

4 Brindley Road
City Park, Manchester
Cheshire M169HQ



Date 28/09/2021 10:17
File CHIPPING LANE 21.09.21.MDX

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Innovyze Network 2020.1.3


Simulation Criteria for Surface Network 4

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /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	1
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	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.800	Storm Duration (mins)	30
Ratio R	0.281		

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 4

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 1
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 0.281
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.800 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, 180, 240, 360, 480, 600,
720, 960, 1440, 2160, 2880, 4320, 5760,
7200, 8640, 10080
Return Period(s) (years) 30
Climate Change (%) 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	S401	15 Winter	30	+0%					116.847
1.001	S402	15 Winter	30	+0%					115.975
2.000	S404	15 Winter	30	+0%	30/15 Summer				114.967
1.002	S405	15 Winter	30	+0%					114.372
3.000	S407	15 Winter	30	+0%					112.907
3.001	S408	15 Winter	30	+0%					112.747
1.003	S409	15 Winter	30	+0%					112.288
1.004	S410	15 Winter	30	+0%	30/15 Summer				110.305
1.005	S411	120 Winter	30	+0%	30/120 Winter				110.252
1.006	S412	120 Winter	30	+0%	30/60 Winter				110.252
1.007	S413	120 Winter	30	+0%	30/60 Winter				110.252
1.008	S414	120 Winter	30	+0%	30/15 Summer				110.252

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S401	-0.155	0.000	0.20		14.5	OK	
1.001	S402	-0.112	0.000	0.49		38.3	OK	

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 4

PN	US/MH Name	Surcharged		Flooded		Flow / Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)	Flow / Overflow Cap.	Flow / Overflow (l/s)					
2.000	S404	0.038	0.000	1.07				41.5	SURCHARGED	
1.002	S405	-0.223	0.000	0.34				106.2	OK	
3.000	S407	-0.183	0.000	0.08				4.2	OK	
3.001	S408	-0.048	0.000	0.97				53.9	OK	
1.003	S409	-0.191	0.000	0.47				188.0	OK	
1.004	S410	0.061	0.000	1.56				204.4	SURCHARGED	
1.005	S411	0.060	0.000	0.03				78.3	SURCHARGED	
1.006	S412	0.138	0.000	0.02				52.2	SURCHARGED	
1.007	S413	0.201	0.000	0.02				34.9	SURCHARGED	
1.008	S414	1.511	0.000	0.74				22.7	SURCHARGED	

STORM SEWER DESIGN

Rainfall Simulation

1:30 year event with Surcharged Outfall

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Surcharged Outfall Details for Surface Network 4

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

1.008	S415	108.700	108.469	0.000	0	0
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Datum (m) 108.370 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	1.000	42	1.000	83	1.000	124	1.000	165	1.000	206	1.000
2	1.000	43	1.000	84	1.000	125	1.000	166	1.000	207	1.000
3	1.000	44	1.000	85	1.000	126	1.000	167	1.000	208	1.000
4	1.000	45	1.000	86	1.000	127	1.000	168	1.000	209	1.000
5	1.000	46	1.000	87	1.000	128	1.000	169	1.000	210	1.000
6	1.000	47	1.000	88	1.000	129	1.000	170	1.000	211	1.000
7	1.000	48	1.000	89	1.000	130	1.000	171	1.000	212	1.000
8	1.000	49	1.000	90	1.000	131	1.000	172	1.000	213	1.000
9	1.000	50	1.000	91	1.000	132	1.000	173	1.000	214	1.000
10	1.000	51	1.000	92	1.000	133	1.000	174	1.000	215	1.000
11	1.000	52	1.000	93	1.000	134	1.000	175	1.000	216	1.000
12	1.000	53	1.000	94	1.000	135	1.000	176	1.000	217	1.000
13	1.000	54	1.000	95	1.000	136	1.000	177	1.000	218	1.000
14	1.000	55	1.000	96	1.000	137	1.000	178	1.000	219	1.000
15	1.000	56	1.000	97	1.000	138	1.000	179	1.000	220	1.000
16	1.000	57	1.000	98	1.000	139	1.000	180	1.000	221	1.000
17	1.000	58	1.000	99	1.000	140	1.000	181	1.000	222	1.000
18	1.000	59	1.000	100	1.000	141	1.000	182	1.000	223	1.000
19	1.000	60	1.000	101	1.000	142	1.000	183	1.000	224	1.000
20	1.000	61	1.000	102	1.000	143	1.000	184	1.000	225	1.000
21	1.000	62	1.000	103	1.000	144	1.000	185	1.000	226	1.000
22	1.000	63	1.000	104	1.000	145	1.000	186	1.000	227	1.000
23	1.000	64	1.000	105	1.000	146	1.000	187	1.000	228	1.000
24	1.000	65	1.000	106	1.000	147	1.000	188	1.000	229	1.000
25	1.000	66	1.000	107	1.000	148	1.000	189	1.000	230	1.000
26	1.000	67	1.000	108	1.000	149	1.000	190	1.000	231	1.000
27	1.000	68	1.000	109	1.000	150	1.000	191	1.000	232	1.000
28	1.000	69	1.000	110	1.000	151	1.000	192	1.000	233	1.000
29	1.000	70	1.000	111	1.000	152	1.000	193	1.000	234	1.000
30	1.000	71	1.000	112	1.000	153	1.000	194	1.000	235	1.000
31	1.000	72	1.000	113	1.000	154	1.000	195	1.000	236	1.000
32	1.000	73	1.000	114	1.000	155	1.000	196	1.000	237	1.000
33	1.000	74	1.000	115	1.000	156	1.000	197	1.000	238	1.000
34	1.000	75	1.000	116	1.000	157	1.000	198	1.000	239	1.000
35	1.000	76	1.000	117	1.000	158	1.000	199	1.000	240	1.000
36	1.000	77	1.000	118	1.000	159	1.000	200	1.000	241	1.000
37	1.000	78	1.000	119	1.000	160	1.000	201	1.000	242	1.000
38	1.000	79	1.000	120	1.000	161	1.000	202	1.000	243	1.000
39	1.000	80	1.000	121	1.000	162	1.000	203	1.000	244	1.000
40	1.000	81	1.000	122	1.000	163	1.000	204	1.000	245	1.000
41	1.000	82	1.000	123	1.000	164	1.000	205	1.000	246	1.000

Surcharged Outfall Details for Surface Network 4


Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
247	1.000	266	1.000	285	1.000	304	1.000	323	1.000	342	1.000
248	1.000	267	1.000	286	1.000	305	1.000	324	1.000	343	1.000
249	1.000	268	1.000	287	1.000	306	1.000	325	1.000	344	1.000
250	1.000	269	1.000	288	1.000	307	1.000	326	1.000	345	1.000
251	1.000	270	1.000	289	1.000	308	1.000	327	1.000	346	1.000
252	1.000	271	1.000	290	1.000	309	1.000	328	1.000	347	1.000
253	1.000	272	1.000	291	1.000	310	1.000	329	1.000	348	1.000
254	1.000	273	1.000	292	1.000	311	1.000	330	1.000	349	1.000
255	1.000	274	1.000	293	1.000	312	1.000	331	1.000	350	1.000
256	1.000	275	1.000	294	1.000	313	1.000	332	1.000	351	1.000
257	1.000	276	1.000	295	1.000	314	1.000	333	1.000	352	1.000
258	1.000	277	1.000	296	1.000	315	1.000	334	1.000	353	1.000
259	1.000	278	1.000	297	1.000	316	1.000	335	1.000	354	1.000
260	1.000	279	1.000	298	1.000	317	1.000	336	1.000	355	1.000
261	1.000	280	1.000	299	1.000	318	1.000	337	1.000	356	1.000
262	1.000	281	1.000	300	1.000	319	1.000	338	1.000	357	1.000
263	1.000	282	1.000	301	1.000	320	1.000	339	1.000	358	1.000
264	1.000	283	1.000	302	1.000	321	1.000	340	1.000	359	1.000
265	1.000	284	1.000	303	1.000	322	1.000	341	1.000	360	1.000

Simulation Criteria for Surface Network 4

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /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	
Number of Online Controls		1 Number of Time/Area Diagrams	
Number of Offline Controls		0 Number of Real Time Controls	

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.800	Storm Duration (mins)	30
Ratio R	0.281		

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 4

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 1
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 0.281
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.800 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)

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,
720, 960, 1440, 2160, 2880, 4320, 5760,
7200, 8640, 10080
Return Period(s) (years) 30
Climate Change (%) 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Water Level
1.000	S401	15 Winter	30	+0%				116.847
1.001	S402	15 Winter	30	+0%				115.975
2.000	S404	15 Winter	30	+0%	30/15 Summer			114.967
1.002	S405	15 Winter	30	+0%				114.372
3.000	S407	15 Winter	30	+0%				112.907
3.001	S408	15 Winter	30	+0%				112.747
1.003	S409	15 Winter	30	+0%				112.288
1.004	S410	180 Winter	30	+0%	30/15 Summer			110.902
1.005	S411	180 Winter	30	+0%	30/60 Winter			110.895
1.006	S412	180 Winter	30	+0%	30/60 Summer			110.895
1.007	S413	180 Winter	30	+0%	30/60 Summer			110.895
1.008	S414	180 Winter	30	+0%	30/15 Summer			110.894

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S401	-0.155	0.000	0.20		14.5	OK	
1.001	S402	-0.112	0.000	0.49		38.3	OK	

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 4

PN	US/MH Name	Surcharged		Flooded		Flow / Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)	Flow / Overflow Cap.	Flow / Overflow (l/s)					
2.000	S404	0.038	0.000	1.07				41.5	SURCHARGED	
1.002	S405	-0.223	0.000	0.34				106.2	OK	
3.000	S407	-0.183	0.000	0.08				4.2	OK	
3.001	S408	-0.048	0.000	0.97				53.9	OK	
1.003	S409	-0.191	0.000	0.47				188.0	OK	
1.004	S410	0.658	0.000	0.45				58.6	SURCHARGED	
1.005	S411	0.703	0.000	0.03				60.6	SURCHARGED	
1.006	S412	0.781	0.000	0.02				48.7	SURCHARGED	
1.007	S413	0.844	0.000	0.03				50.8	SURCHARGED	
1.008	S414	2.153	0.000	0.74				22.7	FLOOD RISK	

STORM SEWER DESIGN

Rainfall Simulation

1:100 year event +30% Climate Change

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Simulation Criteria for Surface Network 4

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /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	1
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	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.800	Storm Duration (mins)	30
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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 4

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 1
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 0.281
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.800 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)

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,
720, 960, 1440, 2160, 2880, 4320, 5760,
7200, 8640, 10080
Return Period(s) (years) 100
Climate Change (%) 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	S401	15 Winter	100	+30%					116.869
1.001	S402	15 Winter	100	+30%					116.022
2.000	S404	15 Winter	100	+30%	100/15 Summer				115.571
1.002	S405	15 Winter	100	+30%					114.421
3.000	S407	15 Winter	100	+30%	100/15 Summer				113.211
3.001	S408	15 Winter	100	+30%	100/15 Summer				113.199
1.003	S409	15 Winter	100	+30%					112.351
1.004	S410	120 Winter	100	+30%	100/15 Summer				111.082
1.005	S411	120 Winter	100	+30%	100/15 Summer				111.073
1.006	S412	120 Winter	100	+30%	100/15 Summer				111.072
1.007	S413	120 Winter	100	+30%	100/15 Summer				111.071
1.008	S414	120 Winter	100	+30%	100/15 Summer				111.071

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S401	-0.133	0.000	0.34		24.3	OK	
1.001	S402	-0.065	0.000	0.82		63.6	OK	

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 4

PN	US/MH Name	Surcharged		Flooded		Flow / Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)	Flow (l/s)	Overflow (l/s)					
2.000	S404	0.642	0.000	1.66				64.5	SURCHARGED	
1.002	S405	-0.174	0.000	0.54				170.2	OK	
3.000	S407	0.121	0.000	0.19				10.5	SURCHARGED	
3.001	S408	0.404	0.000	1.49				82.7	SURCHARGED	
1.003	S409	-0.128	0.000	0.75				302.6	OK	
1.004	S410	0.838	0.000	0.96				125.3	SURCHARGED	
1.005	S411	0.881	0.000	0.06				134.1	SURCHARGED	
1.006	S412	0.958	0.000	0.06				142.5	SURCHARGED	
1.007	S413	1.020	0.000	0.10				154.1	SURCHARGED	
1.008	S414	2.330	0.000	0.86				26.4	FLOOD RISK	

Foul Water Network 1

FOUL SEWER DESIGN

Foul Design Details

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FOUL SEWERAGE DESIGN








Design Criteria for Foul Network 1

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	0
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.200
Flow Per Person (l/per/day)	222.00	Maximum Backdrop Height (m)	1.500
Persons per House	3.00	Min Design Depth for Optimisation (m)	1.200
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Foul Network 1


PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	22.412	0.252	88.9	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
1.001	30.458	0.459	66.4	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.002	6.126	0.086	71.2	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
1.003	27.937	1.473	19.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.004	22.606	0.167	135.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.005	26.382	1.437	18.4	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.006	7.840	0.093	84.3	0.000	12	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	109.907	0.000	0.0	4	0.0	12	0.30	0.93	16.4	0.2
1.001	109.655	0.000	0.0	4	0.0	11	0.33	1.08	19.0	0.2
1.002	109.196	0.000	0.0	8	0.0	15	0.40	1.04	18.4	0.4
1.003	109.110	0.000	0.0	8	0.0	11	0.63	2.02	35.7	0.4
1.004	107.637	0.000	0.0	8	0.0	17	0.32	0.75	13.3	0.4
1.005	107.470	0.000	0.0	8	0.0	11	0.64	2.05	36.2	0.4
1.006	106.033	0.000	0.0	20	0.0	24	0.50	0.95	16.9	0.9

FOUL SEWER DESIGN

Foul Manhole Schedules

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FOUL SEWERAGE DESIGN








Design Criteria for Foul Network 1

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	0
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.200
Flow Per Person (l/per/day)	222.00	Maximum Backdrop Height (m)	1.500
Persons per House	3.00	Min Design Depth for Optimisation (m)	1.200
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Foul Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	22.412	0.252	88.9	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
1.001	30.458	0.459	66.4	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.002	6.126	0.086	71.2	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
1.003	27.937	1.473	19.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.004	22.606	0.167	135.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.005	26.382	1.437	18.4	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.006	7.840	0.093	84.3	0.000	12	0.0	1.500	o	150	Pipe/Conduit	


Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	109.907	0.000	0.0	4	0.0	12	0.30	0.93	16.4	0.2
1.001	109.655	0.000	0.0	4	0.0	11	0.33	1.08	19.0	0.2
1.002	109.196	0.000	0.0	8	0.0	15	0.40	1.04	18.4	0.4
1.003	109.110	0.000	0.0	8	0.0	11	0.63	2.02	35.7	0.4
1.004	107.637	0.000	0.0	8	0.0	17	0.32	0.75	13.3	0.4
1.005	107.470	0.000	0.0	8	0.0	11	0.64	2.05	36.2	0.4
1.006	106.033	0.000	0.0	20	0.0	24	0.50	0.95	16.9	0.9

Foul Water Network 2

FOUL SEWER DESIGN

Foul Design Details

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FOUL SEWERAGE DESIGN











Design Criteria for Foul Network 2

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	0
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.200
Flow Per Person (l/per/day)	222.00	Maximum Backdrop Height (m)	1.500
Persons per House	3.00	Min Design Depth for Optimisation (m)	1.200
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500


Designed with Level Soffits

Network Design Table for Foul Network 2





PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	19.011	0.190	100.1	0.000	8	0.0	1.500	o	150	Pipe/Conduit	
1.001	17.079	0.127	134.5	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.002	41.497	0.384	108.1	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
2.000	23.674	0.696	34.0	0.000	3	0.0	1.500	o	150	Pipe/Conduit	
2.001	30.655	1.482	20.7	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.003	33.461	0.903	37.1	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
1.004	18.393	0.136	135.2	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
1.005	19.269	0.143	134.7	0.000	3	0.0	1.500	o	150	Pipe/Conduit	
1.006	25.847	0.897	28.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
3.000	19.008	0.190	100.0	0.000	15	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	E Area (ha)	E Base Flow (l/s)	E Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	113.450	0.000	0.0	8	0.0	16	0.36	0.88	15.5	0.4
1.001	113.260	0.000	0.0	8	0.0	17	0.32	0.75	13.3	0.4
1.002	113.133	0.000	0.0	13	0.0	21	0.40	0.84	14.9	0.6
2.000	114.927	0.000	0.0	3	0.0	8	0.37	1.51	26.6	0.1
2.001	114.231	0.000	0.0	3	0.0	7	0.44	1.93	34.1	0.1
1.003	112.749	0.000	0.0	21	0.0	20	0.68	1.44	25.5	1.0
1.004	111.846	0.000	0.0	25	0.0	30	0.46	0.75	13.3	1.2
1.005	111.710	0.000	0.0	28	0.0	32	0.47	0.75	13.3	1.3
1.006	111.567	0.000	0.0	28	0.0	22	0.81	1.64	28.9	1.3
3.000	110.860	0.000	0.0	15	0.0	22	0.43	0.88	15.5	0.7

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Network Design Table for Foul Network 2

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.007	35.335	0.262	134.9	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.008	21.005	1.541	13.6	0.000	6	0.0	1.500	o	150	Pipe/Conduit	
4.000	41.037	0.304	135.0	0.000	9	0.0	1.500	o	150	Pipe/Conduit	
1.009	47.405	0.627	75.6	0.000	12	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	E Area (ha)	E Base Flow (l/s)	E Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.007	110.670	0.000	0.0	43	0.0	39	0.54	0.75	13.3	2.0
1.008	110.408	0.000	0.0	49	0.0	24	1.25	2.38	42.1	2.3
4.000	109.171	0.000	0.0	9	0.0	18	0.33	0.75	13.3	0.4
1.009	108.867	0.000	0.0	70	0.0	43	0.76	1.01	17.8	3.2

FOUL SEWER DESIGN

Foul Manhole Schedules

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Manhole Schedules for Foul Network 2

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	Pipe Out			Pipes In			Backdrop (mm)
					PN	Invert Level (m)	Diameter (mm)	PN	Invert Level (m)	Diameter (mm)	
F201	116.004	2.554	Open Manhole	1200	1.000	113.450	150				
F202	115.678	2.418	Open Manhole	1200	1.001	113.260	150	1.000	113.260	150	
F203	115.449	2.316	Open Manhole	1200	1.002	113.133	150	1.001	113.133	150	
F204	116.727	1.800	Open Manhole	1200	2.000	114.927	150				
F205	116.037	1.806	Open Manhole	1200	2.001	114.231	150	2.000	114.231	150	
F206	115.110	2.361	Open Manhole	1350	1.003	112.749	150	1.002	112.749	150	
								2.001	112.749	150	
F207	114.027	2.181	Open Manhole	1200	1.004	111.846	150	1.003	111.846	150	
F208	113.592	1.882	Open Manhole	1350	1.005	111.710	150	1.004	111.710	150	
F209	113.271	1.704	Open Manhole	1200	1.006	111.567	150	1.005	111.567	150	
F210	113.209	2.349	Open Manhole	1200	3.000	110.860	150				
F211	112.960	2.290	Open Manhole	1350	1.007	110.670	150	1.006	110.670	150	
								3.000	110.670	150	
F212	112.258	1.850	Open Manhole	1200	1.008	110.408	150	1.007	110.408	150	
F213	110.962	1.791	Open Manhole	1200	4.000	109.171	150				
F214	111.576	2.709	Open Manhole	1350	1.009	108.867	150	1.008	108.867	150	
								4.000	108.867	150	
F20	109.898	1.658	Open Manhole	1200		OUTFALL		1.009	108.240	150	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
F201	360511.445	437892.161	360511.445	437892.161	Required	
F202	360496.874	437879.950	360496.874	437879.950	Required	
F203	360487.094	437865.949	360487.094	437865.949	Required	
F204	360525.779	437821.377	360525.779	437821.377	Required	
F205	360502.279	437818.513	360502.279	437818.513	Required	
F206	360472.818	437826.985	360472.818	437826.985	Required	

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Manhole Schedules for Foul Network 2

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
F207	360440.629	437836.123	360440.629	437836.123	Required	
F208	360428.727	437850.145	360428.727	437850.145	Required	
F209	360424.604	437868.968	360424.604	437868.968	Required	
F210	360429.710	437904.575	360429.710	437904.575	Required	
F211	360414.742	437892.859	360414.742	437892.859	Required	
F212	360379.412	437893.476	360379.412	437893.476	Required	
F213	360339.489	437866.868	360339.489	437866.868	Required	
F214	360360.317	437902.228	360360.317	437902.228	Required	
F20	360321.419	437929.324			No Entry	

Foul Water Network 3

FOUL SEWER DESIGN

Foul Design Details

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FOUL SEWERAGE DESIGN











Design Criteria for Foul Network 3

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	0
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.200
Flow Per Person (l/per/day)	222.00	Maximum Backdrop Height (m)	1.500
Persons per House	3.00	Min Design Depth for Optimisation (m)	1.200
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500


Designed with Level Soffits

Network Design Table for Foul Network 3











PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	60.334	0.603	100.1	0.000	7	0.0	1.500	o	150	Pipe/Conduit	
2.000	56.779	2.969	19.1	0.000	6	0.0	1.500	o	150	Pipe/Conduit	
1.001	75.976	2.250	33.8	0.000	12	0.0	1.500	o	150	Pipe/Conduit	
3.000	28.239	0.466	60.6	0.000	13	0.0	1.500	o	150	Pipe/Conduit	
1.002	46.479	1.343	34.6	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
1.003	24.445	0.707	34.6	0.000	6	0.0	1.500	o	150	Pipe/Conduit	
1.004	31.403	0.908	34.6	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.005	32.574	0.937	34.8	0.000	2	0.0	1.500	o	150	Pipe/Conduit	
1.006	17.710	0.131	135.2	0.000	7	0.0	1.500	o	150	Pipe/Conduit	
1.007	26.316	0.195	135.0	0.000	3	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	E Area (ha)	E Base Flow (l/s)	E Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	114.507	0.000	0.0	7	0.0	15	0.34	0.88	15.5	0.3
2.000	116.873	0.000	0.0	6	0.0	10	0.57	2.01	35.5	0.3
1.001	113.904	0.000	0.0	25	0.0	22	0.74	1.51	26.7	1.2
3.000	112.120	0.000	0.0	13	0.0	18	0.49	1.13	19.9	0.6
1.002	111.654	0.000	0.0	43	0.0	28	0.87	1.49	26.4	2.0
1.003	110.311	0.000	0.0	49	0.0	30	0.91	1.49	26.4	2.3
1.004	109.604	0.000	0.0	49	0.0	30	0.91	1.49	26.4	2.3
1.005	108.696	0.000	0.0	51	0.0	31	0.92	1.49	26.3	2.4
1.006	107.759	0.000	0.0	58	0.0	46	0.59	0.75	13.3	2.7
1.007	107.628	0.000	0.0	61	0.0	47	0.60	0.75	13.3	2.8

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Network Design Table for Foul Network 3

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.008	28.432	0.211	134.7	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.009	14.716	0.154	95.6	0.000	9	0.0	1.500	o	150	Pipe/Conduit	
4.000	22.656	2.248	10.1	0.000	15	0.0	1.500	o	150	Pipe/Conduit	
1.010	9.126	0.091	100.3	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
5.000	29.446	0.260	113.3	0.000	8	0.0	1.500	o	150	Pipe/Conduit	
5.001	23.998	0.213	112.7	0.000	8	0.0	1.500	o	150	Pipe/Conduit	
1.011	57.766	1.457	39.6	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.012	25.668	0.190	135.1	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.013	25.667	0.145	177.0	0.000	3	0.0	1.500	o	225	Pipe/Conduit	
1.014	26.249	0.141	186.2	0.000	4	0.0	1.500	o	225	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.008	107.433	0.000	0.0	61	0.0	47	0.60	0.75	13.3	2.8
1.009	107.222	0.000	0.0	70	0.0	46	0.70	0.90	15.8	3.2
4.000	109.317	0.000	0.0	15	0.0	13	0.96	2.77	49.0	0.7
1.010	107.068	0.000	0.0	85	0.0	52	0.73	0.87	15.5	3.9
5.000	107.450	0.000	0.0	8	0.0	17	0.34	0.82	14.5	0.4
5.001	107.190	0.000	0.0	16	0.0	23	0.42	0.82	14.6	0.7
1.011	106.977	0.000	0.0	101	0.0	44	1.07	1.39	24.6	4.7
1.012	105.520	0.000	0.0	101	0.0	61	0.69	0.75	13.3	4.7
1.013	105.255	0.000	0.0	104	0.0	57	0.61	0.86	34.3	4.8
1.014	105.110	0.000	0.0	108	0.0	59	0.60	0.84	33.4	5.0

FOUL SEWER DESIGN

Foul Manhole Schedules

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Manhole Schedules for Foul Network 3

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
F301	116.381	1.874	Open Manhole	1350	1.000	114.507	150				
F302	118.700	1.827	Open Manhole	1200	2.000	116.873	150				
F303	116.825	2.921	Open Manhole	1800	1.001	113.904	150	1.000	113.904	150	
								2.000	113.904	150	
F305	114.524	2.404	Open Manhole	1200	3.000	112.120	150				
F306	114.309	2.655	Open Manhole	1350	1.002	111.654	150	1.001	111.654	150	
								3.000	111.654	150	
F307	112.576	2.265	Open Manhole	1200	1.003	110.311	150	1.002	110.311	150	
F308	111.640	2.036	Open Manhole	1350	1.004	109.604	150	1.003	109.604	150	
F309	111.857	3.161	Open Manhole	1200	1.005	108.696	150	1.004	108.696	150	
F310	111.492	3.733	Open Manhole	1200	1.006	107.759	150	1.005	107.759	150	
F311	111.216	3.588	Open Manhole	1350	1.007	107.628	150	1.006	107.628	150	
F312	110.710	3.277	Open Manhole	1200	1.008	107.433	150	1.007	107.433	150	
F313	110.267	3.045	Open Manhole	1200	1.009	107.222	150	1.008	107.222	150	
F314	111.086	1.769	Open Manhole	1200	4.000	109.317	150				
F315	110.112	3.044	Open Manhole	1200	1.010	107.068	150	1.009	107.068	150	
								4.000	107.069	150	
F316	109.169	1.719	Open Manhole	1350	5.000	107.450	150				
F317	109.853	2.663	Open Manhole	1350	5.001	107.190	150	5.000	107.190	150	
F318	109.682	2.705	Open Manhole	1350	1.011	106.977	150	1.010	106.977	150	
								5.001	106.977	150	
F319	107.323	1.803	Open Manhole	1200	1.012	105.520	150	1.011	105.520	150	
F320	107.336	2.081	Open Manhole	1350	1.013	105.255	225	1.012	105.330	150	
F321	106.984	1.874	Open Manhole	1200	1.014	105.110	225	1.013	105.110	225	
F23	106.952	1.983	Open Manhole	1200		OUTFALL		1.014	104.969	225	

1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
F301	360534.166	437908.238	360534.166	437908.238	Required	
F302	360616.360	437898.323	360616.360	437898.323	Required	
F303	360582.715	437944.060	360582.715	437944.060	Required	

4 Brindley Road
 City Park, Manchester
 Cheshire M169HQ



Date 28/09/2021 10:33
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Designed by doyleco
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Innovyze

Network 2020.1.3

Manhole Schedules for Foul Network 3

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
F305	360514.794	437988.492	360514.794	437988.492	Required	
F306	360537.578	438005.175	360537.578	438005.175	Required	
F307	360510.027	438042.608	360510.027	438042.608	Required	
F308	360495.925	438062.576	360495.925	438062.576	Required	
F309	360469.391	438045.780	360469.391	438045.780	Required	
F310	360441.868	438028.358	360441.868	438028.358	Required	
F311	360424.802	438023.626	360424.802	438023.626	Required	
F312	360399.443	438016.594	360399.443	438016.594	Required	
F313	360374.699	438002.590	360374.699	438002.590	Required	
F314	360381.771	437977.818	360381.771	437977.818	Required	
F315	360364.270	437992.207	360364.270	437992.207	Required	
F316	360314.887	437966.073	360314.887	437966.073	Required	
F317	360339.658	437981.726	360339.658	437981.726	Required	
F318	360357.194	437997.970	360357.194	437997.970	Required	
F319	360319.984	438042.155	360319.984	438042.155	Required	

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 City Park, Manchester
 Cheshire M169HQ



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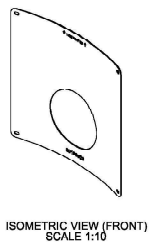
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Network 2020.1.3

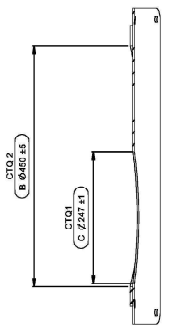
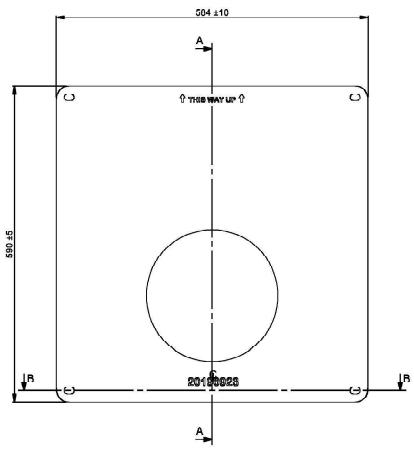
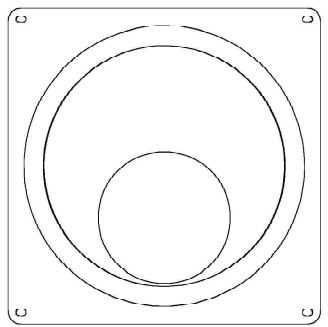
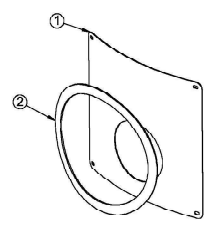
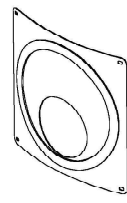
Manhole Schedules for Foul Network 3

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
F320	360299.350	438026.888	360299.350	438026.888	Required	
F321	360278.717	438011.621	360278.717	438011.621	Required	
F23	360259.016	437994.275			No Entry	

ITEM NO.	Description	WEIGHT	QTY.
1	OPLATE ROUND WALL FRONT PLATE	7.12	1
2	OUTLET PIPE SCAL	0.271	1



SECTION A-A
SCALE 1:10



SECTION A-A



SECTION B-B

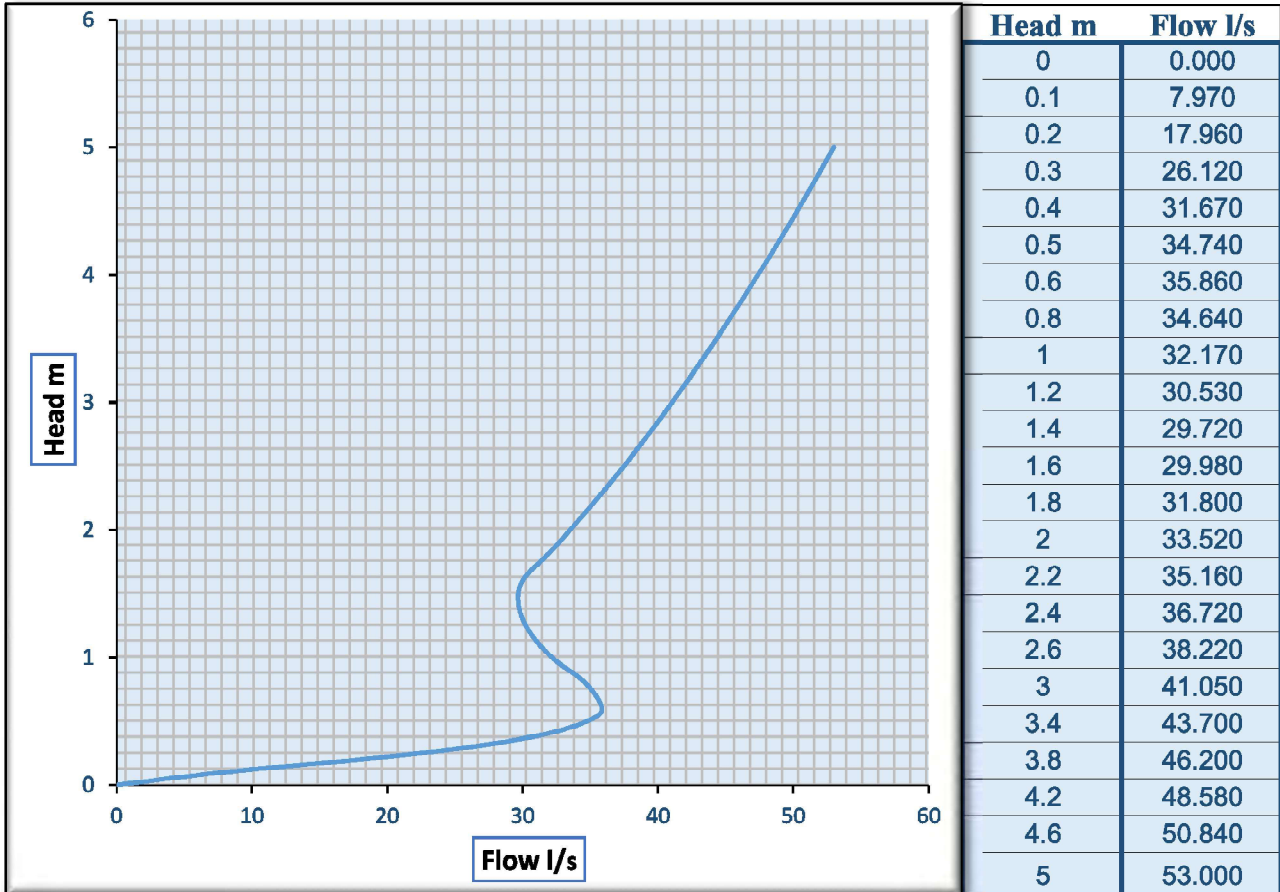
<p>ACO Business Park 1500 Road Salford Greater Manchester M6 7ST, UK Tel: 0161 2750000 www.aco.co.uk</p>	<p>Drawing Number: Q-PLATE-RW SL20190923</p> <p>Title: ACO QPLATE ROUND WALL</p>	<p>Part Number: SEE TABLE</p>
	<p>Project No: N/A</p> <p>Created By: Created at: 23/09/2019</p> <p>Material: N/A - ASSEMBLY</p> <p>Surface Finish: SEE NOTES</p> <p>Weight: 7.49kg</p> <p>Production Note: DNV ID: 10010</p>	

CROWN WATER Data Sheet

230 mm QR5 Type Vortex Flow Control

Job Ref : 4280619

Client Name	Baratt Homes	Date	28/06/2019
Project Name	Chipping Lane, Longridg	For the attention of	Corinne Doyle



Design Flow	42.4 l/s	Flush Flow	35.93 l/s
Design Head	3.2 m	At Head	0.611 m
Minimum Pipe	300 mm	Kickback Flow	29.37 l/s
Sump Depth	540 mm	At Head	1.491 m

Note: Surface Water Only

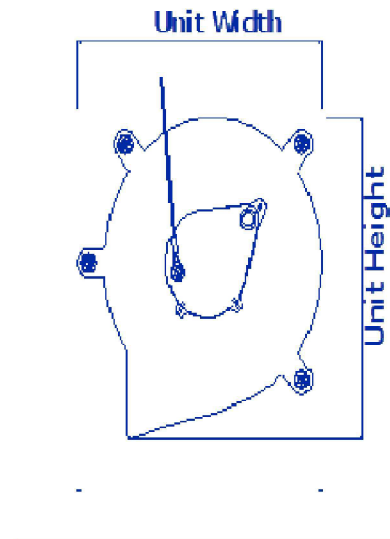
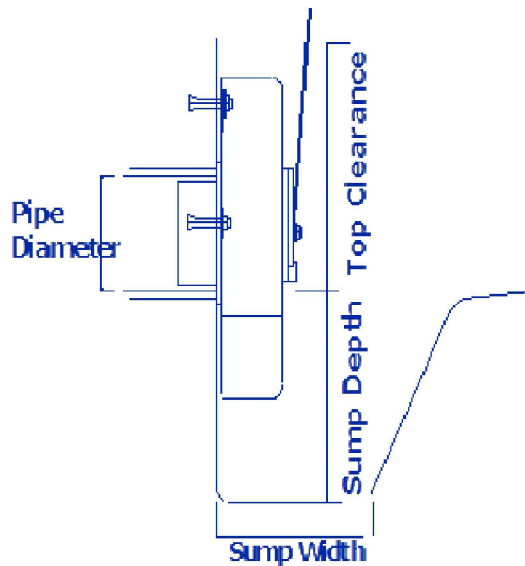
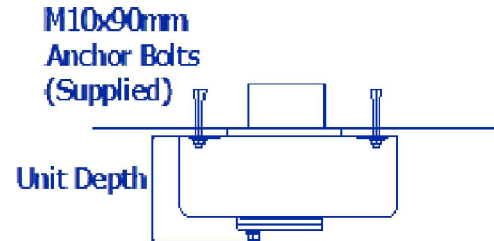
Crown Water Ltd
Index House
Ascot SL5 7ET
Tel 01344 886996 Fax 01344 886646
sales@crownwater.com
 Company Registration Number 9514593



230 mm QR5 Type Vortex Flow Control

Client Name	Baratt Homes	Date	28/06/2019
Project Name	Chipping Lane, Longridg	For the attention of	Corinne Doyle

Crown Water Radial Type Vortex Flow Control Unit Installation Guide



Unit Outlet Diameter	230mm	Sump Depth (Min)	540 mm
Unit Height	1160 mm	Sump Width (Min)	420 mm
Unit Width	1110 mm	Pipe Diameter (Min)	300mm
Unit Depth	270 mm	Top Clearance(Min)	750 mm

Note: Surface Water Only

Crown Water Ltd
Index House
Ascot SL5 7ET
Tel 01344 886996 Fax 01344 886646
sales@crownwater.com
 Company Registration Number 9514593

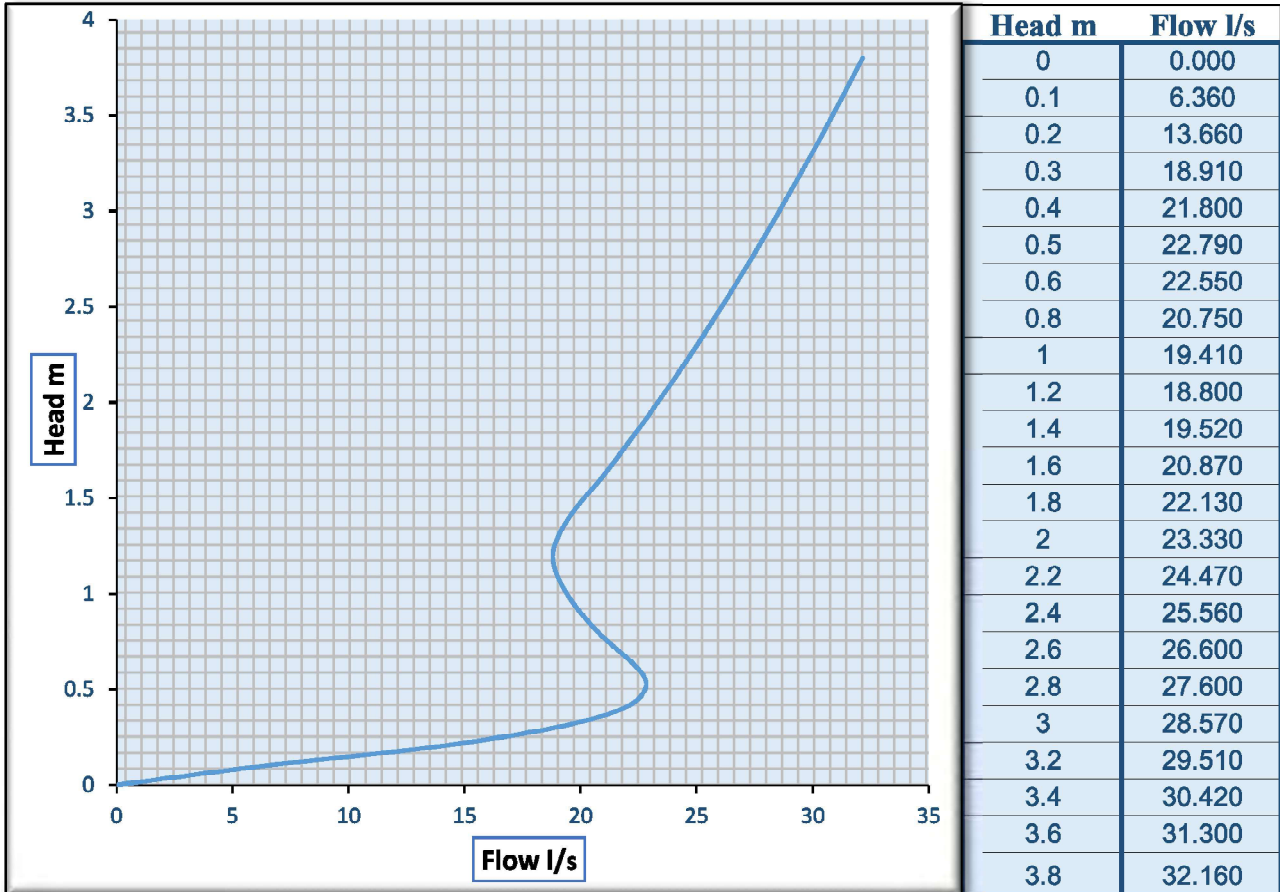


CROWN WATER Data Sheet

192 mm QR5 Type Vortex Flow Control

Job Ref : 4280619

Client Name	Baratt Homes	Date	28/06/2019
Project Name	Chipping Lane, Longridg	For the attention of	Corinne Doyle



Design Flow	26.6 l/s	Flush Flow	22.83 l/s
Design Head	2.6 m	At Head	0.509 m
Minimum Pipe	225 mm	Kickback Flow	18.67 l/s
Sump Depth	470 mm	At Head	1.244 m

Note: Surface Water Only

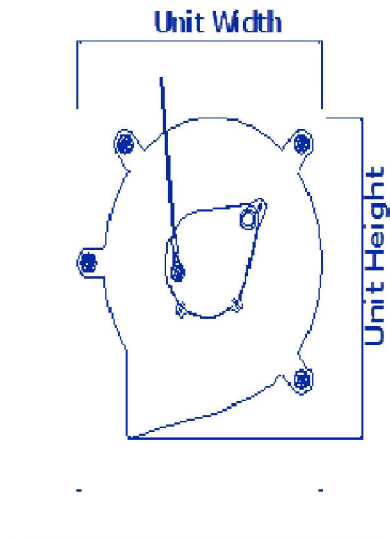
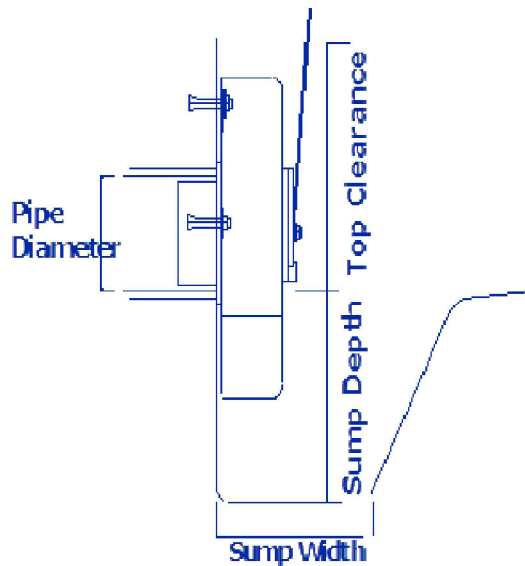
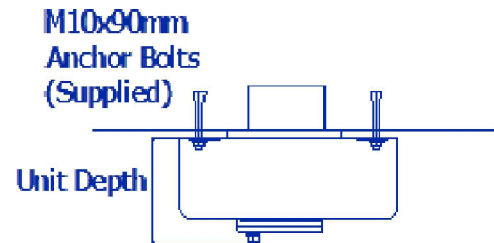
Crown Water Ltd
Index House
Ascot SL5 7ET
Tel 01344 886996 Fax 01344 886646
sales@crownwater.com
 Company Registration Number 9514593



192 mm QR5 Type Vortex Flow Control

Client Name	Baratt Homes	Date	28/06/2019
Project Name	Chipping Lane, Longridg	For the attention of	Corinne Doyle

Crown Water Radial Type Vortex Flow Control Unit Installation Guide



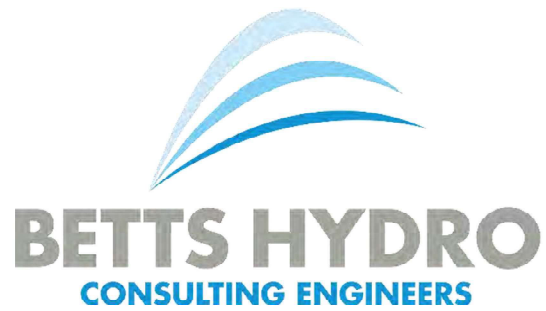
Unit Outlet Diameter	192mm	Sump Depth (Min)	470 mm
Unit Height	980 mm	Sump Width (Min)	380 mm
Unit Width	930 mm	Pipe Diameter (Min)	225mm
Unit Depth	230 mm	Top Clearance(Min)	605 mm

Note: Surface Water Only

Crown Water Ltd
Index House
Ascot SL5 7ET
Tel 01344 886996 Fax 01344 886646
sales@crownwater.com
 Company Registration Number 9514593



Appendix E
Extract from FRA for Phase 1



Chipping Lane, Longridge

**FLOOD RISK ASSESSMENT
& SUSTAINABLE DRAINAGE ASSESSMENT**



For

Barratt Homes
BDW Trading Limited
Barratt House, Cartwright Way,
Forest Business Park, Bardon Hill,
Coalville,
Leicestershire,
LE67 1UF



March 2016

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