341	0.350
92	0.350	142	0.350	192	0.350	242	0.350	292	0.350	342	0.350
93	0.350	143	0.350	193	0.350	243	0.350	293	0.350	343	0.350
94	0.350	144	0.350	194	0.350	244	0.350	294	0.350	344	0.350
95	0.350	145	0.350	195	0.350	245	0.350	295	0.350	345	0.350
96	0.350	146	0.350	196	0.350	246	0.350	296	0.350	346	0.350
97	0.350	147	0.350	197	0.350	247	0.350	297	0.350	347	0.350
98	0.350	148	0.350	198	0.350	248	0.350	298	0.350	348	0.350
99	0.350	149	0.350	199	0.350	249	0.350	299	0.350	349	0.350
100	0.350	150	0.350	200	0.350	250	0.350	300	0.350	350	0.350
101	0.350	151	0.350	201	0.350	251	0.350	301	0.350	351	0.350
102	0.350	152	0.350	202	0.350	252	0.350	302	0.350	352	0.350
103	0.350	153	0.350	203	0.350	253	0.350	303	0.350	353	0.350
104	0.350	154	0.350	204	0.350	254	0.350	304	0.350	354	0.350
105	0.350	155	0.350	205	0.350	255	0.350	305	0.350	355	0.350
106	0.350	156	0.350	206	0.350	256	0.350	306	0.350	356	0.350
107	0.350	157	0.350	207	0.350	257	0.350	307	0.350	357	0.350
108	0.350	158	0.350	208	0.350	258	0.350	308	0.350	358	0.350
109	0.350	159	0.350	209	0.350	259	0.350	309	0.350	359	0.350
110	0.350	160	0.350	210	0.350	260	0.350	310	0.350	360	0.350
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Innovyze Network 2019.1		
<u>Simulation Criteria for Storm</u> Volumetric Runoff Coeff 0.750 Additional Flow - % of Total Flow 0.000 Areal Reduction Factor 1.000 MADD Factor * 10m³/ha Storage 2.000 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 Storage Structures 3 Number of Online Controls 1 Number of Time/Area Diagrams 0 Number of Offline Controls 0 Number of Real Time Controls 0 <u>Synthetic Rainfall Details</u> Rainfall Model FSR Profile Type Summer Return Period (years) 100 Cv (Summer) 0.750 Region England and Wales Cv (Winter) 0.840 M5-60 (mm) 19.000 Storm Duration (mins) 30 Ratio R 0.373		
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Online Controls for Storm Hydro-Brake® Optimum Manhole: FCC C, DS/PN: 1.004, Volume (m³): 3.2 Unit Reference MD-SHE-0177-1500-0800-1500 Design Head (m)0.800 Design Flow (l/s)15.0 Flush-Flo™Calculated ObjectiveMinimise upstream storage ApplicationSurface Sump AvailableYes Diameter (mm)177 Invert Level (m)110.000 Minimum Outlet Pipe Diameter (mm)225 Suggested Manhole Diameter (mm)1200 Control Points Head (m)Flow (l/s) Design Point (Calculated)0.80015.0 Flush-Flo™0.28815.0 Kick-Flo®0.59013.0 Mean Flow over Head Range-12.5 The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated <table><tr><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td></tr><tr><td>0.100</td><td>6.3</td><td>1.200</td><td>18.2</td><td>3.000</td><td>28.2</td><td>7.000</td><td>42.4</td></tr><tr><td>0.200</td><td>14.7</td><td>1.400</td><td>19.6</td><td>3.500</td><td>30.4</td><td>7.500</td><td>43.9</td></tr><tr><td>0.300</td><td>15.0</td><td>1.600</td><td>20.9</td><td>4.000</td><td>32.4</td><td>8.000</td><td>45.3</td></tr><tr><td>0.400</td><td>14.7</td><td>1.800</td><td>22.1</td><td>4.500</td><td>34.3</td><td>8.500</td><td>46.4</td></tr><tr><td>0.500</td><td>14.2</td><td>2.000</td><td>23.2</td><td>5.000</td><td>36.1</td><td>9.000</td><td>47.8</td></tr><tr><td>0.600</td><td>13.1</td><td>2.200</td><td>24.3</td><td>5.500</td><td>37.8</td><td>9.500</td><td>49.1</td></tr><tr><td>0.800</td><td>15.0</td><td>2.400</td><td>25.3</td><td>6.000</td><td>39.4</td><td></td><td></td></tr><tr><td>1.000</td><td>16.7</td><td>2.600</td><td>26.3</td><td>6.500</td><td>40.9</td><td></td><td></td></tr></table> ©1982-2019 Innovyze			Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	6.3	1.200	18.2	3.000	28.2	7.000	42.4	0.200	14.7	1.400	19.6	3.500	30.4	7.500	43.9	0.300	15.0	1.600	20.9	4.000	32.4	8.000	45.3	0.400	14.7	1.800	22.1	4.500	34.3	8.500	46.4	0.500	14.2	2.000	23.2	5.000	36.1	9.000	47.8	0.600	13.1	2.200	24.3	5.500	37.8	9.500	49.1	0.800	15.0	2.400	25.3	6.000	39.4			1.000	16.7	2.600	26.3	6.500	40.9		
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)																																																																			
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0.500	14.2	2.000	23.2	5.000	36.1	9.000	47.8																																																																			
0.600	13.1	2.200	24.3	5.500	37.8	9.500	49.1																																																																			
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Storage Structures for Storm

Porous Car Park Manhole: 31, DS/PN: 1.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	13.9	Slope (1:X)	80.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	110.400	Membrane Depth (mm)	0

Porous Car Park Manhole: 33, DS/PN: 1.003

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	6.9	Slope (1:X)	80.0
Safety Factor	2.0	Depression Storage (mm)	0
Porosity	0.30	Evaporation (mm/day)	0
Invert Level (m)	110.150	Cap Volume Depth (m)	0.350

Tank or Pond Manhole: FCC C, DS/PN: 1.004

Invert Level (m) 110.000

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	15.0	0.700	0.0	1.400	0.0	2.100	0.0
0.100	15.0	0.800	0.0	1.500	0.0	2.200	0.0
0.200	15.0	0.900	0.0	1.600	0.0	2.300	0.0
0.300	15.0	1.000	0.0	1.700	0.0	2.400	0.0
0.400	15.0	1.100	0.0	1.800	0.0	2.500	0.0
0.401	15.0	1.200	0.0	1.900	0.0		
0.600	0.0	1.300	0.0	2.000	0.0		

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The Custard Factory, Gibb St...
Birmingham, B9 4AA

Fole Diary
CB COLLIER
Network C

Date 10/07/2024 09:08
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Designed by Riaz Alam
Checked by

Innovyze

Network 2019.1

Micro Drainage

1 year Return Period 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 2.000

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 Storage Structures 3

Number of Online Controls 1

Number of Time/Area Diagrams 0

Number of Offline Controls 0

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR

Ratio R 0.373

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

DVD Status ON

Analysis Timestep Fine

Inertia Status ON

DTS Status ON

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440

Return Period(s) (years) 1, 2, 30, 100

Climate Change (%) 0, 0, 0, 40

US/MH

PN

Name

Storm

Return Period

Climate Change

First (X) Surge

First (Y) Flood

First (Z) Overflow

Overflow Act.

1.000

30

15 Winter

1

+0%

1.001

31

15 Winter

1

+0%

1.002

32

15 Winter

1

+0%

100/15 Summer

1.003

33

15 Winter

1

+0%

100/15 Summer

2.000

ATT TANK

60 Winter

1

+0%

1.004

FCC C

30 Winter

1

+0%

100/15 Winter

Water

US/MH

Level

Surcharged

Flooded

Pipe

Level

PN

Name

(m)

Depth

Volume

Flow /

Overflow

Flow

Status

Exceeded

1.000

30

110.623

-0.127

0.000

0.06

1.2

OK

1.001

31

110.441

-0.109

0.000

0.17

4.1

OK

1.002

32

110.303

-0.097

0.000

0.27

4.8

OK

1.003

33

110.208

-0.092

0.000

0.32

5.2

OK

2.000

ATT TANK

110.100

-0.225

0.000

0.00

0.0

OK

1.004

FCC C

110.072

-0.153

0.000

0.09

3.5

OK

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