


Kirksaunders Associates Ltd		Page 1
Templegate House 115-123 High Street Orpington Kent BR6 0LG	Lower Horsebridge Network Model	
Date 20/01/2017 File 6369 - NETWORK MODEL WI...	Designed by S.Kanadia Checked by G.Wilby	
Micro Drainage	Network 2016.1.1	

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)	20.600	Add Flow / Climate Change (%)	40
Ratio R	0.359	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	5	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

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
S1.000	26.630	0.410	65.0	0.186	5.00	0.0	0.600	o	225	Pipe/Conduit	
S2.000	11.411	0.029	400.0	0.000	5.00	0.0	0.600	o	225	Pipe/Conduit	
S3.000	14.653	0.037	396.0	0.000	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	14.106	0.081	174.1	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	26.721	0.153	174.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.003	43.063	1.025	42.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.004	50.484	0.177	285.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.005	36.441	0.182	200.2	0.000	0.00	0.0	0.600	o	300	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)
S1.000	5.00	5.27	16.580	0.186	0.0	0.0	1.0	1.63	64.6	3.5
S2.000	5.00	5.29	16.198	0.000	0.0	0.0	0.0	0.65	25.8	0.0
S3.000	5.00	5.38	16.206	0.000	0.0	0.0	0.0	0.65	25.9	0.0
S1.001	5.00	5.61	16.169	0.186	0.0	0.0	1.0	0.99	39.3	3.5
S1.002	5.00	6.06	16.088	0.186	0.0	0.0	1.0	0.99	39.2	3.5
S1.003	5.00	6.42	15.935	0.186	0.0	0.0	1.0	2.02	80.5	3.5
S1.004	5.00	7.33	14.855	0.186	0.0	0.0	1.0	0.93	65.5	3.5
S1.005	5.00	7.88	14.678	0.186	0.0	0.0	1.0	1.11	78.3	3.5



Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.186	0.186	0.186
2.000	-	-	100	0.000	0.000	0.000
3.000	-	-	100	0.000	0.000	0.000
1.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.186	0.186	0.186

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)
S1.005	S	15.800	14.496	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	17.630	26	17.630	51	17.630	76	17.630	101	17.630	126	17.630
2	17.630	27	17.630	52	17.630	77	17.630	102	17.630	127	17.630
3	17.630	28	17.630	53	17.630	78	17.630	103	17.630	128	17.630
4	17.630	29	17.630	54	17.630	79	17.630	104	17.630	129	17.630
5	17.630	30	17.630	55	17.630	80	17.630	105	17.630	130	17.630
6	17.630	31	17.630	56	17.630	81	17.630	106	17.630	131	17.630
7	17.630	32	17.630	57	17.630	82	17.630	107	17.630	132	17.630
8	17.630	33	17.630	58	17.630	83	17.630	108	17.630	133	17.630
9	17.630	34	17.630	59	17.630	84	17.630	109	17.630	134	17.630
10	17.630	35	17.630	60	17.630	85	17.630	110	17.630	135	17.630
11	17.630	36	17.630	61	17.630	86	17.630	111	17.630	136	17.630
12	17.630	37	17.630	62	17.630	87	17.630	112	17.630	137	17.630
13	17.630	38	17.630	63	17.630	88	17.630	113	17.630	138	17.630
14	17.630	39	17.630	64	17.630	89	17.630	114	17.630	139	17.630
15	17.630	40	17.630	65	17.630	90	17.630	115	17.630	140	17.630
16	17.630	41	17.630	66	17.630	91	17.630	116	17.630	141	17.630
17	17.630	42	17.630	67	17.630	92	17.630	117	17.630	142	17.630
18	17.630	43	17.630	68	17.630	93	17.630	118	17.630	143	17.630
19	17.630	44	17.630	69	17.630	94	17.630	119	17.630	144	17.630
20	17.630	45	17.630	70	17.630	95	17.630	120	17.630	145	17.630
21	17.630	46	17.630	71	17.630	96	17.630	121	17.630	146	17.630
22	17.630	47	17.630	72	17.630	97	17.630	122	17.630	147	17.630
23	17.630	48	17.630	73	17.630	98	17.630	123	17.630	148	17.630
24	17.630	49	17.630	74	17.630	99	17.630	124	17.630	149	17.630
25	17.630	50	17.630	75	17.630	100	17.630	125	17.630	150	17.630

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
151	17.630	201	17.630	251	17.630	301	17.630	351	17.630	401	17.630
152	17.630	202	17.630	252	17.630	302	17.630	352	17.630	402	17.630
153	17.630	203	17.630	253	17.630	303	17.630	353	17.630	403	17.630
154	17.630	204	17.630	254	17.630	304	17.630	354	17.630	404	17.630
155	17.630	205	17.630	255	17.630	305	17.630	355	17.630	405	17.630
156	17.630	206	17.630	256	17.630	306	17.630	356	17.630	406	17.630
157	17.630	207	17.630	257	17.630	307	17.630	357	17.630	407	17.630
158	17.630	208	17.630	258	17.630	308	17.630	358	17.630	408	17.630
159	17.630	209	17.630	259	17.630	309	17.630	359	17.630	409	17.630
160	17.630	210	17.630	260	17.630	310	17.630	360	17.630	410	17.630
161	17.630	211	17.630	261	17.630	311	17.630	361	17.630	411	17.630
162	17.630	212	17.630	262	17.630	312	17.630	362	17.630	412	17.630
163	17.630	213	17.630	263	17.630	313	17.630	363	17.630	413	17.630
164	17.630	214	17.630	264	17.630	314	17.630	364	17.630	414	17.630
165	17.630	215	17.630	265	17.630	315	17.630	365	17.630	415	17.630
166	17.630	216	17.630	266	17.630	316	17.630	366	17.630	416	17.630
167	17.630	217	17.630	267	17.630	317	17.630	367	17.630	417	17.630
168	17.630	218	17.630	268	17.630	318	17.630	368	17.630	418	17.630
169	17.630	219	17.630	269	17.630	319	17.630	369	17.630	419	17.630
170	17.630	220	17.630	270	17.630	320	17.630	370	17.630	420	17.630
171	17.630	221	17.630	271	17.630	321	17.630	371	17.630	421	17.630
172	17.630	222	17.630	272	17.630	322	17.630	372	17.630	422	17.630
173	17.630	223	17.630	273	17.630	323	17.630	373	17.630	423	17.630
174	17.630	224	17.630	274	17.630	324	17.630	374	17.630	424	17.630
175	17.630	225	17.630	275	17.630	325	17.630	375	17.630	425	17.630
176	17.630	226	17.630	276	17.630	326	17.630	376	17.630	426	17.630
177	17.630	227	17.630	277	17.630	327	17.630	377	17.630	427	17.630
178	17.630	228	17.630	278	17.630	328	17.630	378	17.630	428	17.630
179	17.630	229	17.630	279	17.630	329	17.630	379	17.630	429	17.630
180	17.630	230	17.630	280	17.630	330	17.630	380	17.630	430	17.630
181	17.630	231	17.630	281	17.630	331	17.630	381	17.630	431	17.630
182	17.630	232	17.630	282	17.630	332	17.630	382	17.630	432	17.630
183	17.630	233	17.630	283	17.630	333	17.630	383	17.630	433	17.630
184	17.630	234	17.630	284	17.630	334	17.630	384	17.630	434	17.630
185	17.630	235	17.630	285	17.630	335	17.630	385	17.630	435	17.630
186	17.630	236	17.630	286	17.630	336	17.630	386	17.630	436	17.630
187	17.630	237	17.630	287	17.630	337	17.630	387	17.630	437	17.630
188	17.630	238	17.630	288	17.630	338	17.630	388	17.630	438	17.630
189	17.630	239	17.630	289	17.630	339	17.630	389	17.630	439	17.630
190	17.630	240	17.630	290	17.630	340	17.630	390	17.630	440	17.630
191	17.630	241	17.630	291	17.630	341	17.630	391	17.630	441	17.630
192	17.630	242	17.630	292	17.630	342	17.630	392	17.630	442	17.630
193	17.630	243	17.630	293	17.630	343	17.630	393	17.630	443	17.630
194	17.630	244	17.630	294	17.630	344	17.630	394	17.630	444	17.630
195	17.630	245	17.630	295	17.630	345	17.630	395	17.630	445	17.630
196	17.630	246	17.630	296	17.630	346	17.630	396	17.630	446	17.630
197	17.630	247	17.630	297	17.630	347	17.630	397	17.630	447	17.630
198	17.630	248	17.630	298	17.630	348	17.630	398	17.630	448	17.630
199	17.630	249	17.630	299	17.630	349	17.630	399	17.630	449	17.630
200	17.630	250	17.630	300	17.630	350	17.630	400	17.630	450	17.630



Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
451	17.630	501	17.630	551	17.630	601	17.630	651	17.630	701	17.630
452	17.630	502	17.630	552	17.630	602	17.630	652	17.630	702	17.630
453	17.630	503	17.630	553	17.630	603	17.630	653	17.630	703	17.630
454	17.630	504	17.630	554	17.630	604	17.630	654	17.630	704	17.630
455	17.630	505	17.630	555	17.630	605	17.630	655	17.630	705	17.630
456	17.630	506	17.630	556	17.630	606	17.630	656	17.630	706	17.630
457	17.630	507	17.630	557	17.630	607	17.630	657	17.630	707	17.630
458	17.630	508	17.630	558	17.630	608	17.630	658	17.630	708	17.630
459	17.630	509	17.630	559	17.630	609	17.630	659	17.630	709	17.630
460	17.630	510	17.630	560	17.630	610	17.630	660	17.630	710	17.630
461	17.630	511	17.630	561	17.630	611	17.630	661	17.630	711	17.630
462	17.630	512	17.630	562	17.630	612	17.630	662	17.630	712	17.630
463	17.630	513	17.630	563	17.630	613	17.630	663	17.630	713	17.630
464	17.630	514	17.630	564	17.630	614	17.630	664	17.630	714	17.630
465	17.630	515	17.630	565	17.630	615	17.630	665	17.630	715	17.630
466	17.630	516	17.630	566	17.630	616	17.630	666	17.630	716	17.630
467	17.630	517	17.630	567	17.630	617	17.630	667	17.630	717	17.630
468	17.630	518	17.630	568	17.630	618	17.630	668	17.630	718	17.630
469	17.630	519	17.630	569	17.630	619	17.630	669	17.630	719	17.630
470	17.630	520	17.630	570	17.630	620	17.630	670	17.630	720	17.630
471	17.630	521	17.630	571	17.630	621	17.630	671	17.630	721	17.630
472	17.630	522	17.630	572	17.630	622	17.630	672	17.630	722	17.630
473	17.630	523	17.630	573	17.630	623	17.630	673	17.630	723	17.630
474	17.630	524	17.630	574	17.630	624	17.630	674	17.630	724	17.630
475	17.630	525	17.630	575	17.630	625	17.630	675	17.630	725	17.630
476	17.630	526	17.630	576	17.630	626	17.630	676	17.630	726	17.630
477	17.630	527	17.630	577	17.630	627	17.630	677	17.630	727	17.630
478	17.630	528	17.630	578	17.630	628	17.630	678	17.630	728	17.630
479	17.630	529	17.630	579	17.630	629	17.630	679	17.630	729	17.630
480	17.630	530	17.630	580	17.630	630	17.630	680	17.630	730	17.630
481	17.630	531	17.630	581	17.630	631	17.630	681	17.630	731	17.630
482	17.630	532	17.630	582	17.630	632	17.630	682	17.630	732	17.630
483	17.630	533	17.630	583	17.630	633	17.630	683	17.630	733	17.630
484	17.630	534	17.630	584	17.630	634	17.630	684	17.630	734	17.630
485	17.630	535	17.630	585	17.630	635	17.630	685	17.630	735	17.630
486	17.630	536	17.630	586	17.630	636	17.630	686	17.630	736	17.630
487	17.630	537	17.630	587	17.630	637	17.630	687	17.630	737	17.630
488	17.630	538	17.630	588	17.630	638	17.630	688	17.630	738	17.630
489	17.630	539	17.630	589	17.630	639	17.630	689	17.630	739	17.630
490	17.630	540	17.630	590	17.630	640	17.630	690	17.630	740	17.630
491	17.630	541	17.630	591	17.630	641	17.630	691	17.630	741	17.630
492	17.630	542	17.630	592	17.630	642	17.630	692	17.630	742	17.630
493	17.630	543	17.630	593	17.630	643	17.630	693	17.630	743	17.630
494	17.630	544	17.630	594	17.630	644	17.630	694	17.630	744	17.630
495	17.630	545	17.630	595	17.630	645	17.630	695	17.630	745	17.630
496	17.630	546	17.630	596	17.630	646	17.630	696	17.630	746	17.630
497	17.630	547	17.630	597	17.630	647	17.630	697	17.630	747	17.630
498	17.630	548	17.630	598	17.630	648	17.630	698	17.630	748	17.630
499	17.630	549	17.630	599	17.630	649	17.630	699	17.630	749	17.630
500	17.630	550	17.630	600	17.630	650	17.630	700	17.630	750	17.630



Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
751	17.630	801	17.630	851	17.630	901	17.630	951	17.630	1001	17.630
752	17.630	802	17.630	852	17.630	902	17.630	952	17.630	1002	17.630
753	17.630	803	17.630	853	17.630	903	17.630	953	17.630	1003	17.630
754	17.630	804	17.630	854	17.630	904	17.630	954	17.630	1004	17.630
755	17.630	805	17.630	855	17.630	905	17.630	955	17.630	1005	17.630
756	17.630	806	17.630	856	17.630	906	17.630	956	17.630	1006	17.630
757	17.630	807	17.630	857	17.630	907	17.630	957	17.630	1007	17.630
758	17.630	808	17.630	858	17.630	908	17.630	958	17.630	1008	17.630
759	17.630	809	17.630	859	17.630	909	17.630	959	17.630	1009	17.630
760	17.630	810	17.630	860	17.630	910	17.630	960	17.630	1010	17.630
761	17.630	811	17.630	861	17.630	911	17.630	961	17.630	1011	17.630
762	17.630	812	17.630	862	17.630	912	17.630	962	17.630	1012	17.630
763	17.630	813	17.630	863	17.630	913	17.630	963	17.630	1013	17.630
764	17.630	814	17.630	864	17.630	914	17.630	964	17.630	1014	17.630
765	17.630	815	17.630	865	17.630	915	17.630	965	17.630	1015	17.630
766	17.630	816	17.630	866	17.630	916	17.630	966	17.630	1016	17.630
767	17.630	817	17.630	867	17.630	917	17.630	967	17.630	1017	17.630
768	17.630	818	17.630	868	17.630	918	17.630	968	17.630	1018	17.630
769	17.630	819	17.630	869	17.630	919	17.630	969	17.630	1019	17.630
770	17.630	820	17.630	870	17.630	920	17.630	970	17.630	1020	17.630
771	17.630	821	17.630	871	17.630	921	17.630	971	17.630	1021	17.630
772	17.630	822	17.630	872	17.630	922	17.630	972	17.630	1022	17.630
773	17.630	823	17.630	873	17.630	923	17.630	973	17.630	1023	17.630
774	17.630	824	17.630	874	17.630	924	17.630	974	17.630	1024	17.630
775	17.630	825	17.630	875	17.630	925	17.630	975	17.630	1025	17.630
776	17.630	826	17.630	876	17.630	926	17.630	976	17.630	1026	17.630
777	17.630	827	17.630	877	17.630	927	17.630	977	17.630	1027	17.630
778	17.630	828	17.630	878	17.630	928	17.630	978	17.630	1028	17.630
779	17.630	829	17.630	879	17.630	929	17.630	979	17.630	1029	17.630
780	17.630	830	17.630	880	17.630	930	17.630	980	17.630	1030	17.630
781	17.630	831	17.630	881	17.630	931	17.630	981	17.630	1031	17.630
782	17.630	832	17.630	882	17.630	932	17.630	982	17.630	1032	17.630
783	17.630	833	17.630	883	17.630	933	17.630	983	17.630	1033	17.630
784	17.630	834	17.630	884	17.630	934	17.630	984	17.630	1034	17.630
785	17.630	835	17.630	885	17.630	935	17.630	985	17.630	1035	17.630
786	17.630	836	17.630	886	17.630	936	17.630	986	17.630	1036	17.630
787	17.630	837	17.630	887	17.630	937	17.630	987	17.630	1037	17.630
788	17.630	838	17.630	888	17.630	938	17.630	988	17.630	1038	17.630
789	17.630	839	17.630	889	17.630	939	17.630	989	17.630	1039	17.630
790	17.630	840	17.630	890	17.630	940	17.630	990	17.630	1040	17.630
791	17.630	841	17.630	891	17.630	941	17.630	991	17.630	1041	17.630
792	17.630	842	17.630	892	17.630	942	17.630	992	17.630	1042	17.630
793	17.630	843	17.630	893	17.630	943	17.630	993	17.630	1043	17.630
794	17.630	844	17.630	894	17.630	944	17.630	994	17.630	1044	17.630
795	17.630	845	17.630	895	17.630	945	17.630	995	17.630	1045	17.630
796	17.630	846	17.630	896	17.630	946	17.630	996	17.630	1046	17.630
797	17.630	847	17.630	897	17.630	947	17.630	997	17.630	1047	17.630
798	17.630	848	17.630	898	17.630	948	17.630	998	17.630	1048	17.630
799	17.630	849	17.630	899	17.630	949	17.630	999	17.630	1049	17.630
800	17.630	850	17.630	900	17.630	950	17.630	1000	17.630	1050	17.630

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1051	17.630	1101	17.630	1151	17.630	1201	17.630	1251	17.630	1301	17.630
1052	17.630	1102	17.630	1152	17.630	1202	17.630	1252	17.630	1302	17.630
1053	17.630	1103	17.630	1153	17.630	1203	17.630	1253	17.630	1303	17.630
1054	17.630	1104	17.630	1154	17.630	1204	17.630	1254	17.630	1304	17.630
1055	17.630	1105	17.630	1155	17.630	1205	17.630	1255	17.630	1305	17.630
1056	17.630	1106	17.630	1156	17.630	1206	17.630	1256	17.630	1306	17.630
1057	17.630	1107	17.630	1157	17.630	1207	17.630	1257	17.630	1307	17.630
1058	17.630	1108	17.630	1158	17.630	1208	17.630	1258	17.630	1308	17.630
1059	17.630	1109	17.630	1159	17.630	1209	17.630	1259	17.630	1309	17.630
1060	17.630	1110	17.630	1160	17.630	1210	17.630	1260	17.630	1310	17.630
1061	17.630	1111	17.630	1161	17.630	1211	17.630	1261	17.630	1311	17.630
1062	17.630	1112	17.630	1162	17.630	1212	17.630	1262	17.630	1312	17.630
1063	17.630	1113	17.630	1163	17.630	1213	17.630	1263	17.630	1313	17.630
1064	17.630	1114	17.630	1164	17.630	1214	17.630	1264	17.630	1314	17.630
1065	17.630	1115	17.630	1165	17.630	1215	17.630	1265	17.630	1315	17.630
1066	17.630	1116	17.630	1166	17.630	1216	17.630	1266	17.630	1316	17.630
1067	17.630	1117	17.630	1167	17.630	1217	17.630	1267	17.630	1317	17.630
1068	17.630	1118	17.630	1168	17.630	1218	17.630	1268	17.630	1318	17.630
1069	17.630	1119	17.630	1169	17.630	1219	17.630	1269	17.630	1319	17.630
1070	17.630	1120	17.630	1170	17.630	1220	17.630	1270	17.630	1320	17.630
1071	17.630	1121	17.630	1171	17.630	1221	17.630	1271	17.630	1321	17.630
1072	17.630	1122	17.630	1172	17.630	1222	17.630	1272	17.630	1322	17.630
1073	17.630	1123	17.630	1173	17.630	1223	17.630	1273	17.630	1323	17.630
1074	17.630	1124	17.630	1174	17.630	1224	17.630	1274	17.630	1324	17.630
1075	17.630	1125	17.630	1175	17.630	1225	17.630	1275	17.630	1325	17.630
1076	17.630	1126	17.630	1176	17.630	1226	17.630	1276	17.630	1326	17.630
1077	17.630	1127	17.630	1177	17.630	1227	17.630	1277	17.630	1327	17.630
1078	17.630	1128	17.630	1178	17.630	1228	17.630	1278	17.630	1328	17.630
1079	17.630	1129	17.630	1179	17.630	1229	17.630	1279	17.630	1329	17.630
1080	17.630	1130	17.630	1180	17.630	1230	17.630	1280	17.630	1330	17.630
1081	17.630	1131	17.630	1181	17.630	1231	17.630	1281	17.630	1331	17.630
1082	17.630	1132	17.630	1182	17.630	1232	17.630	1282	17.630	1332	17.630
1083	17.630	1133	17.630	1183	17.630	1233	17.630	1283	17.630	1333	17.630
1084	17.630	1134	17.630	1184	17.630	1234	17.630	1284	17.630	1334	17.630
1085	17.630	1135	17.630	1185	17.630	1235	17.630	1285	17.630	1335	17.630
1086	17.630	1136	17.630	1186	17.630	1236	17.630	1286	17.630	1336	17.630
1087	17.630	1137	17.630	1187	17.630	1237	17.630	1287	17.630	1337	17.630
1088	17.630	1138	17.630	1188	17.630	1238	17.630	1288	17.630	1338	17.630
1089	17.630	1139	17.630	1189	17.630	1239	17.630	1289	17.630	1339	17.630
1090	17.630	1140	17.630	1190	17.630	1240	17.630	1290	17.630	1340	17.630
1091	17.630	1141	17.630	1191	17.630	1241	17.630	1291	17.630	1341	17.630
1092	17.630	1142	17.630	1192	17.630	1242	17.630	1292	17.630	1342	17.630
1093	17.630	1143	17.630	1193	17.630	1243	17.630	1293	17.630	1343	17.630
1094	17.630	1144	17.630	1194	17.630	1244	17.630	1294	17.630	1344	17.630
1095	17.630	1145	17.630	1195	17.630	1245	17.630	1295	17.630	1345	17.630
1096	17.630	1146	17.630	1196	17.630	1246	17.630	1296	17.630	1346	17.630
1097	17.630	1147	17.630	1197	17.630	1247	17.630	1297	17.630	1347	17.630
1098	17.630	1148	17.630	1198	17.630	1248	17.630	1298	17.630	1348	17.630
1099	17.630	1149	17.630	1199	17.630	1249	17.630	1299	17.630	1349	17.630
1100	17.630	1150	17.630	1200	17.630	1250	17.630	1300	17.630	1350	17.630

Surcharged Outfall Details for Storm


Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1351	17.630	1366	17.630	1381	17.630	1396	17.630	1411	17.630	1426	17.630
1352	17.630	1367	17.630	1382	17.630	1397	17.630	1412	17.630	1427	17.630
1353	17.630	1368	17.630	1383	17.630	1398	17.630	1413	17.630	1428	17.630
1354	17.630	1369	17.630	1384	17.630	1399	17.630	1414	17.630	1429	17.630
1355	17.630	1370	17.630	1385	17.630	1400	17.630	1415	17.630	1430	17.630
1356	17.630	1371	17.630	1386	17.630	1401	17.630	1416	17.630	1431	17.630
1357	17.630	1372	17.630	1387	17.630	1402	17.630	1417	17.630	1432	17.630
1358	17.630	1373	17.630	1388	17.630	1403	17.630	1418	17.630	1433	17.630
1359	17.630	1374	17.630	1389	17.630	1404	17.630	1419	17.630	1434	17.630
1360	17.630	1375	17.630	1390	17.630	1405	17.630	1420	17.630	1435	17.630
1361	17.630	1376	17.630	1391	17.630	1406	17.630	1421	17.630	1436	17.630
1362	17.630	1377	17.630	1392	17.630	1407	17.630	1422	17.630	1437	17.630
1363	17.630	1378	17.630	1393	17.630	1408	17.630	1423	17.630	1438	17.630
1364	17.630	1379	17.630	1394	17.630	1409	17.630	1424	17.630	1439	17.630
1365	17.630	1380	17.630	1395	17.630	1410	17.630	1425	17.630	1440	17.630

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	30.000
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	2
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	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.600	Storm Duration (mins)	15
Ratio R	0.359		

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Templegate House 115-123 High Street Orpington Kent BR6 0LG	Lower Horsebridge Network Model	
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Micro Drainage	Network 2016.1.1	

Online Controls for Storm


Hydro-Brake® Optimum Manhole: S2, DS/PN: S1.001, Volume (m³): 4.2

Unit Reference	MD-SHE-0105-5000-1000-5000
Design Head (m)	1.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	105
Invert Level (m)	16.169
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	5.0
Flush-Flo™	0.296	5.0
Kick-Flo®	0.637	4.1
Mean Flow over Head Range	-	4.3

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.6	1.200	5.4	3.000	8.4	7.000	12.5
0.200	4.8	1.400	5.8	3.500	9.0	7.500	12.9
0.300	5.0	1.600	6.2	4.000	9.6	8.000	13.3
0.400	4.9	1.800	6.6	4.500	10.1	8.500	13.7
0.500	4.7	2.000	6.9	5.000	10.6	9.000	14.1
0.600	4.3	2.200	7.2	5.500	11.1	9.500	14.5
0.800	4.5	2.400	7.5	6.000	11.6		
1.000	5.0	2.600	7.8	6.500	12.1		

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Micro Drainage	Network 2016.1.1	

Storage Structures for Storm

Cellular Storage Manhole: S2, DS/PN: S2.000

Invert Level (m) 16.198 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	100.0	0.0	1.000	100.0	0.0

Cellular Storage Manhole: S3, DS/PN: S3.000

Invert Level (m) 16.206 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	100.0	0.0	1.000	100.0	0.0