TECHNICAL DESIGN NOTE

Hydrock

Project name	Lotmead Farm, Swindon		
Design note title	Site Wide - Drainage Strategy Summary		
Document reference	22006-HYD-P0-XX-TN-C-0002		
Author	E Partridge		
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1. BACKGROUND

This Technical Note has been prepared in support of the Reserved Matters Planning Submission and discharge of outline planning condition 46 (provided below), for the proposed Lotmead Farm development in Swindon, planning application number S/OUT/19/0582.

The Lotmead Farm development is part of the Swindon New Eastern Villages allocation, and represents approximately 2,500 new houses and associated infrastructure. The proposed drainage strategy follows the principles set out in the approved outline FRA (Ref: 27970/4003, Dated:08/03/2019) and FRA Addendum (Ref: 27970/4003/TN001, Dated: 22/08/2019) produced by PBA/Stantec.

Figure 1 Indicative Site Plan for the Overall Development

Condition 46

Prior to the approval of the first reserved matters, a strategic Surface Water Management Scheme for the site, in accordance with the approved Addendum to March 2019 Flood Risk Assessment (27970/4003/TN001) dated 22/08/19, shall be submitted to, and approved in writing by the Local Planning Authority.

- Details to demonstrate how the proposed flows from the site will be restricted to 4.67l/s/ha for all events up to and including the 1% AEP + climate change event;
- Details of how the drainage scheme has been designed to incorporate SuDS techniques to manage water quantity and maintain water quality as set out in the FRA addendum, and in accordance with adopted policy and best practice guidance including the New Eastern Villages SuDS Vision SPD and the SuDS Manual C753;
- A strategic surface water drainage plan showing the proposed location of the proposed SuDS features;
- Details of the volumes (including indicative dimensions and indicative cross sections) and proposed construction details of the proposed SuDS measures;
- Details of how the scheme shall be maintained and managed after completion;
- Detailed drainage calculations for all rainfall events up to and including the 1 in 100 year plus climate change event to demonstrate that the strategic SuDS features can cater for the critical storm event for its lifetime;
- The submission of evidence relating to accepted outfalls from the site, particularly from any third party network owners; and
- Sequencing for implementation in accordance with the approved Phasing Plan (Condition 9).

The detailed Surface Water Management Schemes for each phase or sub phase (as required by condition 48) shall be implemented in accordance with the approved details and timetable.

2. SUFACE WATER DRAINAGE STRATEGY

2.1 Pre-Development

The entirety of the Lotmead Farm development is currently undeveloped fields and would generate surface water runoff ('greenfield runoff') rate once soils are saturated. The development is adjacent to the Liden Brook, River Cole and Dorcan Stream and there are several surface water ditches crossing through the site.

Flood modelling has been undertaken for the adjacent water courses to determine the extents of flooding within the site. The extent is shown on the drainage strategy drawing 22006-HYD-XX-XX-DR-C-2002.

2.2 Post-Development

In accordance with the Sustainable Drainage Systems (SuDS) hierarchy, rainfall run-off should be managed in the following preferential order:

1. Infiltrated to ground.

2. Discharged to local watercourses.

3. Discharged to a local surface water sewer network.

4. Discharged to a local combined water sewer network.

A desk study and geotechnical report was produced by Hydrock, ref: 20786- HYD-XX-XX-RP-GE-1001. Testing identified reworked alluvium over Ampthill Clay and Kimmeridge Clay Formation. In line with the SuDS hierarchy, infiltration was investigated as the primary method of stormwater disposal for the site and soakaway testing was undertaken at SA01-08. The report concluded that soakaways were considered unsuitable for the site based on the inability of the soils to offer infiltration and as such, infiltration is not considered a viable option for surface water disposal.

Following the hierarchy, surface water runoff generated by the proposed development will be drained to the Liden Brook and River Cole via a network of attenuation devices and associated flow controls.

2.2.1 Discharge Rate

Proposed discharge rates from the development are based on the approved Flood Risk Assessment Addendum, produced by PBA/Stantec. The approved strategy divided the developable area into 18 sub-catchments with a maximum discharge rate of 4.67l/s/ha for all rainfall events up to the 1 in 100 year plus climate change.

With further design development, the catchments have been adjusted to suit the location of the proposed strategic SuDS features and to reduce the size of each catchment. The catchments still maintain a 4.67l/s/ha discharge rate in the critical event. Details of each catchment and their discharge rate are shown on drawing 22006-HYD-XX-XX-DR-C-2002 provided in Appendix B.

2.2.2 Climate Change

Following the release of the latest climate change allowances by the Environment Agency in May 2022, an allowance of 40% will be applied to the 1 in 100 year calculations, as the site is located in the Gloucestershire and the Vale Management Catchment.

2.2.3 Impermeable Areas

In the absence of a detailed site layout, the attenuation structures across the development have been sized based on a percentage impermeable area. The following assumptions have been made (as per the approved FRA Addendum):

- Residential areas = 60% PIMP
- Commercial/retail areas = 80% PIMP

2.2.4 SuDS Design

MicroDrainage software has been used to design the strategic attenuation features using the above parameters. Calculations for each catchment for the 1 in 100 year storm event plus 40% allowance for climate change are available as Appendix A with the size and locations as shown in Appendix B.

Design of each above ground SuDS component incorporates a minimum of 1 in 3 side slopes, 300mm freeboard and a 2m maintenance strip around the crest.

In addition, the SuDS are located outside of the 1 in 100-year fluvial floodplain with the invert level of the components set at or above the 1 in 100 year + 35% flood level as per the LLFA's request in response to the outline planning permission. Surcharged outfalls have also been included within the design to ensure the drainage features will operate correctly and have sufficient capacity during a flood event.

In addition to the strategic SuDS shown on the drainage strategy plan, each catchment will also utilise further source control measures to improve water quality, biodiversity, and amenity. This will include the use of over the edge swales to replace traditional gully-to-pipe drainage alongside the Southern Connector Road, with further swales, rain gardens, filter strips, and tree pits provided alongside tertiary roads.

There is potential for the attenuation requirements in strategic features to decrease during the detailed design stage as the above source control measures are included within the network. In addition, confirmation of the impermeable areas for each catchment will also affect the storage requirements.

2.3 Water Quality Analysis

As per Chapter 26 of the SuDS Manual, individual properties and general access roads are deemed to have a low-level pollution hazard and all other roads (with the exception of trunk roads/motorways) are deemed to have a medium-level pollution hazard. A simple index approach is therefore recommended to determine what measures are required to deal with any pollution that may arise. The tables below are extracts from Chapter 26 of The SuDS Manual, identifying the level of pollution hazard and pollution mitigation index respectively. The total pollution hazard indices must be less than or equal to the total SuDS mitigation indices.

Table 1: Pollution hazard indices for different land use classifications (extract from CIRIA C753 SuDS manual)

Land Use	Pollution Hazard Level	Total Suspended Solids	Metals	Hydro-carbons
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non- residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways	Medium	0.7	0.6	0.7

Table 2: Indicative SuDS mitigation indices for discharges to surface waters (extract from CIRIA C753 SuDS manual)

Land Use	Mitigation Indices		
Type of SuDS component	TSS	Metals	Hydrocarbons
Swale	0.5	0.6	0.6
Detention Basin	0.5	0.5	0.6
Mitigation Total Total SuDS mitigation index = mitigation index1 + 0.5 (mitigation index2)	0.75	0.85	0.9

Table 2 confirms that the total mitigation index of the attenuation features and swales is greater or equal to pollution hazard index in 1 and is therefore satisfactory for dealing with any potential pollution arising from the development. No further mitigation measures are required.

2.4 Exceedance & Site Levels

The site levels for each catchment will be designed such that any exceedance flows will be routed towards the site SuDS features. FFLs will be designed to be 600mm above the 1 in 100 year + 35% CC flood levels.

2.5 SuDS Maintenance and Management Plan

The main sewer systems serving this development will be offered for adoption under Section 104 of the Water Act 1991. This means that maintenance responsibilities will fall to them as the owner of the system. In the instance that Thames Water will not adopt the SuDS features, a management company will be appointed and maintenance will be undertaken in line with the below tables.

Private plot drainage (designed in accordance with Part H Building Regulations) will be maintained by individual plot owners. No communal SuDS features have been proposed within a property's curtilage and therefore no individual homeowner will be responsible for the maintenance of any shared drainage features.

Highway gulley's, roadside swales & their connections to the sewer system will remain the responsibility of Swindon Borough Council as the adopting highway authority.

2.5.1 Attenuation Basin

The attenuation basins will be planted basin, designed to temporarily hold surface water runoff, while the system discharges at a controlled rate. As a minimum the maintenance regime for the basin should comply with the Ciria SuDS Manual, see Table 3 below.

Table 3: Operation and maintenance requirements for detention basins. (C753 Ciria SuDs Manual 2015, page 502)

Maintenance Schedule	Required action	Typical Frequency
Regular Maintenance	Remove litter and debris	Monthly
	Cut grass - for spillways and access routes	Monthly (during growing season) or as required
	Cut grass - meadow grass in and around basin	Half yearly (spring - before nesting and autumn)
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Monthly (for first year), then annually or as required.
	Check any penstocks and other mechanical devices	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlets, outlet and forebay	Annually (or as required)
Occasional Maintenance	Reseed areas of poor vegetation growth	As required
	Prune and trim any trees and remove cuttings	Every 2 years or as required
	Remove sediment from inlets, outlets, forebay and main basin when required	Every 5 years or as required (likely to be minimal requirements where effective upstream source control is provided)
Remedial Actions	Repair erosion or other damage by reseeding or re-turfing	As required

	Realignment of rip-rap	As required
	Repair/rehabilitation of inlets, outlets and overflows	As required
	Relevel uneven surfaces and reinstate design levels	As required.

2.5.2 Swales

Swales will be used for conveyance of stormwater throughout each of the catchments, these swales will be planted and unlined. The maintenance regime for the swales should be in accordance the Ciria SuDS Manual C753, see Table 4 below.

Table 4: Operation and maintenance requirements for Swales. (C753 Ciria SuDs Manual 2015, page 329)

Maintenance Schedule	Required action	Typical Frequency
Regular Maintenance	Remove litter and debris	Monthly
	Cut grass - to retain grass height within specified design range	Monthly (during growing season), or as required
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect vegetation coverage	Monthly for 6 months, quarterly for 2 years, then half yearly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Half yearly
Occasional Maintenance	Reseed areas of poor vegetation growth, alter plant types to better suit conditions if required.	As required or if bare soil is exposed over 10% or more of the swale treatment area
Remedial Actions	Repair erosion or other damage by reseeding or re-turfing	As required
	Relevel uneven surfaces and reinstate design levels	As required.
	Scarify and spike topsoil layer to improve infiltration process, break up silt deposits and prevent compaction of soil surface	As required
	Remove and dispose of oils or petrol residues using safe standard practices	As required
	Remove build-up of sediment	As required

3. SUMMARY

This drainage strategy report has been prepared by Hydrock on behalf of Countryside Sovereign Swindon LLP in support of a planning application for proposed development of Lotmead Farm.

- Surface water flows are to be attenuated within attenuation features designed for the 1 in 100 year storm event plus 40% allowance for climate change.
- All attenuation features are to be set above the 100 year +35% climate change fluvial flood level, as requested by the LLFA in the outline planning permission.
- Flows are to be discharged into either the Liden Brook or River Cole at a maximum rate of 4.67l/s/ha.
- The detention basins and swales will provide sufficient water quality improvements for a development of this type.
- Maintenance should be carried out in accordance with the schedule set out in this report as a minimum.
- The LLFA has been consulted throughout the development of this drainage strategy in order to deliver a scheme that meets their requirements and is also viable. Balancing these two factors has been achieved through the following design principles:
  - » Available green space around the perimeter of the site has been utilised for attenuation basins, creating areas which will enhance biodiversity and provide a safe route for exceedance flows, remote from habitable buildings.
  - » Existing drainage features have been retained and, in some cases, enhanced to provide attenuation.
  - » In parcel SuDS features have been utilised where possible in the form of smaller ponds and roadside swales.

Appendix A - MicroDrainage Calculations

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)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
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

« - Indicates pipe capacity < flow

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	10.000	0.033	303.0	4.561	5.00	0.0	0.600	o	300	Pipe/Conduit	
S1.001	10.000	0.300	33.3	0.000	0.00	0.0	0.600	o	525	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	50.00	5.19	92.500	4.561	0.0	0.0	0.0	0.90	63.5«	617.6
S1.001	50.00	5.23	91.800	4.561	0.0	0.0	0.0	3.89	841.9	617.6

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)
S1.001	S	93.000	91.500	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)	Time (mins)	Depth (m)
1	91.700	12	91.700	23	91.700	34	91.700	45	91.700	56	91.700	67	91.700
2	91.700	13	91.700	24	91.700	35	91.700	46	91.700	57	91.700	68	91.700
3	91.700	14	91.700	25	91.700	36	91.700	47	91.700	58	91.700	69	91.700
4	91.700	15	91.700	26	91.700	37	91.700	48	91.700	59	91.700	70	91.700
5	91.700	16	91.700	27	91.700	38	91.700	49	91.700	60	91.700	71	91.700
6	91.700	17	91.700	28	91.700	39	91.700	50	91.700	61	91.700	72	91.700
7	91.700	18	91.700	29	91.700	40	91.700	51	91.700	62	91.700	73	91.700
8	91.700	19	91.700	30	91.700	41	91.700	52	91.700	63	91.700	74	91.700
9	91.700	20	91.700	31	91.700	42	91.700	53	91.700	64	91.700	75	91.700
10	91.700	21	91.700	32	91.700	43	91.700	54	91.700	65	91.700	76	91.700
11	91.700	22	91.700	33	91.700	44	91.700	55	91.700	66	91.700	77	91.700

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)	Time (mins)	Depth (m)
78	91.700	137	91.700	196	91.700	255	91.700	314	91.700	373	91.700	432	91.700
79	91.700	138	91.700	197	91.700	256	91.700	315	91.700	374	91.700	433	91.700
80	91.700	139	91.700	198	91.700	257	91.700	316	91.700	375	91.700	434	91.700
81	91.700	140	91.700	199	91.700	258	91.700	317	91.700	376	91.700	435	91.700
82	91.700	141	91.700	200	91.700	259	91.700	318	91.700	377	91.700	436	91.700
83	91.700	142	91.700	201	91.700	260	91.700	319	91.700	378	91.700	437	91.700
84	91.700	143	91.700	202	91.700	261	91.700	320	91.700	379	91.700	438	91.700
85	91.700	144	91.700	203	91.700	262	91.700	321	91.700	380	91.700	439	91.700
86	91.700	145	91.700	204	91.700	263	91.700	322	91.700	381	91.700	440	91.700
87	91.700	146	91.700	205	91.700	264	91.700	323	91.700	382	91.700	441	91.700
88	91.700	147	91.700	206	91.700	265	91.700	324	91.700	383	91.700	442	91.700
89	91.700	148	91.700	207	91.700	266	91.700	325	91.700	384	91.700	443	91.700
90	91.700	149	91.700	208	91.700	267	91.700	326	91.700	385	91.700	444	91.700
91	91.700	150	91.700	209	91.700	268	91.700	327	91.700	386	91.700	445	91.700
92	91.700	151	91.700	210	91.700	269	91.700	328	91.700	387	91.700	446	91.700
93	91.700	152	91.700	211	91.700	270	91.700	329	91.700	388	91.700	447	91.700
94	91.700	153	91.700	212	91.700	271	91.700	330	91.700	389	91.700	448	91.700
95	91.700	154	91.700	213	91.700	272	91.700	331	91.700	390	91.700	449	91.700
96	91.700	155	91.700	214	91.700	273	91.700	332	91.700	391	91.700	450	91.700
97	91.700	156	91.700	215	91.700	274	91.700	333	91.700	392	91.700	451	91.700
98	91.700	157	91.700	216	91.700	275	91.700	334	91.700	393	91.700	452	91.700
99	91.700	158	91.700	217	91.700	276	91.700	335	91.700	394	91.700	453	91.700
100	91.700	159	91.700	218	91.700	277	91.700	336	91.700	395	91.700	454	91.700
101	91.700	160	91.700	219	91.700	278	91.700	337	91.700	396	91.700	455	91.700
102	91.700	161	91.700	220	91.700	279	91.700	338	91.700	397	91.700	456	91.700
103	91.700	162	91.700	221	91.700	280	91.700	339	91.700	398	91.700	457	91.700
104	91.700	163	91.700	222	91.700	281	91.700	340	91.700	399	91.700	458	91.700
105	91.700	164	91.700	223	91.700	282	91.700	341	91.700	400	91.700	459	91.700
106	91.700	165	91.700	224	91.700	283	91.700	342	91.700	401	91.700	460	91.700
107	91.700	166	91.700	225	91.700	284	91.700	343	91.700	402	91.700	461	91.700
108	91.700	167	91.700	226	91.700	285	91.700	344	91.700	403	91.700	462	91.700
109	91.700	168	91.700	227	91.700	286	91.700	345	91.700	404	91.700	463	91.700
110	91.700	169	91.700	228	91.700	287	91.700	346	91.700	405	91.700	464	91.700
111	91.700	170	91.700	229	91.700	288	91.700	347	91.700	406	91.700	465	91.700
112	91.700	171	91.700	230	91.700	289	91.700	348	91.700	407	91.700	466	91.700
113	91.700	172	91.700	231	91.700	290	91.700	349	91.700	408	91.700	467	91.700
114	91.700	173	91.700	232	91.700	291	91.700	350	91.700	409	91.700	468	91.700
115	91.700	174	91.700	233	91.700	292	91.700	351	91.700	410	91.700	469	91.700
116	91.700	175	91.700	234	91.700	293	91.700	352	91.700	411	91.700	470	91.700
117	91.700	176	91.700	235	91.700	294	91.700	353	91.700	412	91.700	471	91.700
118	91.700	177	91.700	236	91.700	295	91.700	354	91.700	413	91.700	472	91.700
119	91.700	178	91.700	237	91.700	296	91.700	355	91.700	414	91.700	473	91.700
120	91.700	179	91.700	238	91.700	297	91.700	356	91.700	415	91.700	474	91.700
121	91.700	180	91.700	239	91.700	298	91.700	357	91.700	416	91.700	475	91.700
122	91.700	181	91.700	240	91.700	299	91.700	358	91.700	417	91.700	476	91.700
123	91.700	182	91.700	241	91.700	300	91.700	359	91.700	418	91.700	477	91.700
124	91.700	183	91.700	242	91.700	301	91.700	360	91.700	419	91.700	478	91.700
125	91.700	184	91.700	243	91.700	302	91.700	361	91.700	420	91.700	479	91.700
126	91.700	185	91.700	244	91.700	303	91.700	362	91.700	421	91.700	480	91.700
127	91.700	186	91.700	245	91.700	304	91.700	363	91.700	422	91.700	481	91.700
128	91.700	187	91.700	246	91.700	305	91.700	364	91.700	423	91.700	482	91.700
129	91.700	188	91.700	247	91.700	306	91.700	365	91.700	424	91.700	483	91.700
130	91.700	189	91.700	248	91.700	307	91.700	366	91.700	425	91.700	484	91.700
131	91.700	190	91.700	249	91.700	308	91.700	367	91.700	426	91.700	485	91.700
132	91.700	191	91.700	250	91.700	309	91.700	368	91.700	427	91.700	486	91.700
133	91.700	192	91.700	251	91.700	310	91.700	369	91.700	428	91.700	487	91.700
134	91.700	193	91.700	252	91.700	311	91.700	370	91.700	429	91.700	488	91.700
135	91.700	194	91.700	253	91.700	312	91.700	371	91.700	430	91.700	489	91.700
136	91.700	195	91.700	254	91.700	313	91.700	372	91.700	431	91.700	490	91.700

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)	Time (mins)	Depth (m)
491	91.700	550	91.700	609	91.700	668	91.700	727	91.700	786	91.700	845	91.700
492	91.700	551	91.700	610	91.700	669	91.700	728	91.700	787	91.700	846	91.700
493	91.700	552	91.700	611	91.700	670	91.700	729	91.700	788	91.700	847	91.700
494	91.700	553	91.700	612	91.700	671	91.700	730	91.700	789	91.700	848	91.700
495	91.700	554	91.700	613	91.700	672	91.700	731	91.700	790	91.700	849	91.700
496	91.700	555	91.700	614	91.700	673	91.700	732	91.700	791	91.700	850	91.700
497	91.700	556	91.700	615	91.700	674	91.700	733	91.700	792	91.700	851	91.700
498	91.700	557	91.700	616	91.700	675	91.700	734	91.700	793	91.700	852	91.700
499	91.700	558	91.700	617	91.700	676	91.700	735	91.700	794	91.700	853	91.700
500	91.700	559	91.700	618	91.700	677	91.700	736	91.700	795	91.700	854	91.700
501	91.700	560	91.700	619	91.700	678	91.700	737	91.700	796	91.700	855	91.700
502	91.700	561	91.700	620	91.700	679	91.700	738	91.700	797	91.700	856	91.700
503	91.700	562	91.700	621	91.700	680	91.700	739	91.700	798	91.700	857	91.700
504	91.700	563	91.700	622	91.700	681	91.700	740	91.700	799	91.700	858	91.700
505	91.700	564	91.700	623	91.700	682	91.700	741	91.700	800	91.700	859	91.700
506	91.700	565	91.700	624	91.700	683	91.700	742	91.700	801	91.700	860	91.700
507	91.700	566	91.700	625	91.700	684	91.700	743	91.700	802	91.700	861	91.700
508	91.700	567	91.700	626	91.700	685	91.700	744	91.700	803	91.700	862	91.700
509	91.700	568	91.700	627	91.700	686	91.700	745	91.700	804	91.700	863	91.700
510	91.700	569	91.700	628	91.700	687	91.700	746	91.700	805	91.700	864	91.700
511	91.700	570	91.700	629	91.700	688	91.700	747	91.700	806	91.700	865	91.700
512	91.700	571	91.700	630	91.700	689	91.700	748	91.700	807	91.700	866	91.700
513	91.700	572	91.700	631	91.700	690	91.700	749	91.700	808	91.700	867	91.700
514	91.700	573	91.700	632	91.700	691	91.700	750	91.700	809	91.700	868	91.700
515	91.700	574	91.700	633	91.700	692	91.700	751	91.700	810	91.700	869	91.700
516	91.700	575	91.700	634	91.700	693	91.700	752	91.700	811	91.700	870	91.700
517	91.700	576	91.700	635	91.700	694	91.700	753	91.700	812	91.700	871	91.700
518	91.700	577	91.700	636	91.700	695	91.700	754	91.700	813	91.700	872	91.700
519	91.700	578	91.700	637	91.700	696	91.700	755	91.700	814	91.700	873	91.700
520	91.700	579	91.700	638	91.700	697	91.700	756	91.700	815	91.700	874	91.700
521	91.700	580	91.700	639	91.700	698	91.700	757	91.700	816	91.700	875	91.700
522	91.700	581	91.700	640	91.700	699	91.700	758	91.700	817	91.700	876	91.700
523	91.700	582	91.700	641	91.700	700	91.700	759	91.700	818	91.700	877	91.700
524	91.700	583	91.700	642	91.700	701	91.700	760	91.700	819	91.700	878	91.700
525	91.700	584	91.700	643	91.700	702	91.700	761	91.700	820	91.700	879	91.700
526	91.700	585	91.700	644	91.700	703	91.700	762	91.700	821	91.700	880	91.700
527	91.700	586	91.700	645	91.700	704	91.700	763	91.700	822	91.700	881	91.700
528	91.700	587	91.700	646	91.700	705	91.700	764	91.700	823	91.700	882	91.700
529	91.700	588	91.700	647	91.700	706	91.700	765	91.700	824	91.700	883	91.700
530	91.700	589	91.700	648	91.700	707	91.700	766	91.700	825	91.700	884	91.700
531	91.700	590	91.700	649	91.700	708	91.700	767	91.700	826	91.700	885	91.700
532	91.700	591	91.700	650	91.700	709	91.700	768	91.700	827	91.700	886	91.700
533	91.700	592	91.700	651	91.700	710	91.700	769	91.700	828	91.700	887	91.700
534	91.700	593	91.700	652	91.700	711	91.700	770	91.700	829	91.700	888	91.700
535	91.700	594	91.700	653	91.700	712	91.700	771	91.700	830	91.700	889	91.700
536	91.700	595	91.700	654	91.700	713	91.700	772	91.700	831	91.700	890	91.700
537	91.700	596	91.700	655	91.700	714	91.700	773	91.700	832	91.700	891	91.700
538	91.700	597	91.700	656	91.700	715	91.700	774	91.700	833	91.700	892	91.700
539	91.700	598	91.700	657	91.700	716	91.700	775	91.700	834	91.700	893	91.700
540	91.700	599	91.700	658	91.700	717	91.700	776	91.700	835	91.700	894	91.700
541	91.700	600	91.700	659	91.700	718	91.700	777	91.700	836	91.700	895	91.700
542	91.700	601	91.700	660	91.700	719	91.700	778	91.700	837	91.700	896	91.700
543	91.700	602	91.700	661	91.700	720	91.700	779	91.700	838	91.700	897	91.700
544	91.700	603	91.700	662	91.700	721	91.700	780	91.700	839	91.700	898	91.700
545	91.700	604	91.700	663	91.700	722	91.700	781	91.700	840	91.700	899	91.700
546	91.700	605	91.700	664	91.700	723	91.700	782	91.700	841	91.700	900	91.700
547	91.700	606	91.700	665	91.700	724	91.700	783	91.700	842	91.700	901	91.700
548	91.700	607	91.700	666	91.700	725	91.700	784	91.700	843	91.700	902	91.700
549	91.700	608	91.700	667	91.700	726	91.700	785	91.700	844	91.700	903	91.700

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)	Time (mins)	Depth (m)
904	91.700	963	91.700	1022	91.700	1081	91.700	1140	91.700	1199	91.700	1258	91.700
905	91.700	964	91.700	1023	91.700	1082	91.700	1141	91.700	1200	91.700	1259	91.700
906	91.700	965	91.700	1024	91.700	1083	91.700	1142	91.700	1201	91.700	1260	91.700
907	91.700	966	91.700	1025	91.700	1084	91.700	1143	91.700	1202	91.700	1261	91.700
908	91.700	967	91.700	1026	91.700	1085	91.700	1144	91.700	1203	91.700	1262	91.700
909	91.700	968	91.700	1027	91.700	1086	91.700	1145	91.700	1204	91.700	1263	91.700
910	91.700	969	91.700	1028	91.700	1087	91.700	1146	91.700	1205	91.700	1264	91.700
911	91.700	970	91.700	1029	91.700	1088	91.700	1147	91.700	1206	91.700	1265	91.700
912	91.700	971	91.700	1030	91.700	1089	91.700	1148	91.700	1207	91.700	1266	91.700
913	91.700	972	91.700	1031	91.700	1090	91.700	1149	91.700	1208	91.700	1267	91.700
914	91.700	973	91.700	1032	91.700	1091	91.700	1150	91.700	1209	91.700	1268	91.700
915	91.700	974	91.700	1033	91.700	1092	91.700	1151	91.700	1210	91.700	1269	91.700
916	91.700	975	91.700	1034	91.700	1093	91.700	1152	91.700	1211	91.700	1270	91.700
917	91.700	976	91.700	1035	91.700	1094	91.700	1153	91.700	1212	91.700	1271	91.700
918	91.700	977	91.700	1036	91.700	1095	91.700	1154	91.700	1213	91.700	1272	91.700
919	91.700	978	91.700	1037	91.700	1096	91.700	1155	91.700	1214	91.700	1273	91.700
920	91.700	979	91.700	1038	91.700	1097	91.700	1156	91.700	1215	91.700	1274	91.700
921	91.700	980	91.700	1039	91.700	1098	91.700	1157	91.700	1216	91.700	1275	91.700
922	91.700	981	91.700	1040	91.700	1099	91.700	1158	91.700	1217	91.700	1276	91.700
923	91.700	982	91.700	1041	91.700	1100	91.700	1159	91.700	1218	91.700	1277	91.700
924	91.700	983	91.700	1042	91.700	1101	91.700	1160	91.700	1219	91.700	1278	91.700
925	91.700	984	91.700	1043	91.700	1102	91.700	1161	91.700	1220	91.700	1279	91.700
926	91.700	985	91.700	1044	91.700	1103	91.700	1162	91.700	1221	91.700	1280	91.700
927	91.700	986	91.700	1045	91.700	1104	91.700	1163	91.700	1222	91.700	1281	91.700
928	91.700	987	91.700	1046	91.700	1105	91.700	1164	91.700	1223	91.700	1282	91.700
929	91.700	988	91.700	1047	91.700	1106	91.700	1165	91.700	1224	91.700	1283	91.700
930	91.700	989	91.700	1048	91.700	1107	91.700	1166	91.700	1225	91.700	1284	91.700
931	91.700	990	91.700	1049	91.700	1108	91.700	1167	91.700	1226	91.700	1285	91.700
932	91.700	991	91.700	1050	91.700	1109	91.700	1168	91.700	1227	91.700	1286	91.700
933	91.700	992	91.700	1051	91.700	1110	91.700	1169	91.700	1228	91.700	1287	91.700
934	91.700	993	91.700	1052	91.700	1111	91.700	1170	91.700	1229	91.700	1288	91.700
935	91.700	994	91.700	1053	91.700	1112	91.700	1171	91.700	1230	91.700	1289	91.700
936	91.700	995	91.700	1054	91.700	1113	91.700	1172	91.700	1231	91.700	1290	91.700
937	91.700	996	91.700	1055	91.700	1114	91.700	1173	91.700	1232	91.700	1291	91.700
938	91.700	997	91.700	1056	91.700	1115	91.700	1174	91.700	1233	91.700	1292	91.700
939	91.700	998	91.700	1057	91.700	1116	91.700	1175	91.700	1234	91.700	1293	91.700
940	91.700	999	91.700	1058	91.700	1117	91.700	1176	91.700	1235	91.700	1294	91.700
941	91.700	1000	91.700	1059	91.700	1118	91.700	1177	91.700	1236	91.700	1295	91.700
942	91.700	1001	91.700	1060	91.700	1119	91.700	1178	91.700	1237	91.700	1296	91.700
943	91.700	1002	91.700	1061	91.700	1120	91.700	1179	91.700	1238	91.700	1297	91.700
944	91.700	1003	91.700	1062	91.700	1121	91.700	1180	91.700	1239	91.700	1298	91.700
945	91.700	1004	91.700	1063	91.700	1122	91.700	1181	91.700	1240	91.700	1299	91.700
946	91.700	1005	91.700	1064	91.700	1123	91.700	1182	91.700	1241	91.700	1300	91.700
947	91.700	1006	91.700	1065	91.700	1124	91.700	1183	91.700	1242	91.700	1301	91.700
948	91.700	1007	91.700	1066	91.700	1125	91.700	1184	91.700	1243	91.700	1302	91.700
949	91.700	1008	91.700	1067	91.700	1126	91.700	1185	91.700	1244	91.700	1303	91.700
950	91.700	1009	91.700	1068	91.700	1127	91.700	1186	91.700	1245	91.700	1304	91.700
951	91.700	1010	91.700	1069	91.700	1128	91.700	1187	91.700	1246	91.700	1305	91.700
952	91.700	1011	91.700	1070	91.700	1129	91.700	1188	91.700	1247	91.700	1306	91.700
953	91.700	1012	91.700	1071	91.700	1130	91.700	1189	91.700	1248	91.700	1307	91.700
954	91.700	1013	91.700	1072	91.700	1131	91.700	1190	91.700	1249	91.700	1308	91.700
955	91.700	1014	91.700	1073	91.700	1132	91.700	1191	91.700	1250	91.700	1309	91.700
956	91.700	1015	91.700	1074	91.700	1133	91.700	1192	91.700	1251	91.700	1310	91.700
957	91.700	1016	91.700	1075	91.700	1134	91.700	1193	91.700	1252	91.700	1311	91.700
958	91.700	1017	91.700	1076	91.700	1135	91.700	1194	91.700	1253	91.700	1312	91.700
959	91.700	1018	91.700	1077	91.700	1136	91.700	1195	91.700	1254	91.700	1313	91.700
960	91.700	1019	91.700	1078	91.700	1137	91.700	1196	91.700	1255	91.700	1314	91.700
961	91.700	1020	91.700	1079	91.700	1138	91.700	1197	91.700	1256	91.700	1315	91.700
962	91.700	1021	91.700	1080	91.700	1139	91.700	1198	91.700	1257	91.700	1316	91.700

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)	Time (mins)	Depth (m)
1317	91.700	1335	91.700	1353	91.700	1371	91.700	1389	91.700	1407	91.700	1425	91.700
1318	91.700	1336	91.700	1354	91.700	1372	91.700	1390	91.700	1408	91.700	1426	91.700
1319	91.700	1337	91.700	1355	91.700	1373	91.700	1391	91.700	1409	91.700	1427	91.700
1320	91.700	1338	91.700	1356	91.700	1374	91.700	1392	91.700	1410	91.700	1428	91.700
1321	91.700	1339	91.700	1357	91.700	1375	91.700	1393	91.700	1411	91.700	1429	91.700
1322	91.700	1340	91.700	1358	91.700	1376	91.700	1394	91.700	1412	91.700	1430	91.700
1323	91.700	1341	91.700	1359	91.700	1377	91.700	1395	91.700	1413	91.700	1431	91.700
1324	91.700	1342	91.700	1360	91.700	1378	91.700	1396	91.700	1414	91.700	1432	91.700
1325	91.700	1343	91.700	1361	91.700	1379	91.700	1397	91.700	1415	91.700	1433	91.700
1326	91.700	1344	91.700	1362	91.700	1380	91.700	1398	91.700	1416	91.700	1434	91.700
1327	91.700	1345	91.700	1363	91.700	1381	91.700	1399	91.700	1417	91.700	1435	91.700
1328	91.700	1346	91.700	1364	91.700	1382	91.700	1400	91.700	1418	91.700	1436	91.700
1329	91.700	1347	91.700	1365	91.700	1383	91.700	1401	91.700	1419	91.700	1437	91.700
1330	91.700	1348	91.700	1366	91.700	1384	91.700	1402	91.700	1420	91.700	1438	91.700
1331	91.700	1349	91.700	1367	91.700	1385	91.700	1403	91.700	1421	91.700	1439	91.700
1332	91.700	1350	91.700	1368	91.700	1386	91.700	1404	91.700	1422	91.700	1440	91.700
1333	91.700	1351	91.700	1369	91.700	1387	91.700	1405	91.700	1423	91.700		
1334	91.700	1352	91.700	1370	91.700	1388	91.700	1406	91.700	1424	91.700		

Online Controls for Storm

Hydro-Brake® Optimum Manhole: SA - Basin OUT, DS/PN: S1.001, Volume (m³): 2.8

Unit Reference	MD-SHE-0275-4340-1200-4340
Design Head (m)	1.200
Design Flow (l/s)	43.4
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	275
Invert Level (m)	91.800
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	43.4	Kick-Flo®	0.889	37.6
Flush-Flo™	0.448	43.4	Mean Flow over Head Range	-	36.0

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)	Depth (m)	Flow (l/s)
0.100	8.7	0.800	40.3	2.000	55.5	4.000	77.7	7.000	102.0
0.200	28.3	1.000	39.8	2.200	58.1	4.500	82.3	7.500	105.5
0.300	42.2	1.200	43.4	2.400	60.6	5.000	86.6	8.000	108.9
0.400	43.3	1.400	46.7	2.600	63.0	5.500	90.7	8.500	112.2
0.500	43.3	1.600	49.8	3.000	67.5	6.000	94.6	9.000	115.3
0.600	42.7	1.800	52.8	3.500	72.8	6.500	98.4	9.500	118.4

Storage Structures for Storm

Tank or Pond Manhole: SA - Basin OUT, DS/PN: S1.001

Invert Level (m) 91.800

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	4175.0	1.200	5479.0

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 Coeffiecient	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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SA - Basin IN	15 Summer	1	+0%					92.800
S1.001	SA - Basin OUT	720 Winter	1	+0%	100/120 Winter				91.960

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SA - Basin IN	0.000	0.000	4.19			257.1	SURCHARGED*	
S1.001	SA - Basin OUT	-0.365	0.000	0.05			19.9	OK	

30 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 Coeffiecient	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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SA - Basin IN	15 Summer	30	+0%					92.800
S1.001	SA - Basin OUT	480 Winter	30	+0%	100/120 Winter				92.120

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SA - Basin IN	0.000	0.000	7.47			458.4	SURCHARGED*	
S1.001	SA - Basin OUT	-0.205	0.000	0.10			42.5	OK	

100 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 Coeffiecient	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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SA - Basin IN	15 Summer	100	+40%					92.800
S1.001	SA - Basin OUT	480 Winter	100	+40%	100/120 Winter				92.417

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SA - Basin IN	0.000	0.000	10.68			655.2	SURCHARGED*	
S1.001	SA - Basin OUT	0.092	0.000	0.10			43.2	SURCHARGED	

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)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
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

« - Indicates pipe capacity < flow

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	20.000	0.171	117.0	0.000	5.00	0.0	0.600	o	100	Pipe/Conduit	
1.001	20.000	0.000	0.0	2.220	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.002	5.000	0.010	500.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.003	200.000	0.000	0.0	0.820	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.004	5.000	0.010	500.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.005	20.000	0.000	0.0	0.000	0.00	0.0	0.600	o	600	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	50.00	5.47	90.900	0.000	0.0	0.0	0.0	0.71	5.6	0.0
1.001	50.00	7.71	90.800	2.220	0.0	0.0	0.0	0.15	10.5«	300.6
1.002	50.00	5.08	90.800	0.000	24.3	0.0	0.0	1.08	306.0	24.3
1.003	50.00	27.46	90.600	0.820	24.3	0.0	0.0	0.15	10.5«	135.3
1.004	50.00	5.08	90.600	0.000	24.3	0.0	0.0	1.08	306.0	24.3
1.005	50.00	6.50	90.300	0.000	24.3	0.0	0.0	0.23	66.4	24.3

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)
1.005		91.300	90.300	0.000	0	0

Surcharged Outfall Details for Storm

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	90.300	48	90.300	95	90.300	142	90.300	189	90.300	236	90.300
2	90.300	49	90.300	96	90.300	143	90.300	190	90.300	237	90.300
3	90.300	50	90.300	97	90.300	144	90.300	191	90.300	238	90.300
4	90.300	51	90.300	98	90.300	145	90.300	192	90.300	239	90.300
5	90.300	52	90.300	99	90.300	146	90.300	193	90.300	240	90.300
6	90.300	53	90.300	100	90.300	147	90.300	194	90.300	241	90.300
7	90.300	54	90.300	101	90.300	148	90.300	195	90.300	242	90.300
8	90.300	55	90.300	102	90.300	149	90.300	196	90.300	243	90.300
9	90.300	56	90.300	103	90.300	150	90.300	197	90.300	244	90.300
10	90.300	57	90.300	104	90.300	151	90.300	198	90.300	245	90.300
11	90.300	58	90.300	105	90.300	152	90.300	199	90.300	246	90.300
12	90.300	59	90.300	106	90.300	153	90.300	200	90.300	247	90.300
13	90.300	60	90.300	107	90.300	154	90.300	201	90.300	248	90.300
14	90.300	61	90.300	108	90.300	155	90.300	202	90.300	249	90.300
15	90.300	62	90.300	109	90.300	156	90.300	203	90.300	250	90.300
16	90.300	63	90.300	110	90.300	157	90.300	204	90.300	251	90.300
17	90.300	64	90.300	111	90.300	158	90.300	205	90.300	252	90.300
18	90.300	65	90.300	112	90.300	159	90.300	206	90.300	253	90.300
19	90.300	66	90.300	113	90.300	160	90.300	207	90.300	254	90.300
20	90.300	67	90.300	114	90.300	161	90.300	208	90.300	255	90.300
21	90.300	68	90.300	115	90.300	162	90.300	209	90.300	256	90.300
22	90.300	69	90.300	116	90.300	163	90.300	210	90.300	257	90.300
23	90.300	70	90.300	117	90.300	164	90.300	211	90.300	258	90.300
24	90.300	71	90.300	118	90.300	165	90.300	212	90.300	259	90.300
25	90.300	72	90.300	119	90.300	166	90.300	213	90.300	260	90.300
26	90.300	73	90.300	120	90.300	167	90.300	214	90.300	261	90.300
27	90.300	74	90.300	121	90.300	168	90.300	215	90.300	262	90.300
28	90.300	75	90.300	122	90.300	169	90.300	216	90.300	263	90.300
29	90.300	76	90.300	123	90.300	170	90.300	217	90.300	264	90.300
30	90.300	77	90.300	124	90.300	171	90.300	218	90.300	265	90.300
31	90.300	78	90.300	125	90.300	172	90.300	219	90.300	266	90.300
32	90.300	79	90.300	126	90.300	173	90.300	220	90.300	267	90.300
33	90.300	80	90.300	127	90.300	174	90.300	221	90.300	268	90.300
34	90.300	81	90.300	128	90.300	175	90.300	222	90.300	269	90.300
35	90.300	82	90.300	129	90.300	176	90.300	223	90.300	270	90.300
36	90.300	83	90.300	130	90.300	177	90.300	224	90.300	271	90.300
37	90.300	84	90.300	131	90.300	178	90.300	225	90.300	272	90.300
38	90.300	85	90.300	132	90.300	179	90.300	226	90.300	273	90.300
39	90.300	86	90.300	133	90.300	180	90.300	227	90.300	274	90.300
40	90.300	87	90.300	134	90.300	181	90.300	228	90.300	275	90.300
41	90.300	88	90.300	135	90.300	182	90.300	229	90.300	276	90.300
42	90.300	89	90.300	136	90.300	183	90.300	230	90.300	277	90.300
43	90.300	90	90.300	137	90.300	184	90.300	231	90.300	278	90.300
44	90.300	91	90.300	138	90.300	185	90.300	232	90.300	279	90.300
45	90.300	92	90.300	139	90.300	186	90.300	233	90.300	280	90.300
46	90.300	93	90.300	140	90.300	187	90.300	234	90.300	281	90.300
47	90.300	94	90.300	141	90.300	188	90.300	235	90.300	282	90.300

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)
283	90.300	333	90.300	383	90.300	433	90.300	483	90.300	533	90.300
284	90.300	334	90.300	384	90.300	434	90.300	484	90.300	534	90.300
285	90.300	335	90.300	385	90.300	435	90.300	485	90.300	535	90.300
286	90.300	336	90.300	386	90.300	436	90.300	486	90.300	536	90.300
287	90.300	337	90.300	387	90.300	437	90.300	487	90.300	537	90.300
288	90.300	338	90.300	388	90.300	438	90.300	488	90.300	538	90.300
289	90.300	339	90.300	389	90.300	439	90.300	489	90.300	539	90.300
290	90.300	340	90.300	390	90.300	440	90.300	490	90.300	540	90.300
291	90.300	341	90.300	391	90.300	441	90.300	491	90.300	541	90.300
292	90.300	342	90.300	392	90.300	442	90.300	492	90.300	542	90.300
293	90.300	343	90.300	393	90.300	443	90.300	493	90.300	543	90.300
294	90.300	344	90.300	394	90.300	444	90.300	494	90.300	544	90.300
295	90.300	345	90.300	395	90.300	445	90.300	495	90.300	545	90.300
296	90.300	346	90.300	396	90.300	446	90.300	496	90.300	546	90.300
297	90.300	347	90.300	397	90.300	447	90.300	497	90.300	547	90.300
298	90.300	348	90.300	398	90.300	448	90.300	498	90.300	548	90.300
299	90.300	349	90.300	399	90.300	449	90.300	499	90.300	549	90.300
300	90.300	350	90.300	400	90.300	450	90.300	500	90.300	550	90.300
301	90.300	351	90.300	401	90.300	451	90.300	501	90.300	551	90.300
302	90.300	352	90.300	402	90.300	452	90.300	502	90.300	552	90.300
303	90.300	353	90.300	403	90.300	453	90.300	503	90.300	553	90.300
304	90.300	354	90.300	404	90.300	454	90.300	504	90.300	554	90.300
305	90.300	355	90.300	405	90.300	455	90.300	505	90.300	555	90.300
306	90.300	356	90.300	406	90.300	456	90.300	506	90.300	556	90.300
307	90.300	357	90.300	407	90.300	457	90.300	507	90.300	557	90.300
308	90.300	358	90.300	408	90.300	458	90.300	508	90.300	558	90.300
309	90.300	359	90.300	409	90.300	459	90.300	509	90.300	559	90.300
310	90.300	360	90.300	410	90.300	460	90.300	510	90.300	560	90.300
311	90.300	361	90.300	411	90.300	461	90.300	511	90.300	561	90.300
312	90.300	362	90.300	412	90.300	462	90.300	512	90.300	562	90.300
313	90.300	363	90.300	413	90.300	463	90.300	513	90.300	563	90.300
314	90.300	364	90.300	414	90.300	464	90.300	514	90.300	564	90.300
315	90.300	365	90.300	415	90.300	465	90.300	515	90.300	565	90.300
316	90.300	366	90.300	416	90.300	466	90.300	516	90.300	566	90.300
317	90.300	367	90.300	417	90.300	467	90.300	517	90.300	567	90.300
318	90.300	368	90.300	418	90.300	468	90.300	518	90.300	568	90.300
319	90.300	369	90.300	419	90.300	469	90.300	519	90.300	569	90.300
320	90.300	370	90.300	420	90.300	470	90.300	520	90.300	570	90.300
321	90.300	371	90.300	421	90.300	471	90.300	521	90.300	571	90.300
322	90.300	372	90.300	422	90.300	472	90.300	522	90.300	572	90.300
323	90.300	373	90.300	423	90.300	473	90.300	523	90.300	573	90.300
324	90.300	374	90.300	424	90.300	474	90.300	524	90.300	574	90.300
325	90.300	375	90.300	425	90.300	475	90.300	525	90.300	575	90.300
326	90.300	376	90.300	426	90.300	476	90.300	526	90.300	576	90.300
327	90.300	377	90.300	427	90.300	477	90.300	527	90.300	577	90.300
328	90.300	378	90.300	428	90.300	478	90.300	528	90.300	578	90.300
329	90.300	379	90.300	429	90.300	479	90.300	529	90.300	579	90.300
330	90.300	380	90.300	430	90.300	480	90.300	530	90.300	580	90.300
331	90.300	381	90.300	431	90.300	481	90.300	531	90.300	581	90.300
332	90.300	382	90.300	432	90.300	482	90.300	532	90.300	582	90.300

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)
583	90.300	633	90.300	683	90.300	733	90.300	783	90.300	833	90.300
584	90.300	634	90.300	684	90.300	734	90.300	784	90.300	834	90.300
585	90.300	635	90.300	685	90.300	735	90.300	785	90.300	835	90.300
586	90.300	636	90.300	686	90.300	736	90.300	786	90.300	836	90.300
587	90.300	637	90.300	687	90.300	737	90.300	787	90.300	837	90.300
588	90.300	638	90.300	688	90.300	738	90.300	788	90.300	838	90.300
589	90.300	639	90.300	689	90.300	739	90.300	789	90.300	839	90.300
590	90.300	640	90.300	690	90.300	740	90.300	790	90.300	840	90.300
591	90.300	641	90.300	691	90.300	741	90.300	791	90.300	841	90.300
592	90.300	642	90.300	692	90.300	742	90.300	792	90.300	842	90.300
593	90.300	643	90.300	693	90.300	743	90.300	793	90.300	843	90.300
594	90.300	644	90.300	694	90.300	744	90.300	794	90.300	844	90.300
595	90.300	645	90.300	695	90.300	745	90.300	795	90.300	845	90.300
596	90.300	646	90.300	696	90.300	746	90.300	796	90.300	846	90.300
597	90.300	647	90.300	697	90.300	747	90.300	797	90.300	847	90.300
598	90.300	648	90.300	698	90.300	748	90.300	798	90.300	848	90.300
599	90.300	649	90.300	699	90.300	749	90.300	799	90.300	849	90.300
600	90.300	650	90.300	700	90.300	750	90.300	800	90.300	850	90.300
601	90.300	651	90.300	701	90.300	751	90.300	801	90.300	851	90.300
602	90.300	652	90.300	702	90.300	752	90.300	802	90.300	852	90.300
603	90.300	653	90.300	703	90.300	753	90.300	803	90.300	853	90.300
604	90.300	654	90.300	704	90.300	754	90.300	804	90.300	854	90.300
605	90.300	655	90.300	705	90.300	755	90.300	805	90.300	855	90.300
606	90.300	656	90.300	706	90.300	756	90.300	806	90.300	856	90.300
607	90.300	657	90.300	707	90.300	757	90.300	807	90.300	857	90.300
608	90.300	658	90.300	708	90.300	758	90.300	808	90.300	858	90.300
609	90.300	659	90.300	709	90.300	759	90.300	809	90.300	859	90.300
610	90.300	660	90.300	710	90.300	760	90.300	810	90.300	860	90.300
611	90.300	661	90.300	711	90.300	761	90.300	811	90.300	861	90.300
612	90.300	662	90.300	712	90.300	762	90.300	812	90.300	862	90.300
613	90.300	663	90.300	713	90.300	763	90.300	813	90.300	863	90.300
614	90.300	664	90.300	714	90.300	764	90.300	814	90.300	864	90.300
615	90.300	665	90.300	715	90.300	765	90.300	815	90.300	865	90.300
616	90.300	666	90.300	716	90.300	766	90.300	816	90.300	866	90.300
617	90.300	667	90.300	717	90.300	767	90.300	817	90.300	867	90.300
618	90.300	668	90.300	718	90.300	768	90.300	818	90.300	868	90.300
619	90.300	669	90.300	719	90.300	769	90.300	819	90.300	869	90.300
620	90.300	670	90.300	720	90.300	770	90.300	820	90.300	870	90.300
621	90.300	671	90.300	721	90.300	771	90.300	821	90.300	871	90.300
622	90.300	672	90.300	722	90.300	772	90.300	822	90.300	872	90.300
623	90.300	673	90.300	723	90.300	773	90.300	823	90.300	873	90.300
624	90.300	674	90.300	724	90.300	774	90.300	824	90.300	874	90.300
625	90.300	675	90.300	725	90.300	775	90.300	825	90.300	875	90.300
626	90.300	676	90.300	726	90.300	776	90.300	826	90.300	876	90.300
627	90.300	677	90.300	727	90.300	777	90.300	827	90.300	877	90.300
628	90.300	678	90.300	728	90.300	778	90.300	828	90.300	878	90.300
629	90.300	679	90.300	729	90.300	779	90.300	829	90.300	879	90.300
630	90.300	680	90.300	730	90.300	780	90.300	830	90.300	880	90.300
631	90.300	681	90.300	731	90.300	781	90.300	831	90.300	881	90.300
632	90.300	682	90.300	732	90.300	782	90.300	832	90.300	882	90.300

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)
883	90.300	933	90.300	983	90.300	1033	90.300	1083	90.300	1133	90.300
884	90.300	934	90.300	984	90.300	1034	90.300	1084	90.300	1134	90.300
885	90.300	935	90.300	985	90.300	1035	90.300	1085	90.300	1135	90.300
886	90.300	936	90.300	986	90.300	1036	90.300	1086	90.300	1136	90.300
887	90.300	937	90.300	987	90.300	1037	90.300	1087	90.300	1137	90.300
888	90.300	938	90.300	988	90.300	1038	90.300	1088	90.300	1138	90.300
889	90.300	939	90.300	989	90.300	1039	90.300	1089	90.300	1139	90.300
890	90.300	940	90.300	990	90.300	1040	90.300	1090	90.300	1140	90.300
891	90.300	941	90.300	991	90.300	1041	90.300	1091	90.300	1141	90.300
892	90.300	942	90.300	992	90.300	1042	90.300	1092	90.300	1142	90.300
893	90.300	943	90.300	993	90.300	1043	90.300	1093	90.300	1143	90.300
894	90.300	944	90.300	994	90.300	1044	90.300	1094	90.300	1144	90.300
895	90.300	945	90.300	995	90.300	1045	90.300	1095	90.300	1145	90.300
896	90.300	946	90.300	996	90.300	1046	90.300	1096	90.300	1146	90.300
897	90.300	947	90.300	997	90.300	1047	90.300	1097	90.300	1147	90.300
898	90.300	948	90.300	998	90.300	1048	90.300	1098	90.300	1148	90.300
899	90.300	949	90.300	999	90.300	1049	90.300	1099	90.300	1149	90.300
900	90.300	950	90.300	1000	90.300	1050	90.300	1100	90.300	1150	90.300
901	90.300	951	90.300	1001	90.300	1051	90.300	1101	90.300	1151	90.300
902	90.300	952	90.300	1002	90.300	1052	90.300	1102	90.300	1152	90.300
903	90.300	953	90.300	1003	90.300	1053	90.300	1103	90.300	1153	90.300
904	90.300	954	90.300	1004	90.300	1054	90.300	1104	90.300	1154	90.300
905	90.300	955	90.300	1005	90.300	1055	90.300	1105	90.300	1155	90.300
906	90.300	956	90.300	1006	90.300	1056	90.300	1106	90.300	1156	90.300
907	90.300	957	90.300	1007	90.300	1057	90.300	1107	90.300	1157	90.300
908	90.300	958	90.300	1008	90.300	1058	90.300	1108	90.300	1158	90.300
909	90.300	959	90.300	1009	90.300	1059	90.300	1109	90.300	1159	90.300
910	90.300	960	90.300	1010	90.300	1060	90.300	1110	90.300	1160	90.300
911	90.300	961	90.300	1011	90.300	1061	90.300	1111	90.300	1161	90.300
912	90.300	962	90.300	1012	90.300	1062	90.300	1112	90.300	1162	90.300
913	90.300	963	90.300	1013	90.300	1063	90.300	1113	90.300	1163	90.300
914	90.300	964	90.300	1014	90.300	1064	90.300	1114	90.300	1164	90.300
915	90.300	965	90.300	1015	90.300	1065	90.300	1115	90.300	1165	90.300
916	90.300	966	90.300	1016	90.300	1066	90.300	1116	90.300	1166	90.300
917	90.300	967	90.300	1017	90.300	1067	90.300	1117	90.300	1167	90.300
918	90.300	968	90.300	1018	90.300	1068	90.300	1118	90.300	1168	90.300
919	90.300	969	90.300	1019	90.300	1069	90.300	1119	90.300	1169	90.300
920	90.300	970	90.300	1020	90.300	1070	90.300	1120	90.300	1170	90.300
921	90.300	971	90.300	1021	90.300	1071	90.300	1121	90.300	1171	90.300
922	90.300	972	90.300	1022	90.300	1072	90.300	1122	90.300	1172	90.300
923	90.300	973	90.300	1023	90.300	1073	90.300	1123	90.300	1173	90.300
924	90.300	974	90.300	1024	90.300	1074	90.300	1124	90.300	1174	90.300
925	90.300	975	90.300	1025	90.300	1075	90.300	1125	90.300	1175	90.300
926	90.300	976	90.300	1026	90.300	1076	90.300	1126	90.300	1176	90.300
927	90.300	977	90.300	1027	90.300	1077	90.300	1127	90.300	1177	90.300
928	90.300	978	90.300	1028	90.300	1078	90.300	1128	90.300	1178	90.300
929	90.300	979	90.300	1029	90.300	1079	90.300	1129	90.300	1179	90.300
930	90.300	980	90.300	1030	90.300	1080	90.300	1130	90.300	1180	90.300
931	90.300	981	90.300	1031	90.300	1081	90.300	1131	90.300	1181	90.300
932	90.300	982	90.300	1032	90.300	1082	90.300	1132	90.300	1182	90.300

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)
1183	90.300	1226	90.300	1269	90.300	1312	90.300	1355	90.300	1398	90.300
1184	90.300	1227	90.300	1270	90.300	1313	90.300	1356	90.300	1399	90.300
1185	90.300	1228	90.300	1271	90.300	1314	90.300	1357	90.300	1400	90.300
1186	90.300	1229	90.300	1272	90.300	1315	90.300	1358	90.300	1401	90.300
1187	90.300	1230	90.300	1273	90.300	1316	90.300	1359	90.300	1402	90.300
1188	90.300	1231	90.300	1274	90.300	1317	90.300	1360	90.300	1403	90.300
1189	90.300	1232	90.300	1275	90.300	1318	90.300	1361	90.300	1404	90.300
1190	90.300	1233	90.300	1276	90.300	1319	90.300	1362	90.300	1405	90.300
1191	90.300	1234	90.300	1277	90.300	1320	90.300	1363	90.300	1406	90.300
1192	90.300	1235	90.300	1278	90.300	1321	90.300	1364	90.300	1407	90.300
1193	90.300	1236	90.300	1279	90.300	1322	90.300	1365	90.300	1408	90.300
1194	90.300	1237	90.300	1280	90.300	1323	90.300	1366	90.300	1409	90.300
1195	90.300	1238	90.300	1281	90.300	1324	90.300	1367	90.300	1410	90.300
1196	90.300	1239	90.300	1282	90.300	1325	90.300	1368	90.300	1411	90.300
1197	90.300	1240	90.300	1283	90.300	1326	90.300	1369	90.300	1412	90.300
1198	90.300	1241	90.300	1284	90.300	1327	90.300	1370	90.300	1413	90.300
1199	90.300	1242	90.300	1285	90.300	1328	90.300	1371	90.300	1414	90.300
1200	90.300	1243	90.300	1286	90.300	1329	90.300	1372	90.300	1415	90.300
1201	90.300	1244	90.300	1287	90.300	1330	90.300	1373	90.300	1416	90.300
1202	90.300	1245	90.300	1288	90.300	1331	90.300	1374	90.300	1417	90.300
1203	90.300	1246	90.300	1289	90.300	1332	90.300	1375	90.300	1418	90.300
1204	90.300	1247	90.300	1290	90.300	1333	90.300	1376	90.300	1419	90.300
1205	90.300	1248	90.300	1291	90.300	1334	90.300	1377	90.300	1420	90.300
1206	90.300	1249	90.300	1292	90.300	1335	90.300	1378	90.300	1421	90.300
1207	90.300	1250	90.300	1293	90.300	1336	90.300	1379	90.300	1422	90.300
1208	90.300	1251	90.300	1294	90.300	1337	90.300	1380	90.300	1423	90.300
1209	90.300	1252	90.300	1295	90.300	1338	90.300	1381	90.300	1424	90.300
1210	90.300	1253	90.300	1296	90.300	1339	90.300	1382	90.300	1425	90.300
1211	90.300	1254	90.300	1297	90.300	1340	90.300	1383	90.300	1426	90.300
1212	90.300	1255	90.300	1298	90.300	1341	90.300	1384	90.300	1427	90.300
1213	90.300	1256	90.300	1299	90.300	1342	90.300	1385	90.300	1428	90.300
1214	90.300	1257	90.300	1300	90.300	1343	90.300	1386	90.300	1429	90.300
1215	90.300	1258	90.300	1301	90.300	1344	90.300	1387	90.300	1430	90.300
1216	90.300	1259	90.300	1302	90.300	1345	90.300	1388	90.300	1431	90.300
1217	90.300	1260	90.300	1303	90.300	1346	90.300	1389	90.300	1432	90.300
1218	90.300	1261	90.300	1304	90.300	1347	90.300	1390	90.300	1433	90.300
1219	90.300	1262	90.300	1305	90.300	1348	90.300	1391	90.300	1434	90.300
1220	90.300	1263	90.300	1306	90.300	1349	90.300	1392	90.300	1435	90.300
1221	90.300	1264	90.300	1307	90.300	1350	90.300	1393	90.300	1436	90.300
1222	90.300	1265	90.300	1308	90.300	1351	90.300	1394	90.300	1437	90.300
1223	90.300	1266	90.300	1309	90.300	1352	90.300	1395	90.300	1438	90.300
1224	90.300	1267	90.300	1310	90.300	1353	90.300	1396	90.300	1439	90.300
1225	90.300	1268	90.300	1311	90.300	1354	90.300	1397	90.300	1440	90.300

Online Controls for Storm

Orifice Manhole: 2, DS/PN: 1.001, Volume (m³): 1.3

Diameter (m) 0.180 Discharge Coefficient 0.600 Invert Level (m) 90.800

Orifice Manhole: 4, DS/PN: 1.003, Volume (m³): 2.8

Diameter (m) 0.150 Discharge Coefficient 0.600 Invert Level (m) 90.600

Hydro-Brake® Optimum Manhole: 6, DS/PN: 1.005, Volume (m³): 2.8

Unit Reference	MD-SHE-0214-2430-1200-2430
Design Head (m)	1.200
Design Flow (l/s)	24.3
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	214
Invert Level (m)	90.300
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	24.3
Flush-Flo™	0.390	24.2
Kick-Flo®	0.842	20.5
Mean Flow over Head Range	-	20.6

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	7.2	1.200	24.3	3.000	37.7	7.000	56.8
0.200	20.8	1.400	26.1	3.500	40.6	7.500	58.7
0.300	23.9	1.600	27.9	4.000	43.3	8.000	60.6
0.400	24.2	1.800	29.5	4.500	45.8	8.500	62.4
0.500	24.0	2.000	31.0	5.000	48.2	9.000	64.1
0.600	23.6	2.200	32.5	5.500	50.5	9.500	65.8
0.800	21.5	2.400	33.8	6.000	52.7		
1.000	22.3	2.600	35.2	6.500	54.8		

Storage Structures for Storm

Tank or Pond Manhole: 2, DS/PN: 1.001

Invert Level (m) 90.800

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1686.0	1.000	2257.0

Tank or Pond Manhole: 4, DS/PN: 1.003

Invert Level (m) 90.600

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	887.0	1.000	2039.0

Tank or Pond Manhole: 6, DS/PN: 1.005

Invert Level (m) 90.300

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	248.0	1.000	468.0

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 Coeffiecient	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	3	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	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 35, 40

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	2	1440 Winter	1	+0%	1/360 Winter				91.072
1.001	2	1440 Winter	1	+0%	30/30 Summer				91.073
1.002	3	1440 Winter	1	+0%					90.836
1.003	4	1440 Winter	1	+0%	30/60 Winter				90.823
1.004	5	1440 Winter	1	+0%					90.635
1.005	6	1440 Winter	1	+0%					90.403

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	2	0.072	0.000	0.00			0.0	SURCHARGED	
1.001	2	-0.027	0.000	0.13			2.5	OK	
1.002	3	-0.564	0.000	0.01			2.5	OK	
1.003	4	-0.077	0.000	0.08			2.6	OK	
1.004	5	-0.565	0.000	0.01			2.6	OK	
1.005	6	-0.497	0.000	0.03			2.6	OK	

30 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 Coeffiecient	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	3	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	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 35, 40

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	2	600 Winter	30	+35%	1/360 Winter				91.305
1.001	2	600 Winter	30	+35%	30/30 Summer				91.306
1.002	3	1440 Winter	30	+35%					91.181
1.003	4	1440 Winter	30	+35%	30/60 Winter				91.180
1.004	5	1440 Winter	30	+35%					90.728
1.005	6	1440 Winter	30	+35%					90.593

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	2	0.305	0.000	0.00			0.0	SURCHARGED	
1.001	2	0.206	0.000	1.59			30.4	SURCHARGED	
1.002	3	-0.219	0.000	0.12			26.0	OK	
1.003	4	0.280	0.000	0.66			22.3	SURCHARGED	
1.004	5	-0.472	0.000	0.10			22.3	OK	
1.005	6	-0.307	0.000	0.21			21.8	OK	

100 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 Coeffiecient	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	3	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	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 35, 40

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	2	600 Winter	100	+40%	1/360 Winter				91.459
1.001	2	600 Winter	100	+40%	30/30 Summer				91.459
1.002	3	960 Winter	100	+40%					91.302
1.003	4	960 Winter	100	+40%	30/60 Winter				91.300
1.004	5	1440 Winter	100	+40%					90.782
1.005	6	1440 Winter	100	+40%					90.777

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	2	0.459	0.000	0.00			0.0	SURCHARGED	
1.001	2	0.359	0.000	1.82			34.7	SURCHARGED	
1.002	3	-0.098	0.000	0.15			31.9	FLOOD RISK	
1.003	4	0.400	0.000	0.77			26.3	SURCHARGED	
1.004	5	-0.418	0.000	0.12			26.2	OK	
1.005	6	-0.123	0.000	0.24			24.2	OK	

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)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
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

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	110.472	0.130	849.8	1.000	5.00	29.0		0.045	4 \=/	1500	1:4 Swale	
1.001	27.754	0.187	148.4	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.002	116.505	0.233	500.0	0.492	0.00	0.0		0.045	4 \=/	1500	1:4 Swale	
1.003	7.035	0.100	70.4	0.000	0.00	0.0		0.045	4 \=/	1500	1:4 Swale	
2.000	96.500	0.397	243.1	0.000	5.00	0.0		0.045	4 \=/	600	1:4 Swale	
2.001	39.751	0.200	198.8	3.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
1.004	220.282	0.400	550.7	0.798	0.00	0.0		0.045	4 \=/	1500	1:4 Swale	
1.005	10.848	0.050	217.0	0.000	0.00	0.0		0.045	4 \=/	1500	1:4 Swale	

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	50.00	15.21	90.850	1.000	29.0	0.0	0.0	0.18	56.8«	164.4
1.001	50.00	5.36	90.720	0.000	36.9	0.0	0.0	1.29	91.1	36.9
1.002	50.00	13.62	90.533	0.492	36.9	0.0	0.0	0.24	74.1«	103.5
1.003	50.00	5.19	90.300	0.000	41.5	0.0	0.0	0.63	197.5	41.5
2.000	50.00	10.31	90.797	0.000	0.0	0.0	0.0	0.30	54.5	0.0
2.001	50.00	5.46	90.400	0.000	23.4	0.0	0.0	1.44	228.8	23.4
1.004	50.00	21.85	90.000	0.798	64.9	0.0	0.0	0.22	70.6«	173.0
1.005	50.00	5.51	89.600	0.000	72.5	0.0	0.0	0.36	112.4	72.5

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)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
3.000	11.996	0.050	239.9	0.000	5.00	0.0	0.600		o	100	Pipe/Conduit	
3.001	29.073	0.078	372.7	0.742	0.00	0.0	0.600		o	150	Pipe/Conduit	
3.002	149.891	1.091	137.4	0.000	0.00	0.0		0.045	3 \=/	300	1:3 Swale	
4.000	23.094	0.050	461.9	0.000	5.00	0.0	0.600		o	100	Pipe/Conduit	
4.001	25.214	0.969	26.0	0.561	0.00	0.0	0.600		o	100	Pipe/Conduit	
3.003	98.505	1.131	87.1	0.000	0.00	0.0		0.045	3 \=/	300	1:3 Swale	
5.000	43.678	0.105	416.0	2.016	5.00	0.0		0.045	3 \=/	1500	1:3 Swale	
6.000	52.523	0.105	500.2	2.016	5.00	0.0		0.045	3 \=/	1500	1:3 Swale	
5.001	29.674	0.095	312.4	0.000	0.00	0.0	0.600		o	675	Pipe/Conduit	
5.002	121.826	0.100	1218.3	0.000	0.00	0.0	0.600		o	750	Pipe/Conduit	
5.003	85.045	0.100	850.5	6.108	0.00	0.0	0.600		o	750	Pipe/Conduit	
5.004	49.301	0.141	349.7	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
7.000	250.659	0.501	500.3	1.710	5.00	0.0		0.045	4 \=/	500	1:4 Swale	
7.001	9.621	0.140	68.7	0.000	0.00	0.0	0.600		o	375	Pipe/Conduit	
5.005	130.420	0.295	442.1	0.000	0.00	0.0	0.600		1 _/	500	1:1 Ditch	

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)
3.000	50.00	5.41	91.750	0.000	0.0	0.0	0.0	0.49	3.9	0.0
3.001	50.00	5.94	91.650	0.000	3.3	0.0	0.0	0.51	9.1	3.3
3.002	50.00	12.50	91.622	0.000	3.3	0.0	0.0	0.38	42.9	3.3
4.000	50.00	6.09	91.750	0.000	0.0	0.0	0.0	0.35	2.8	0.0
4.001	50.00	5.28	91.700	0.000	2.6	0.0	0.0	1.52	11.9	2.6
3.003	50.00	8.43	90.531	0.000	5.9	0.0	0.0	0.48	53.8	5.9
5.000	50.00	7.75	90.400	2.016	0.0	0.0	0.0	0.26	77.3«	273.0
6.000	50.00	8.63	90.400	2.016	0.0	0.0	0.0	0.24	70.5«	273.0
5.001	50.00	8.97	90.295	4.032	0.0	0.0	0.0	1.48	528.7«	546.0
5.002	50.00	11.53	90.200	4.032	0.0	0.0	0.0	0.79	350.4«	546.0
5.003	50.00	13.02	90.100	10.140	0.0	0.0	0.0	0.95	420.4«	1373.1
5.004	50.00	5.98	90.000	0.000	74.3	0.0	0.0	0.84	59.0«	74.3
7.000	50.00	25.20	90.500	1.710	0.0	0.0	0.0	0.21	34.1«	231.6
7.001	50.00	5.07	89.999	0.000	11.2	0.0	0.0	2.19	241.7	11.2
5.005	50.00	6.70	89.859	0.000	85.5	0.0	0.0	1.28	307.7	85.5

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)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
5.006	4.333	0.014	300.0	0.000	0.00	0.0	0.600		o	525	Pipe/Conduit	
1.006	15.374	0.051	301.5	0.000	0.00	0.0	0.600		o	500	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)
5.006	50.00	6.75	89.564	0.000	85.5	0.0	0.0	1.29	278.8	85.5
1.006	50.00	5.21	89.550	0.000	163.9	0.0	0.0	1.25	244.6	163.9

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)
1.006	Ditch 4	90.849	89.499	89.450	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	89.550	23	89.550	45	89.550	67	89.550	89	89.550	111	89.550
2	89.550	24	89.550	46	89.550	68	89.550	90	89.550	112	89.550
3	89.550	25	89.550	47	89.550	69	89.550	91	89.550	113	89.550
4	89.550	26	89.550	48	89.550	70	89.550	92	89.550	114	89.550
5	89.550	27	89.550	49	89.550	71	89.550	93	89.550	115	89.550
6	89.550	28	89.550	50	89.550	72	89.550	94	89.550	116	89.550
7	89.550	29	89.550	51	89.550	73	89.550	95	89.550	117	89.550
8	89.550	30	89.550	52	89.550	74	89.550	96	89.550	118	89.550
9	89.550	31	89.550	53	89.550	75	89.550	97	89.550	119	89.550
10	89.550	32	89.550	54	89.550	76	89.550	98	89.550	120	89.550
11	89.550	33	89.550	55	89.550	77	89.550	99	89.550	121	89.550
12	89.550	34	89.550	56	89.550	78	89.550	100	89.550	122	89.550
13	89.550	35	89.550	57	89.550	79	89.550	101	89.550	123	89.550
14	89.550	36	89.550	58	89.550	80	89.550	102	89.550	124	89.550
15	89.550	37	89.550	59	89.550	81	89.550	103	89.550	125	89.550
16	89.550	38	89.550	60	89.550	82	89.550	104	89.550	126	89.550
17	89.550	39	89.550	61	89.550	83	89.550	105	89.550	127	89.550
18	89.550	40	89.550	62	89.550	84	89.550	106	89.550	128	89.550
19	89.550	41	89.550	63	89.550	85	89.550	107	89.550	129	89.550
20	89.550	42	89.550	64	89.550	86	89.550	108	89.550	130	89.550
21	89.550	43	89.550	65	89.550	87	89.550	109	89.550	131	89.550
22	89.550	44	89.550	66	89.550	88	89.550	110	89.550	132	89.550

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)
133	89.550	183	89.550	233	89.550	283	89.550	333	89.550	383	89.550
134	89.550	184	89.550	234	89.550	284	89.550	334	89.550	384	89.550
135	89.550	185	89.550	235	89.550	285	89.550	335	89.550	385	89.550
136	89.550	186	89.550	236	89.550	286	89.550	336	89.550	386	89.550
137	89.550	187	89.550	237	89.550	287	89.550	337	89.550	387	89.550
138	89.550	188	89.550	238	89.550	288	89.550	338	89.550	388	89.550
139	89.550	189	89.550	239	89.550	289	89.550	339	89.550	389	89.550
140	89.550	190	89.550	240	89.550	290	89.550	340	89.550	390	89.550
141	89.550	191	89.550	241	89.550	291	89.550	341	89.550	391	89.550
142	89.550	192	89.550	242	89.550	292	89.550	342	89.550	392	89.550
143	89.550	193	89.550	243	89.550	293	89.550	343	89.550	393	89.550
144	89.550	194	89.550	244	89.550	294	89.550	344	89.550	394	89.550
145	89.550	195	89.550	245	89.550	295	89.550	345	89.550	395	89.550
146	89.550	196	89.550	246	89.550	296	89.550	346	89.550	396	89.550
147	89.550	197	89.550	247	89.550	297	89.550	347	89.550	397	89.550
148	89.550	198	89.550	248	89.550	298	89.550	348	89.550	398	89.550
149	89.550	199	89.550	249	89.550	299	89.550	349	89.550	399	89.550
150	89.550	200	89.550	250	89.550	300	89.550	350	89.550	400	89.550
151	89.550	201	89.550	251	89.550	301	89.550	351	89.550	401	89.550
152	89.550	202	89.550	252	89.550	302	89.550	352	89.550	402	89.550
153	89.550	203	89.550	253	89.550	303	89.550	353	89.550	403	89.550
154	89.550	204	89.550	254	89.550	304	89.550	354	89.550	404	89.550
155	89.550	205	89.550	255	89.550	305	89.550	355	89.550	405	89.550
156	89.550	206	89.550	256	89.550	306	89.550	356	89.550	406	89.550
157	89.550	207	89.550	257	89.550	307	89.550	357	89.550	407	89.550
158	89.550	208	89.550	258	89.550	308	89.550	358	89.550	408	89.550
159	89.550	209	89.550	259	89.550	309	89.550	359	89.550	409	89.550
160	89.550	210	89.550	260	89.550	310	89.550	360	89.550	410	89.550
161	89.550	211	89.550	261	89.550	311	89.550	361	89.550	411	89.550
162	89.550	212	89.550	262	89.550	312	89.550	362	89.550	412	89.550
163	89.550	213	89.550	263	89.550	313	89.550	363	89.550	413	89.550
164	89.550	214	89.550	264	89.550	314	89.550	364	89.550	414	89.550
165	89.550	215	89.550	265	89.550	315	89.550	365	89.550	415	89.550
166	89.550	216	89.550	266	89.550	316	89.550	366	89.550	416	89.550
167	89.550	217	89.550	267	89.550	317	89.550	367	89.550	417	89.550
168	89.550	218	89.550	268	89.550	318	89.550	368	89.550	418	89.550
169	89.550	219	89.550	269	89.550	319	89.550	369	89.550	419	89.550
170	89.550	220	89.550	270	89.550	320	89.550	370	89.550	420	89.550
171	89.550	221	89.550	271	89.550	321	89.550	371	89.550	421	89.550
172	89.550	222	89.550	272	89.550	322	89.550	372	89.550	422	89.550
173	89.550	223	89.550	273	89.550	323	89.550	373	89.550	423	89.550
174	89.550	224	89.550	274	89.550	324	89.550	374	89.550	424	89.550
175	89.550	225	89.550	275	89.550	325	89.550	375	89.550	425	89.550
176	89.550	226	89.550	276	89.550	326	89.550	376	89.550	426	89.550
177	89.550	227	89.550	277	89.550	327	89.550	377	89.550	427	89.550
178	89.550	228	89.550	278	89.550	328	89.550	378	89.550	428	89.550
179	89.550	229	89.550	279	89.550	329	89.550	379	89.550	429	89.550
180	89.550	230	89.550	280	89.550	330	89.550	380	89.550	430	89.550
181	89.550	231	89.550	281	89.550	331	89.550	381	89.550	431	89.550
182	89.550	232	89.550	282	89.550	332	89.550	382	89.550	432	89.550

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)
433	89.550	483	89.550	533	89.550	583	89.550	633	89.550	683	89.550
434	89.550	484	89.550	534	89.550	584	89.550	634	89.550	684	89.550
435	89.550	485	89.550	535	89.550	585	89.550	635	89.550	685	89.550
436	89.550	486	89.550	536	89.550	586	89.550	636	89.550	686	89.550
437	89.550	487	89.550	537	89.550	587	89.550	637	89.550	687	89.550
438	89.550	488	89.550	538	89.550	588	89.550	638	89.550	688	89.550
439	89.550	489	89.550	539	89.550	589	89.550	639	89.550	689	89.550
440	89.550	490	89.550	540	89.550	590	89.550	640	89.550	690	89.550
441	89.550	491	89.550	541	89.550	591	89.550	641	89.550	691	89.550
442	89.550	492	89.550	542	89.550	592	89.550	642	89.550	692	89.550
443	89.550	493	89.550	543	89.550	593	89.550	643	89.550	693	89.550
444	89.550	494	89.550	544	89.550	594	89.550	644	89.550	694	89.550
445	89.550	495	89.550	545	89.550	595	89.550	645	89.550	695	89.550
446	89.550	496	89.550	546	89.550	596	89.550	646	89.550	696	89.550
447	89.550	497	89.550	547	89.550	597	89.550	647	89.550	697	89.550
448	89.550	498	89.550	548	89.550	598	89.550	648	89.550	698	89.550
449	89.550	499	89.550	549	89.550	599	89.550	649	89.550	699	89.550
450	89.550	500	89.550	550	89.550	600	89.550	650	89.550	700	89.550
451	89.550	501	89.550	551	89.550	601	89.550	651	89.550	701	89.550
452	89.550	502	89.550	552	89.550	602	89.550	652	89.550	702	89.550
453	89.550	503	89.550	553	89.550	603	89.550	653	89.550	703	89.550
454	89.550	504	89.550	554	89.550	604	89.550	654	89.550	704	89.550
455	89.550	505	89.550	555	89.550	605	89.550	655	89.550	705	89.550
456	89.550	506	89.550	556	89.550	606	89.550	656	89.550	706	89.550
457	89.550	507	89.550	557	89.550	607	89.550	657	89.550	707	89.550
458	89.550	508	89.550	558	89.550	608	89.550	658	89.550	708	89.550
459	89.550	509	89.550	559	89.550	609	89.550	659	89.550	709	89.550
460	89.550	510	89.550	560	89.550	610	89.550	660	89.550	710	89.550
461	89.550	511	89.550	561	89.550	611	89.550	661	89.550	711	89.550
462	89.550	512	89.550	562	89.550	612	89.550	662	89.550	712	89.550
463	89.550	513	89.550	563	89.550	613	89.550	663	89.550	713	89.550
464	89.550	514	89.550	564	89.550	614	89.550	664	89.550	714	89.550
465	89.550	515	89.550	565	89.550	615	89.550	665	89.550	715	89.550
466	89.550	516	89.550	566	89.550	616	89.550	666	89.550	716	89.550
467	89.550	517	89.550	567	89.550	617	89.550	667	89.550	717	89.550
468	89.550	518	89.550	568	89.550	618	89.550	668	89.550	718	89.550
469	89.550	519	89.550	569	89.550	619	89.550	669	89.550	719	89.550
470	89.550	520	89.550	570	89.550	620	89.550	670	89.550	720	89.550
471	89.550	521	89.550	571	89.550	621	89.550	671	89.550	721	89.550
472	89.550	522	89.550	572	89.550	622	89.550	672	89.550	722	89.550
473	89.550	523	89.550	573	89.550	623	89.550	673	89.550	723	89.550
474	89.550	524	89.550	574	89.550	624	89.550	674	89.550	724	89.550
475	89.550	525	89.550	575	89.550	625	89.550	675	89.550	725	89.550
476	89.550	526	89.550	576	89.550	626	89.550	676	89.550	726	89.550
477	89.550	527	89.550	577	89.550	627	89.550	677	89.550	727	89.550
478	89.550	528	89.550	578	89.550	628	89.550	678	89.550	728	89.550
479	89.550	529	89.550	579	89.550	629	89.550	679	89.550	729	89.550
480	89.550	530	89.550	580	89.550	630	89.550	680	89.550	730	89.550
481	89.550	531	89.550	581	89.550	631	89.550	681	89.550	731	89.550
482	89.550	532	89.550	582	89.550	632	89.550	682	89.550	732	89.550

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)
733	89.550	783	89.550	833	89.550	883	89.550	933	89.550	983	89.550
734	89.550	784	89.550	834	89.550	884	89.550	934	89.550	984	89.550
735	89.550	785	89.550	835	89.550	885	89.550	935	89.550	985	89.550
736	89.550	786	89.550	836	89.550	886	89.550	936	89.550	986	89.550
737	89.550	787	89.550	837	89.550	887	89.550	937	89.550	987	89.550
738	89.550	788	89.550	838	89.550	888	89.550	938	89.550	988	89.550
739	89.550	789	89.550	839	89.550	889	89.550	939	89.550	989	89.550
740	89.550	790	89.550	840	89.550	890	89.550	940	89.550	990	89.550
741	89.550	791	89.550	841	89.550	891	89.550	941	89.550	991	89.550
742	89.550	792	89.550	842	89.550	892	89.550	942	89.550	992	89.550
743	89.550	793	89.550	843	89.550	893	89.550	943	89.550	993	89.550
744	89.550	794	89.550	844	89.550	894	89.550	944	89.550	994	89.550
745	89.550	795	89.550	845	89.550	895	89.550	945	89.550	995	89.550
746	89.550	796	89.550	846	89.550	896	89.550	946	89.550	996	89.550
747	89.550	797	89.550	847	89.550	897	89.550	947	89.550	997	89.550
748	89.550	798	89.550	848	89.550	898	89.550	948	89.550	998	89.550
749	89.550	799	89.550	849	89.550	899	89.550	949	89.550	999	89.550
750	89.550	800	89.550	850	89.550	900	89.550	950	89.550	1000	89.550
751	89.550	801	89.550	851	89.550	901	89.550	951	89.550	1001	89.550
752	89.550	802	89.550	852	89.550	902	89.550	952	89.550	1002	89.550
753	89.550	803	89.550	853	89.550	903	89.550	953	89.550	1003	89.550
754	89.550	804	89.550	854	89.550	904	89.550	954	89.550	1004	89.550
755	89.550	805	89.550	855	89.550	905	89.550	955	89.550	1005	89.550
756	89.550	806	89.550	856	89.550	906	89.550	956	89.550	1006	89.550
757	89.550	807	89.550	857	89.550	907	89.550	957	89.550	1007	89.550
758	89.550	808	89.550	858	89.550	908	89.550	958	89.550	1008	89.550
759	89.550	809	89.550	859	89.550	909	89.550	959	89.550	1009	89.550
760	89.550	810	89.550	860	89.550	910	89.550	960	89.550	1010	89.550
761	89.550	811	89.550	861	89.550	911	89.550	961	89.550	1011	89.550
762	89.550	812	89.550	862	89.550	912	89.550	962	89.550	1012	89.550
763	89.550	813	89.550	863	89.550	913	89.550	963	89.550	1013	89.550
764	89.550	814	89.550	864	89.550	914	89.550	964	89.550	1014	89.550
765	89.550	815	89.550	865	89.550	915	89.550	965	89.550	1015	89.550
766	89.550	816	89.550	866	89.550	916	89.550	966	89.550	1016	89.550
767	89.550	817	89.550	867	89.550	917	89.550	967	89.550	1017	89.550
768	89.550	818	89.550	868	89.550	918	89.550	968	89.550	1018	89.550
769	89.550	819	89.550	869	89.550	919	89.550	969	89.550	1019	89.550
770	89.550	820	89.550	870	89.550	920	89.550	970	89.550	1020	89.550
771	89.550	821	89.550	871	89.550	921	89.550	971	89.550	1021	89.550
772	89.550	822	89.550	872	89.550	922	89.550	972	89.550	1022	89.550
773	89.550	823	89.550	873	89.550	923	89.550	973	89.550	1023	89.550
774	89.550	824	89.550	874	89.550	924	89.550	974	89.550	1024	89.550
775	89.550	825	89.550	875	89.550	925	89.550	975	89.550	1025	89.550
776	89.550	826	89.550	876	89.550	926	89.550	976	89.550	1026	89.550
777	89.550	827	89.550	877	89.550	927	89.550	977	89.550	1027	89.550
778	89.550	828	89.550	878	89.550	928	89.550	978	89.550	1028	89.550
779	89.550	829	89.550	879	89.550	929	89.550	979	89.550	1029	89.550
780	89.550	830	89.550	880	89.550	930	89.550	980	89.550	1030	89.550
781	89.550	831	89.550	881	89.550	931	89.550	981	89.550	1031	89.550
782	89.550	832	89.550	882	89.550	932	89.550	982	89.550	1032	89.550

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)
1033	89.550	1083	89.550	1133	89.550	1183	89.550	1233	89.550	1283	89.550
1034	89.550	1084	89.550	1134	89.550	1184	89.550	1234	89.550	1284	89.550
1035	89.550	1085	89.550	1135	89.550	1185	89.550	1235	89.550	1285	89.550
1036	89.550	1086	89.550	1136	89.550	1186	89.550	1236	89.550	1286	89.550
1037	89.550	1087	89.550	1137	89.550	1187	89.550	1237	89.550	1287	89.550
1038	89.550	1088	89.550	1138	89.550	1188	89.550	1238	89.550	1288	89.550
1039	89.550	1089	89.550	1139	89.550	1189	89.550	1239	89.550	1289	89.550
1040	89.550	1090	89.550	1140	89.550	1190	89.550	1240	89.550	1290	89.550
1041	89.550	1091	89.550	1141	89.550	1191	89.550	1241	89.550	1291	89.550
1042	89.550	1092	89.550	1142	89.550	1192	89.550	1242	89.550	1292	89.550
1043	89.550	1093	89.550	1143	89.550	1193	89.550	1243	89.550	1293	89.550
1044	89.550	1094	89.550	1144	89.550	1194	89.550	1244	89.550	1294	89.550
1045	89.550	1095	89.550	1145	89.550	1195	89.550	1245	89.550	1295	89.550
1046	89.550	1096	89.550	1146	89.550	1196	89.550	1246	89.550	1296	89.550
1047	89.550	1097	89.550	1147	89.550	1197	89.550	1247	89.550	1297	89.550
1048	89.550	1098	89.550	1148	89.550	1198	89.550	1248	89.550	1298	89.550
1049	89.550	1099	89.550	1149	89.550	1199	89.550	1249	89.550	1299	89.550
1050	89.550	1100	89.550	1150	89.550	1200	89.550	1250	89.550	1300	89.550
1051	89.550	1101	89.550	1151	89.550	1201	89.550	1251	89.550	1301	89.550
1052	89.550	1102	89.550	1152	89.550	1202	89.550	1252	89.550	1302	89.550
1053	89.550	1103	89.550	1153	89.550	1203	89.550	1253	89.550	1303	89.550
1054	89.550	1104	89.550	1154	89.550	1204	89.550	1254	89.550	1304	89.550
1055	89.550	1105	89.550	1155	89.550	1205	89.550	1255	89.550	1305	89.550
1056	89.550	1106	89.550	1156	89.550	1206	89.550	1256	89.550	1306	89.550
1057	89.550	1107	89.550	1157	89.550	1207	89.550	1257	89.550	1307	89.550
1058	89.550	1108	89.550	1158	89.550	1208	89.550	1258	89.550	1308	89.550
1059	89.550	1109	89.550	1159	89.550	1209	89.550	1259	89.550	1309	89.550
1060	89.550	1110	89.550	1160	89.550	1210	89.550	1260	89.550	1310	89.550
1061	89.550	1111	89.550	1161	89.550	1211	89.550	1261	89.550	1311	89.550
1062	89.550	1112	89.550	1162	89.550	1212	89.550	1262	89.550	1312	89.550
1063	89.550	1113	89.550	1163	89.550	1213	89.550	1263	89.550	1313	89.550
1064	89.550	1114	89.550	1164	89.550	1214	89.550	1264	89.550	1314	89.550
1065	89.550	1115	89.550	1165	89.550	1215	89.550	1265	89.550	1315	89.550
1066	89.550	1116	89.550	1166	89.550	1216	89.550	1266	89.550	1316	89.550
1067	89.550	1117	89.550	1167	89.550	1217	89.550	1267	89.550	1317	89.550
1068	89.550	1118	89.550	1168	89.550	1218	89.550	1268	89.550	1318	89.550
1069	89.550	1119	89.550	1169	89.550	1219	89.550	1269	89.550	1319	89.550
1070	89.550	1120	89.550	1170	89.550	1220	89.550	1270	89.550	1320	89.550
1071	89.550	1121	89.550	1171	89.550	1221	89.550	1271	89.550	1321	89.550
1072	89.550	1122	89.550	1172	89.550	1222	89.550	1272	89.550	1322	89.550
1073	89.550	1123	89.550	1173	89.550	1223	89.550	1273	89.550	1323	89.550
1074	89.550	1124	89.550	1174	89.550	1224	89.550	1274	89.550	1324	89.550
1075	89.550	1125	89.550	1175	89.550	1225	89.550	1275	89.550	1325	89.550
1076	89.550	1126	89.550	1176	89.550	1226	89.550	1276	89.550	1326	89.550
1077	89.550	1127	89.550	1177	89.550	1227	89.550	1277	89.550	1327	89.550
1078	89.550	1128	89.550	1178	89.550	1228	89.550	1278	89.550	1328	89.550
1079	89.550	1129	89.550	1179	89.550	1229	89.550	1279	89.550	1329	89.550
1080	89.550	1130	89.550	1180	89.550	1230	89.550	1280	89.550	1330	89.550
1081	89.550	1131	89.550	1181	89.550	1231	89.550	1281	89.550	1331	89.550
1082	89.550	1132	89.550	1182	89.550	1232	89.550	1282	89.550	1332	89.550

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)
1333	89.550	1351	89.550	1369	89.550	1387	89.550	1405	89.550	1423	89.550
1334	89.550	1352	89.550	1370	89.550	1388	89.550	1406	89.550	1424	89.550
1335	89.550	1353	89.550	1371	89.550	1389	89.550	1407	89.550	1425	89.550
1336	89.550	1354	89.550	1372	89.550	1390	89.550	1408	89.550	1426	89.550
1337	89.550	1355	89.550	1373	89.550	1391	89.550	1409	89.550	1427	89.550
1338	89.550	1356	89.550	1374	89.550	1392	89.550	1410	89.550	1428	89.550
1339	89.550	1357	89.550	1375	89.550	1393	89.550	1411	89.550	1429	89.550
1340	89.550	1358	89.550	1376	89.550	1394	89.550	1412	89.550	1430	89.550
1341	89.550	1359	89.550	1377	89.550	1395	89.550	1413	89.550	1431	89.550
1342	89.550	1360	89.550	1378	89.550	1396	89.550	1414	89.550	1432	89.550
1343	89.550	1361	89.550	1379	89.550	1397	89.550	1415	89.550	1433	89.550
1344	89.550	1362	89.550	1380	89.550	1398	89.550	1416	89.550	1434	89.550
1345	89.550	1363	89.550	1381	89.550	1399	89.550	1417	89.550	1435	89.550
1346	89.550	1364	89.550	1382	89.550	1400	89.550	1418	89.550	1436	89.550
1347	89.550	1365	89.550	1383	89.550	1401	89.550	1419	89.550	1437	89.550
1348	89.550	1366	89.550	1384	89.550	1402	89.550	1420	89.550	1438	89.550
1349	89.550	1367	89.550	1385	89.550	1403	89.550	1421	89.550	1439	89.550
1350	89.550	1368	89.550	1386	89.550	1404	89.550	1422	89.550	1440	89.550

Online Controls for Storm

Hydro-Brake® Optimum Manhole: Culvert 1, DS/PN: 1.001, Volume (m³): 958.6

Unit Reference	MD-SHE-0255-3690-1300-3690
Design Head (m)	1.300
Design Flow (l/s)	36.9
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	255
Invert Level (m)	90.720
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.300	36.9
Flush-Flo™	0.441	36.9
Kick-Flo®	0.931	31.4
Mean Flow over Head Range	-	31.1

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	8.2	1.200	35.5	3.000	55.2	7.000	83.3
0.200	26.2	1.400	38.2	3.500	59.5	7.500	86.2
0.300	35.9	1.600	40.8	4.000	63.5	8.000	88.9
0.400	36.8	1.800	43.1	4.500	67.2	8.500	91.6
0.500	36.8	2.000	45.4	5.000	70.7	9.000	94.2
0.600	36.3	2.200	47.5	5.500	74.1	9.500	96.7
0.800	34.6	2.400	49.6	6.000	77.3		
1.000	32.5	2.600	51.5	6.500	80.4		

Orifice Manhole: D1.1 FC, DS/PN: 1.003, Volume (m³): 1009.5

Diameter (m) 0.160 Discharge Coefficient 0.600 Invert Level (m) 90.300

Orifice Manhole: E2 - Basin, DS/PN: 2.001, Volume (m³): 792.0

Diameter (m) 0.120 Discharge Coefficient 0.600 Invert Level (m) 90.400

Orifice Manhole: D1.2 - FC, DS/PN: 1.005, Volume (m³): 2478.2

Diameter (m) 0.200 Discharge Coefficient 0.600 Invert Level (m) 89.600

Orifice Manhole: F1 1 PP, DS/PN: 3.001, Volume (m³): 0.8

Diameter (m) 0.047 Discharge Coefficient 0.600 Invert Level (m) 91.650

Orifice Manhole: F1 2 PP, DS/PN: 4.001, Volume (m³): 0.9

Diameter (m) 0.040 Discharge Coefficient 0.600 Invert Level (m) 91.700

Orifice Manhole: C2 - Basin 3, DS/PN: 5.004, Volume (m³): 40.3

Diameter (m) 0.200 Discharge Coefficient 0.600 Invert Level (m) 90.000

Hydro-Brake® Optimum Manhole: D1.3 - Flow control, DS/PN: 7.001, Volume (m³): 1854.4

Unit Reference	MD-SHE-0154-1120-1000-1120
Design Head (m)	1.000
Design Flow (l/s)	11.2
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	154
Invert Level (m)	89.999
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	11.2
Flush-Flo™	0.308	11.2
Kick-Flo®	0.683	9.4
Mean Flow over Head Range	-	9.6

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	5.5	1.200	12.2	3.000	18.9	7.000	28.3
0.200	10.8	1.400	13.1	3.500	20.3	7.500	29.3
0.300	11.2	1.600	14.0	4.000	21.6	8.000	30.2
0.400	11.1	1.800	14.8	4.500	22.9	8.500	31.1
0.500	10.8	2.000	15.5	5.000	24.1	9.000	32.0
0.600	10.3	2.200	16.3	5.500	25.2	9.500	32.8
0.800	10.1	2.400	17.0	6.000	26.3		
1.000	11.2	2.600	17.6	6.500	27.3		

Storage Structures for Storm

Tank or Pond Manhole: E2 - Basin, DS/PN: 2.001

Invert Level (m) 90.400

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1992.0	1.300	2866.0

Porous Car Park Manhole: F1 1 PP, DS/PN: 3.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	74.1
Membrane Percolation (mm/hr)	1000	Length (m)	100.0
Max Percolation (l/s)	2058.3	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	90.700	Cap Volume Depth (m)	0.250

Porous Car Park Manhole: F1 2 PP, DS/PN: 4.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	56.1
Membrane Percolation (mm/hr)	1000	Length (m)	100.0
Max Percolation (l/s)	1558.3	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	91.700	Cap Volume Depth (m)	0.250

Tank or Pond Manhole: C1 - Basin 1 Out, DS/PN: 5.002

Invert Level (m) 90.200

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	452.0	1.200	844.0	1.500	956.0

Tank or Pond Manhole: C2 - Basin 2, DS/PN: 5.003

Invert Level (m) 90.100

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	732.0	1.500	2115.0

Tank or Pond Manhole: C2 - Basin 3, DS/PN: 5.004

Invert Level (m) 90.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	3605.0	1.100	4541.0	1.400	4808.0

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 Coeffiecient	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	6
Number of Online Controls	8	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	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
1.000	E1 - Swale	360 Winter	1	+0%			
1.001	Culvert 1	360 Winter	1	+0%	1/15 Summer		
1.002	D1.1 Swale	720 Winter	1	+0%			
1.003	D1.1 FC	720 Winter	1	+0%			
2.000	E2 pipe	15 Summer	1	+0%			
2.001	E2 - Basin	720 Winter	1	+0%	100/30 Winter		
1.004	D1.2 Swale	960 Winter	1	+0%			
1.005	D1.2 - FC	960 Winter	1	+0%			
3.000	F1.1 PP	15 Summer	1	+0%	100/720 Winter	100/720 Winter	
3.001	F1 1 PP	1440 Winter	1	+0%	100/720 Winter	100/720 Winter	
3.002	F1 - Swale 1	180 Winter	1	+0%			
4.000	F1 2 PP	1440 Winter	1	+0%	100/120 Winter		
4.001	F1 2 PP	1440 Winter	1	+0%	30/240 Winter		
3.003	F1 - Swale 2	1440 Winter	1	+0%			
5.000	C1 - Swale 1	15 Winter	1	+0%			
6.000	C1 - Swale 2	15 Winter	1	+0%			
5.001	C1 - Basin 1 In	15 Winter	1	+0%	30/15 Summer		

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
1.000	E1 - Swale		91.202	-0.948	0.000	0.01			49.7
1.001	Culvert 1		91.199	0.179	0.000	0.43			35.7
1.002	D1.1 Swale		90.850	-0.983	0.000	0.01			40.5
1.003	D1.1 FC		90.847	-0.753	0.000	0.00			36.5
2.000	E2 pipe		90.797	-1.300	0.000	0.00			0.0
2.001	E2 - Basin		90.604	-0.246	0.000	0.06			11.4
1.004	D1.2 Swale		90.216	-1.284	0.000	0.01			52.9
1.005	D1.2 - FC		90.194	-0.756	0.000	0.00			48.0
3.000	F1.1 PP		91.750	-0.100	0.000	0.00			0.0
3.001	F1 1 PP		90.772	-1.028	0.000	0.00			0.0
3.002	F1 - Swale 1		91.580	-0.420	0.000	0.00			0.0
4.000	F1 2 PP		91.758	-0.092	0.000	0.00			0.0
4.001	F1 2 PP		91.758	-0.042	0.000	0.06			0.6
3.003	F1 - Swale 2		90.541	-0.909	0.000	0.00			0.6
5.000	C1 - Swale 1		90.788	-1.112	0.000	0.03			256.8
6.000	C1 - Swale 2		90.798	-1.102	0.000	0.03			252.8
5.001	C1 - Basin 1 In		90.770	-0.200	0.000	0.84			350.8

PN	US/MH Name	Status	Level Exceeded
1.000	E1 - Swale	OK	
1.001	Culvert 1	SURCHARGED	
1.002	D1.1 Swale	OK	
1.003	D1.1 FC	OK	
2.000	E2 pipe	OK	
2.001	E2 - Basin	OK	
1.004	D1.2 Swale	OK	
1.005	D1.2 - FC	OK	
3.000	F1.1 PP	OK	3
3.001	F1 1 PP	OK	3
3.002	F1 - Swale 1	OK	
4.000	F1 2 PP	OK	
4.001	F1 2 PP	OK	
3.003	F1 - Swale 2	OK	
5.000	C1 - Swale 1	OK	
6.000	C1 - Swale 2	OK	
5.001	C1 - Basin 1 In	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
5.002	C1 - Basin 1 Out	60 Winter	1	+0%	30/30 Winter		
5.003	C2 - Basin 2	120 Winter	1	+0%	30/30 Winter		
5.004	C2 - Basin 3	720 Winter	1	+0%	1/240 Winter		
7.000	D1.3 - Swale	15 Winter	1	+0%			
7.001	D1.3 - Flow control	120 Winter	1	+0%	1/15 Summer		
5.005	C4 - Swale In	960 Winter	1	+0%			
5.006	C4 - Swale Out	960 Winter	1	+0%			
1.006	Culvert 2	960 Winter	1	+0%			

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
5.002	C1 - Basin 1 Out		90.609	-0.341	0.000	0.35		
5.003	C2 - Basin 2		90.536	-0.314	0.000	0.64		
5.004	C2 - Basin 3		90.330	0.030	0.000	0.72		
7.000	D1.3 - Swale		90.856	-0.944	0.000	0.03		
7.001	D1.3 - Flow control		90.560	0.186	0.000	0.08		
5.005	C4 - Swale In		89.976	-1.324	0.000	0.01		
5.006	C4 - Swale Out		89.817	-0.272	0.000	0.31		
1.006	Culvert 2		89.810	-0.240	0.000	0.54		

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
5.002	C1 - Basin 1 Out	127.4	OK	
5.003	C2 - Basin 2	241.1	OK	
5.004	C2 - Basin 3	40.0	SURCHARGED	
7.000	D1.3 - Swale	179.3	OK	
7.001	D1.3 - Flow control	11.2	SURCHARGED	
5.005	C4 - Swale In	51.1	OK	
5.006	C4 - Swale Out	51.0	OK	
1.006	Culvert 2	98.0	OK	

30 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 Coeffiecient	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	6
Number of Online Controls	8	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	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
1.000	E1 - Swale	240 Winter	30	+0%			
1.001	Culvert 1	240 Winter	30	+0%	1/15 Summer		
1.002	D1.1 Swale	960 Winter	30	+0%			
1.003	D1.1 FC	960 Winter	30	+0%			
2.000	E2 pipe	480 Winter	30	+0%			
2.001	E2 - Basin	480 Winter	30	+0%	100/30 Winter		
1.004	D1.2 Swale	960 Winter	30	+0%			
1.005	D1.2 - FC	960 Winter	30	+0%			
3.000	F1.1 PP	15 Summer	30	+0%	100/720 Winter	100/720 Winter	
3.001	F1 1 PP	1440 Winter	30	+0%	100/720 Winter	100/720 Winter	
3.002	F1 - Swale 1	180 Summer	30	+0%			
4.000	F1 2 PP	1440 Winter	30	+0%	100/120 Winter		
4.001	F1 2 PP	1440 Winter	30	+0%	30/240 Winter		
3.003	F1 - Swale 2	1440 Winter	30	+0%			
5.000	C1 - Swale 1	15 Winter	30	+0%			
6.000	C1 - Swale 2	15 Winter	30	+0%			
5.001	C1 - Basin 1 In	15 Winter	30	+0%	30/15 Summer		

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
1.000	E1 - Swale		91.496	-0.654	0.000	0.02			91.2
1.001	Culvert 1		91.495	0.475	0.000	0.45			36.7
1.002	D1.1 Swale		90.982	-0.851	0.000	0.01			47.1
1.003	D1.1 FC		90.981	-0.619	0.000	0.00			40.1
2.000	E2 pipe		90.828	-1.269	0.000	0.00			0.0
2.001	E2 - Basin		90.828	-0.022	0.000	0.09			18.2
1.004	D1.2 Swale		90.396	-1.104	0.000	0.01			71.0
1.005	D1.2 - FC		90.393	-0.557	0.000	0.01			57.7
3.000	F1.1 PP		91.750	-0.100	0.000	0.00			0.0
3.001	F1 1 PP		90.866	-0.934	0.000	0.00			0.0
3.002	F1 - Swale 1		91.582	-0.418	0.000	0.00			0.0
4.000	F1 2 PP		91.835	-0.015	0.000	0.00			0.0
4.001	F1 2 PP		91.835	0.035	0.000	0.10			1.1
3.003	F1 - Swale 2		90.549	-0.901	0.000	0.00			1.1
5.000	C1 - Swale 1		91.164	-0.736	0.000	0.07			625.7
6.000	C1 - Swale 2		91.166	-0.734	0.000	0.08			618.9
5.001	C1 - Basin 1 In		91.161	0.191	0.000	1.70			713.6

PN	US/MH Name	Status	Level Exceeded
1.000	E1 - Swale	OK	
1.001	Culvert 1	SURCHARGED	
1.002	D1.1 Swale	OK	
1.003	D1.1 FC	OK	
2.000	E2 pipe	OK	
2.001	E2 - Basin	OK	
1.004	D1.2 Swale	OK	
1.005	D1.2 - FC	OK	
3.000	F1.1 PP	OK	3
3.001	F1 1 PP	OK	3
3.002	F1 - Swale 1	OK	
4.000	F1 2 PP	OK	
4.001	F1 2 PP	SURCHARGED	
3.003	F1 - Swale 2	OK	
5.000	C1 - Swale 1	OK	
6.000	C1 - Swale 2	OK	
5.001	C1 - Basin 1 In	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
5.002	C1 - Basin 1 Out	60 Winter	30	+0%	30/30 Winter		
5.003	C2 - Basin 2	60 Winter	30	+0%	30/30 Winter		
5.004	C2 - Basin 3	480 Winter	30	+0%	1/240 Winter		
7.000	D1.3 - Swale	15 Winter	30	+0%			
7.001	D1.3 - Flow control	240 Winter	30	+0%	1/15 Summer		
5.005	C4 - Swale In	1440 Winter	30	+0%			
5.006	C4 - Swale Out	1440 Winter	30	+0%			
1.006	Culvert 2	1440 Winter	30	+0%			

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
5.002	C1 - Basin 1 Out		90.997	0.047	0.000	0.73		
5.003	C2 - Basin 2		90.931	0.081	0.000	1.47		
5.004	C2 - Basin 3		90.661	0.361	0.000	1.00		
7.000	D1.3 - Swale		91.027	-0.773	0.000	0.07		
7.001	D1.3 - Flow control		90.868	0.494	0.000	0.08		
5.005	C4 - Swale In		89.999	-1.301	0.000	0.01		
5.006	C4 - Swale Out		89.856	-0.233	0.000	0.40		
1.006	Culvert 2		89.849	-0.201	0.000	0.67		

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
5.002	C1 - Basin 1 Out	260.4	SURCHARGED	
5.003	C2 - Basin 2	557.1	SURCHARGED	
5.004	C2 - Basin 3	55.4	SURCHARGED	
7.000	D1.3 - Swale	401.6	OK	
7.001	D1.3 - Flow control	11.2	SURCHARGED	
5.005	C4 - Swale In	65.1	OK	
5.006	C4 - Swale Out	65.1	OK	
1.006	Culvert 2	122.2	OK	

100 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 Coeffiecient	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	6
Number of Online Controls	8	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 0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
1.000	E1 - Swale	480 Winter	100	+40%			
1.001	Culvert 1	480 Winter	100	+40%	1/15 Summer		
1.002	D1.1 Swale	960 Winter	100	+40%			
1.003	D1.1 FC	960 Winter	100	+40%			
2.000	E2 pipe	600 Winter	100	+40%			
2.001	E2 - Basin	600 Winter	100	+40%	100/30 Winter		
1.004	D1.2 Swale	960 Winter	100	+40%			
1.005	D1.2 - FC	960 Winter	100	+40%			
3.000	F1.1 PP	1440 Winter	100	+40%	100/720 Winter	100/720 Winter	
3.001	F1 1 PP	1440 Winter	100	+40%	100/720 Winter	100/720 Winter	
3.002	F1 - Swale 1	1440 Winter	100	+40%			
4.000	F1 2 PP	1440 Winter	100	+40%	100/120 Winter		
4.001	F1 2 PP	1440 Winter	100	+40%	30/240 Winter		
3.003	F1 - Swale 2	1440 Winter	100	+40%			
5.000	C1 - Swale 1	30 Winter	100	+40%			
6.000	C1 - Swale 2	30 Winter	100	+40%			
5.001	C1 - Basin 1 In	30 Winter	100	+40%	30/15 Summer		

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
1.000	E1 - Swale		91.844	-0.306	0.000	0.02			95.6
1.001	Culvert 1		91.842	0.822	0.000	0.45			36.7
1.002	D1.1 Swale		91.175	-0.658	0.000	0.01			55.8
1.003	D1.1 FC		91.174	-0.426	0.000	0.00			40.7
2.000	E2 pipe		91.162	-0.935	0.000	0.00			0.1
2.001	E2 - Basin		91.162	0.312	0.000	0.11			22.4
1.004	D1.2 Swale		90.570	-0.930	0.000	0.01			90.8
1.005	D1.2 - FC		90.570	-0.380	0.000	0.01			64.6
3.000	F1.1 PP		92.308	0.458	8.387	0.91			3.3
3.001	F1 1 PP		92.315	0.515	14.930	0.41			3.6
3.002	F1 - Swale 1		91.664	-0.336	0.000	0.01			3.6
4.000	F1 2 PP		92.244	0.394	0.000	0.03			0.1
4.001	F1 2 PP		92.244	0.444	0.000	0.21			2.4
3.003	F1 - Swale 2		90.581	-0.869	0.000	0.00			6.0
5.000	C1 - Swale 1		91.635	-0.265	0.000	0.11			922.5
6.000	C1 - Swale 2		91.636	-0.264	0.000	0.12			911.1
5.001	C1 - Basin 1 In		91.632	0.662	0.000	2.19			917.1

PN	US/MH Name	Status	Level Exceeded	
1.000	E1 - Swale	OK		
1.001	Culvert 1	FLOOD RISK		
1.002	D1.1 Swale	OK		
1.003	D1.1 FC	OK		
2.000	E2 pipe	OK		
2.001	E2 - Basin	SURCHARGED		
1.004	D1.2 Swale	OK		
1.005	D1.2 - FC	OK		
3.000	F1.1 PP	FLOOD		3
3.001	F1 1 PP	FLOOD		3
3.002	F1 - Swale 1	OK		
4.000	F1 2 PP	FLOOD RISK		
4.001	F1 2 PP	FLOOD RISK		
3.003	F1 - Swale 2	OK		
5.000	C1 - Swale 1	FLOOD RISK*		
6.000	C1 - Swale 2	FLOOD RISK*		
5.001	C1 - Basin 1 In	FLOOD RISK		

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
5.002	C1 - Basin 1 Out	60 Winter	100	+40%	30/30 Winter		
5.003	C2 - Basin 2	60 Winter	100	+40%	30/30 Winter		
5.004	C2 - Basin 3	600 Winter	100	+40%	1/240 Winter		
7.000	D1.3 - Swale	480 Winter	100	+40%			
7.001	D1.3 - Flow control	480 Winter	100	+40%	1/15 Summer		
5.005	C4 - Swale In	720 Winter	100	+40%			
5.006	C4 - Swale Out	720 Winter	100	+40%			
1.006	Culvert 2	720 Winter	100	+40%			

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
5.002	C1 - Basin 1 Out		91.472	0.522	0.000	1.17		
5.003	C2 - Basin 2		91.328	0.478	0.000	2.47		
5.004	C2 - Basin 3		91.116	0.816	0.000	1.32		
7.000	D1.3 - Swale		91.184	-0.616	0.000	0.02		
7.001	D1.3 - Flow control		91.184	0.810	0.000	0.08		
5.005	C4 - Swale In		90.029	-1.271	0.000	0.01		
5.006	C4 - Swale Out		89.911	-0.178	0.000	0.52		
1.006	Culvert 2		89.903	-0.147	0.000	0.84		

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
5.002	C1 - Basin 1 Out	418.7	FLOOD RISK	
5.003	C2 - Basin 2	935.6	FLOOD RISK	
5.004	C2 - Basin 3	73.3	FLOOD RISK	
7.000	D1.3 - Swale	114.3	OK	
7.001	D1.3 - Flow control	12.0	FLOOD RISK	
5.005	C4 - Swale In	85.2	OK	
5.006	C4 - Swale Out	85.2	OK	
1.006	Culvert 2	154.2	OK	

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)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
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	10.000	0.400	25.0	0.000	5.00	0.0	0.600	o	600	Pipe/Conduit	
S1.001	20.000	0.200	100.0	1.614	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.002	25.000	0.400	62.5	1.902	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.003	75.000	1.000	75.0	3.920	0.00	0.0	0.600	o	900	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	50.00	5.03	90.500	0.000	0.0	0.0	0.0	4.88	1380.8	0.0
S1.001	50.00	5.17	90.100	1.614	0.0	0.0	0.0	2.44	688.6	218.6
S1.002	50.00	5.31	89.900	3.516	0.0	0.0	0.0	3.08	872.0	476.1
S1.003	50.00	5.35	89.500	0.000	57.9	0.0	0.0	3.62	2303.2	57.9

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)
S1.003	S	89.800	88.500	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)	Time (mins)	Depth (m)
1	89.500	11	89.500	21	89.500	31	89.500	41	89.500	51	89.500	61	89.500
2	89.500	12	89.500	22	89.500	32	89.500	42	89.500	52	89.500	62	89.500
3	89.500	13	89.500	23	89.500	33	89.500	43	89.500	53	89.500	63	89.500
4	89.500	14	89.500	24	89.500	34	89.500	44	89.500	54	89.500	64	89.500
5	89.500	15	89.500	25	89.500	35	89.500	45	89.500	55	89.500	65	89.500
6	89.500	16	89.500	26	89.500	36	89.500	46	89.500	56	89.500	66	89.500
7	89.500	17	89.500	27	89.500	37	89.500	47	89.500	57	89.500	67	89.500
8	89.500	18	89.500	28	89.500	38	89.500	48	89.500	58	89.500	68	89.500
9	89.500	19	89.500	29	89.500	39	89.500	49	89.500	59	89.500	69	89.500
10	89.500	20	89.500	30	89.500	40	89.500	50	89.500	60	89.500	70	89.500

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)	Time (mins)	Depth (m)
71	89.500	130	89.500	189	89.500	248	89.500	307	89.500	366	89.500	425	89.500
72	89.500	131	89.500	190	89.500	249	89.500	308	89.500	367	89.500	426	89.500
73	89.500	132	89.500	191	89.500	250	89.500	309	89.500	368	89.500	427	89.500
74	89.500	133	89.500	192	89.500	251	89.500	310	89.500	369	89.500	428	89.500
75	89.500	134	89.500	193	89.500	252	89.500	311	89.500	370	89.500	429	89.500
76	89.500	135	89.500	194	89.500	253	89.500	312	89.500	371	89.500	430	89.500
77	89.500	136	89.500	195	89.500	254	89.500	313	89.500	372	89.500	431	89.500
78	89.500	137	89.500	196	89.500	255	89.500	314	89.500	373	89.500	432	89.500
79	89.500	138	89.500	197	89.500	256	89.500	315	89.500	374	89.500	433	89.500
80	89.500	139	89.500	198	89.500	257	89.500	316	89.500	375	89.500	434	89.500
81	89.500	140	89.500	199	89.500	258	89.500	317	89.500	376	89.500	435	89.500
82	89.500	141	89.500	200	89.500	259	89.500	318	89.500	377	89.500	436	89.500
83	89.500	142	89.500	201	89.500	260	89.500	319	89.500	378	89.500	437	89.500
84	89.500	143	89.500	202	89.500	261	89.500	320	89.500	379	89.500	438	89.500
85	89.500	144	89.500	203	89.500	262	89.500	321	89.500	380	89.500	439	89.500
86	89.500	145	89.500	204	89.500	263	89.500	322	89.500	381	89.500	440	89.500
87	89.500	146	89.500	205	89.500	264	89.500	323	89.500	382	89.500	441	89.500
88	89.500	147	89.500	206	89.500	265	89.500	324	89.500	383	89.500	442	89.500
89	89.500	148	89.500	207	89.500	266	89.500	325	89.500	384	89.500	443	89.500
90	89.500	149	89.500	208	89.500	267	89.500	326	89.500	385	89.500	444	89.500
91	89.500	150	89.500	209	89.500	268	89.500	327	89.500	386	89.500	445	89.500
92	89.500	151	89.500	210	89.500	269	89.500	328	89.500	387	89.500	446	89.500
93	89.500	152	89.500	211	89.500	270	89.500	329	89.500	388	89.500	447	89.500
94	89.500	153	89.500	212	89.500	271	89.500	330	89.500	389	89.500	448	89.500
95	89.500	154	89.500	213	89.500	272	89.500	331	89.500	390	89.500	449	89.500
96	89.500	155	89.500	214	89.500	273	89.500	332	89.500	391	89.500	450	89.500
97	89.500	156	89.500	215	89.500	274	89.500	333	89.500	392	89.500	451	89.500
98	89.500	157	89.500	216	89.500	275	89.500	334	89.500	393	89.500	452	89.500
99	89.500	158	89.500	217	89.500	276	89.500	335	89.500	394	89.500	453	89.500
100	89.500	159	89.500	218	89.500	277	89.500	336	89.500	395	89.500	454	89.500
101	89.500	160	89.500	219	89.500	278	89.500	337	89.500	396	89.500	455	89.500
102	89.500	161	89.500	220	89.500	279	89.500	338	89.500	397	89.500	456	89.500
103	89.500	162	89.500	221	89.500	280	89.500	339	89.500	398	89.500	457	89.500
104	89.500	163	89.500	222	89.500	281	89.500	340	89.500	399	89.500	458	89.500
105	89.500	164	89.500	223	89.500	282	89.500	341	89.500	400	89.500	459	89.500
106	89.500	165	89.500	224	89.500	283	89.500	342	89.500	401	89.500	460	89.500
107	89.500	166	89.500	225	89.500	284	89.500	343	89.500	402	89.500	461	89.500
108	89.500	167	89.500	226	89.500	285	89.500	344	89.500	403	89.500	462	89.500
109	89.500	168	89.500	227	89.500	286	89.500	345	89.500	404	89.500	463	89.500
110	89.500	169	89.500	228	89.500	287	89.500	346	89.500	405	89.500	464	89.500
111	89.500	170	89.500	229	89.500	288	89.500	347	89.500	406	89.500	465	89.500
112	89.500	171	89.500	230	89.500	289	89.500	348	89.500	407	89.500	466	89.500
113	89.500	172	89.500	231	89.500	290	89.500	349	89.500	408	89.500	467	89.500
114	89.500	173	89.500	232	89.500	291	89.500	350	89.500	409	89.500	468	89.500
115	89.500	174	89.500	233	89.500	292	89.500	351	89.500	410	89.500	469	89.500
116	89.500	175	89.500	234	89.500	293	89.500	352	89.500	411	89.500	470	89.500
117	89.500	176	89.500	235	89.500	294	89.500	353	89.500	412	89.500	471	89.500
118	89.500	177	89.500	236	89.500	295	89.500	354	89.500	413	89.500	472	89.500
119	89.500	178	89.500	237	89.500	296	89.500	355	89.500	414	89.500	473	89.500
120	89.500	179	89.500	238	89.500	297	89.500	356	89.500	415	89.500	474	89.500
121	89.500	180	89.500	239	89.500	298	89.500	357	89.500	416	89.500	475	89.500
122	89.500	181	89.500	240	89.500	299	89.500	358	89.500	417	89.500	476	89.500
123	89.500	182	89.500	241	89.500	300	89.500	359	89.500	418	89.500	477	89.500
124	89.500	183	89.500	242	89.500	301	89.500	360	89.500	419	89.500	478	89.500
125	89.500	184	89.500	243	89.500	302	89.500	361	89.500	420	89.500	479	89.500
126	89.500	185	89.500	244	89.500	303	89.500	362	89.500	421	89.500	480	89.500
127	89.500	186	89.500	245	89.500	304	89.500	363	89.500	422	89.500	481	89.500
128	89.500	187	89.500	246	89.500	305	89.500	364	89.500	423	89.500	482	89.500
129	89.500	188	89.500	247	89.500	306	89.500	365	89.500	424	89.500	483	89.500

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)	Time (mins)	Depth (m)
484	89.500	543	89.500	602	89.500	661	89.500	720	89.500	779	89.500	838	89.500
485	89.500	544	89.500	603	89.500	662	89.500	721	89.500	780	89.500	839	89.500
486	89.500	545	89.500	604	89.500	663	89.500	722	89.500	781	89.500	840	89.500
487	89.500	546	89.500	605	89.500	664	89.500	723	89.500	782	89.500	841	89.500
488	89.500	547	89.500	606	89.500	665	89.500	724	89.500	783	89.500	842	89.500
489	89.500	548	89.500	607	89.500	666	89.500	725	89.500	784	89.500	843	89.500
490	89.500	549	89.500	608	89.500	667	89.500	726	89.500	785	89.500	844	89.500
491	89.500	550	89.500	609	89.500	668	89.500	727	89.500	786	89.500	845	89.500
492	89.500	551	89.500	610	89.500	669	89.500	728	89.500	787	89.500	846	89.500
493	89.500	552	89.500	611	89.500	670	89.500	729	89.500	788	89.500	847	89.500
494	89.500	553	89.500	612	89.500	671	89.500	730	89.500	789	89.500	848	89.500
495	89.500	554	89.500	613	89.500	672	89.500	731	89.500	790	89.500	849	89.500
496	89.500	555	89.500	614	89.500	673	89.500	732	89.500	791	89.500	850	89.500
497	89.500	556	89.500	615	89.500	674	89.500	733	89.500	792	89.500	851	89.500
498	89.500	557	89.500	616	89.500	675	89.500	734	89.500	793	89.500	852	89.500
499	89.500	558	89.500	617	89.500	676	89.500	735	89.500	794	89.500	853	89.500
500	89.500	559	89.500	618	89.500	677	89.500	736	89.500	795	89.500	854	89.500
501	89.500	560	89.500	619	89.500	678	89.500	737	89.500	796	89.500	855	89.500
502	89.500	561	89.500	620	89.500	679	89.500	738	89.500	797	89.500	856	89.500
503	89.500	562	89.500	621	89.500	680	89.500	739	89.500	798	89.500	857	89.500
504	89.500	563	89.500	622	89.500	681	89.500	740	89.500	799	89.500	858	89.500
505	89.500	564	89.500	623	89.500	682	89.500	741	89.500	800	89.500	859	89.500
506	89.500	565	89.500	624	89.500	683	89.500	742	89.500	801	89.500	860	89.500
507	89.500	566	89.500	625	89.500	684	89.500	743	89.500	802	89.500	861	89.500
508	89.500	567	89.500	626	89.500	685	89.500	744	89.500	803	89.500	862	89.500
509	89.500	568	89.500	627	89.500	686	89.500	745	89.500	804	89.500	863	89.500
510	89.500	569	89.500	628	89.500	687	89.500	746	89.500	805	89.500	864	89.500
511	89.500	570	89.500	629	89.500	688	89.500	747	89.500	806	89.500	865	89.500
512	89.500	571	89.500	630	89.500	689	89.500	748	89.500	807	89.500	866	89.500
513	89.500	572	89.500	631	89.500	690	89.500	749	89.500	808	89.500	867	89.500
514	89.500	573	89.500	632	89.500	691	89.500	750	89.500	809	89.500	868	89.500
515	89.500	574	89.500	633	89.500	692	89.500	751	89.500	810	89.500	869	89.500
516	89.500	575	89.500	634	89.500	693	89.500	752	89.500	811	89.500	870	89.500
517	89.500	576	89.500	635	89.500	694	89.500	753	89.500	812	89.500	871	89.500
518	89.500	577	89.500	636	89.500	695	89.500	754	89.500	813	89.500	872	89.500
519	89.500	578	89.500	637	89.500	696	89.500	755	89.500	814	89.500	873	89.500
520	89.500	579	89.500	638	89.500	697	89.500	756	89.500	815	89.500	874	89.500
521	89.500	580	89.500	639	89.500	698	89.500	757	89.500	816	89.500	875	89.500
522	89.500	581	89.500	640	89.500	699	89.500	758	89.500	817	89.500	876	89.500
523	89.500	582	89.500	641	89.500	700	89.500	759	89.500	818	89.500	877	89.500
524	89.500	583	89.500	642	89.500	701	89.500	760	89.500	819	89.500	878	89.500
525	89.500	584	89.500	643	89.500	702	89.500	761	89.500	820	89.500	879	89.500
526	89.500	585	89.500	644	89.500	703	89.500	762	89.500	821	89.500	880	89.500
527	89.500	586	89.500	645	89.500	704	89.500	763	89.500	822	89.500	881	89.500
528	89.500	587	89.500	646	89.500	705	89.500	764	89.500	823	89.500	882	89.500
529	89.500	588	89.500	647	89.500	706	89.500	765	89.500	824	89.500	883	89.500
530	89.500	589	89.500	648	89.500	707	89.500	766	89.500	825	89.500	884	89.500
531	89.500	590	89.500	649	89.500	708	89.500	767	89.500	826	89.500	885	89.500
532	89.500	591	89.500	650	89.500	709	89.500	768	89.500	827	89.500	886	89.500
533	89.500	592	89.500	651	89.500	710	89.500	769	89.500	828	89.500	887	89.500
534	89.500	593	89.500	652	89.500	711	89.500	770	89.500	829	89.500	888	89.500
535	89.500	594	89.500	653	89.500	712	89.500	771	89.500	830	89.500	889	89.500
536	89.500	595	89.500	654	89.500	713	89.500	772	89.500	831	89.500	890	89.500
537	89.500	596	89.500	655	89.500	714	89.500	773	89.500	832	89.500	891	89.500
538	89.500	597	89.500	656	89.500	715	89.500	774	89.500	833	89.500	892	89.500
539	89.500	598	89.500	657	89.500	716	89.500	775	89.500	834	89.500	893	89.500
540	89.500	599	89.500	658	89.500	717	89.500	776	89.500	835	89.500	894	89.500
541	89.500	600	89.500	659	89.500	718	89.500	777	89.500	836	89.500	895	89.500
542	89.500	601	89.500	660	89.500	719	89.500	778	89.500	837	89.500	896	89.500

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)	Time (mins)	Depth (m)
897	89.500	956	89.500	1015	89.500	1074	89.500	1133	89.500	1192	89.500	1251	89.500
898	89.500	957	89.500	1016	89.500	1075	89.500	1134	89.500	1193	89.500	1252	89.500
899	89.500	958	89.500	1017	89.500	1076	89.500	1135	89.500	1194	89.500	1253	89.500
900	89.500	959	89.500	1018	89.500	1077	89.500	1136	89.500	1195	89.500	1254	89.500
901	89.500	960	89.500	1019	89.500	1078	89.500	1137	89.500	1196	89.500	1255	89.500
902	89.500	961	89.500	1020	89.500	1079	89.500	1138	89.500	1197	89.500	1256	89.500
903	89.500	962	89.500	1021	89.500	1080	89.500	1139	89.500	1198	89.500	1257	89.500
904	89.500	963	89.500	1022	89.500	1081	89.500	1140	89.500	1199	89.500	1258	89.500
905	89.500	964	89.500	1023	89.500	1082	89.500	1141	89.500	1200	89.500	1259	89.500
906	89.500	965	89.500	1024	89.500	1083	89.500	1142	89.500	1201	89.500	1260	89.500
907	89.500	966	89.500	1025	89.500	1084	89.500	1143	89.500	1202	89.500	1261	89.500
908	89.500	967	89.500	1026	89.500	1085	89.500	1144	89.500	1203	89.500	1262	89.500
909	89.500	968	89.500	1027	89.500	1086	89.500	1145	89.500	1204	89.500	1263	89.500
910	89.500	969	89.500	1028	89.500	1087	89.500	1146	89.500	1205	89.500	1264	89.500
911	89.500	970	89.500	1029	89.500	1088	89.500	1147	89.500	1206	89.500	1265	89.500
912	89.500	971	89.500	1030	89.500	1089	89.500	1148	89.500	1207	89.500	1266	89.500
913	89.500	972	89.500	1031	89.500	1090	89.500	1149	89.500	1208	89.500	1267	89.500
914	89.500	973	89.500	1032	89.500	1091	89.500	1150	89.500	1209	89.500	1268	89.500
915	89.500	974	89.500	1033	89.500	1092	89.500	1151	89.500	1210	89.500	1269	89.500
916	89.500	975	89.500	1034	89.500	1093	89.500	1152	89.500	1211	89.500	1270	89.500
917	89.500	976	89.500	1035	89.500	1094	89.500	1153	89.500	1212	89.500	1271	89.500
918	89.500	977	89.500	1036	89.500	1095	89.500	1154	89.500	1213	89.500	1272	89.500
919	89.500	978	89.500	1037	89.500	1096	89.500	1155	89.500	1214	89.500	1273	89.500
920	89.500	979	89.500	1038	89.500	1097	89.500	1156	89.500	1215	89.500	1274	89.500
921	89.500	980	89.500	1039	89.500	1098	89.500	1157	89.500	1216	89.500	1275	89.500
922	89.500	981	89.500	1040	89.500	1099	89.500	1158	89.500	1217	89.500	1276	89.500
923	89.500	982	89.500	1041	89.500	1100	89.500	1159	89.500	1218	89.500	1277	89.500
924	89.500	983	89.500	1042	89.500	1101	89.500	1160	89.500	1219	89.500	1278	89.500
925	89.500	984	89.500	1043	89.500	1102	89.500	1161	89.500	1220	89.500	1279	89.500
926	89.500	985	89.500	1044	89.500	1103	89.500	1162	89.500	1221	89.500	1280	89.500
927	89.500	986	89.500	1045	89.500	1104	89.500	1163	89.500	1222	89.500	1281	89.500
928	89.500	987	89.500	1046	89.500	1105	89.500	1164	89.500	1223	89.500	1282	89.500
929	89.500	988	89.500	1047	89.500	1106	89.500	1165	89.500	1224	89.500	1283	89.500
930	89.500	989	89.500	1048	89.500	1107	89.500	1166	89.500	1225	89.500	1284	89.500
931	89.500	990	89.500	1049	89.500	1108	89.500	1167	89.500	1226	89.500	1285	89.500
932	89.500	991	89.500	1050	89.500	1109	89.500	1168	89.500	1227	89.500	1286	89.500
933	89.500	992	89.500	1051	89.500	1110	89.500	1169	89.500	1228	89.500	1287	89.500
934	89.500	993	89.500	1052	89.500	1111	89.500	1170	89.500	1229	89.500	1288	89.500
935	89.500	994	89.500	1053	89.500	1112	89.500	1171	89.500	1230	89.500	1289	89.500
936	89.500	995	89.500	1054	89.500	1113	89.500	1172	89.500	1231	89.500	1290	89.500
937	89.500	996	89.500	1055	89.500	1114	89.500	1173	89.500	1232	89.500	1291	89.500
938	89.500	997	89.500	1056	89.500	1115	89.500	1174	89.500	1233	89.500	1292	89.500
939	89.500	998	89.500	1057	89.500	1116	89.500	1175	89.500	1234	89.500	1293	89.500
940	89.500	999	89.500	1058	89.500	1117	89.500	1176	89.500	1235	89.500	1294	89.500
941	89.500	1000	89.500	1059	89.500	1118	89.500	1177	89.500	1236	89.500	1295	89.500
942	89.500	1001	89.500	1060	89.500	1119	89.500	1178	89.500	1237	89.500	1296	89.500
943	89.500	1002	89.500	1061	89.500	1120	89.500	1179	89.500	1238	89.500	1297	89.500
944	89.500	1003	89.500	1062	89.500	1121	89.500	1180	89.500	1239	89.500	1298	89.500
945	89.500	1004	89.500	1063	89.500	1122	89.500	1181	89.500	1240	89.500	1299	89.500
946	89.500	1005	89.500	1064	89.500	1123	89.500	1182	89.500	1241	89.500	1300	89.500
947	89.500	1006	89.500	1065	89.500	1124	89.500	1183	89.500	1242	89.500	1301	89.500
948	89.500	1007	89.500	1066	89.500	1125	89.500	1184	89.500	1243	89.500	1302	89.500
949	89.500	1008	89.500	1067	89.500	1126	89.500	1185	89.500	1244	89.500	1303	89.500
950	89.500	1009	89.500	1068	89.500	1127	89.500	1186	89.500	1245	89.500	1304	89.500
951	89.500	1010	89.500	1069	89.500	1128	89.500	1187	89.500	1246	89.500	1305	89.500
952	89.500	1011	89.500	1070	89.500	1129	89.500	1188	89.500	1247	89.500	1306	89.500
953	89.500	1012	89.500	1071	89.500	1130	89.500	1189	89.500	1248	89.500	1307	89.500
954	89.500	1013	89.500	1072	89.500	1131	89.500	1190	89.500	1249	89.500	1308	89.500
955	89.500	1014	89.500	1073	89.500	1132	89.500	1191	89.500	1250	89.500	1309	89.500

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)	Time (mins)	Depth (m)
1310	89.500	1329	89.500	1348	89.500	1367	89.500	1386	89.500	1405	89.500	1424	89.500
1311	89.500	1330	89.500	1349	89.500	1368	89.500	1387	89.500	1406	89.500	1425	89.500
1312	89.500	1331	89.500	1350	89.500	1369	89.500	1388	89.500	1407	89.500	1426	89.500
1313	89.500	1332	89.500	1351	89.500	1370	89.500	1389	89.500	1408	89.500	1427	89.500
1314	89.500	1333	89.500	1352	89.500	1371	89.500	1390	89.500	1409	89.500	1428	89.500
1315	89.500	1334	89.500	1353	89.500	1372	89.500	1391	89.500	1410	89.500	1429	89.500
1316	89.500	1335	89.500	1354	89.500	1373	89.500	1392	89.500	1411	89.500	1430	89.500
1317	89.500	1336	89.500	1355	89.500	1374	89.500	1393	89.500	1412	89.500	1431	89.500
1318	89.500	1337	89.500	1356	89.500	1375	89.500	1394	89.500	1413	89.500	1432	89.500
1319	89.500	1338	89.500	1357	89.500	1376	89.500	1395	89.500	1414	89.500	1433	89.500
1320	89.500	1339	89.500	1358	89.500	1377	89.500	1396	89.500	1415	89.500	1434	89.500
1321	89.500	1340	89.500	1359	89.500	1378	89.500	1397	89.500	1416	89.500	1435	89.500
1322	89.500	1341	89.500	1360	89.500	1379	89.500	1398	89.500	1417	89.500	1436	89.500
1323	89.500	1342	89.500	1361	89.500	1380	89.500	1399	89.500	1418	89.500	1437	89.500
1324	89.500	1343	89.500	1362	89.500	1381	89.500	1400	89.500	1419	89.500	1438	89.500
1325	89.500	1344	89.500	1363	89.500	1382	89.500	1401	89.500	1420	89.500	1439	89.500
1326	89.500	1345	89.500	1364	89.500	1383	89.500	1402	89.500	1421	89.500	1440	89.500
1327	89.500	1346	89.500	1365	89.500	1384	89.500	1403	89.500	1422	89.500		
1328	89.500	1347	89.500	1366	89.500	1385	89.500	1404	89.500	1423	89.500		

Online Controls for Storm

Orifice Manhole: SD2 - Basin 2, DS/PN: S1.002, Volume (m³): 7.9

Diameter (m) 0.550 Discharge Coefficient 0.600 Invert Level (m) 89.900

Hydro-Brake® Optimum Manhole: SD2&3 - Basin 3, DS/PN: S1.003, Volume (m³): 9.9

Unit Reference	MD-SHE-0310-5790-1300-5790
Design Head (m)	1.300
Design Flow (l/s)	57.9
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	310
Invert Level (m)	89.500
Minimum Outlet Pipe Diameter (mm)	375
Suggested Manhole Diameter (mm)	2100

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.300	57.8	Kick-Flo®	0.972	50.3
Flush-Flo™	0.501	57.8	Mean Flow over Head Range	-	47.8

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)	Depth (m)	Flow (l/s)
0.100	9.4	0.800	55.3	2.000	71.2	4.000	99.7	7.000	131.0
0.200	31.8	1.000	51.0	2.200	74.6	4.500	105.6	7.500	135.5
0.300	54.9	1.200	55.6	2.400	77.8	5.000	111.2	8.000	139.8
0.400	57.2	1.400	59.9	2.600	80.9	5.500	116.5	8.500	144.1
0.500	57.8	1.600	63.9	3.000	86.7	6.000	121.5	9.000	148.1
0.600	57.4	1.800	67.7	3.500	93.4	6.500	126.3	9.500	152.1

Storage Structures for Storm

Tank or Pond Manhole: SD2 - Basin 1, DS/PN: S1.001

Invert Level (m) 90.100

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	441.0	1.100	853.0

Tank or Pond Manhole: SD2 - Basin 2, DS/PN: S1.002

Invert Level (m) 89.900

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	349.0	1.500	796.0

Tank or Pond Manhole: SD2&3 - Basin 3, DS/PN: S1.003

Invert Level (m) 89.500

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	3971.0	1.300	5149.0

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 Coeffiecient	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 3 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
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)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SD2 - Basin 1 inlet	15 Summer	1	+0%					90.500
S1.001	SD2 - Basin 1	60 Winter	1	+0%	100/15 Winter				90.269
S1.002	SD2 - Basin 2	60 Winter	1	+0%	100/15 Summer				90.232
S1.003	SD2&3 - Basin 3	600 Winter	1	+0%	100/240 Winter				89.735

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SD2 - Basin 1 inlet	-0.600	0.000	0.00			0.0	OK*	
S1.001	SD2 - Basin 1	-0.431	0.000	0.14			64.8	OK	
S1.002	SD2 - Basin 2	-0.268	0.000	0.19			122.3	OK	
S1.003	SD2&3 - Basin 3	-0.665	0.000	0.02			39.7	OK	

30 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 Coeffiecient	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 3 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
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)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SD2 - Basin 1 inlet	60 Winter	30	+0%					90.510
S1.001	SD2 - Basin 1	60 Winter	30	+0%	100/15 Winter				90.510
S1.002	SD2 - Basin 2	60 Winter	30	+0%	100/15 Summer				90.485
S1.003	SD2&3 - Basin 3	360 Winter	30	+0%	100/240 Winter				90.010

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SD2 - Basin 1 inlet	-0.590	0.000	0.00			0.1	OK*	
S1.001	SD2 - Basin 1	-0.190	0.000	0.31			138.0	OK	
S1.002	SD2 - Basin 2	-0.015	0.000	0.46			293.0	OK	
S1.003	SD2&3 - Basin 3	-0.390	0.000	0.03			57.7	OK	

100 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 Coeffiecient	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 3 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
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)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SD2 - Basin 1 inlet	60 Winter	100	+40%					90.838
S1.001	SD2 - Basin 1	60 Winter	100	+40%	100/15 Winter				90.838
S1.002	SD2 - Basin 2	60 Winter	100	+40%	100/15 Summer				90.797
S1.003	SD2&3 - Basin 3	600 Winter	100	+40%	100/240 Winter				90.460

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SD2 - Basin 1 inlet	-0.262	0.000	0.00			0.3	OK*	
S1.001	SD2 - Basin 1	0.138	0.000	0.50			222.7	SURCHARGED	
S1.002	SD2 - Basin 2	0.297	0.000	0.77			484.8	SURCHARGED	
S1.003	SD2&3 - Basin 3	0.060	0.000	0.03			57.7	SURCHARGED	

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)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
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

« - Indicates pipe capacity < flow

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	10.000	0.033	303.0	4.500	5.00	0.0	0.600	o	300	Pipe/Conduit	
S1.001	10.000	1.150	8.7	0.000	0.00	0.0	0.600	o	375	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	50.00	5.19	89.700	4.500	0.0	0.0	0.0	0.90	63.5«	609.4
S1.001	50.00	5.21	89.500	4.500	0.0	0.0	0.0	6.18	682.1	609.4

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	4.500	4.500	4.500
1.001	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				4.500	4.500	4.500

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)
S1.001	S	89.800	88.350	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)	Time (mins)	Depth (m)
1	89.500	40	89.500	79	89.500	118	89.500	157	89.500	196	89.500	235	89.500
2	89.500	41	89.500	80	89.500	119	89.500	158	89.500	197	89.500	236	89.500
3	89.500	42	89.500	81	89.500	120	89.500	159	89.500	198	89.500	237	89.500
4	89.500	43	89.500	82	89.500	121	89.500	160	89.500	199	89.500	238	89.500
5	89.500	44	89.500	83	89.500	122	89.500	161	89.500	200	89.500	239	89.500
6	89.500	45	89.500	84	89.500	123	89.500	162	89.500	201	89.500	240	89.500
7	89.500	46	89.500	85	89.500	124	89.500	163	89.500	202	89.500	241	89.500
8	89.500	47	89.500	86	89.500	125	89.500	164	89.500	203	89.500	242	89.500
9	89.500	48	89.500	87	89.500	126	89.500	165	89.500	204	89.500	243	89.500
10	89.500	49	89.500	88	89.500	127	89.500	166	89.500	205	89.500	244	89.500
11	89.500	50	89.500	89	89.500	128	89.500	167	89.500	206	89.500	245	89.500
12	89.500	51	89.500	90	89.500	129	89.500	168	89.500	207	89.500	246	89.500
13	89.500	52	89.500	91	89.500	130	89.500	169	89.500	208	89.500	247	89.500
14	89.500	53	89.500	92	89.500	131	89.500	170	89.500	209	89.500	248	89.500
15	89.500	54	89.500	93	89.500	132	89.500	171	89.500	210	89.500	249	89.500
16	89.500	55	89.500	94	89.500	133	89.500	172	89.500	211	89.500	250	89.500
17	89.500	56	89.500	95	89.500	134	89.500	173	89.500	212	89.500	251	89.500
18	89.500	57	89.500	96	89.500	135	89.500	174	89.500	213	89.500	252	89.500
19	89.500	58	89.500	97	89.500	136	89.500	175	89.500	214	89.500	253	89.500
20	89.500	59	89.500	98	89.500	137	89.500	176	89.500	215	89.500	254	89.500
21	89.500	60	89.500	99	89.500	138	89.500	177	89.500	216	89.500	255	89.500
22	89.500	61	89.500	100	89.500	139	89.500	178	89.500	217	89.500	256	89.500
23	89.500	62	89.500	101	89.500	140	89.500	179	89.500	218	89.500	257	89.500
24	89.500	63	89.500	102	89.500	141	89.500	180	89.500	219	89.500	258	89.500
25	89.500	64	89.500	103	89.500	142	89.500	181	89.500	220	89.500	259	89.500
26	89.500	65	89.500	104	89.500	143	89.500	182	89.500	221	89.500	260	89.500
27	89.500	66	89.500	105	89.500	144	89.500	183	89.500	222	89.500	261	89.500
28	89.500	67	89.500	106	89.500	145	89.500	184	89.500	223	89.500	262	89.500
29	89.500	68	89.500	107	89.500	146	89.500	185	89.500	224	89.500	263	89.500
30	89.500	69	89.500	108	89.500	147	89.500	186	89.500	225	89.500	264	89.500
31	89.500	70	89.500	109	89.500	148	89.500	187	89.500	226	89.500	265	89.500
32	89.500	71	89.500	110	89.500	149	89.500	188	89.500	227	89.500	266	89.500
33	89.500	72	89.500	111	89.500	150	89.500	189	89.500	228	89.500	267	89.500
34	89.500	73	89.500	112	89.500	151	89.500	190	89.500	229	89.500	268	89.500
35	89.500	74	89.500	113	89.500	152	89.500	191	89.500	230	89.500	269	89.500
36	89.500	75	89.500	114	89.500	153	89.500	192	89.500	231	89.500	270	89.500
37	89.500	76	89.500	115	89.500	154	89.500	193	89.500	232	89.500	271	89.500
38	89.500	77	89.500	116	89.500	155	89.500	194	89.500	233	89.500	272	89.500
39	89.500	78	89.500	117	89.500	156	89.500	195	89.500	234	89.500	273	89.500

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)	Time (mins)	Depth (m)
274	89.500	333	89.500	392	89.500	451	89.500	510	89.500	569	89.500	628	89.500
275	89.500	334	89.500	393	89.500	452	89.500	511	89.500	570	89.500	629	89.500
276	89.500	335	89.500	394	89.500	453	89.500	512	89.500	571	89.500	630	89.500
277	89.500	336	89.500	395	89.500	454	89.500	513	89.500	572	89.500	631	89.500
278	89.500	337	89.500	396	89.500	455	89.500	514	89.500	573	89.500	632	89.500
279	89.500	338	89.500	397	89.500	456	89.500	515	89.500	574	89.500	633	89.500
280	89.500	339	89.500	398	89.500	457	89.500	516	89.500	575	89.500	634	89.500
281	89.500	340	89.500	399	89.500	458	89.500	517	89.500	576	89.500	635	89.500
282	89.500	341	89.500	400	89.500	459	89.500	518	89.500	577	89.500	636	89.500
283	89.500	342	89.500	401	89.500	460	89.500	519	89.500	578	89.500	637	89.500
284	89.500	343	89.500	402	89.500	461	89.500	520	89.500	579	89.500	638	89.500
285	89.500	344	89.500	403	89.500	462	89.500	521	89.500	580	89.500	639	89.500
286	89.500	345	89.500	404	89.500	463	89.500	522	89.500	581	89.500	640	89.500
287	89.500	346	89.500	405	89.500	464	89.500	523	89.500	582	89.500	641	89.500
288	89.500	347	89.500	406	89.500	465	89.500	524	89.500	583	89.500	642	89.500
289	89.500	348	89.500	407	89.500	466	89.500	525	89.500	584	89.500	643	89.500
290	89.500	349	89.500	408	89.500	467	89.500	526	89.500	585	89.500	644	89.500
291	89.500	350	89.500	409	89.500	468	89.500	527	89.500	586	89.500	645	89.500
292	89.500	351	89.500	410	89.500	469	89.500	528	89.500	587	89.500	646	89.500
293	89.500	352	89.500	411	89.500	470	89.500	529	89.500	588	89.500	647	89.500
294	89.500	353	89.500	412	89.500	471	89.500	530	89.500	589	89.500	648	89.500
295	89.500	354	89.500	413	89.500	472	89.500	531	89.500	590	89.500	649	89.500
296	89.500	355	89.500	414	89.500	473	89.500	532	89.500	591	89.500	650	89.500
297	89.500	356	89.500	415	89.500	474	89.500	533	89.500	592	89.500	651	89.500
298	89.500	357	89.500	416	89.500	475	89.500	534	89.500	593	89.500	652	89.500
299	89.500	358	89.500	417	89.500	476	89.500	535	89.500	594	89.500	653	89.500
300	89.500	359	89.500	418	89.500	477	89.500	536	89.500	595	89.500	654	89.500
301	89.500	360	89.500	419	89.500	478	89.500	537	89.500	596	89.500	655	89.500
302	89.500	361	89.500	420	89.500	479	89.500	538	89.500	597	89.500	656	89.500
303	89.500	362	89.500	421	89.500	480	89.500	539	89.500	598	89.500	657	89.500
304	89.500	363	89.500	422	89.500	481	89.500	540	89.500	599	89.500	658	89.500
305	89.500	364	89.500	423	89.500	482	89.500	541	89.500	600	89.500	659	89.500
306	89.500	365	89.500	424	89.500	483	89.500	542	89.500	601	89.500	660	89.500
307	89.500	366	89.500	425	89.500	484	89.500	543	89.500	602	89.500	661	89.500
308	89.500	367	89.500	426	89.500	485	89.500	544	89.500	603	89.500	662	89.500
309	89.500	368	89.500	427	89.500	486	89.500	545	89.500	604	89.500	663	89.500
310	89.500	369	89.500	428	89.500	487	89.500	546	89.500	605	89.500	664	89.500
311	89.500	370	89.500	429	89.500	488	89.500	547	89.500	606	89.500	665	89.500
312	89.500	371	89.500	430	89.500	489	89.500	548	89.500	607	89.500	666	89.500
313	89.500	372	89.500	431	89.500	490	89.500	549	89.500	608	89.500	667	89.500
314	89.500	373	89.500	432	89.500	491	89.500	550	89.500	609	89.500	668	89.500
315	89.500	374	89.500	433	89.500	492	89.500	551	89.500	610	89.500	669	89.500
316	89.500	375	89.500	434	89.500	493	89.500	552	89.500	611	89.500	670	89.500
317	89.500	376	89.500	435	89.500	494	89.500	553	89.500	612	89.500	671	89.500
318	89.500	377	89.500	436	89.500	495	89.500	554	89.500	613	89.500	672	89.500
319	89.500	378	89.500	437	89.500	496	89.500	555	89.500	614	89.500	673	89.500
320	89.500	379	89.500	438	89.500	497	89.500	556	89.500	615	89.500	674	89.500
321	89.500	380	89.500	439	89.500	498	89.500	557	89.500	616	89.500	675	89.500
322	89.500	381	89.500	440	89.500	499	89.500	558	89.500	617	89.500	676	89.500
323	89.500	382	89.500	441	89.500	500	89.500	559	89.500	618	89.500	677	89.500
324	89.500	383	89.500	442	89.500	501	89.500	560	89.500	619	89.500	678	89.500
325	89.500	384	89.500	443	89.500	502	89.500	561	89.500	620	89.500	679	89.500
326	89.500	385	89.500	444	89.500	503	89.500	562	89.500	621	89.500	680	89.500
327	89.500	386	89.500	445	89.500	504	89.500	563	89.500	622	89.500	681	89.500
328	89.500	387	89.500	446	89.500	505	89.500	564	89.500	623	89.500	682	89.500
329	89.500	388	89.500	447	89.500	506	89.500	565	89.500	624	89.500	683	89.500
330	89.500	389	89.500	448	89.500	507	89.500	566	89.500	625	89.500	684	89.500
331	89.500	390	89.500	449	89.500	508	89.500	567	89.500	626	89.500	685	89.500
332	89.500	391	89.500	450	89.500	509	89.500	568	89.500	627	89.500	686	89.500

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)	Time (mins)	Depth (m)
687	89.500	746	89.500	805	89.500	864	89.500	923	89.500	982	89.500	1041	89.500
688	89.500	747	89.500	806	89.500	865	89.500	924	89.500	983	89.500	1042	89.500
689	89.500	748	89.500	807	89.500	866	89.500	925	89.500	984	89.500	1043	89.500
690	89.500	749	89.500	808	89.500	867	89.500	926	89.500	985	89.500	1044	89.500
691	89.500	750	89.500	809	89.500	868	89.500	927	89.500	986	89.500	1045	89.500
692	89.500	751	89.500	810	89.500	869	89.500	928	89.500	987	89.500	1046	89.500
693	89.500	752	89.500	811	89.500	870	89.500	929	89.500	988	89.500	1047	89.500
694	89.500	753	89.500	812	89.500	871	89.500	930	89.500	989	89.500	1048	89.500
695	89.500	754	89.500	813	89.500	872	89.500	931	89.500	990	89.500	1049	89.500
696	89.500	755	89.500	814	89.500	873	89.500	932	89.500	991	89.500	1050	89.500
697	89.500	756	89.500	815	89.500	874	89.500	933	89.500	992	89.500	1051	89.500
698	89.500	757	89.500	816	89.500	875	89.500	934	89.500	993	89.500	1052	89.500
699	89.500	758	89.500	817	89.500	876	89.500	935	89.500	994	89.500	1053	89.500
700	89.500	759	89.500	818	89.500	877	89.500	936	89.500	995	89.500	1054	89.500
701	89.500	760	89.500	819	89.500	878	89.500	937	89.500	996	89.500	1055	89.500
702	89.500	761	89.500	820	89.500	879	89.500	938	89.500	997	89.500	1056	89.500
703	89.500	762	89.500	821	89.500	880	89.500	939	89.500	998	89.500	1057	89.500
704	89.500	763	89.500	822	89.500	881	89.500	940	89.500	999	89.500	1058	89.500
705	89.500	764	89.500	823	89.500	882	89.500	941	89.500	1000	89.500	1059	89.500
706	89.500	765	89.500	824	89.500	883	89.500	942	89.500	1001	89.500	1060	89.500
707	89.500	766	89.500	825	89.500	884	89.500	943	89.500	1002	89.500	1061	89.500
708	89.500	767	89.500	826	89.500	885	89.500	944	89.500	1003	89.500	1062	89.500
709	89.500	768	89.500	827	89.500	886	89.500	945	89.500	1004	89.500	1063	89.500
710	89.500	769	89.500	828	89.500	887	89.500	946	89.500	1005	89.500	1064	89.500
711	89.500	770	89.500	829	89.500	888	89.500	947	89.500	1006	89.500	1065	89.500
712	89.500	771	89.500	830	89.500	889	89.500	948	89.500	1007	89.500	1066	89.500
713	89.500	772	89.500	831	89.500	890	89.500	949	89.500	1008	89.500	1067	89.500
714	89.500	773	89.500	832	89.500	891	89.500	950	89.500	1009	89.500	1068	89.500
715	89.500	774	89.500	833	89.500	892	89.500	951	89.500	1010	89.500	1069	89.500
716	89.500	775	89.500	834	89.500	893	89.500	952	89.500	1011	89.500	1070	89.500
717	89.500	776	89.500	835	89.500	894	89.500	953	89.500	1012	89.500	1071	89.500
718	89.500	777	89.500	836	89.500	895	89.500	954	89.500	1013	89.500	1072	89.500
719	89.500	778	89.500	837	89.500	896	89.500	955	89.500	1014	89.500	1073	89.500
720	89.500	779	89.500	838	89.500	897	89.500	956	89.500	1015	89.500	1074	89.500
721	89.500	780	89.500	839	89.500	898	89.500	957	89.500	1016	89.500	1075	89.500
722	89.500	781	89.500	840	89.500	899	89.500	958	89.500	1017	89.500	1076	89.500
723	89.500	782	89.500	841	89.500	900	89.500	959	89.500	1018	89.500	1077	89.500
724	89.500	783	89.500	842	89.500	901	89.500	960	89.500	1019	89.500	1078	89.500
725	89.500	784	89.500	843	89.500	902	89.500	961	89.500	1020	89.500	1079	89.500
726	89.500	785	89.500	844	89.500	903	89.500	962	89.500	1021	89.500	1080	89.500
727	89.500	786	89.500	845	89.500	904	89.500	963	89.500	1022	89.500	1081	89.500
728	89.500	787	89.500	846	89.500	905	89.500	964	89.500	1023	89.500	1082	89.500
729	89.500	788	89.500	847	89.500	906	89.500	965	89.500	1024	89.500	1083	89.500
730	89.500	789	89.500	848	89.500	907	89.500	966	89.500	1025	89.500	1084	89.500
731	89.500	790	89.500	849	89.500	908	89.500	967	89.500	1026	89.500	1085	89.500
732	89.500	791	89.500	850	89.500	909	89.500	968	89.500	1027	89.500	1086	89.500
733	89.500	792	89.500	851	89.500	910	89.500	969	89.500	1028	89.500	1087	89.500
734	89.500	793	89.500	852	89.500	911	89.500	970	89.500	1029	89.500	1088	89.500
735	89.500	794	89.500	853	89.500	912	89.500	971	89.500	1030	89.500	1089	89.500
736	89.500	795	89.500	854	89.500	913	89.500	972	89.500	1031	89.500	1090	89.500
737	89.500	796	89.500	855	89.500	914	89.500	973	89.500	1032	89.500	1091	89.500
738	89.500	797	89.500	856	89.500	915	89.500	974	89.500	1033	89.500	1092	89.500
739	89.500	798	89.500	857	89.500	916	89.500	975	89.500	1034	89.500	1093	89.500
740	89.500	799	89.500	858	89.500	917	89.500	976	89.500	1035	89.500	1094	89.500
741	89.500	800	89.500	859	89.500	918	89.500	977	89.500	1036	89.500	1095	89.500
742	89.500	801	89.500	860	89.500	919	89.500	978	89.500	1037	89.500	1096	89.500
743	89.500	802	89.500	861	89.500	920	89.500	979	89.500	1038	89.500	1097	89.500
744	89.500	803	89.500	862	89.500	921	89.500	980	89.500	1039	89.500	1098	89.500
745	89.500	804	89.500	863	89.500	922	89.500	981	89.500	1040	89.500	1099	89.500

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)	Time (mins)	Depth (m)
1100	89.500	1149	89.500	1198	89.500	1247	89.500	1296	89.500	1345	89.500	1394	89.500
1101	89.500	1150	89.500	1199	89.500	1248	89.500	1297	89.500	1346	89.500	1395	89.500
1102	89.500	1151	89.500	1200	89.500	1249	89.500	1298	89.500	1347	89.500	1396	89.500
1103	89.500	1152	89.500	1201	89.500	1250	89.500	1299	89.500	1348	89.500	1397	89.500
1104	89.500	1153	89.500	1202	89.500	1251	89.500	1300	89.500	1349	89.500	1398	89.500
1105	89.500	1154	89.500	1203	89.500	1252	89.500	1301	89.500	1350	89.500	1399	89.500
1106	89.500	1155	89.500	1204	89.500	1253	89.500	1302	89.500	1351	89.500	1400	89.500
1107	89.500	1156	89.500	1205	89.500	1254	89.500	1303	89.500	1352	89.500	1401	89.500
1108	89.500	1157	89.500	1206	89.500	1255	89.500	1304	89.500	1353	89.500	1402	89.500
1109	89.500	1158	89.500	1207	89.500	1256	89.500	1305	89.500	1354	89.500	1403	89.500
1110	89.500	1159	89.500	1208	89.500	1257	89.500	1306	89.500	1355	89.500	1404	89.500
1111	89.500	1160	89.500	1209	89.500	1258	89.500	1307	89.500	1356	89.500	1405	89.500
1112	89.500	1161	89.500	1210	89.500	1259	89.500	1308	89.500	1357	89.500	1406	89.500
1113	89.500	1162	89.500	1211	89.500	1260	89.500	1309	89.500	1358	89.500	1407	89.500
1114	89.500	1163	89.500	1212	89.500	1261	89.500	1310	89.500	1359	89.500	1408	89.500
1115	89.500	1164	89.500	1213	89.500	1262	89.500	1311	89.500	1360	89.500	1409	89.500
1116	89.500	1165	89.500	1214	89.500	1263	89.500	1312	89.500	1361	89.500	1410	89.500
1117	89.500	1166	89.500	1215	89.500	1264	89.500	1313	89.500	1362	89.500	1411	89.500
1118	89.500	1167	89.500	1216	89.500	1265	89.500	1314	89.500	1363	89.500	1412	89.500
1119	89.500	1168	89.500	1217	89.500	1266	89.500	1315	89.500	1364	89.500	1413	89.500
1120	89.500	1169	89.500	1218	89.500	1267	89.500	1316	89.500	1365	89.500	1414	89.500
1121	89.500	1170	89.500	1219	89.500	1268	89.500	1317	89.500	1366	89.500	1415	89.500
1122	89.500	1171	89.500	1220	89.500	1269	89.500	1318	89.500	1367	89.500	1416	89.500
1123	89.500	1172	89.500	1221	89.500	1270	89.500	1319	89.500	1368	89.500	1417	89.500
1124	89.500	1173	89.500	1222	89.500	1271	89.500	1320	89.500	1369	89.500	1418	89.500
1125	89.500	1174	89.500	1223	89.500	1272	89.500	1321	89.500	1370	89.500	1419	89.500
1126	89.500	1175	89.500	1224	89.500	1273	89.500	1322	89.500	1371	89.500	1420	89.500
1127	89.500	1176	89.500	1225	89.500	1274	89.500	1323	89.500	1372	89.500	1421	89.500
1128	89.500	1177	89.500	1226	89.500	1275	89.500	1324	89.500	1373	89.500	1422	89.500
1129	89.500	1178	89.500	1227	89.500	1276	89.500	1325	89.500	1374	89.500	1423	89.500
1130	89.500	1179	89.500	1228	89.500	1277	89.500	1326	89.500	1375	89.500	1424	89.500
1131	89.500	1180	89.500	1229	89.500	1278	89.500	1327	89.500	1376	89.500	1425	89.500
1132	89.500	1181	89.500	1230	89.500	1279	89.500	1328	89.500	1377	89.500	1426	89.500
1133	89.500	1182	89.500	1231	89.500	1280	89.500	1329	89.500	1378	89.500	1427	89.500
1134	89.500	1183	89.500	1232	89.500	1281	89.500	1330	89.500	1379	89.500	1428	89.500
1135	89.500	1184	89.500	1233	89.500	1282	89.500	1331	89.500	1380	89.500	1429	89.500
1136	89.500	1185	89.500	1234	89.500	1283	89.500	1332	89.500	1381	89.500	1430	89.500
1137	89.500	1186	89.500	1235	89.500	1284	89.500	1333	89.500	1382	89.500	1431	89.500
1138	89.500	1187	89.500	1236	89.500	1285	89.500	1334	89.500	1383	89.500	1432	89.500
1139	89.500	1188	89.500	1237	89.500	1286	89.500	1335	89.500	1384	89.500	1433	89.500
1140	89.500	1189	89.500	1238	89.500	1287	89.500	1336	89.500	1385	89.500	1434	89.500
1141	89.500	1190	89.500	1239	89.500	1288	89.500	1337	89.500	1386	89.500	1435	89.500
1142	89.500	1191	89.500	1240	89.500	1289	89.500	1338	89.500	1387	89.500	1436	89.500
1143	89.500	1192	89.500	1241	89.500	1290	89.500	1339	89.500	1388	89.500	1437	89.500
1144	89.500	1193	89.500	1242	89.500	1291	89.500	1340	89.500	1389	89.500	1438	89.500
1145	89.500	1194	89.500	1243	89.500	1292	89.500	1341	89.500	1390	89.500	1439	89.500
1146	89.500	1195	89.500	1244	89.500	1293	89.500	1342	89.500	1391	89.500	1440	89.500
1147	89.500	1196	89.500	1245	89.500	1294	89.500	1343	89.500	1392	89.500		
1148	89.500	1197	89.500	1246	89.500	1295	89.500	1344	89.500	1393	89.500		

Online Controls for Storm

Hydro-Brake® Optimum Manhole: SF2 - Basin OUT, DS/PN: S1.001, Volume (m³): 2.1

Unit Reference	MD-SHE-0244-3220-1000-3220
Design Head (m)	1.000
Design Flow (l/s)	32.2
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	244
Invert Level (m)	89.500
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	32.2	Kick-Flo®	0.751	28.1
Flush-Flo™	0.390	32.1	Mean Flow over Head Range	-	26.5

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	8.0	0.800	28.9	2.000	44.9	4.000	62.8	7.000	82.5
0.200	24.8	1.000	32.2	2.200	47.0	4.500	66.5	7.500	85.3
0.300	31.7	1.200	35.1	2.400	49.1	5.000	70.0	8.000	88.0
0.400	32.1	1.400	37.8	2.600	51.0	5.500	73.3	8.500	90.7
0.500	31.8	1.600	40.3	3.000	54.6	6.000	76.5	9.000	93.2
0.600	31.0	1.800	42.7	3.500	58.9	6.500	79.5	9.500	95.7

Storage Structures for Storm

Tank or Pond Manhole: SF2 - Basin OUT, DS/PN: S1.001

Invert Level (m) 89.500

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	3995.0	1.000	4772.0

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 Coeffiecient	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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SF2 - Basin IN	15 Summer	1	+0%					90.000
S1.001	SF2 - Basin OUT	720 Winter	1	+0%	100/60 Summer				89.667

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SF2 - Basin IN	0.000	0.000	4.17			256.1	SURCHARGED*	
S1.001	SF2 - Basin OUT	-0.208	0.000	0.05			19.0	OK	

30 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 Coeffiecient	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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SF2 - Basin IN	15 Summer	30	+0%					90.000
S1.001	SF2 - Basin OUT	480 Winter	30	+0%	100/60 Summer				89.849

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SF2 - Basin IN	0.000	0.000	7.45			457.2	SURCHARGED*	
S1.001	SF2 - Basin OUT	-0.026	0.000	0.08			31.9	OK	

100 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 Coeffiecient	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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SF2 - Basin IN	15 Summer	100	+40%					90.000
S1.001	SF2 - Basin OUT	600 Winter	100	+40%	100/60 Summer				90.181

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SF2 - Basin IN	0.000	0.000	10.66			653.8	SURCHARGED*	
S1.001	SF2 - Basin OUT	0.306	0.000	0.08			32.1	SURCHARGED	

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)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
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

« - Indicates pipe capacity < flow

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	10.000	0.033	303.0	1.900	5.00	0.0	0.600	o	300	Pipe/Conduit	
S1.001	10.000	1.400	7.1	0.000	0.00	0.0	0.600	o	375	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	50.00	5.19	89.800	1.900	0.0	0.0	0.0	0.90	63.5«	257.3
S1.001	50.00	5.21	89.500	1.900	0.0	0.0	0.0	6.82	752.7	257.3

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	1.900	1.900	1.900
1.001	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				1.900	1.900	1.900

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)
S1.001	S	89.800	88.100	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)	Time (mins)	Depth (m)
1	89.500	40	89.500	79	89.500	118	89.500	157	89.500	196	89.500	235	89.500
2	89.500	41	89.500	80	89.500	119	89.500	158	89.500	197	89.500	236	89.500
3	89.500	42	89.500	81	89.500	120	89.500	159	89.500	198	89.500	237	89.500
4	89.500	43	89.500	82	89.500	121	89.500	160	89.500	199	89.500	238	89.500
5	89.500	44	89.500	83	89.500	122	89.500	161	89.500	200	89.500	239	89.500
6	89.500	45	89.500	84	89.500	123	89.500	162	89.500	201	89.500	240	89.500
7	89.500	46	89.500	85	89.500	124	89.500	163	89.500	202	89.500	241	89.500
8	89.500	47	89.500	86	89.500	125	89.500	164	89.500	203	89.500	242	89.500
9	89.500	48	89.500	87	89.500	126	89.500	165	89.500	204	89.500	243	89.500
10	89.500	49	89.500	88	89.500	127	89.500	166	89.500	205	89.500	244	89.500
11	89.500	50	89.500	89	89.500	128	89.500	167	89.500	206	89.500	245	89.500
12	89.500	51	89.500	90	89.500	129	89.500	168	89.500	207	89.500	246	89.500
13	89.500	52	89.500	91	89.500	130	89.500	169	89.500	208	89.500	247	89.500
14	89.500	53	89.500	92	89.500	131	89.500	170	89.500	209	89.500	248	89.500
15	89.500	54	89.500	93	89.500	132	89.500	171	89.500	210	89.500	249	89.500
16	89.500	55	89.500	94	89.500	133	89.500	172	89.500	211	89.500	250	89.500
17	89.500	56	89.500	95	89.500	134	89.500	173	89.500	212	89.500	251	89.500
18	89.500	57	89.500	96	89.500	135	89.500	174	89.500	213	89.500	252	89.500
19	89.500	58	89.500	97	89.500	136	89.500	175	89.500	214	89.500	253	89.500
20	89.500	59	89.500	98	89.500	137	89.500	176	89.500	215	89.500	254	89.500
21	89.500	60	89.500	99	89.500	138	89.500	177	89.500	216	89.500	255	89.500
22	89.500	61	89.500	100	89.500	139	89.500	178	89.500	217	89.500	256	89.500
23	89.500	62	89.500	101	89.500	140	89.500	179	89.500	218	89.500	257	89.500
24	89.500	63	89.500	102	89.500	141	89.500	180	89.500	219	89.500	258	89.500
25	89.500	64	89.500	103	89.500	142	89.500	181	89.500	220	89.500	259	89.500
26	89.500	65	89.500	104	89.500	143	89.500	182	89.500	221	89.500	260	89.500
27	89.500	66	89.500	105	89.500	144	89.500	183	89.500	222	89.500	261	89.500
28	89.500	67	89.500	106	89.500	145	89.500	184	89.500	223	89.500	262	89.500
29	89.500	68	89.500	107	89.500	146	89.500	185	89.500	224	89.500	263	89.500
30	89.500	69	89.500	108	89.500	147	89.500	186	89.500	225	89.500	264	89.500
31	89.500	70	89.500	109	89.500	148	89.500	187	89.500	226	89.500	265	89.500
32	89.500	71	89.500	110	89.500	149	89.500	188	89.500	227	89.500	266	89.500
33	89.500	72	89.500	111	89.500	150	89.500	189	89.500	228	89.500	267	89.500
34	89.500	73	89.500	112	89.500	151	89.500	190	89.500	229	89.500	268	89.500
35	89.500	74	89.500	113	89.500	152	89.500	191	89.500	230	89.500	269	89.500
36	89.500	75	89.500	114	89.500	153	89.500	192	89.500	231	89.500	270	89.500
37	89.500	76	89.500	115	89.500	154	89.500	193	89.500	232	89.500	271	89.500
38	89.500	77	89.500	116	89.500	155	89.500	194	89.500	233	89.500	272	89.500
39	89.500	78	89.500	117	89.500	156	89.500	195	89.500	234	89.500	273	89.500

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)	Time (mins)	Depth (m)
274	89.500	333	89.500	392	89.500	451	89.500	510	89.500	569	89.500	628	89.500
275	89.500	334	89.500	393	89.500	452	89.500	511	89.500	570	89.500	629	89.500
276	89.500	335	89.500	394	89.500	453	89.500	512	89.500	571	89.500	630	89.500
277	89.500	336	89.500	395	89.500	454	89.500	513	89.500	572	89.500	631	89.500
278	89.500	337	89.500	396	89.500	455	89.500	514	89.500	573	89.500	632	89.500
279	89.500	338	89.500	397	89.500	456	89.500	515	89.500	574	89.500	633	89.500
280	89.500	339	89.500	398	89.500	457	89.500	516	89.500	575	89.500	634	89.500
281	89.500	340	89.500	399	89.500	458	89.500	517	89.500	576	89.500	635	89.500
282	89.500	341	89.500	400	89.500	459	89.500	518	89.500	577	89.500	636	89.500
283	89.500	342	89.500	401	89.500	460	89.500	519	89.500	578	89.500	637	89.500
284	89.500	343	89.500	402	89.500	461	89.500	520	89.500	579	89.500	638	89.500
285	89.500	344	89.500	403	89.500	462	89.500	521	89.500	580	89.500	639	89.500
286	89.500	345	89.500	404	89.500	463	89.500	522	89.500	581	89.500	640	89.500
287	89.500	346	89.500	405	89.500	464	89.500	523	89.500	582	89.500	641	89.500
288	89.500	347	89.500	406	89.500	465	89.500	524	89.500	583	89.500	642	89.500
289	89.500	348	89.500	407	89.500	466	89.500	525	89.500	584	89.500	643	89.500
290	89.500	349	89.500	408	89.500	467	89.500	526	89.500	585	89.500	644	89.500
291	89.500	350	89.500	409	89.500	468	89.500	527	89.500	586	89.500	645	89.500
292	89.500	351	89.500	410	89.500	469	89.500	528	89.500	587	89.500	646	89.500
293	89.500	352	89.500	411	89.500	470	89.500	529	89.500	588	89.500	647	89.500
294	89.500	353	89.500	412	89.500	471	89.500	530	89.500	589	89.500	648	89.500
295	89.500	354	89.500	413	89.500	472	89.500	531	89.500	590	89.500	649	89.500
296	89.500	355	89.500	414	89.500	473	89.500	532	89.500	591	89.500	650	89.500
297	89.500	356	89.500	415	89.500	474	89.500	533	89.500	592	89.500	651	89.500
298	89.500	357	89.500	416	89.500	475	89.500	534	89.500	593	89.500	652	89.500
299	89.500	358	89.500	417	89.500	476	89.500	535	89.500	594	89.500	653	89.500
300	89.500	359	89.500	418	89.500	477	89.500	536	89.500	595	89.500	654	89.500
301	89.500	360	89.500	419	89.500	478	89.500	537	89.500	596	89.500	655	89.500
302	89.500	361	89.500	420	89.500	479	89.500	538	89.500	597	89.500	656	89.500
303	89.500	362	89.500	421	89.500	480	89.500	539	89.500	598	89.500	657	89.500
304	89.500	363	89.500	422	89.500	481	89.500	540	89.500	599	89.500	658	89.500
305	89.500	364	89.500	423	89.500	482	89.500	541	89.500	600	89.500	659	89.500
306	89.500	365	89.500	424	89.500	483	89.500	542	89.500	601	89.500	660	89.500
307	89.500	366	89.500	425	89.500	484	89.500	543	89.500	602	89.500	661	89.500
308	89.500	367	89.500	426	89.500	485	89.500	544	89.500	603	89.500	662	89.500
309	89.500	368	89.500	427	89.500	486	89.500	545	89.500	604	89.500	663	89.500
310	89.500	369	89.500	428	89.500	487	89.500	546	89.500	605	89.500	664	89.500
311	89.500	370	89.500	429	89.500	488	89.500	547	89.500	606	89.500	665	89.500
312	89.500	371	89.500	430	89.500	489	89.500	548	89.500	607	89.500	666	89.500
313	89.500	372	89.500	431	89.500	490	89.500	549	89.500	608	89.500	667	89.500
314	89.500	373	89.500	432	89.500	491	89.500	550	89.500	609	89.500	668	89.500
315	89.500	374	89.500	433	89.500	492	89.500	551	89.500	610	89.500	669	89.500
316	89.500	375	89.500	434	89.500	493	89.500	552	89.500	611	89.500	670	89.500
317	89.500	376	89.500	435	89.500	494	89.500	553	89.500	612	89.500	671	89.500
318	89.500	377	89.500	436	89.500	495	89.500	554	89.500	613	89.500	672	89.500
319	89.500	378	89.500	437	89.500	496	89.500	555	89.500	614	89.500	673	89.500
320	89.500	379	89.500	438	89.500	497	89.500	556	89.500	615	89.500	674	89.500
321	89.500	380	89.500	439	89.500	498	89.500	557	89.500	616	89.500	675	89.500
322	89.500	381	89.500	440	89.500	499	89.500	558	89.500	617	89.500	676	89.500
323	89.500	382	89.500	441	89.500	500	89.500	559	89.500	618	89.500	677	89.500
324	89.500	383	89.500	442	89.500	501	89.500	560	89.500	619	89.500	678	89.500
325	89.500	384	89.500	443	89.500	502	89.500	561	89.500	620	89.500	679	89.500
326	89.500	385	89.500	444	89.500	503	89.500	562	89.500	621	89.500	680	89.500
327	89.500	386	89.500	445	89.500	504	89.500	563	89.500	622	89.500	681	89.500
328	89.500	387	89.500	446	89.500	505	89.500	564	89.500	623	89.500	682	89.500
329	89.500	388	89.500	447	89.500	506	89.500	565	89.500	624	89.500	683	89.500
330	89.500	389	89.500	448	89.500	507	89.500	566	89.500	625	89.500	684	89.500
331	89.500	390	89.500	449	89.500	508	89.500	567	89.500	626	89.500	685	89.500
332	89.500	391	89.500	450	89.500	509	89.500	568	89.500	627	89.500	686	89.500

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)	Time (mins)	Depth (m)
687	89.500	746	89.500	805	89.500	864	89.500	923	89.500	982	89.500	1041	89.500
688	89.500	747	89.500	806	89.500	865	89.500	924	89.500	983	89.500	1042	89.500
689	89.500	748	89.500	807	89.500	866	89.500	925	89.500	984	89.500	1043	89.500
690	89.500	749	89.500	808	89.500	867	89.500	926	89.500	985	89.500	1044	89.500
691	89.500	750	89.500	809	89.500	868	89.500	927	89.500	986	89.500	1045	89.500
692	89.500	751	89.500	810	89.500	869	89.500	928	89.500	987	89.500	1046	89.500
693	89.500	752	89.500	811	89.500	870	89.500	929	89.500	988	89.500	1047	89.500
694	89.500	753	89.500	812	89.500	871	89.500	930	89.500	989	89.500	1048	89.500
695	89.500	754	89.500	813	89.500	872	89.500	931	89.500	990	89.500	1049	89.500
696	89.500	755	89.500	814	89.500	873	89.500	932	89.500	991	89.500	1050	89.500
697	89.500	756	89.500	815	89.500	874	89.500	933	89.500	992	89.500	1051	89.500
698	89.500	757	89.500	816	89.500	875	89.500	934	89.500	993	89.500	1052	89.500
699	89.500	758	89.500	817	89.500	876	89.500	935	89.500	994	89.500	1053	89.500
700	89.500	759	89.500	818	89.500	877	89.500	936	89.500	995	89.500	1054	89.500
701	89.500	760	89.500	819	89.500	878	89.500	937	89.500	996	89.500	1055	89.500
702	89.500	761	89.500	820	89.500	879	89.500	938	89.500	997	89.500	1056	89.500
703	89.500	762	89.500	821	89.500	880	89.500	939	89.500	998	89.500	1057	89.500
704	89.500	763	89.500	822	89.500	881	89.500	940	89.500	999	89.500	1058	89.500
705	89.500	764	89.500	823	89.500	882	89.500	941	89.500	1000	89.500	1059	89.500
706	89.500	765	89.500	824	89.500	883	89.500	942	89.500	1001	89.500	1060	89.500
707	89.500	766	89.500	825	89.500	884	89.500	943	89.500	1002	89.500	1061	89.500
708	89.500	767	89.500	826	89.500	885	89.500	944	89.500	1003	89.500	1062	89.500
709	89.500	768	89.500	827	89.500	886	89.500	945	89.500	1004	89.500	1063	89.500
710	89.500	769	89.500	828	89.500	887	89.500	946	89.500	1005	89.500	1064	89.500
711	89.500	770	89.500	829	89.500	888	89.500	947	89.500	1006	89.500	1065	89.500
712	89.500	771	89.500	830	89.500	889	89.500	948	89.500	1007	89.500	1066	89.500
713	89.500	772	89.500	831	89.500	890	89.500	949	89.500	1008	89.500	1067	89.500
714	89.500	773	89.500	832	89.500	891	89.500	950	89.500	1009	89.500	1068	89.500
715	89.500	774	89.500	833	89.500	892	89.500	951	89.500	1010	89.500	1069	89.500
716	89.500	775	89.500	834	89.500	893	89.500	952	89.500	1011	89.500	1070	89.500
717	89.500	776	89.500	835	89.500	894	89.500	953	89.500	1012	89.500	1071	89.500
718	89.500	777	89.500	836	89.500	895	89.500	954	89.500	1013	89.500	1072	89.500
719	89.500	778	89.500	837	89.500	896	89.500	955	89.500	1014	89.500	1073	89.500
720	89.500	779	89.500	838	89.500	897	89.500	956	89.500	1015	89.500	1074	89.500
721	89.500	780	89.500	839	89.500	898	89.500	957	89.500	1016	89.500	1075	89.500
722	89.500	781	89.500	840	89.500	899	89.500	958	89.500	1017	89.500	1076	89.500
723	89.500	782	89.500	841	89.500	900	89.500	959	89.500	1018	89.500	1077	89.500
724	89.500	783	89.500	842	89.500	901	89.500	960	89.500	1019	89.500	1078	89.500
725	89.500	784	89.500	843	89.500	902	89.500	961	89.500	1020	89.500	1079	89.500
726	89.500	785	89.500	844	89.500	903	89.500	962	89.500	1021	89.500	1080	89.500
727	89.500	786	89.500	845	89.500	904	89.500	963	89.500	1022	89.500	1081	89.500
728	89.500	787	89.500	846	89.500	905	89.500	964	89.500	1023	89.500	1082	89.500
729	89.500	788	89.500	847	89.500	906	89.500	965	89.500	1024	89.500	1083	89.500
730	89.500	789	89.500	848	89.500	907	89.500	966	89.500	1025	89.500	1084	89.500
731	89.500	790	89.500	849	89.500	908	89.500	967	89.500	1026	89.500	1085	89.500
732	89.500	791	89.500	850	89.500	909	89.500	968	89.500	1027	89.500	1086	89.500
733	89.500	792	89.500	851	89.500	910	89.500	969	89.500	1028	89.500	1087	89.500
734	89.500	793	89.500	852	89.500	911	89.500	970	89.500	1029	89.500	1088	89.500
735	89.500	794	89.500	853	89.500	912	89.500	971	89.500	1030	89.500	1089	89.500
736	89.500	795	89.500	854	89.500	913	89.500	972	89.500	1031	89.500	1090	89.500
737	89.500	796	89.500	855	89.500	914	89.500	973	89.500	1032	89.500	1091	89.500
738	89.500	797	89.500	856	89.500	915	89.500	974	89.500	1033	89.500	1092	89.500
739	89.500	798	89.500	857	89.500	916	89.500	975	89.500	1034	89.500	1093	89.500
740	89.500	799	89.500	858	89.500	917	89.500	976	89.500	1035	89.500	1094	89.500
741	89.500	800	89.500	859	89.500	918	89.500	977	89.500	1036	89.500	1095	89.500
742	89.500	801	89.500	860	89.500	919	89.500	978	89.500	1037	89.500	1096	89.500
743	89.500	802	89.500	861	89.500	920	89.500	979	89.500	1038	89.500	1097	89.500
744	89.500	803	89.500	862	89.500	921	89.500	980	89.500	1039	89.500	1098	89.500
745	89.500	804	89.500	863	89.500	922	89.500	981	89.500	1040	89.500	1099	89.500

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)	Time (mins)	Depth (m)
1100	89.500	1149	89.500	1198	89.500	1247	89.500	1296	89.500	1345	89.500	1394	89.500
1101	89.500	1150	89.500	1199	89.500	1248	89.500	1297	89.500	1346	89.500	1395	89.500
1102	89.500	1151	89.500	1200	89.500	1249	89.500	1298	89.500	1347	89.500	1396	89.500
1103	89.500	1152	89.500	1201	89.500	1250	89.500	1299	89.500	1348	89.500	1397	89.500
1104	89.500	1153	89.500	1202	89.500	1251	89.500	1300	89.500	1349	89.500	1398	89.500
1105	89.500	1154	89.500	1203	89.500	1252	89.500	1301	89.500	1350	89.500	1399	89.500
1106	89.500	1155	89.500	1204	89.500	1253	89.500	1302	89.500	1351	89.500	1400	89.500
1107	89.500	1156	89.500	1205	89.500	1254	89.500	1303	89.500	1352	89.500	1401	89.500
1108	89.500	1157	89.500	1206	89.500	1255	89.500	1304	89.500	1353	89.500	1402	89.500
1109	89.500	1158	89.500	1207	89.500	1256	89.500	1305	89.500	1354	89.500	1403	89.500
1110	89.500	1159	89.500	1208	89.500	1257	89.500	1306	89.500	1355	89.500	1404	89.500
1111	89.500	1160	89.500	1209	89.500	1258	89.500	1307	89.500	1356	89.500	1405	89.500
1112	89.500	1161	89.500	1210	89.500	1259	89.500	1308	89.500	1357	89.500	1406	89.500
1113	89.500	1162	89.500	1211	89.500	1260	89.500	1309	89.500	1358	89.500	1407	89.500
1114	89.500	1163	89.500	1212	89.500	1261	89.500	1310	89.500	1359	89.500	1408	89.500
1115	89.500	1164	89.500	1213	89.500	1262	89.500	1311	89.500	1360	89.500	1409	89.500
1116	89.500	1165	89.500	1214	89.500	1263	89.500	1312	89.500	1361	89.500	1410	89.500
1117	89.500	1166	89.500	1215	89.500	1264	89.500	1313	89.500	1362	89.500	1411	89.500
1118	89.500	1167	89.500	1216	89.500	1265	89.500	1314	89.500	1363	89.500	1412	89.500
1119	89.500	1168	89.500	1217	89.500	1266	89.500	1315	89.500	1364	89.500	1413	89.500
1120	89.500	1169	89.500	1218	89.500	1267	89.500	1316	89.500	1365	89.500	1414	89.500
1121	89.500	1170	89.500	1219	89.500	1268	89.500	1317	89.500	1366	89.500	1415	89.500
1122	89.500	1171	89.500	1220	89.500	1269	89.500	1318	89.500	1367	89.500	1416	89.500
1123	89.500	1172	89.500	1221	89.500	1270	89.500	1319	89.500	1368	89.500	1417	89.500
1124	89.500	1173	89.500	1222	89.500	1271	89.500	1320	89.500	1369	89.500	1418	89.500
1125	89.500	1174	89.500	1223	89.500	1272	89.500	1321	89.500	1370	89.500	1419	89.500
1126	89.500	1175	89.500	1224	89.500	1273	89.500	1322	89.500	1371	89.500	1420	89.500
1127	89.500	1176	89.500	1225	89.500	1274	89.500	1323	89.500	1372	89.500	1421	89.500
1128	89.500	1177	89.500	1226	89.500	1275	89.500	1324	89.500	1373	89.500	1422	89.500
1129	89.500	1178	89.500	1227	89.500	1276	89.500	1325	89.500	1374	89.500	1423	89.500
1130	89.500	1179	89.500	1228	89.500	1277	89.500	1326	89.500	1375	89.500	1424	89.500
1131	89.500	1180	89.500	1229	89.500	1278	89.500	1327	89.500	1376	89.500	1425	89.500
1132	89.500	1181	89.500	1230	89.500	1279	89.500	1328	89.500	1377	89.500	1426	89.500
1133	89.500	1182	89.500	1231	89.500	1280	89.500	1329	89.500	1378	89.500	1427	89.500
1134	89.500	1183	89.500	1232	89.500	1281	89.500	1330	89.500	1379	89.500	1428	89.500
1135	89.500	1184	89.500	1233	89.500	1282	89.500	1331	89.500	1380	89.500	1429	89.500
1136	89.500	1185	89.500	1234	89.500	1283	89.500	1332	89.500	1381	89.500	1430	89.500
1137	89.500	1186	89.500	1235	89.500	1284	89.500	1333	89.500	1382	89.500	1431	89.500
1138	89.500	1187	89.500	1236	89.500	1285	89.500	1334	89.500	1383	89.500	1432	89.500
1139	89.500	1188	89.500	1237	89.500	1286	89.500	1335	89.500	1384	89.500	1433	89.500
1140	89.500	1189	89.500	1238	89.500	1287	89.500	1336	89.500	1385	89.500	1434	89.500
1141	89.500	1190	89.500	1239	89.500	1288	89.500	1337	89.500	1386	89.500	1435	89.500
1142	89.500	1191	89.500	1240	89.500	1289	89.500	1338	89.500	1387	89.500	1436	89.500
1143	89.500	1192	89.500	1241	89.500	1290	89.500	1339	89.500	1388	89.500	1437	89.500
1144	89.500	1193	89.500	1242	89.500	1291	89.500	1340	89.500	1389	89.500	1438	89.500
1145	89.500	1194	89.500	1243	89.500	1292	89.500	1341	89.500	1390	89.500	1439	89.500
1146	89.500	1195	89.500	1244	89.500	1293	89.500	1342	89.500	1391	89.500	1440	89.500
1147	89.500	1196	89.500	1245	89.500	1294	89.500	1343	89.500	1392	89.500		
1148	89.500	1197	89.500	1246	89.500	1295	89.500	1344	89.500	1393	89.500		

Online Controls for Storm

Hydro-Brake® Optimum Manhole: SG1 - Basin Out, DS/PN: S1.001, Volume (m³): 1.8

Unit Reference	MD-SHE-0177-1490-0800-1490
Design Head (m)	0.800
Design Flow (l/s)	14.9
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	177
Invert Level (m)	89.500
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	14.9	Kick-Flo®	0.590	12.9
Flush-Flo™	0.288	14.9	Mean Flow over Head Range	-	12.4

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)	Depth (m)	Flow (l/s)
0.100	6.3	0.800	14.9	2.000	23.0	4.000	32.2	7.000	42.1
0.200	14.5	1.000	16.6	2.200	24.1	4.500	34.0	7.500	43.6
0.300	14.9	1.200	18.1	2.400	25.1	5.000	35.8	8.000	45.0
0.400	14.6	1.400	19.4	2.600	26.1	5.500	37.5	8.500	46.1
0.500	14.1	1.600	20.7	3.000	28.0	6.000	39.1	9.000	47.5
0.600	13.0	1.800	21.9	3.500	30.1	6.500	40.7	9.500	48.8

Storage Structures for Storm

Tank or Pond Manhole: SG1 - Basin Out, DS/PN: S1.001

Invert Level (m) 89.500

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	2515.0	0.800	3290.0

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 Coeffiecient	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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SG1 - Basin In	15 Summer	1	+0%					90.100
S1.001	SG1 - Basin Out	960 Winter	1	+0%	100/120 Winter				89.615

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SG1 - Basin In	0.000	0.000	2.99			183.5	SURCHARGED*	
S1.001	SG1 - Basin Out	-0.260	0.000	0.02			7.1	OK	

30 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 Coeffiecient	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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SG1 - Basin In	15 Summer	30	+0%					90.100
S1.001	SG1 - Basin Out	480 Winter	30	+0%	100/120 Winter				89.731

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SG1 - Basin In	0.000	0.000	5.88			361.1	SURCHARGED*	
S1.001	SG1 - Basin Out	-0.144	0.000	0.03			14.6	OK	

100 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 Coeffiecient	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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SG1 - Basin In	15 Summer	100	+40%					90.100
S1.001	SG1 - Basin Out	600 Winter	100	+40%	100/120 Winter				89.945

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SG1 - Basin In	0.000	0.000	8.78			538.8	SURCHARGED*	
S1.001	SG1 - Basin Out	0.070	0.000	0.03			14.9	SURCHARGED	

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)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
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

« - Indicates pipe capacity < flow

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	10.000	0.033	303.0	1.400	5.00	0.0	0.600	o	300	Pipe/Conduit	
S1.001	10.000	0.900	11.1	0.000	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)
S1.000	50.00	5.19	89.500	1.400	0.0	0.0	0.0	0.90	63.5«	189.6
S1.001	50.00	5.05	89.300	0.000	10.7	0.0	0.0	3.04	53.7	10.7

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	1.400	1.400	1.400
1.001	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				1.400	1.400	1.400

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)
S1.001	S	89.800	88.400	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)	Time (mins)	Depth (m)
1	89.300	40	89.300	79	89.300	118	89.300	157	89.300	196	89.300	235	89.300
2	89.300	41	89.300	80	89.300	119	89.300	158	89.300	197	89.300	236	89.300
3	89.300	42	89.300	81	89.300	120	89.300	159	89.300	198	89.300	237	89.300
4	89.300	43	89.300	82	89.300	121	89.300	160	89.300	199	89.300	238	89.300
5	89.300	44	89.300	83	89.300	122	89.300	161	89.300	200	89.300	239	89.300
6	89.300	45	89.300	84	89.300	123	89.300	162	89.300	201	89.300	240	89.300
7	89.300	46	89.300	85	89.300	124	89.300	163	89.300	202	89.300	241	89.300
8	89.300	47	89.300	86	89.300	125	89.300	164	89.300	203	89.300	242	89.300
9	89.300	48	89.300	87	89.300	126	89.300	165	89.300	204	89.300	243	89.300
10	89.300	49	89.300	88	89.300	127	89.300	166	89.300	205	89.300	244	89.300
11	89.300	50	89.300	89	89.300	128	89.300	167	89.300	206	89.300	245	89.300
12	89.300	51	89.300	90	89.300	129	89.300	168	89.300	207	89.300	246	89.300
13	89.300	52	89.300	91	89.300	130	89.300	169	89.300	208	89.300	247	89.300
14	89.300	53	89.300	92	89.300	131	89.300	170	89.300	209	89.300	248	89.300
15	89.300	54	89.300	93	89.300	132	89.300	171	89.300	210	89.300	249	89.300
16	89.300	55	89.300	94	89.300	133	89.300	172	89.300	211	89.300	250	89.300
17	89.300	56	89.300	95	89.300	134	89.300	173	89.300	212	89.300	251	89.300
18	89.300	57	89.300	96	89.300	135	89.300	174	89.300	213	89.300	252	89.300
19	89.300	58	89.300	97	89.300	136	89.300	175	89.300	214	89.300	253	89.300
20	89.300	59	89.300	98	89.300	137	89.300	176	89.300	215	89.300	254	89.300
21	89.300	60	89.300	99	89.300	138	89.300	177	89.300	216	89.300	255	89.300
22	89.300	61	89.300	100	89.300	139	89.300	178	89.300	217	89.300	256	89.300
23	89.300	62	89.300	101	89.300	140	89.300	179	89.300	218	89.300	257	89.300
24	89.300	63	89.300	102	89.300	141	89.300	180	89.300	219	89.300	258	89.300
25	89.300	64	89.300	103	89.300	142	89.300	181	89.300	220	89.300	259	89.300
26	89.300	65	89.300	104	89.300	143	89.300	182	89.300	221	89.300	260	89.300
27	89.300	66	89.300	105	89.300	144	89.300	183	89.300	222	89.300	261	89.300
28	89.300	67	89.300	106	89.300	145	89.300	184	89.300	223	89.300	262	89.300
29	89.300	68	89.300	107	89.300	146	89.300	185	89.300	224	89.300	263	89.300
30	89.300	69	89.300	108	89.300	147	89.300	186	89.300	225	89.300	264	89.300
31	89.300	70	89.300	109	89.300	148	89.300	187	89.300	226	89.300	265	89.300
32	89.300	71	89.300	110	89.300	149	89.300	188	89.300	227	89.300	266	89.300
33	89.300	72	89.300	111	89.300	150	89.300	189	89.300	228	89.300	267	89.300
34	89.300	73	89.300	112	89.300	151	89.300	190	89.300	229	89.300	268	89.300
35	89.300	74	89.300	113	89.300	152	89.300	191	89.300	230	89.300	269	89.300
36	89.300	75	89.300	114	89.300	153	89.300	192	89.300	231	89.300	270	89.300
37	89.300	76	89.300	115	89.300	154	89.300	193	89.300	232	89.300	271	89.300
38	89.300	77	89.300	116	89.300	155	89.300	194	89.300	233	89.300	272	89.300
39	89.300	78	89.300	117	89.300	156	89.300	195	89.300	234	89.300	273	89.300

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)	Time (mins)	Depth (m)
274	89.300	333	89.300	392	89.300	451	89.300	510	89.300	569	89.300	628	89.300
275	89.300	334	89.300	393	89.300	452	89.300	511	89.300	570	89.300	629	89.300
276	89.300	335	89.300	394	89.300	453	89.300	512	89.300	571	89.300	630	89.300
277	89.300	336	89.300	395	89.300	454	89.300	513	89.300	572	89.300	631	89.300
278	89.300	337	89.300	396	89.300	455	89.300	514	89.300	573	89.300	632	89.300
279	89.300	338	89.300	397	89.300	456	89.300	515	89.300	574	89.300	633	89.300
280	89.300	339	89.300	398	89.300	457	89.300	516	89.300	575	89.300	634	89.300
281	89.300	340	89.300	399	89.300	458	89.300	517	89.300	576	89.300	635	89.300
282	89.300	341	89.300	400	89.300	459	89.300	518	89.300	577	89.300	636	89.300
283	89.300	342	89.300	401	89.300	460	89.300	519	89.300	578	89.300	637	89.300
284	89.300	343	89.300	402	89.300	461	89.300	520	89.300	579	89.300	638	89.300
285	89.300	344	89.300	403	89.300	462	89.300	521	89.300	580	89.300	639	89.300
286	89.300	345	89.300	404	89.300	463	89.300	522	89.300	581	89.300	640	89.300
287	89.300	346	89.300	405	89.300	464	89.300	523	89.300	582	89.300	641	89.300
288	89.300	347	89.300	406	89.300	465	89.300	524	89.300	583	89.300	642	89.300
289	89.300	348	89.300	407	89.300	466	89.300	525	89.300	584	89.300	643	89.300
290	89.300	349	89.300	408	89.300	467	89.300	526	89.300	585	89.300	644	89.300
291	89.300	350	89.300	409	89.300	468	89.300	527	89.300	586	89.300	645	89.300
292	89.300	351	89.300	410	89.300	469	89.300	528	89.300	587	89.300	646	89.300
293	89.300	352	89.300	411	89.300	470	89.300	529	89.300	588	89.300	647	89.300
294	89.300	353	89.300	412	89.300	471	89.300	530	89.300	589	89.300	648	89.300
295	89.300	354	89.300	413	89.300	472	89.300	531	89.300	590	89.300	649	89.300
296	89.300	355	89.300	414	89.300	473	89.300	532	89.300	591	89.300	650	89.300
297	89.300	356	89.300	415	89.300	474	89.300	533	89.300	592	89.300	651	89.300
298	89.300	357	89.300	416	89.300	475	89.300	534	89.300	593	89.300	652	89.300
299	89.300	358	89.300	417	89.300	476	89.300	535	89.300	594	89.300	653	89.300
300	89.300	359	89.300	418	89.300	477	89.300	536	89.300	595	89.300	654	89.300
301	89.300	360	89.300	419	89.300	478	89.300	537	89.300	596	89.300	655	89.300
302	89.300	361	89.300	420	89.300	479	89.300	538	89.300	597	89.300	656	89.300
303	89.300	362	89.300	421	89.300	480	89.300	539	89.300	598	89.300	657	89.300
304	89.300	363	89.300	422	89.300	481	89.300	540	89.300	599	89.300	658	89.300
305	89.300	364	89.300	423	89.300	482	89.300	541	89.300	600	89.300	659	89.300
306	89.300	365	89.300	424	89.300	483	89.300	542	89.300	601	89.300	660	89.300
307	89.300	366	89.300	425	89.300	484	89.300	543	89.300	602	89.300	661	89.300
308	89.300	367	89.300	426	89.300	485	89.300	544	89.300	603	89.300	662	89.300
309	89.300	368	89.300	427	89.300	486	89.300	545	89.300	604	89.300	663	89.300
310	89.300	369	89.300	428	89.300	487	89.300	546	89.300	605	89.300	664	89.300
311	89.300	370	89.300	429	89.300	488	89.300	547	89.300	606	89.300	665	89.300
312	89.300	371	89.300	430	89.300	489	89.300	548	89.300	607	89.300	666	89.300
313	89.300	372	89.300	431	89.300	490	89.300	549	89.300	608	89.300	667	89.300
314	89.300	373	89.300	432	89.300	491	89.300	550	89.300	609	89.300	668	89.300
315	89.300	374	89.300	433	89.300	492	89.300	551	89.300	610	89.300	669	89.300
316	89.300	375	89.300	434	89.300	493	89.300	552	89.300	611	89.300	670	89.300
317	89.300	376	89.300	435	89.300	494	89.300	553	89.300	612	89.300	671	89.300
318	89.300	377	89.300	436	89.300	495	89.300	554	89.300	613	89.300	672	89.300
319	89.300	378	89.300	437	89.300	496	89.300	555	89.300	614	89.300	673	89.300
320	89.300	379	89.300	438	89.300	497	89.300	556	89.300	615	89.300	674	89.300
321	89.300	380	89.300	439	89.300	498	89.300	557	89.300	616	89.300	675	89.300
322	89.300	381	89.300	440	89.300	499	89.300	558	89.300	617	89.300	676	89.300
323	89.300	382	89.300	441	89.300	500	89.300	559	89.300	618	89.300	677	89.300
324	89.300	383	89.300	442	89.300	501	89.300	560	89.300	619	89.300	678	89.300
325	89.300	384	89.300	443	89.300	502	89.300	561	89.300	620	89.300	679	89.300
326	89.300	385	89.300	444	89.300	503	89.300	562	89.300	621	89.300	680	89.300
327	89.300	386	89.300	445	89.300	504	89.300	563	89.300	622	89.300	681	89.300
328	89.300	387	89.300	446	89.300	505	89.300	564	89.300	623	89.300	682	89.300
329	89.300	388	89.300	447	89.300	506	89.300	565	89.300	624	89.300	683	89.300
330	89.300	389	89.300	448	89.300	507	89.300	566	89.300	625	89.300	684	89.300
331	89.300	390	89.300	449	89.300	508	89.300	567	89.300	626	89.300	685	89.300
332	89.300	391	89.300	450	89.300	509	89.300	568	89.300	627	89.300	686	89.300

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)	Time (mins)	Depth (m)
687	89.300	746	89.300	805	89.300	864	89.300	923	89.300	982	89.300	1041	89.300
688	89.300	747	89.300	806	89.300	865	89.300	924	89.300	983	89.300	1042	89.300
689	89.300	748	89.300	807	89.300	866	89.300	925	89.300	984	89.300	1043	89.300
690	89.300	749	89.300	808	89.300	867	89.300	926	89.300	985	89.300	1044	89.300
691	89.300	750	89.300	809	89.300	868	89.300	927	89.300	986	89.300	1045	89.300
692	89.300	751	89.300	810	89.300	869	89.300	928	89.300	987	89.300	1046	89.300
693	89.300	752	89.300	811	89.300	870	89.300	929	89.300	988	89.300	1047	89.300
694	89.300	753	89.300	812	89.300	871	89.300	930	89.300	989	89.300	1048	89.300
695	89.300	754	89.300	813	89.300	872	89.300	931	89.300	990	89.300	1049	89.300
696	89.300	755	89.300	814	89.300	873	89.300	932	89.300	991	89.300	1050	89.300
697	89.300	756	89.300	815	89.300	874	89.300	933	89.300	992	89.300	1051	89.300
698	89.300	757	89.300	816	89.300	875	89.300	934	89.300	993	89.300	1052	89.300
699	89.300	758	89.300	817	89.300	876	89.300	935	89.300	994	89.300	1053	89.300
700	89.300	759	89.300	818	89.300	877	89.300	936	89.300	995	89.300	1054	89.300
701	89.300	760	89.300	819	89.300	878	89.300	937	89.300	996	89.300	1055	89.300
702	89.300	761	89.300	820	89.300	879	89.300	938	89.300	997	89.300	1056	89.300
703	89.300	762	89.300	821	89.300	880	89.300	939	89.300	998	89.300	1057	89.300
704	89.300	763	89.300	822	89.300	881	89.300	940	89.300	999	89.300	1058	89.300
705	89.300	764	89.300	823	89.300	882	89.300	941	89.300	1000	89.300	1059	89.300
706	89.300	765	89.300	824	89.300	883	89.300	942	89.300	1001	89.300	1060	89.300
707	89.300	766	89.300	825	89.300	884	89.300	943	89.300	1002	89.300	1061	89.300
708	89.300	767	89.300	826	89.300	885	89.300	944	89.300	1003	89.300	1062	89.300
709	89.300	768	89.300	827	89.300	886	89.300	945	89.300	1004	89.300	1063	89.300
710	89.300	769	89.300	828	89.300	887	89.300	946	89.300	1005	89.300	1064	89.300
711	89.300	770	89.300	829	89.300	888	89.300	947	89.300	1006	89.300	1065	89.300
712	89.300	771	89.300	830	89.300	889	89.300	948	89.300	1007	89.300	1066	89.300
713	89.300	772	89.300	831	89.300	890	89.300	949	89.300	1008	89.300	1067	89.300
714	89.300	773	89.300	832	89.300	891	89.300	950	89.300	1009	89.300	1068	89.300
715	89.300	774	89.300	833	89.300	892	89.300	951	89.300	1010	89.300	1069	89.300
716	89.300	775	89.300	834	89.300	893	89.300	952	89.300	1011	89.300	1070	89.300
717	89.300	776	89.300	835	89.300	894	89.300	953	89.300	1012	89.300	1071	89.300
718	89.300	777	89.300	836	89.300	895	89.300	954	89.300	1013	89.300	1072	89.300
719	89.300	778	89.300	837	89.300	896	89.300	955	89.300	1014	89.300	1073	89.300
720	89.300	779	89.300	838	89.300	897	89.300	956	89.300	1015	89.300	1074	89.300
721	89.300	780	89.300	839	89.300	898	89.300	957	89.300	1016	89.300	1075	89.300
722	89.300	781	89.300	840	89.300	899	89.300	958	89.300	1017	89.300	1076	89.300
723	89.300	782	89.300	841	89.300	900	89.300	959	89.300	1018	89.300	1077	89.300
724	89.300	783	89.300	842	89.300	901	89.300	960	89.300	1019	89.300	1078	89.300
725	89.300	784	89.300	843	89.300	902	89.300	961	89.300	1020	89.300	1079	89.300
726	89.300	785	89.300	844	89.300	903	89.300	962	89.300	1021	89.300	1080	89.300
727	89.300	786	89.300	845	89.300	904	89.300	963	89.300	1022	89.300	1081	89.300
728	89.300	787	89.300	846	89.300	905	89.300	964	89.300	1023	89.300	1082	89.300
729	89.300	788	89.300	847	89.300	906	89.300	965	89.300	1024	89.300	1083	89.300
730	89.300	789	89.300	848	89.300	907	89.300	966	89.300	1025	89.300	1084	89.300
731	89.300	790	89.300	849	89.300	908	89.300	967	89.300	1026	89.300	1085	89.300
732	89.300	791	89.300	850	89.300	909	89.300	968	89.300	1027	89.300	1086	89.300
733	89.300	792	89.300	851	89.300	910	89.300	969	89.300	1028	89.300	1087	89.300
734	89.300	793	89.300	852	89.300	911	89.300	970	89.300	1029	89.300	1088	89.300
735	89.300	794	89.300	853	89.300	912	89.300	971	89.300	1030	89.300	1089	89.300
736	89.300	795	89.300	854	89.300	913	89.300	972	89.300	1031	89.300	1090	89.300
737	89.300	796	89.300	855	89.300	914	89.300	973	89.300	1032	89.300	1091	89.300
738	89.300	797	89.300	856	89.300	915	89.300	974	89.300	1033	89.300	1092	89.300
739	89.300	798	89.300	857	89.300	916	89.300	975	89.300	1034	89.300	1093	89.300
740	89.300	799	89.300	858	89.300	917	89.300	976	89.300	1035	89.300	1094	89.300
741	89.300	800	89.300	859	89.300	918	89.300	977	89.300	1036	89.300	1095	89.300
742	89.300	801	89.300	860	89.300	919	89.300	978	89.300	1037	89.300	1096	89.300
743	89.300	802	89.300	861	89.300	920	89.300	979	89.300	1038	89.300	1097	89.300
744	89.300	803	89.300	862	89.300	921	89.300	980	89.300	1039	89.300	1098	89.300
745	89.300	804	89.300	863	89.300	922	89.300	981	89.300	1040	89.300	1099	89.300

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)	Time (mins)	Depth (m)
1100	89.300	1149	89.300	1198	89.300	1247	89.300	1296	89.300	1345	89.300	1394	89.300
1101	89.300	1150	89.300	1199	89.300	1248	89.300	1297	89.300	1346	89.300	1395	89.300
1102	89.300	1151	89.300	1200	89.300	1249	89.300	1298	89.300	1347	89.300	1396	89.300
1103	89.300	1152	89.300	1201	89.300	1250	89.300	1299	89.300	1348	89.300	1397	89.300
1104	89.300	1153	89.300	1202	89.300	1251	89.300	1300	89.300	1349	89.300	1398	89.300
1105	89.300	1154	89.300	1203	89.300	1252	89.300	1301	89.300	1350	89.300	1399	89.300
1106	89.300	1155	89.300	1204	89.300	1253	89.300	1302	89.300	1351	89.300	1400	89.300
1107	89.300	1156	89.300	1205	89.300	1254	89.300	1303	89.300	1352	89.300	1401	89.300
1108	89.300	1157	89.300	1206	89.300	1255	89.300	1304	89.300	1353	89.300	1402	89.300
1109	89.300	1158	89.300	1207	89.300	1256	89.300	1305	89.300	1354	89.300	1403	89.300
1110	89.300	1159	89.300	1208	89.300	1257	89.300	1306	89.300	1355	89.300	1404	89.300
1111	89.300	1160	89.300	1209	89.300	1258	89.300	1307	89.300	1356	89.300	1405	89.300
1112	89.300	1161	89.300	1210	89.300	1259	89.300	1308	89.300	1357	89.300	1406	89.300
1113	89.300	1162	89.300	1211	89.300	1260	89.300	1309	89.300	1358	89.300	1407	89.300
1114	89.300	1163	89.300	1212	89.300	1261	89.300	1310	89.300	1359	89.300	1408	89.300
1115	89.300	1164	89.300	1213	89.300	1262	89.300	1311	89.300	1360	89.300	1409	89.300
1116	89.300	1165	89.300	1214	89.300	1263	89.300	1312	89.300	1361	89.300	1410	89.300
1117	89.300	1166	89.300	1215	89.300	1264	89.300	1313	89.300	1362	89.300	1411	89.300
1118	89.300	1167	89.300	1216	89.300	1265	89.300	1314	89.300	1363	89.300	1412	89.300
1119	89.300	1168	89.300	1217	89.300	1266	89.300	1315	89.300	1364	89.300	1413	89.300
1120	89.300	1169	89.300	1218	89.300	1267	89.300	1316	89.300	1365	89.300	1414	89.300
1121	89.300	1170	89.300	1219	89.300	1268	89.300	1317	89.300	1366	89.300	1415	89.300
1122	89.300	1171	89.300	1220	89.300	1269	89.300	1318	89.300	1367	89.300	1416	89.300
1123	89.300	1172	89.300	1221	89.300	1270	89.300	1319	89.300	1368	89.300	1417	89.300
1124	89.300	1173	89.300	1222	89.300	1271	89.300	1320	89.300	1369	89.300	1418	89.300
1125	89.300	1174	89.300	1223	89.300	1272	89.300	1321	89.300	1370	89.300	1419	89.300
1126	89.300	1175	89.300	1224	89.300	1273	89.300	1322	89.300	1371	89.300	1420	89.300
1127	89.300	1176	89.300	1225	89.300	1274	89.300	1323	89.300	1372	89.300	1421	89.300
1128	89.300	1177	89.300	1226	89.300	1275	89.300	1324	89.300	1373	89.300	1422	89.300
1129	89.300	1178	89.300	1227	89.300	1276	89.300	1325	89.300	1374	89.300	1423	89.300
1130	89.300	1179	89.300	1228	89.300	1277	89.300	1326	89.300	1375	89.300	1424	89.300
1131	89.300	1180	89.300	1229	89.300	1278	89.300	1327	89.300	1376	89.300	1425	89.300
1132	89.300	1181	89.300	1230	89.300	1279	89.300	1328	89.300	1377	89.300	1426	89.300
1133	89.300	1182	89.300	1231	89.300	1280	89.300	1329	89.300	1378	89.300	1427	89.300
1134	89.300	1183	89.300	1232	89.300	1281	89.300	1330	89.300	1379	89.300	1428	89.300
1135	89.300	1184	89.300	1233	89.300	1282	89.300	1331	89.300	1380	89.300	1429	89.300
1136	89.300	1185	89.300	1234	89.300	1283	89.300	1332	89.300	1381	89.300	1430	89.300
1137	89.300	1186	89.300	1235	89.300	1284	89.300	1333	89.300	1382	89.300	1431	89.300
1138	89.300	1187	89.300	1236	89.300	1285	89.300	1334	89.300	1383	89.300	1432	89.300
1139	89.300	1188	89.300	1237	89.300	1286	89.300	1335	89.300	1384	89.300	1433	89.300
1140	89.300	1189	89.300	1238	89.300	1287	89.300	1336	89.300	1385	89.300	1434	89.300
1141	89.300	1190	89.300	1239	89.300	1288	89.300	1337	89.300	1386	89.300	1435	89.300
1142	89.300	1191	89.300	1240	89.300	1289	89.300	1338	89.300	1387	89.300	1436	89.300
1143	89.300	1192	89.300	1241	89.300	1290	89.300	1339	89.300	1388	89.300	1437	89.300
1144	89.300	1193	89.300	1242	89.300	1291	89.300	1340	89.300	1389	89.300	1438	89.300
1145	89.300	1194	89.300	1243	89.300	1292	89.300	1341	89.300	1390	89.300	1439	89.300
1146	89.300	1195	89.300	1244	89.300	1293	89.300	1342	89.300	1391	89.300	1440	89.300
1147	89.300	1196	89.300	1245	89.300	1294	89.300	1343	89.300	1392	89.300		
1148	89.300	1197	89.300	1246	89.300	1295	89.300	1344	89.300	1393	89.300		

Online Controls for Storm

Hydro-Brake® Optimum Manhole: SG2 - Basin Out, DS/PN: S1.001, Volume (m³): 2.0

Unit Reference	MD-SHE-0147-1070-1200-1070
Design Head (m)	1.200
Design Flow (l/s)	10.7
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	147
Invert Level (m)	89.300
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	10.7	Kick-Flo®	0.782	8.8
Flush-Flo™	0.357	10.7	Mean Flow over Head Range	-	9.3

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)	Depth (m)	Flow (l/s)
0.100	5.3	0.800	8.8	2.000	13.6	4.000	19.0	7.000	24.8
0.200	10.1	1.000	9.8	2.200	14.3	4.500	20.1	7.500	25.6
0.300	10.6	1.200	10.7	2.400	14.9	5.000	21.1	8.000	26.4
0.400	10.7	1.400	11.5	2.600	15.4	5.500	22.1	8.500	27.2
0.500	10.5	1.600	12.3	3.000	16.5	6.000	23.0	9.000	28.0
0.600	10.2	1.800	13.0	3.500	17.8	6.500	23.9	9.500	28.7

Storage Structures for Storm

Tank or Pond Manhole: SG2 - Basin Out, DS/PN: S1.001

Invert Level (m) 89.300

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	676.0	1.200	1617.0

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 Coeffiecient	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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SG2 - Basin In	15 Summer	1	+0%					89.800
S1.001	SG2 - Basin Out	360 Winter	1	+0%	1/30 Winter				89.518

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SG2 - Basin In	0.000	0.000	2.52			154.4	SURCHARGED*	
S1.001	SG2 - Basin Out	0.068	0.000	0.19			9.3	SURCHARGED	

30 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 Coeffiecient	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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SG2 - Basin In	15 Summer	30	+0%					89.800
S1.001	SG2 - Basin Out	240 Winter	30	+0%	1/30 Winter				89.784

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SG2 - Basin In	0.000	0.000	5.13			314.8	SURCHARGED*	
S1.001	SG2 - Basin Out	0.334	0.000	0.22			10.6	SURCHARGED	

100 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 Coeffiecient	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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SG2 - Basin In	15 Summer	100	+40%					89.800
S1.001	SG2 - Basin Out	480 Winter	100	+40%	1/30 Winter				90.170

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SG2 - Basin In	0.000	0.000	7.92			486.2	SURCHARGED*	
S1.001	SG2 - Basin Out	0.720	0.000	0.22			10.6	SURCHARGED	

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)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
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

« - Indicates pipe capacity < flow

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	10.000	0.033	303.0	0.500	5.00	0.0	0.600	o	300	Pipe/Conduit	
S1.001	10.000	0.600	16.7	0.000	0.00	0.0	0.600	o	375	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	50.00	5.19	89.500	0.500	0.0	0.0	0.0	0.90	63.5«	67.7
S1.001	50.00	5.22	89.300	0.500	0.0	0.0	0.0	4.46	492.3	67.7

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.500	0.500	0.500
1.001	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.500	0.500	0.500

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)
S1.001	S	89.800	88.700	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)	Time (mins)	Depth (m)
1	89.300	40	89.300	79	89.300	118	89.300	157	89.300	196	89.300	235	89.300
2	89.300	41	89.300	80	89.300	119	89.300	158	89.300	197	89.300	236	89.300
3	89.300	42	89.300	81	89.300	120	89.300	159	89.300	198	89.300	237	89.300
4	89.300	43	89.300	82	89.300	121	89.300	160	89.300	199	89.300	238	89.300
5	89.300	44	89.300	83	89.300	122	89.300	161	89.300	200	89.300	239	89.300
6	89.300	45	89.300	84	89.300	123	89.300	162	89.300	201	89.300	240	89.300
7	89.300	46	89.300	85	89.300	124	89.300	163	89.300	202	89.300	241	89.300
8	89.300	47	89.300	86	89.300	125	89.300	164	89.300	203	89.300	242	89.300
9	89.300	48	89.300	87	89.300	126	89.300	165	89.300	204	89.300	243	89.300
10	89.300	49	89.300	88	89.300	127	89.300	166	89.300	205	89.300	244	89.300
11	89.300	50	89.300	89	89.300	128	89.300	167	89.300	206	89.300	245	89.300
12	89.300	51	89.300	90	89.300	129	89.300	168	89.300	207	89.300	246	89.300
13	89.300	52	89.300	91	89.300	130	89.300	169	89.300	208	89.300	247	89.300
14	89.300	53	89.300	92	89.300	131	89.300	170	89.300	209	89.300	248	89.300
15	89.300	54	89.300	93	89.300	132	89.300	171	89.300	210	89.300	249	89.300
16	89.300	55	89.300	94	89.300	133	89.300	172	89.300	211	89.300	250	89.300
17	89.300	56	89.300	95	89.300	134	89.300	173	89.300	212	89.300	251	89.300
18	89.300	57	89.300	96	89.300	135	89.300	174	89.300	213	89.300	252	89.300
19	89.300	58	89.300	97	89.300	136	89.300	175	89.300	214	89.300	253	89.300
20	89.300	59	89.300	98	89.300	137	89.300	176	89.300	215	89.300	254	89.300
21	89.300	60	89.300	99	89.300	138	89.300	177	89.300	216	89.300	255	89.300
22	89.300	61	89.300	100	89.300	139	89.300	178	89.300	217	89.300	256	89.300
23	89.300	62	89.300	101	89.300	140	89.300	179	89.300	218	89.300	257	89.300
24	89.300	63	89.300	102	89.300	141	89.300	180	89.300	219	89.300	258	89.300
25	89.300	64	89.300	103	89.300	142	89.300	181	89.300	220	89.300	259	89.300
26	89.300	65	89.300	104	89.300	143	89.300	182	89.300	221	89.300	260	89.300
27	89.300	66	89.300	105	89.300	144	89.300	183	89.300	222	89.300	261	89.300
28	89.300	67	89.300	106	89.300	145	89.300	184	89.300	223	89.300	262	89.300
29	89.300	68	89.300	107	89.300	146	89.300	185	89.300	224	89.300	263	89.300
30	89.300	69	89.300	108	89.300	147	89.300	186	89.300	225	89.300	264	89.300
31	89.300	70	89.300	109	89.300	148	89.300	187	89.300	226	89.300	265	89.300
32	89.300	71	89.300	110	89.300	149	89.300	188	89.300	227	89.300	266	89.300
33	89.300	72	89.300	111	89.300	150	89.300	189	89.300	228	89.300	267	89.300
34	89.300	73	89.300	112	89.300	151	89.300	190	89.300	229	89.300	268	89.300
35	89.300	74	89.300	113	89.300	152	89.300	191	89.300	230	89.300	269	89.300
36	89.300	75	89.300	114	89.300	153	89.300	192	89.300	231	89.300	270	89.300
37	89.300	76	89.300	115	89.300	154	89.300	193	89.300	232	89.300	271	89.300
38	89.300	77	89.300	116	89.300	155	89.300	194	89.300	233	89.300	272	89.300
39	89.300	78	89.300	117	89.300	156	89.300	195	89.300	234	89.300	273	89.300

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)	Time (mins)	Depth (m)
274	89.300	333	89.300	392	89.300	451	89.300	510	89.300	569	89.300	628	89.300
275	89.300	334	89.300	393	89.300	452	89.300	511	89.300	570	89.300	629	89.300
276	89.300	335	89.300	394	89.300	453	89.300	512	89.300	571	89.300	630	89.300
277	89.300	336	89.300	395	89.300	454	89.300	513	89.300	572	89.300	631	89.300
278	89.300	337	89.300	396	89.300	455	89.300	514	89.300	573	89.300	632	89.300
279	89.300	338	89.300	397	89.300	456	89.300	515	89.300	574	89.300	633	89.300
280	89.300	339	89.300	398	89.300	457	89.300	516	89.300	575	89.300	634	89.300
281	89.300	340	89.300	399	89.300	458	89.300	517	89.300	576	89.300	635	89.300
282	89.300	341	89.300	400	89.300	459	89.300	518	89.300	577	89.300	636	89.300
283	89.300	342	89.300	401	89.300	460	89.300	519	89.300	578	89.300	637	89.300
284	89.300	343	89.300	402	89.300	461	89.300	520	89.300	579	89.300	638	89.300
285	89.300	344	89.300	403	89.300	462	89.300	521	89.300	580	89.300	639	89.300
286	89.300	345	89.300	404	89.300	463	89.300	522	89.300	581	89.300	640	89.300
287	89.300	346	89.300	405	89.300	464	89.300	523	89.300	582	89.300	641	89.300
288	89.300	347	89.300	406	89.300	465	89.300	524	89.300	583	89.300	642	89.300
289	89.300	348	89.300	407	89.300	466	89.300	525	89.300	584	89.300	643	89.300
290	89.300	349	89.300	408	89.300	467	89.300	526	89.300	585	89.300	644	89.300
291	89.300	350	89.300	409	89.300	468	89.300	527	89.300	586	89.300	645	89.300
292	89.300	351	89.300	410	89.300	469	89.300	528	89.300	587	89.300	646	89.300
293	89.300	352	89.300	411	89.300	470	89.300	529	89.300	588	89.300	647	89.300
294	89.300	353	89.300	412	89.300	471	89.300	530	89.300	589	89.300	648	89.300
295	89.300	354	89.300	413	89.300	472	89.300	531	89.300	590	89.300	649	89.300
296	89.300	355	89.300	414	89.300	473	89.300	532	89.300	591	89.300	650	89.300
297	89.300	356	89.300	415	89.300	474	89.300	533	89.300	592	89.300	651	89.300
298	89.300	357	89.300	416	89.300	475	89.300	534	89.300	593	89.300	652	89.300
299	89.300	358	89.300	417	89.300	476	89.300	535	89.300	594	89.300	653	89.300
300	89.300	359	89.300	418	89.300	477	89.300	536	89.300	595	89.300	654	89.300
301	89.300	360	89.300	419	89.300	478	89.300	537	89.300	596	89.300	655	89.300
302	89.300	361	89.300	420	89.300	479	89.300	538	89.300	597	89.300	656	89.300
303	89.300	362	89.300	421	89.300	480	89.300	539	89.300	598	89.300	657	89.300
304	89.300	363	89.300	422	89.300	481	89.300	540	89.300	599	89.300	658	89.300
305	89.300	364	89.300	423	89.300	482	89.300	541	89.300	600	89.300	659	89.300
306	89.300	365	89.300	424	89.300	483	89.300	542	89.300	601	89.300	660	89.300
307	89.300	366	89.300	425	89.300	484	89.300	543	89.300	602	89.300	661	89.300
308	89.300	367	89.300	426	89.300	485	89.300	544	89.300	603	89.300	662	89.300
309	89.300	368	89.300	427	89.300	486	89.300	545	89.300	604	89.300	663	89.300
310	89.300	369	89.300	428	89.300	487	89.300	546	89.300	605	89.300	664	89.300
311	89.300	370	89.300	429	89.300	488	89.300	547	89.300	606	89.300	665	89.300
312	89.300	371	89.300	430	89.300	489	89.300	548	89.300	607	89.300	666	89.300
313	89.300	372	89.300	431	89.300	490	89.300	549	89.300	608	89.300	667	89.300
314	89.300	373	89.300	432	89.300	491	89.300	550	89.300	609	89.300	668	89.300
315	89.300	374	89.300	433	89.300	492	89.300	551	89.300	610	89.300	669	89.300
316	89.300	375	89.300	434	89.300	493	89.300	552	89.300	611	89.300	670	89.300
317	89.300	376	89.300	435	89.300	494	89.300	553	89.300	612	89.300	671	89.300
318	89.300	377	89.300	436	89.300	495	89.300	554	89.300	613	89.300	672	89.300
319	89.300	378	89.300	437	89.300	496	89.300	555	89.300	614	89.300	673	89.300
320	89.300	379	89.300	438	89.300	497	89.300	556	89.300	615	89.300	674	89.300
321	89.300	380	89.300	439	89.300	498	89.300	557	89.300	616	89.300	675	89.300
322	89.300	381	89.300	440	89.300	499	89.300	558	89.300	617	89.300	676	89.300
323	89.300	382	89.300	441	89.300	500	89.300	559	89.300	618	89.300	677	89.300
324	89.300	383	89.300	442	89.300	501	89.300	560	89.300	619	89.300	678	89.300
325	89.300	384	89.300	443	89.300	502	89.300	561	89.300	620	89.300	679	89.300
326	89.300	385	89.300	444	89.300	503	89.300	562	89.300	621	89.300	680	89.300
327	89.300	386	89.300	445	89.300	504	89.300	563	89.300	622	89.300	681	89.300
328	89.300	387	89.300	446	89.300	505	89.300	564	89.300	623	89.300	682	89.300
329	89.300	388	89.300	447	89.300	506	89.300	565	89.300	624	89.300	683	89.300
330	89.300	389	89.300	448	89.300	507	89.300	566	89.300	625	89.300	684	89.300
331	89.300	390	89.300	449	89.300	508	89.300	567	89.300	626	89.300	685	89.300
332	89.300	391	89.300	450	89.300	509	89.300	568	89.300	627	89.300	686	89.300

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)	Time (mins)	Depth (m)
687	89.300	746	89.300	805	89.300	864	89.300	923	89.300	982	89.300	1041	89.300
688	89.300	747	89.300	806	89.300	865	89.300	924	89.300	983	89.300	1042	89.300
689	89.300	748	89.300	807	89.300	866	89.300	925	89.300	984	89.300	1043	89.300
690	89.300	749	89.300	808	89.300	867	89.300	926	89.300	985	89.300	1044	89.300
691	89.300	750	89.300	809	89.300	868	89.300	927	89.300	986	89.300	1045	89.300
692	89.300	751	89.300	810	89.300	869	89.300	928	89.300	987	89.300	1046	89.300
693	89.300	752	89.300	811	89.300	870	89.300	929	89.300	988	89.300	1047	89.300
694	89.300	753	89.300	812	89.300	871	89.300	930	89.300	989	89.300	1048	89.300
695	89.300	754	89.300	813	89.300	872	89.300	931	89.300	990	89.300	1049	89.300
696	89.300	755	89.300	814	89.300	873	89.300	932	89.300	991	89.300	1050	89.300
697	89.300	756	89.300	815	89.300	874	89.300	933	89.300	992	89.300	1051	89.300
698	89.300	757	89.300	816	89.300	875	89.300	934	89.300	993	89.300	1052	89.300
699	89.300	758	89.300	817	89.300	876	89.300	935	89.300	994	89.300	1053	89.300
700	89.300	759	89.300	818	89.300	877	89.300	936	89.300	995	89.300	1054	89.300
701	89.300	760	89.300	819	89.300	878	89.300	937	89.300	996	89.300	1055	89.300
702	89.300	761	89.300	820	89.300	879	89.300	938	89.300	997	89.300	1056	89.300
703	89.300	762	89.300	821	89.300	880	89.300	939	89.300	998	89.300	1057	89.300
704	89.300	763	89.300	822	89.300	881	89.300	940	89.300	999	89.300	1058	89.300
705	89.300	764	89.300	823	89.300	882	89.300	941	89.300	1000	89.300	1059	89.300
706	89.300	765	89.300	824	89.300	883	89.300	942	89.300	1001	89.300	1060	89.300
707	89.300	766	89.300	825	89.300	884	89.300	943	89.300	1002	89.300	1061	89.300
708	89.300	767	89.300	826	89.300	885	89.300	944	89.300	1003	89.300	1062	89.300
709	89.300	768	89.300	827	89.300	886	89.300	945	89.300	1004	89.300	1063	89.300
710	89.300	769	89.300	828	89.300	887	89.300	946	89.300	1005	89.300	1064	89.300
711	89.300	770	89.300	829	89.300	888	89.300	947	89.300	1006	89.300	1065	89.300
712	89.300	771	89.300	830	89.300	889	89.300	948	89.300	1007	89.300	1066	89.300
713	89.300	772	89.300	831	89.300	890	89.300	949	89.300	1008	89.300	1067	89.300
714	89.300	773	89.300	832	89.300	891	89.300	950	89.300	1009	89.300	1068	89.300
715	89.300	774	89.300	833	89.300	892	89.300	951	89.300	1010	89.300	1069	89.300
716	89.300	775	89.300	834	89.300	893	89.300	952	89.300	1011	89.300	1070	89.300
717	89.300	776	89.300	835	89.300	894	89.300	953	89.300	1012	89.300	1071	89.300
718	89.300	777	89.300	836	89.300	895	89.300	954	89.300	1013	89.300	1072	89.300
719	89.300	778	89.300	837	89.300	896	89.300	955	89.300	1014	89.300	1073	89.300
720	89.300	779	89.300	838	89.300	897	89.300	956	89.300	1015	89.300	1074	89.300
721	89.300	780	89.300	839	89.300	898	89.300	957	89.300	1016	89.300	1075	89.300
722	89.300	781	89.300	840	89.300	899	89.300	958	89.300	1017	89.300	1076	89.300
723	89.300	782	89.300	841	89.300	900	89.300	959	89.300	1018	89.300	1077	89.300
724	89.300	783	89.300	842	89.300	901	89.300	960	89.300	1019	89.300	1078	89.300
725	89.300	784	89.300	843	89.300	902	89.300	961	89.300	1020	89.300	1079	89.300
726	89.300	785	89.300	844	89.300	903	89.300	962	89.300	1021	89.300	1080	89.300
727	89.300	786	89.300	845	89.300	904	89.300	963	89.300	1022	89.300	1081	89.300
728	89.300	787	89.300	846	89.300	905	89.300	964	89.300	1023	89.300	1082	89.300
729	89.300	788	89.300	847	89.300	906	89.300	965	89.300	1024	89.300	1083	89.300
730	89.300	789	89.300	848	89.300	907	89.300	966	89.300	1025	89.300	1084	89.300
731	89.300	790	89.300	849	89.300	908	89.300	967	89.300	1026	89.300	1085	89.300
732	89.300	791	89.300	850	89.300	909	89.300	968	89.300	1027	89.300	1086	89.300
733	89.300	792	89.300	851	89.300	910	89.300	969	89.300	1028	89.300	1087	89.300
734	89.300	793	89.300	852	89.300	911	89.300	970	89.300	1029	89.300	1088	89.300
735	89.300	794	89.300	853	89.300	912	89.300	971	89.300	1030	89.300	1089	89.300
736	89.300	795	89.300	854	89.300	913	89.300	972	89.300	1031	89.300	1090	89.300
737	89.300	796	89.300	855	89.300	914	89.300	973	89.300	1032	89.300	1091	89.300
738	89.300	797	89.300	856	89.300	915	89.300	974	89.300	1033	89.300	1092	89.300
739	89.300	798	89.300	857	89.300	916	89.300	975	89.300	1034	89.300	1093	89.300
740	89.300	799	89.300	858	89.300	917	89.300	976	89.300	1035	89.300	1094	89.300
741	89.300	800	89.300	859	89.300	918	89.300	977	89.300	1036	89.300	1095	89.300
742	89.300	801	89.300	860	89.300	919	89.300	978	89.300	1037	89.300	1096	89.300
743	89.300	802	89.300	861	89.300	920	89.300	979	89.300	1038	89.300	1097	89.300
744	89.300	803	89.300	862	89.300	921	89.300	980	89.300	1039	89.300	1098	89.300
745	89.300	804	89.300	863	89.300	922	89.300	981	89.300	1040	89.300	1099	89.300

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)	Time (mins)	Depth (m)
1100	89.300	1149	89.300	1198	89.300	1247	89.300	1296	89.300	1345	89.300	1394	89.300
1101	89.300	1150	89.300	1199	89.300	1248	89.300	1297	89.300	1346	89.300	1395	89.300
1102	89.300	1151	89.300	1200	89.300	1249	89.300	1298	89.300	1347	89.300	1396	89.300
1103	89.300	1152	89.300	1201	89.300	1250	89.300	1299	89.300	1348	89.300	1397	89.300
1104	89.300	1153	89.300	1202	89.300	1251	89.300	1300	89.300	1349	89.300	1398	89.300
1105	89.300	1154	89.300	1203	89.300	1252	89.300	1301	89.300	1350	89.300	1399	89.300
1106	89.300	1155	89.300	1204	89.300	1253	89.300	1302	89.300	1351	89.300	1400	89.300
1107	89.300	1156	89.300	1205	89.300	1254	89.300	1303	89.300	1352	89.300	1401	89.300
1108	89.300	1157	89.300	1206	89.300	1255	89.300	1304	89.300	1353	89.300	1402	89.300
1109	89.300	1158	89.300	1207	89.300	1256	89.300	1305	89.300	1354	89.300	1403	89.300
1110	89.300	1159	89.300	1208	89.300	1257	89.300	1306	89.300	1355	89.300	1404	89.300
1111	89.300	1160	89.300	1209	89.300	1258	89.300	1307	89.300	1356	89.300	1405	89.300
1112	89.300	1161	89.300	1210	89.300	1259	89.300	1308	89.300	1357	89.300	1406	89.300
1113	89.300	1162	89.300	1211	89.300	1260	89.300	1309	89.300	1358	89.300	1407	89.300
1114	89.300	1163	89.300	1212	89.300	1261	89.300	1310	89.300	1359	89.300	1408	89.300
1115	89.300	1164	89.300	1213	89.300	1262	89.300	1311	89.300	1360	89.300	1409	89.300
1116	89.300	1165	89.300	1214	89.300	1263	89.300	1312	89.300	1361	89.300	1410	89.300
1117	89.300	1166	89.300	1215	89.300	1264	89.300	1313	89.300	1362	89.300	1411	89.300
1118	89.300	1167	89.300	1216	89.300	1265	89.300	1314	89.300	1363	89.300	1412	89.300
1119	89.300	1168	89.300	1217	89.300	1266	89.300	1315	89.300	1364	89.300	1413	89.300
1120	89.300	1169	89.300	1218	89.300	1267	89.300	1316	89.300	1365	89.300	1414	89.300
1121	89.300	1170	89.300	1219	89.300	1268	89.300	1317	89.300	1366	89.300	1415	89.300
1122	89.300	1171	89.300	1220	89.300	1269	89.300	1318	89.300	1367	89.300	1416	89.300
1123	89.300	1172	89.300	1221	89.300	1270	89.300	1319	89.300	1368	89.300	1417	89.300
1124	89.300	1173	89.300	1222	89.300	1271	89.300	1320	89.300	1369	89.300	1418	89.300
1125	89.300	1174	89.300	1223	89.300	1272	89.300	1321	89.300	1370	89.300	1419	89.300
1126	89.300	1175	89.300	1224	89.300	1273	89.300	1322	89.300	1371	89.300	1420	89.300
1127	89.300	1176	89.300	1225	89.300	1274	89.300	1323	89.300	1372	89.300	1421	89.300
1128	89.300	1177	89.300	1226	89.300	1275	89.300	1324	89.300	1373	89.300	1422	89.300
1129	89.300	1178	89.300	1227	89.300	1276	89.300	1325	89.300	1374	89.300	1423	89.300
1130	89.300	1179	89.300	1228	89.300	1277	89.300	1326	89.300	1375	89.300	1424	89.300
1131	89.300	1180	89.300	1229	89.300	1278	89.300	1327	89.300	1376	89.300	1425	89.300
1132	89.300	1181	89.300	1230	89.300	1279	89.300	1328	89.300	1377	89.300	1426	89.300
1133	89.300	1182	89.300	1231	89.300	1280	89.300	1329	89.300	1378	89.300	1427	89.300
1134	89.300	1183	89.300	1232	89.300	1281	89.300	1330	89.300	1379	89.300	1428	89.300
1135	89.300	1184	89.300	1233	89.300	1282	89.300	1331	89.300	1380	89.300	1429	89.300
1136	89.300	1185	89.300	1234	89.300	1283	89.300	1332	89.300	1381	89.300	1430	89.300
1137	89.300	1186	89.300	1235	89.300	1284	89.300	1333	89.300	1382	89.300	1431	89.300
1138	89.300	1187	89.300	1236	89.300	1285	89.300	1334	89.300	1383	89.300	1432	89.300
1139	89.300	1188	89.300	1237	89.300	1286	89.300	1335	89.300	1384	89.300	1433	89.300
1140	89.300	1189	89.300	1238	89.300	1287	89.300	1336	89.300	1385	89.300	1434	89.300
1141	89.300	1190	89.300	1239	89.300	1288	89.300	1337	89.300	1386	89.300	1435	89.300
1142	89.300	1191	89.300	1240	89.300	1289	89.300	1338	89.300	1387	89.300	1436	89.300
1143	89.300	1192	89.300	1241	89.300	1290	89.300	1339	89.300	1388	89.300	1437	89.300
1144	89.300	1193	89.300	1242	89.300	1291	89.300	1340	89.300	1389	89.300	1438	89.300
1145	89.300	1194	89.300	1243	89.300	1292	89.300	1341	89.300	1390	89.300	1439	89.300
1146	89.300	1195	89.300	1244	89.300	1293	89.300	1342	89.300	1391	89.300	1440	89.300
1147	89.300	1196	89.300	1245	89.300	1294	89.300	1343	89.300	1392	89.300		
1148	89.300	1197	89.300	1246	89.300	1295	89.300	1344	89.300	1393	89.300		

Online Controls for Storm

Hydro-Brake® Optimum Manhole: SG3 - Basin OUT, DS/PN: S1.001, Volume (m³): 2.1

Unit Reference	MD-SHE-0097-4200-1000-4200
Design Head (m)	1.000
Design Flow (l/s)	4.2
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	97
Invert Level (m)	89.300
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	4.2	Kick-Flo®	0.635	3.4
Flush-Flo™	0.299	4.2	Mean Flow over Head Range	-	3.7

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)	Depth (m)	Flow (l/s)
0.100	3.2	0.800	3.8	2.000	5.8	4.000	8.0	7.000	10.4
0.200	4.1	1.000	4.2	2.200	6.0	4.500	8.5	7.500	10.8
0.300	4.2	1.200	4.6	2.400	6.3	5.000	8.9	8.000	11.1
0.400	4.1	1.400	4.9	2.600	6.5	5.500	9.3	8.500	11.5
0.500	4.0	1.600	5.2	3.000	7.0	6.000	9.7	9.000	11.8
0.600	3.6	1.800	5.5	3.500	7.5	6.500	10.1	9.500	12.1

Storage Structures for Storm

Tank or Pond Manhole: SG3 - Basin OUT, DS/PN: S1.001

Invert Level (m) 89.300

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	407.0	1.000	805.0

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 Coeffiecient	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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SG3 - Basin IN	15 Winter	1	+0%					89.800
S1.001	SG3 - Basin OUT	360 Winter	1	+0%	100/30 Winter				89.437

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SG3 - Basin IN	0.000	0.000	1.00			61.4	SURCHARGED*	
S1.001	SG3 - Basin OUT	-0.238	0.000	0.01			3.2	OK	

30 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 Coeffiecient	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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SG3 - Basin IN	15 Summer	30	+0%					89.800
S1.001	SG3 - Basin OUT	240 Winter	30	+0%	100/30 Winter				89.613

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SG3 - Basin IN	0.000	0.000	2.56			156.9	SURCHARGED*	
S1.001	SG3 - Basin OUT	-0.062	0.000	0.01			4.2	OK	

100 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 Coeffiecient	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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SG3 - Basin IN	15 Summer	100	+40%					89.800
S1.001	SG3 - Basin OUT	480 Winter	100	+40%	100/30 Winter				89.885

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SG3 - Basin IN	0.000	0.000	4.37			267.9	SURCHARGED*	
S1.001	SG3 - Basin OUT	0.210	0.000	0.01			4.2	SURCHARGED	

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)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
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

« - Indicates pipe capacity < flow

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	10.000	0.033	303.0	4.278	5.00	0.0	0.600	o	300	Pipe/Conduit	
S1.001	10.000	1.400	7.1	0.000	0.00	0.0	0.600	o	375	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	50.00	5.19	90.300	4.278	0.0	0.0	0.0	0.90	63.5«	579.3
S1.001	50.00	5.21	90.000	4.278	0.0	0.0	0.0	6.82	752.7	579.3

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)
S1.001	S	89.800	88.600	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)	Time (mins)	Depth (m)
1	89.300	12	89.300	23	89.300	34	89.300	45	89.300	56	89.300	67	89.300
2	89.300	13	89.300	24	89.300	35	89.300	46	89.300	57	89.300	68	89.300
3	89.300	14	89.300	25	89.300	36	89.300	47	89.300	58	89.300	69	89.300
4	89.300	15	89.300	26	89.300	37	89.300	48	89.300	59	89.300	70	89.300
5	89.300	16	89.300	27	89.300	38	89.300	49	89.300	60	89.300	71	89.300
6	89.300	17	89.300	28	89.300	39	89.300	50	89.300	61	89.300	72	89.300
7	89.300	18	89.300	29	89.300	40	89.300	51	89.300	62	89.300	73	89.300
8	89.300	19	89.300	30	89.300	41	89.300	52	89.300	63	89.300	74	89.300
9	89.300	20	89.300	31	89.300	42	89.300	53	89.300	64	89.300	75	89.300
10	89.300	21	89.300	32	89.300	43	89.300	54	89.300	65	89.300	76	89.300
11	89.300	22	89.300	33	89.300	44	89.300	55	89.300	66	89.300	77	89.300

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)	Time (mins)	Depth (m)
78	89.300	137	89.300	196	89.300	255	89.300	314	89.300	373	89.300	432	89.300
79	89.300	138	89.300	197	89.300	256	89.300	315	89.300	374	89.300	433	89.300
80	89.300	139	89.300	198	89.300	257	89.300	316	89.300	375	89.300	434	89.300
81	89.300	140	89.300	199	89.300	258	89.300	317	89.300	376	89.300	435	89.300
82	89.300	141	89.300	200	89.300	259	89.300	318	89.300	377	89.300	436	89.300
83	89.300	142	89.300	201	89.300	260	89.300	319	89.300	378	89.300	437	89.300
84	89.300	143	89.300	202	89.300	261	89.300	320	89.300	379	89.300	438	89.300
85	89.300	144	89.300	203	89.300	262	89.300	321	89.300	380	89.300	439	89.300
86	89.300	145	89.300	204	89.300	263	89.300	322	89.300	381	89.300	440	89.300
87	89.300	146	89.300	205	89.300	264	89.300	323	89.300	382	89.300	441	89.300
88	89.300	147	89.300	206	89.300	265	89.300	324	89.300	383	89.300	442	89.300
89	89.300	148	89.300	207	89.300	266	89.300	325	89.300	384	89.300	443	89.300
90	89.300	149	89.300	208	89.300	267	89.300	326	89.300	385	89.300	444	89.300
91	89.300	150	89.300	209	89.300	268	89.300	327	89.300	386	89.300	445	89.300
92	89.300	151	89.300	210	89.300	269	89.300	328	89.300	387	89.300	446	89.300
93	89.300	152	89.300	211	89.300	270	89.300	329	89.300	388	89.300	447	89.300
94	89.300	153	89.300	212	89.300	271	89.300	330	89.300	389	89.300	448	89.300
95	89.300	154	89.300	213	89.300	272	89.300	331	89.300	390	89.300	449	89.300
96	89.300	155	89.300	214	89.300	273	89.300	332	89.300	391	89.300	450	89.300
97	89.300	156	89.300	215	89.300	274	89.300	333	89.300	392	89.300	451	89.300
98	89.300	157	89.300	216	89.300	275	89.300	334	89.300	393	89.300	452	89.300
99	89.300	158	89.300	217	89.300	276	89.300	335	89.300	394	89.300	453	89.300
100	89.300	159	89.300	218	89.300	277	89.300	336	89.300	395	89.300	454	89.300
101	89.300	160	89.300	219	89.300	278	89.300	337	89.300	396	89.300	455	89.300
102	89.300	161	89.300	220	89.300	279	89.300	338	89.300	397	89.300	456	89.300
103	89.300	162	89.300	221	89.300	280	89.300	339	89.300	398	89.300	457	89.300
104	89.300	163	89.300	222	89.300	281	89.300	340	89.300	399	89.300	458	89.300
105	89.300	164	89.300	223	89.300	282	89.300	341	89.300	400	89.300	459	89.300
106	89.300	165	89.300	224	89.300	283	89.300	342	89.300	401	89.300	460	89.300
107	89.300	166	89.300	225	89.300	284	89.300	343	89.300	402	89.300	461	89.300
108	89.300	167	89.300	226	89.300	285	89.300	344	89.300	403	89.300	462	89.300
109	89.300	168	89.300	227	89.300	286	89.300	345	89.300	404	89.300	463	89.300
110	89.300	169	89.300	228	89.300	287	89.300	346	89.300	405	89.300	464	89.300
111	89.300	170	89.300	229	89.300	288	89.300	347	89.300	406	89.300	465	89.300
112	89.300	171	89.300	230	89.300	289	89.300	348	89.300	407	89.300	466	89.300
113	89.300	172	89.300	231	89.300	290	89.300	349	89.300	408	89.300	467	89.300
114	89.300	173	89.300	232	89.300	291	89.300	350	89.300	409	89.300	468	89.300
115	89.300	174	89.300	233	89.300	292	89.300	351	89.300	410	89.300	469	89.300
116	89.300	175	89.300	234	89.300	293	89.300	352	89.300	411	89.300	470	89.300
117	89.300	176	89.300	235	89.300	294	89.300	353	89.300	412	89.300	471	89.300
118	89.300	177	89.300	236	89.300	295	89.300	354	89.300	413	89.300	472	89.300
119	89.300	178	89.300	237	89.300	296	89.300	355	89.300	414	89.300	473	89.300
120	89.300	179	89.300	238	89.300	297	89.300	356	89.300	415	89.300	474	89.300
121	89.300	180	89.300	239	89.300	298	89.300	357	89.300	416	89.300	475	89.300
122	89.300	181	89.300	240	89.300	299	89.300	358	89.300	417	89.300	476	89.300
123	89.300	182	89.300	241	89.300	300	89.300	359	89.300	418	89.300	477	89.300
124	89.300	183	89.300	242	89.300	301	89.300	360	89.300	419	89.300	478	89.300
125	89.300	184	89.300	243	89.300	302	89.300	361	89.300	420	89.300	479	89.300
126	89.300	185	89.300	244	89.300	303	89.300	362	89.300	421	89.300	480	89.300
127	89.300	186	89.300	245	89.300	304	89.300	363	89.300	422	89.300	481	89.300
128	89.300	187	89.300	246	89.300	305	89.300	364	89.300	423	89.300	482	89.300
129	89.300	188	89.300	247	89.300	306	89.300	365	89.300	424	89.300	483	89.300
130	89.300	189	89.300	248	89.300	307	89.300	366	89.300	425	89.300	484	89.300
131	89.300	190	89.300	249	89.300	308	89.300	367	89.300	426	89.300	485	89.300
132	89.300	191	89.300	250	89.300	309	89.300	368	89.300	427	89.300	486	89.300
133	89.300	192	89.300	251	89.300	310	89.300	369	89.300	428	89.300	487	89.300
134	89.300	193	89.300	252	89.300	311	89.300	370	89.300	429	89.300	488	89.300
135	89.300	194	89.300	253	89.300	312	89.300	371	89.300	430	89.300	489	89.300
136	89.300	195	89.300	254	89.300	313	89.300	372	89.300	431	89.300	490	89.300

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)	Time (mins)	Depth (m)
491	89.300	550	89.300	609	89.300	668	89.300	727	89.300	786	89.300	845	89.300
492	89.300	551	89.300	610	89.300	669	89.300	728	89.300	787	89.300	846	89.300
493	89.300	552	89.300	611	89.300	670	89.300	729	89.300	788	89.300	847	89.300
494	89.300	553	89.300	612	89.300	671	89.300	730	89.300	789	89.300	848	89.300
495	89.300	554	89.300	613	89.300	672	89.300	731	89.300	790	89.300	849	89.300
496	89.300	555	89.300	614	89.300	673	89.300	732	89.300	791	89.300	850	89.300
497	89.300	556	89.300	615	89.300	674	89.300	733	89.300	792	89.300	851	89.300
498	89.300	557	89.300	616	89.300	675	89.300	734	89.300	793	89.300	852	89.300
499	89.300	558	89.300	617	89.300	676	89.300	735	89.300	794	89.300	853	89.300
500	89.300	559	89.300	618	89.300	677	89.300	736	89.300	795	89.300	854	89.300
501	89.300	560	89.300	619	89.300	678	89.300	737	89.300	796	89.300	855	89.300
502	89.300	561	89.300	620	89.300	679	89.300	738	89.300	797	89.300	856	89.300
503	89.300	562	89.300	621	89.300	680	89.300	739	89.300	798	89.300	857	89.300
504	89.300	563	89.300	622	89.300	681	89.300	740	89.300	799	89.300	858	89.300
505	89.300	564	89.300	623	89.300	682	89.300	741	89.300	800	89.300	859	89.300
506	89.300	565	89.300	624	89.300	683	89.300	742	89.300	801	89.300	860	89.300
507	89.300	566	89.300	625	89.300	684	89.300	743	89.300	802	89.300	861	89.300
508	89.300	567	89.300	626	89.300	685	89.300	744	89.300	803	89.300	862	89.300
509	89.300	568	89.300	627	89.300	686	89.300	745	89.300	804	89.300	863	89.300
510	89.300	569	89.300	628	89.300	687	89.300	746	89.300	805	89.300	864	89.300
511	89.300	570	89.300	629	89.300	688	89.300	747	89.300	806	89.300	865	89.300
512	89.300	571	89.300	630	89.300	689	89.300	748	89.300	807	89.300	866	89.300
513	89.300	572	89.300	631	89.300	690	89.300	749	89.300	808	89.300	867	89.300
514	89.300	573	89.300	632	89.300	691	89.300	750	89.300	809	89.300	868	89.300
515	89.300	574	89.300	633	89.300	692	89.300	751	89.300	810	89.300	869	89.300
516	89.300	575	89.300	634	89.300	693	89.300	752	89.300	811	89.300	870	89.300
517	89.300	576	89.300	635	89.300	694	89.300	753	89.300	812	89.300	871	89.300
518	89.300	577	89.300	636	89.300	695	89.300	754	89.300	813	89.300	872	89.300
519	89.300	578	89.300	637	89.300	696	89.300	755	89.300	814	89.300	873	89.300
520	89.300	579	89.300	638	89.300	697	89.300	756	89.300	815	89.300	874	89.300
521	89.300	580	89.300	639	89.300	698	89.300	757	89.300	816	89.300	875	89.300
522	89.300	581	89.300	640	89.300	699	89.300	758	89.300	817	89.300	876	89.300
523	89.300	582	89.300	641	89.300	700	89.300	759	89.300	818	89.300	877	89.300
524	89.300	583	89.300	642	89.300	701	89.300	760	89.300	819	89.300	878	89.300
525	89.300	584	89.300	643	89.300	702	89.300	761	89.300	820	89.300	879	89.300
526	89.300	585	89.300	644	89.300	703	89.300	762	89.300	821	89.300	880	89.300
527	89.300	586	89.300	645	89.300	704	89.300	763	89.300	822	89.300	881	89.300
528	89.300	587	89.300	646	89.300	705	89.300	764	89.300	823	89.300	882	89.300
529	89.300	588	89.300	647	89.300	706	89.300	765	89.300	824	89.300	883	89.300
530	89.300	589	89.300	648	89.300	707	89.300	766	89.300	825	89.300	884	89.300
531	89.300	590	89.300	649	89.300	708	89.300	767	89.300	826	89.300	885	89.300
532	89.300	591	89.300	650	89.300	709	89.300	768	89.300	827	89.300	886	89.300
533	89.300	592	89.300	651	89.300	710	89.300	769	89.300	828	89.300	887	89.300
534	89.300	593	89.300	652	89.300	711	89.300	770	89.300	829	89.300	888	89.300
535	89.300	594	89.300	653	89.300	712	89.300	771	89.300	830	89.300	889	89.300
536	89.300	595	89.300	654	89.300	713	89.300	772	89.300	831	89.300	890	89.300
537	89.300	596	89.300	655	89.300	714	89.300	773	89.300	832	89.300	891	89.300
538	89.300	597	89.300	656	89.300	715	89.300	774	89.300	833	89.300	892	89.300
539	89.300	598	89.300	657	89.300	716	89.300	775	89.300	834	89.300	893	89.300
540	89.300	599	89.300	658	89.300	717	89.300	776	89.300	835	89.300	894	89.300
541	89.300	600	89.300	659	89.300	718	89.300	777	89.300	836	89.300	895	89.300
542	89.300	601	89.300	660	89.300	719	89.300	778	89.300	837	89.300	896	89.300
543	89.300	602	89.300	661	89.300	720	89.300	779	89.300	838	89.300	897	89.300
544	89.300	603	89.300	662	89.300	721	89.300	780	89.300	839	89.300	898	89.300
545	89.300	604	89.300	663	89.300	722	89.300	781	89.300	840	89.300	899	89.300
546	89.300	605	89.300	664	89.300	723	89.300	782	89.300	841	89.300	900	89.300
547	89.300	606	89.300	665	89.300	724	89.300	783	89.300	842	89.300	901	89.300
548	89.300	607	89.300	666	89.300	725	89.300	784	89.300	843	89.300	902	89.300
549	89.300	608	89.300	667	89.300	726	89.300	785	89.300	844	89.300	903	89.300

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)	Time (mins)	Depth (m)
904	89.300	963	89.300	1022	89.300	1081	89.300	1140	89.300	1199	89.300	1258	89.300
905	89.300	964	89.300	1023	89.300	1082	89.300	1141	89.300	1200	89.300	1259	89.300
906	89.300	965	89.300	1024	89.300	1083	89.300	1142	89.300	1201	89.300	1260	89.300
907	89.300	966	89.300	1025	89.300	1084	89.300	1143	89.300	1202	89.300	1261	89.300
908	89.300	967	89.300	1026	89.300	1085	89.300	1144	89.300	1203	89.300	1262	89.300
909	89.300	968	89.300	1027	89.300	1086	89.300	1145	89.300	1204	89.300	1263	89.300
910	89.300	969	89.300	1028	89.300	1087	89.300	1146	89.300	1205	89.300	1264	89.300
911	89.300	970	89.300	1029	89.300	1088	89.300	1147	89.300	1206	89.300	1265	89.300
912	89.300	971	89.300	1030	89.300	1089	89.300	1148	89.300	1207	89.300	1266	89.300
913	89.300	972	89.300	1031	89.300	1090	89.300	1149	89.300	1208	89.300	1267	89.300
914	89.300	973	89.300	1032	89.300	1091	89.300	1150	89.300	1209	89.300	1268	89.300
915	89.300	974	89.300	1033	89.300	1092	89.300	1151	89.300	1210	89.300	1269	89.300
916	89.300	975	89.300	1034	89.300	1093	89.300	1152	89.300	1211	89.300	1270	89.300
917	89.300	976	89.300	1035	89.300	1094	89.300	1153	89.300	1212	89.300	1271	89.300
918	89.300	977	89.300	1036	89.300	1095	89.300	1154	89.300	1213	89.300	1272	89.300
919	89.300	978	89.300	1037	89.300	1096	89.300	1155	89.300	1214	89.300	1273	89.300
920	89.300	979	89.300	1038	89.300	1097	89.300	1156	89.300	1215	89.300	1274	89.300
921	89.300	980	89.300	1039	89.300	1098	89.300	1157	89.300	1216	89.300	1275	89.300
922	89.300	981	89.300	1040	89.300	1099	89.300	1158	89.300	1217	89.300	1276	89.300
923	89.300	982	89.300	1041	89.300	1100	89.300	1159	89.300	1218	89.300	1277	89.300
924	89.300	983	89.300	1042	89.300	1101	89.300	1160	89.300	1219	89.300	1278	89.300
925	89.300	984	89.300	1043	89.300	1102	89.300	1161	89.300	1220	89.300	1279	89.300
926	89.300	985	89.300	1044	89.300	1103	89.300	1162	89.300	1221	89.300	1280	89.300
927	89.300	986	89.300	1045	89.300	1104	89.300	1163	89.300	1222	89.300	1281	89.300
928	89.300	987	89.300	1046	89.300	1105	89.300	1164	89.300	1223	89.300	1282	89.300
929	89.300	988	89.300	1047	89.300	1106	89.300	1165	89.300	1224	89.300	1283	89.300
930	89.300	989	89.300	1048	89.300	1107	89.300	1166	89.300	1225	89.300	1284	89.300
931	89.300	990	89.300	1049	89.300	1108	89.300	1167	89.300	1226	89.300	1285	89.300
932	89.300	991	89.300	1050	89.300	1109	89.300	1168	89.300	1227	89.300	1286	89.300
933	89.300	992	89.300	1051	89.300	1110	89.300	1169	89.300	1228	89.300	1287	89.300
934	89.300	993	89.300	1052	89.300	1111	89.300	1170	89.300	1229	89.300	1288	89.300
935	89.300	994	89.300	1053	89.300	1112	89.300	1171	89.300	1230	89.300	1289	89.300
936	89.300	995	89.300	1054	89.300	1113	89.300	1172	89.300	1231	89.300	1290	89.300
937	89.300	996	89.300	1055	89.300	1114	89.300	1173	89.300	1232	89.300	1291	89.300
938	89.300	997	89.300	1056	89.300	1115	89.300	1174	89.300	1233	89.300	1292	89.300
939	89.300	998	89.300	1057	89.300	1116	89.300	1175	89.300	1234	89.300	1293	89.300
940	89.300	999	89.300	1058	89.300	1117	89.300	1176	89.300	1235	89.300	1294	89.300
941	89.300	1000	89.300	1059	89.300	1118	89.300	1177	89.300	1236	89.300	1295	89.300
942	89.300	1001	89.300	1060	89.300	1119	89.300	1178	89.300	1237	89.300	1296	89.300
943	89.300	1002	89.300	1061	89.300	1120	89.300	1179	89.300	1238	89.300	1297	89.300
944	89.300	1003	89.300	1062	89.300	1121	89.300	1180	89.300	1239	89.300	1298	89.300
945	89.300	1004	89.300	1063	89.300	1122	89.300	1181	89.300	1240	89.300	1299	89.300
946	89.300	1005	89.300	1064	89.300	1123	89.300	1182	89.300	1241	89.300	1300	89.300
947	89.300	1006	89.300	1065	89.300	1124	89.300	1183	89.300	1242	89.300	1301	89.300
948	89.300	1007	89.300	1066	89.300	1125	89.300	1184	89.300	1243	89.300	1302	89.300
949	89.300	1008	89.300	1067	89.300	1126	89.300	1185	89.300	1244	89.300	1303	89.300
950	89.300	1009	89.300	1068	89.300	1127	89.300	1186	89.300	1245	89.300	1304	89.300
951	89.300	1010	89.300	1069	89.300	1128	89.300	1187	89.300	1246	89.300	1305	89.300
952	89.300	1011	89.300	1070	89.300	1129	89.300	1188	89.300	1247	89.300	1306	89.300
953	89.300	1012	89.300	1071	89.300	1130	89.300	1189	89.300	1248	89.300	1307	89.300
954	89.300	1013	89.300	1072	89.300	1131	89.300	1190	89.300	1249	89.300	1308	89.300
955	89.300	1014	89.300	1073	89.300	1132	89.300	1191	89.300	1250	89.300	1309	89.300
956	89.300	1015	89.300	1074	89.300	1133	89.300	1192	89.300	1251	89.300	1310	89.300
957	89.300	1016	89.300	1075	89.300	1134	89.300	1193	89.300	1252	89.300	1311	89.300
958	89.300	1017	89.300	1076	89.300	1135	89.300	1194	89.300	1253	89.300	1312	89.300
959	89.300	1018	89.300	1077	89.300	1136	89.300	1195	89.300	1254	89.300	1313	89.300
960	89.300	1019	89.300	1078	89.300	1137	89.300	1196	89.300	1255	89.300	1314	89.300
961	89.300	1020	89.300	1079	89.300	1138	89.300	1197	89.300	1256	89.300	1315	89.300
962	89.300	1021	89.300	1080	89.300	1139	89.300	1198	89.300	1257	89.300	1316	89.300

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)	Time (mins)	Depth (m)
1317	89.300	1335	89.300	1353	89.300	1371	89.300	1389	89.300	1407	89.300	1425	89.300
1318	89.300	1336	89.300	1354	89.300	1372	89.300	1390	89.300	1408	89.300	1426	89.300
1319	89.300	1337	89.300	1355	89.300	1373	89.300	1391	89.300	1409	89.300	1427	89.300
1320	89.300	1338	89.300	1356	89.300	1374	89.300	1392	89.300	1410	89.300	1428	89.300
1321	89.300	1339	89.300	1357	89.300	1375	89.300	1393	89.300	1411	89.300	1429	89.300
1322	89.300	1340	89.300	1358	89.300	1376	89.300	1394	89.300	1412	89.300	1430	89.300
1323	89.300	1341	89.300	1359	89.300	1377	89.300	1395	89.300	1413	89.300	1431	89.300
1324	89.300	1342	89.300	1360	89.300	1378	89.300	1396	89.300	1414	89.300	1432	89.300
1325	89.300	1343	89.300	1361	89.300	1379	89.300	1397	89.300	1415	89.300	1433	89.300
1326	89.300	1344	89.300	1362	89.300	1380	89.300	1398	89.300	1416	89.300	1434	89.300
1327	89.300	1345	89.300	1363	89.300	1381	89.300	1399	89.300	1417	89.300	1435	89.300
1328	89.300	1346	89.300	1364	89.300	1382	89.300	1400	89.300	1418	89.300	1436	89.300
1329	89.300	1347	89.300	1365	89.300	1383	89.300	1401	89.300	1419	89.300	1437	89.300
1330	89.300	1348	89.300	1366	89.300	1384	89.300	1402	89.300	1420	89.300	1438	89.300
1331	89.300	1349	89.300	1367	89.300	1385	89.300	1403	89.300	1421	89.300	1439	89.300
1332	89.300	1350	89.300	1368	89.300	1386	89.300	1404	89.300	1422	89.300	1440	89.300
1333	89.300	1351	89.300	1369	89.300	1387	89.300	1405	89.300	1423	89.300		
1334	89.300	1352	89.300	1370	89.300	1388	89.300	1406	89.300	1424	89.300		

Online Controls for Storm

Hydro-Brake® Optimum Manhole: S2, DS/PN: S1.001, Volume (m³): 2.1

Unit Reference	MD-SHE-0248-3330-1000-3330
Design Head (m)	1.000
Design Flow (l/s)	33.3
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	248
Invert Level (m)	90.000
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	33.3	Kick-Flo®	0.755	29.1
Flush-Flo™	0.393	33.3	Mean Flow over Head Range	-	27.4

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)	Depth (m)	Flow (l/s)
0.100	8.1	0.800	29.9	2.000	46.5	4.000	65.0	7.000	85.3
0.200	25.3	1.000	33.3	2.200	48.7	4.500	68.8	7.500	88.3
0.300	32.9	1.200	36.3	2.400	50.7	5.000	72.4	8.000	91.1
0.400	33.3	1.400	39.1	2.600	52.8	5.500	75.9	8.500	93.8
0.500	32.9	1.600	41.7	3.000	56.5	6.000	79.2	9.000	96.5
0.600	32.1	1.800	44.2	3.500	60.9	6.500	82.3	9.500	99.0

Storage Structures for Storm

Tank or Pond Manhole: S2, DS/PN: S1.001

Invert Level (m) 90.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	4686.0	1.000	5739.0

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 Coeffiecient	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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 35, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.000	S2	15 Summer	1	+0%					90.600	0.000
S1.001	S2	960 Winter	1	+0%	30/240 Winter				90.145	-0.230

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S2	0.000	4.43			272.1	SURCHARGED*	
S1.001	S2	0.000	0.03			15.4	OK	

30 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 Coeffiecient	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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 35, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.000	S2	15 Summer	30	+35%					90.600	0.000
S1.001	S2	480 Winter	30	+35%	30/240 Winter				90.397	0.022

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S2	0.000	9.55			586.1	SURCHARGED*	
S1.001	S2	0.000	0.07			33.3	SURCHARGED	

100 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 Coeffiecient	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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 35, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.000	S2	15 Summer	100	+40%					90.600	0.000
S1.001	S2	600 Winter	100	+40%	30/240 Winter				90.551	0.176

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S2	0.000	11.41			699.9	SURCHARGED*	
S1.001	S2	0.000	0.07			33.3	SURCHARGED	

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)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
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

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	150.000	0.500	300.0	1.542	5.00	0.0	0.045	3 \=/	1000	1:3 Swale	
S1.001	10.000	0.383	26.1	0.000	0.00	0.0	0.045	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	50.00	13.41	91.700	1.542	0.0	0.0	0.0	0.30	64.7«	208.8
S1.001	50.00	13.62	91.200	1.542	0.0	0.0	0.0	0.77	54.7«	208.8

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)
S1.001	S	92.500	90.817	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)	Time (mins)	Depth (m)
1	89.300	12	89.300	23	89.300	34	89.300	45	89.300	56	89.300	67	89.300
2	89.300	13	89.300	24	89.300	35	89.300	46	89.300	57	89.300	68	89.300
3	89.300	14	89.300	25	89.300	36	89.300	47	89.300	58	89.300	69	89.300
4	89.300	15	89.300	26	89.300	37	89.300	48	89.300	59	89.300	70	89.300
5	89.300	16	89.300	27	89.300	38	89.300	49	89.300	60	89.300	71	89.300
6	89.300	17	89.300	28	89.300	39	89.300	50	89.300	61	89.300	72	89.300
7	89.300	18	89.300	29	89.300	40	89.300	51	89.300	62	89.300	73	89.300
8	89.300	19	89.300	30	89.300	41	89.300	52	89.300	63	89.300	74	89.300
9	89.300	20	89.300	31	89.300	42	89.300	53	89.300	64	89.300	75	89.300
10	89.300	21	89.300	32	89.300	43	89.300	54	89.300	65	89.300	76	89.300
11	89.300	22	89.300	33	89.300	44	89.300	55	89.300	66	89.300	77	89.300

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)	Time (mins)	Depth (m)
78	89.300	137	89.300	196	89.300	255	89.300	314	89.300	373	89.300	432	89.300
79	89.300	138	89.300	197	89.300	256	89.300	315	89.300	374	89.300	433	89.300
80	89.300	139	89.300	198	89.300	257	89.300	316	89.300	375	89.300	434	89.300
81	89.300	140	89.300	199	89.300	258	89.300	317	89.300	376	89.300	435	89.300
82	89.300	141	89.300	200	89.300	259	89.300	318	89.300	377	89.300	436	89.300
83	89.300	142	89.300	201	89.300	260	89.300	319	89.300	378	89.300	437	89.300
84	89.300	143	89.300	202	89.300	261	89.300	320	89.300	379	89.300	438	89.300
85	89.300	144	89.300	203	89.300	262	89.300	321	89.300	380	89.300	439	89.300
86	89.300	145	89.300	204	89.300	263	89.300	322	89.300	381	89.300	440	89.300
87	89.300	146	89.300	205	89.300	264	89.300	323	89.300	382	89.300	441	89.300
88	89.300	147	89.300	206	89.300	265	89.300	324	89.300	383	89.300	442	89.300
89	89.300	148	89.300	207	89.300	266	89.300	325	89.300	384	89.300	443	89.300
90	89.300	149	89.300	208	89.300	267	89.300	326	89.300	385	89.300	444	89.300
91	89.300	150	89.300	209	89.300	268	89.300	327	89.300	386	89.300	445	89.300
92	89.300	151	89.300	210	89.300	269	89.300	328	89.300	387	89.300	446	89.300
93	89.300	152	89.300	211	89.300	270	89.300	329	89.300	388	89.300	447	89.300
94	89.300	153	89.300	212	89.300	271	89.300	330	89.300	389	89.300	448	89.300
95	89.300	154	89.300	213	89.300	272	89.300	331	89.300	390	89.300	449	89.300
96	89.300	155	89.300	214	89.300	273	89.300	332	89.300	391	89.300	450	89.300
97	89.300	156	89.300	215	89.300	274	89.300	333	89.300	392	89.300	451	89.300
98	89.300	157	89.300	216	89.300	275	89.300	334	89.300	393	89.300	452	89.300
99	89.300	158	89.300	217	89.300	276	89.300	335	89.300	394	89.300	453	89.300
100	89.300	159	89.300	218	89.300	277	89.300	336	89.300	395	89.300	454	89.300
101	89.300	160	89.300	219	89.300	278	89.300	337	89.300	396	89.300	455	89.300
102	89.300	161	89.300	220	89.300	279	89.300	338	89.300	397	89.300	456	89.300
103	89.300	162	89.300	221	89.300	280	89.300	339	89.300	398	89.300	457	89.300
104	89.300	163	89.300	222	89.300	281	89.300	340	89.300	399	89.300	458	89.300
105	89.300	164	89.300	223	89.300	282	89.300	341	89.300	400	89.300	459	89.300
106	89.300	165	89.300	224	89.300	283	89.300	342	89.300	401	89.300	460	89.300
107	89.300	166	89.300	225	89.300	284	89.300	343	89.300	402	89.300	461	89.300
108	89.300	167	89.300	226	89.300	285	89.300	344	89.300	403	89.300	462	89.300
109	89.300	168	89.300	227	89.300	286	89.300	345	89.300	404	89.300	463	89.300
110	89.300	169	89.300	228	89.300	287	89.300	346	89.300	405	89.300	464	89.300
111	89.300	170	89.300	229	89.300	288	89.300	347	89.300	406	89.300	465	89.300
112	89.300	171	89.300	230	89.300	289	89.300	348	89.300	407	89.300	466	89.300
113	89.300	172	89.300	231	89.300	290	89.300	349	89.300	408	89.300	467	89.300
114	89.300	173	89.300	232	89.300	291	89.300	350	89.300	409	89.300	468	89.300
115	89.300	174	89.300	233	89.300	292	89.300	351	89.300	410	89.300	469	89.300
116	89.300	175	89.300	234	89.300	293	89.300	352	89.300	411	89.300	470	89.300
117	89.300	176	89.300	235	89.300	294	89.300	353	89.300	412	89.300	471	89.300
118	89.300	177	89.300	236	89.300	295	89.300	354	89.300	413	89.300	472	89.300
119	89.300	178	89.300	237	89.300	296	89.300	355	89.300	414	89.300	473	89.300
120	89.300	179	89.300	238	89.300	297	89.300	356	89.300	415	89.300	474	89.300
121	89.300	180	89.300	239	89.300	298	89.300	357	89.300	416	89.300	475	89.300
122	89.300	181	89.300	240	89.300	299	89.300	358	89.300	417	89.300	476	89.300
123	89.300	182	89.300	241	89.300	300	89.300	359	89.300	418	89.300	477	89.300
124	89.300	183	89.300	242	89.300	301	89.300	360	89.300	419	89.300	478	89.300
125	89.300	184	89.300	243	89.300	302	89.300	361	89.300	420	89.300	479	89.300
126	89.300	185	89.300	244	89.300	303	89.300	362	89.300	421	89.300	480	89.300
127	89.300	186	89.300	245	89.300	304	89.300	363	89.300	422	89.300	481	89.300
128	89.300	187	89.300	246	89.300	305	89.300	364	89.300	423	89.300	482	89.300
129	89.300	188	89.300	247	89.300	306	89.300	365	89.300	424	89.300	483	89.300
130	89.300	189	89.300	248	89.300	307	89.300	366	89.300	425	89.300	484	89.300
131	89.300	190	89.300	249	89.300	308	89.300	367	89.300	426	89.300	485	89.300
132	89.300	191	89.300	250	89.300	309	89.300	368	89.300	427	89.300	486	89.300
133	89.300	192	89.300	251	89.300	310	89.300	369	89.300	428	89.300	487	89.300
134	89.300	193	89.300	252	89.300	311	89.300	370	89.300	429	89.300	488	89.300
135	89.300	194	89.300	253	89.300	312	89.300	371	89.300	430	89.300	489	89.300
136	89.300	195	89.300	254	89.300	313	89.300	372	89.300	431	89.300	490	89.300

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)	Time (mins)	Depth (m)
491	89.300	550	89.300	609	89.300	668	89.300	727	89.300	786	89.300	845	89.300
492	89.300	551	89.300	610	89.300	669	89.300	728	89.300	787	89.300	846	89.300
493	89.300	552	89.300	611	89.300	670	89.300	729	89.300	788	89.300	847	89.300
494	89.300	553	89.300	612	89.300	671	89.300	730	89.300	789	89.300	848	89.300
495	89.300	554	89.300	613	89.300	672	89.300	731	89.300	790	89.300	849	89.300
496	89.300	555	89.300	614	89.300	673	89.300	732	89.300	791	89.300	850	89.300
497	89.300	556	89.300	615	89.300	674	89.300	733	89.300	792	89.300	851	89.300
498	89.300	557	89.300	616	89.300	675	89.300	734	89.300	793	89.300	852	89.300
499	89.300	558	89.300	617	89.300	676	89.300	735	89.300	794	89.300	853	89.300
500	89.300	559	89.300	618	89.300	677	89.300	736	89.300	795	89.300	854	89.300
501	89.300	560	89.300	619	89.300	678	89.300	737	89.300	796	89.300	855	89.300
502	89.300	561	89.300	620	89.300	679	89.300	738	89.300	797	89.300	856	89.300
503	89.300	562	89.300	621	89.300	680	89.300	739	89.300	798	89.300	857	89.300
504	89.300	563	89.300	622	89.300	681	89.300	740	89.300	799	89.300	858	89.300
505	89.300	564	89.300	623	89.300	682	89.300	741	89.300	800	89.300	859	89.300
506	89.300	565	89.300	624	89.300	683	89.300	742	89.300	801	89.300	860	89.300
507	89.300	566	89.300	625	89.300	684	89.300	743	89.300	802	89.300	861	89.300
508	89.300	567	89.300	626	89.300	685	89.300	744	89.300	803	89.300	862	89.300
509	89.300	568	89.300	627	89.300	686	89.300	745	89.300	804	89.300	863	89.300
510	89.300	569	89.300	628	89.300	687	89.300	746	89.300	805	89.300	864	89.300
511	89.300	570	89.300	629	89.300	688	89.300	747	89.300	806	89.300	865	89.300
512	89.300	571	89.300	630	89.300	689	89.300	748	89.300	807	89.300	866	89.300
513	89.300	572	89.300	631	89.300	690	89.300	749	89.300	808	89.300	867	89.300
514	89.300	573	89.300	632	89.300	691	89.300	750	89.300	809	89.300	868	89.300
515	89.300	574	89.300	633	89.300	692	89.300	751	89.300	810	89.300	869	89.300
516	89.300	575	89.300	634	89.300	693	89.300	752	89.300	811	89.300	870	89.300
517	89.300	576	89.300	635	89.300	694	89.300	753	89.300	812	89.300	871	89.300
518	89.300	577	89.300	636	89.300	695	89.300	754	89.300	813	89.300	872	89.300
519	89.300	578	89.300	637	89.300	696	89.300	755	89.300	814	89.300	873	89.300
520	89.300	579	89.300	638	89.300	697	89.300	756	89.300	815	89.300	874	89.300
521	89.300	580	89.300	639	89.300	698	89.300	757	89.300	816	89.300	875	89.300
522	89.300	581	89.300	640	89.300	699	89.300	758	89.300	817	89.300	876	89.300
523	89.300	582	89.300	641	89.300	700	89.300	759	89.300	818	89.300	877	89.300
524	89.300	583	89.300	642	89.300	701	89.300	760	89.300	819	89.300	878	89.300
525	89.300	584	89.300	643	89.300	702	89.300	761	89.300	820	89.300	879	89.300
526	89.300	585	89.300	644	89.300	703	89.300	762	89.300	821	89.300	880	89.300
527	89.300	586	89.300	645	89.300	704	89.300	763	89.300	822	89.300	881	89.300
528	89.300	587	89.300	646	89.300	705	89.300	764	89.300	823	89.300	882	89.300
529	89.300	588	89.300	647	89.300	706	89.300	765	89.300	824	89.300	883	89.300
530	89.300	589	89.300	648	89.300	707	89.300	766	89.300	825	89.300	884	89.300
531	89.300	590	89.300	649	89.300	708	89.300	767	89.300	826	89.300	885	89.300
532	89.300	591	89.300	650	89.300	709	89.300	768	89.300	827	89.300	886	89.300
533	89.300	592	89.300	651	89.300	710	89.300	769	89.300	828	89.300	887	89.300
534	89.300	593	89.300	652	89.300	711	89.300	770	89.300	829	89.300	888	89.300
535	89.300	594	89.300	653	89.300	712	89.300	771	89.300	830	89.300	889	89.300
536	89.300	595	89.300	654	89.300	713	89.300	772	89.300	831	89.300	890	89.300
537	89.300	596	89.300	655	89.300	714	89.300	773	89.300	832	89.300	891	89.300
538	89.300	597	89.300	656	89.300	715	89.300	774	89.300	833	89.300	892	89.300
539	89.300	598	89.300	657	89.300	716	89.300	775	89.300	834	89.300	893	89.300
540	89.300	599	89.300	658	89.300	717	89.300	776	89.300	835	89.300	894	89.300
541	89.300	600	89.300	659	89.300	718	89.300	777	89.300	836	89.300	895	89.300
542	89.300	601	89.300	660	89.300	719	89.300	778	89.300	837	89.300	896	89.300
543	89.300	602	89.300	661	89.300	720	89.300	779	89.300	838	89.300	897	89.300
544	89.300	603	89.300	662	89.300	721	89.300	780	89.300	839	89.300	898	89.300
545	89.300	604	89.300	663	89.300	722	89.300	781	89.300	840	89.300	899	89.300
546	89.300	605	89.300	664	89.300	723	89.300	782	89.300	841	89.300	900	89.300
547	89.300	606	89.300	665	89.300	724	89.300	783	89.300	842	89.300	901	89.300
548	89.300	607	89.300	666	89.300	725	89.300	784	89.300	843	89.300	902	89.300
549	89.300	608	89.300	667	89.300	726	89.300	785	89.300	844	89.300	903	89.300

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)	Time (mins)	Depth (m)
904	89.300	963	89.300	1022	89.300	1081	89.300	1140	89.300	1199	89.300	1258	89.300
905	89.300	964	89.300	1023	89.300	1082	89.300	1141	89.300	1200	89.300	1259	89.300
906	89.300	965	89.300	1024	89.300	1083	89.300	1142	89.300	1201	89.300	1260	89.300
907	89.300	966	89.300	1025	89.300	1084	89.300	1143	89.300	1202	89.300	1261	89.300
908	89.300	967	89.300	1026	89.300	1085	89.300	1144	89.300	1203	89.300	1262	89.300
909	89.300	968	89.300	1027	89.300	1086	89.300	1145	89.300	1204	89.300	1263	89.300
910	89.300	969	89.300	1028	89.300	1087	89.300	1146	89.300	1205	89.300	1264	89.300
911	89.300	970	89.300	1029	89.300	1088	89.300	1147	89.300	1206	89.300	1265	89.300
912	89.300	971	89.300	1030	89.300	1089	89.300	1148	89.300	1207	89.300	1266	89.300
913	89.300	972	89.300	1031	89.300	1090	89.300	1149	89.300	1208	89.300	1267	89.300
914	89.300	973	89.300	1032	89.300	1091	89.300	1150	89.300	1209	89.300	1268	89.300
915	89.300	974	89.300	1033	89.300	1092	89.300	1151	89.300	1210	89.300	1269	89.300
916	89.300	975	89.300	1034	89.300	1093	89.300	1152	89.300	1211	89.300	1270	89.300
917	89.300	976	89.300	1035	89.300	1094	89.300	1153	89.300	1212	89.300	1271	89.300
918	89.300	977	89.300	1036	89.300	1095	89.300	1154	89.300	1213	89.300	1272	89.300
919	89.300	978	89.300	1037	89.300	1096	89.300	1155	89.300	1214	89.300	1273	89.300
920	89.300	979	89.300	1038	89.300	1097	89.300	1156	89.300	1215	89.300	1274	89.300
921	89.300	980	89.300	1039	89.300	1098	89.300	1157	89.300	1216	89.300	1275	89.300
922	89.300	981	89.300	1040	89.300	1099	89.300	1158	89.300	1217	89.300	1276	89.300
923	89.300	982	89.300	1041	89.300	1100	89.300	1159	89.300	1218	89.300	1277	89.300
924	89.300	983	89.300	1042	89.300	1101	89.300	1160	89.300	1219	89.300	1278	89.300
925	89.300	984	89.300	1043	89.300	1102	89.300	1161	89.300	1220	89.300	1279	89.300
926	89.300	985	89.300	1044	89.300	1103	89.300	1162	89.300	1221	89.300	1280	89.300
927	89.300	986	89.300	1045	89.300	1104	89.300	1163	89.300	1222	89.300	1281	89.300
928	89.300	987	89.300	1046	89.300	1105	89.300	1164	89.300	1223	89.300	1282	89.300
929	89.300	988	89.300	1047	89.300	1106	89.300	1165	89.300	1224	89.300	1283	89.300
930	89.300	989	89.300	1048	89.300	1107	89.300	1166	89.300	1225	89.300	1284	89.300
931	89.300	990	89.300	1049	89.300	1108	89.300	1167	89.300	1226	89.300	1285	89.300
932	89.300	991	89.300	1050	89.300	1109	89.300	1168	89.300	1227	89.300	1286	89.300
933	89.300	992	89.300	1051	89.300	1110	89.300	1169	89.300	1228	89.300	1287	89.300
934	89.300	993	89.300	1052	89.300	1111	89.300	1170	89.300	1229	89.300	1288	89.300
935	89.300	994	89.300	1053	89.300	1112	89.300	1171	89.300	1230	89.300	1289	89.300
936	89.300	995	89.300	1054	89.300	1113	89.300	1172	89.300	1231	89.300	1290	89.300
937	89.300	996	89.300	1055	89.300	1114	89.300	1173	89.300	1232	89.300	1291	89.300
938	89.300	997	89.300	1056	89.300	1115	89.300	1174	89.300	1233	89.300	1292	89.300
939	89.300	998	89.300	1057	89.300	1116	89.300	1175	89.300	1234	89.300	1293	89.300
940	89.300	999	89.300	1058	89.300	1117	89.300	1176	89.300	1235	89.300	1294	89.300
941	89.300	1000	89.300	1059	89.300	1118	89.300	1177	89.300	1236	89.300	1295	89.300
942	89.300	1001	89.300	1060	89.300	1119	89.300	1178	89.300	1237	89.300	1296	89.300
943	89.300	1002	89.300	1061	89.300	1120	89.300	1179	89.300	1238	89.300	1297	89.300
944	89.300	1003	89.300	1062	89.300	1121	89.300	1180	89.300	1239	89.300	1298	89.300
945	89.300	1004	89.300	1063	89.300	1122	89.300	1181	89.300	1240	89.300	1299	89.300
946	89.300	1005	89.300	1064	89.300	1123	89.300	1182	89.300	1241	89.300	1300	89.300
947	89.300	1006	89.300	1065	89.300	1124	89.300	1183	89.300	1242	89.300	1301	89.300
948	89.300	1007	89.300	1066	89.300	1125	89.300	1184	89.300	1243	89.300	1302	89.300
949	89.300	1008	89.300	1067	89.300	1126	89.300	1185	89.300	1244	89.300	1303	89.300
950	89.300	1009	89.300	1068	89.300	1127	89.300	1186	89.300	1245	89.300	1304	89.300
951	89.300	1010	89.300	1069	89.300	1128	89.300	1187	89.300	1246	89.300	1305	89.300
952	89.300	1011	89.300	1070	89.300	1129	89.300	1188	89.300	1247	89.300	1306	89.300
953	89.300	1012	89.300	1071	89.300	1130	89.300	1189	89.300	1248	89.300	1307	89.300
954	89.300	1013	89.300	1072	89.300	1131	89.300	1190	89.300	1249	89.300	1308	89.300
955	89.300	1014	89.300	1073	89.300	1132	89.300	1191	89.300	1250	89.300	1309	89.300
956	89.300	1015	89.300	1074	89.300	1133	89.300	1192	89.300	1251	89.300	1310	89.300
957	89.300	1016	89.300	1075	89.300	1134	89.300	1193	89.300	1252	89.300	1311	89.300
958	89.300	1017	89.300	1076	89.300	1135	89.300	1194	89.300	1253	89.300	1312	89.300
959	89.300	1018	89.300	1077	89.300	1136	89.300	1195	89.300	1254	89.300	1313	89.300
960	89.300	1019	89.300	1078	89.300	1137	89.300	1196	89.300	1255	89.300	1314	89.300
961	89.300	1020	89.300	1079	89.300	1138	89.300	1197	89.300	1256	89.300	1315	89.300
962	89.300	1021	89.300	1080	89.300	1139	89.300	1198	89.300	1257	89.300	1316	89.300

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)	Time (mins)	Depth (m)
1317	89.300	1335	89.300	1353	89.300	1371	89.300	1389	89.300	1407	89.300	1425	89.300
1318	89.300	1336	89.300	1354	89.300	1372	89.300	1390	89.300	1408	89.300	1426	89.300
1319	89.300	1337	89.300	1355	89.300	1373	89.300	1391	89.300	1409	89.300	1427	89.300
1320	89.300	1338	89.300	1356	89.300	1374	89.300	1392	89.300	1410	89.300	1428	89.300
1321	89.300	1339	89.300	1357	89.300	1375	89.300	1393	89.300	1411	89.300	1429	89.300
1322	89.300	1340	89.300	1358	89.300	1376	89.300	1394	89.300	1412	89.300	1430	89.300
1323	89.300	1341	89.300	1359	89.300	1377	89.300	1395	89.300	1413	89.300	1431	89.300
1324	89.300	1342	89.300	1360	89.300	1378	89.300	1396	89.300	1414	89.300	1432	89.300
1325	89.300	1343	89.300	1361	89.300	1379	89.300	1397	89.300	1415	89.300	1433	89.300
1326	89.300	1344	89.300	1362	89.300	1380	89.300	1398	89.300	1416	89.300	1434	89.300
1327	89.300	1345	89.300	1363	89.300	1381	89.300	1399	89.300	1417	89.300	1435	89.300
1328	89.300	1346	89.300	1364	89.300	1382	89.300	1400	89.300	1418	89.300	1436	89.300
1329	89.300	1347	89.300	1365	89.300	1383	89.300	1401	89.300	1419	89.300	1437	89.300
1330	89.300	1348	89.300	1366	89.300	1384	89.300	1402	89.300	1420	89.300	1438	89.300
1331	89.300	1349	89.300	1367	89.300	1385	89.300	1403	89.300	1421	89.300	1439	89.300
1332	89.300	1350	89.300	1368	89.300	1386	89.300	1404	89.300	1422	89.300	1440	89.300
1333	89.300	1351	89.300	1369	89.300	1387	89.300	1405	89.300	1423	89.300		
1334	89.300	1352	89.300	1370	89.300	1388	89.300	1406	89.300	1424	89.300		

Online Controls for Storm

Hydro-Brake® Optimum Manhole: SH1 - Basin, DS/PN: S1.001, Volume (m³): 600.0

Unit Reference	MD-SHE-0158-1200-1000-1200
Design Head (m)	1.000
Design Flow (l/s)	12.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	158
Invert Level (m)	91.200
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	12.0	Kick-Flo®	0.687	10.1
Flush-Flo™	0.312	12.0	Mean Flow over Head Range	-	10.2

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)	Depth (m)	Flow (l/s)
0.100	5.7	0.800	10.8	2.000	16.7	4.000	23.2	7.000	30.4
0.200	11.6	1.000	12.0	2.200	17.4	4.500	24.6	7.500	31.4
0.300	12.0	1.200	13.1	2.400	18.2	5.000	25.8	8.000	32.4
0.400	11.8	1.400	14.1	2.600	18.9	5.500	27.0	8.500	33.4
0.500	11.6	1.600	15.0	3.000	20.2	6.000	28.2	9.000	34.3
0.600	11.1	1.800	15.8	3.500	21.8	6.500	29.3	9.500	35.2

Storage Structures for Storm

Tank or Pond Manhole: SH1 - Basin, DS/PN: S1.001

Invert Level (m) 91.200

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	492.0	1.200	947.0

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 Coeffiecient	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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.000	SH1 - Swale	15 Winter	1	+0%					91.978	-0.722
S1.001	SH1 - Basin	240 Winter	1	+0%	30/15 Summer				91.470	-0.030

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Level Status	Level Exceeded
S1.000	SH1 - Swale	0.000	0.06			211.4	OK	
S1.001	SH1 - Basin	0.000	0.21			11.7	OK*	

30 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 Coeffiecient	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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.000	SH1 - Swale	15 Winter	30	+0%					92.132	-0.568
S1.001	SH1 - Basin	240 Winter	30	+0%	30/15 Summer				91.776	0.276

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SH1 - Swale	0.000	0.14			488.9	OK	
S1.001	SH1 - Basin	0.000	0.21			11.7	SURCHARGED*	

100 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 Coeffiecient	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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	0.750		
Cv (Winter)	0.840		

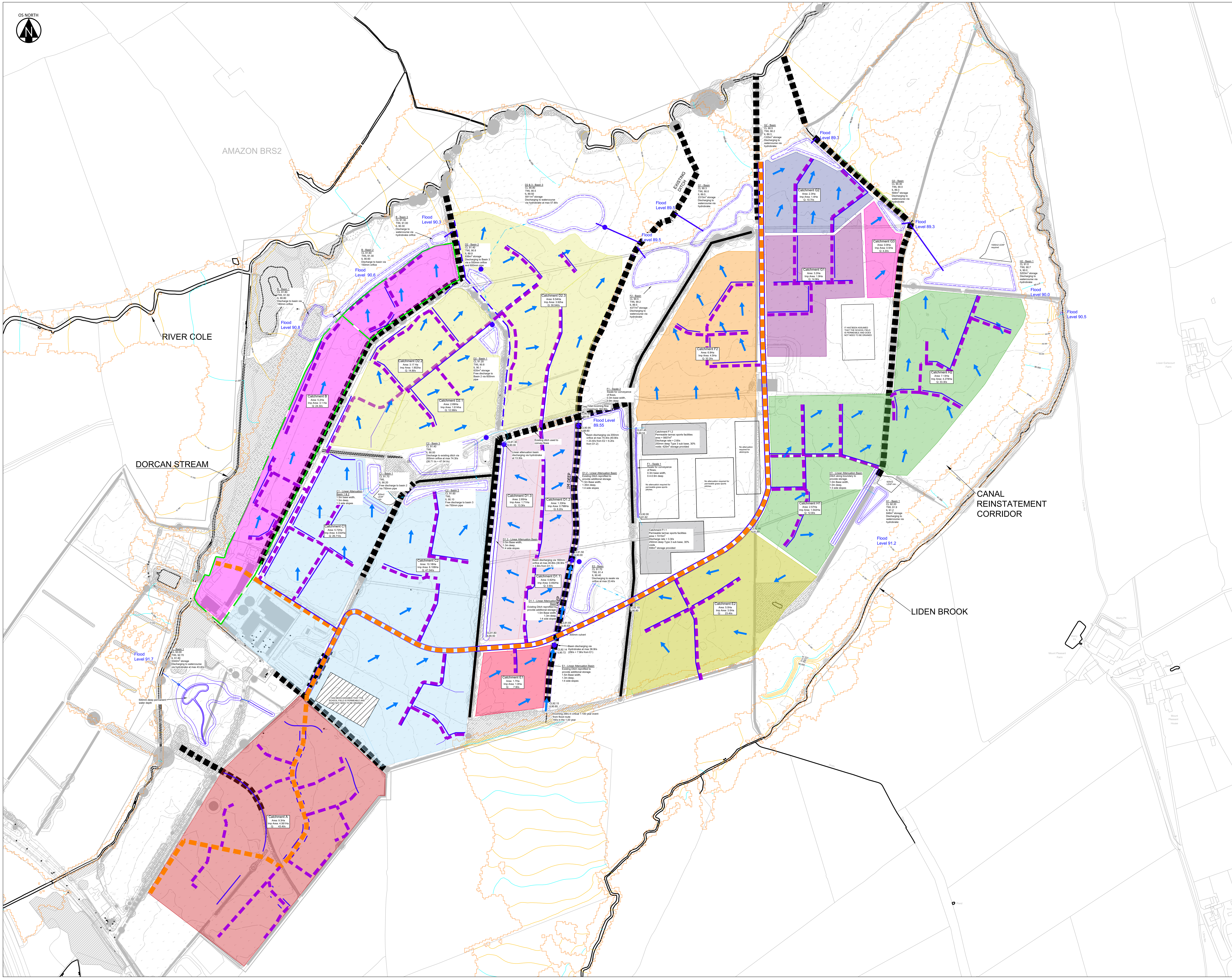
Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.000	SH1 - Swale	15 Winter	100	+40%					92.272	-0.428
S1.001	SH1 - Basin	480 Winter	100	+40%	30/15 Summer				92.125	0.625

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SH1 - Swale	0.000	0.24			829.0	OK	
S1.001	SH1 - Basin	0.000	0.21			11.7	FLOOD RISK*	

Appendix B - Drainage Strategy



KEY

- Site Boundary
- 1: 100% CC Flood Extents
- 0.000 — 1: 100% CC Flood Level Minor Contour @ 0.10m interval
- 0.000 — 1: 100% CC Flood Level Major Contour @ 0.50m interval
- SuDS Feature
- Southern Connector Road - to utilise over-the-edge swales
- Tertiary roads - to utilise over the edge swales where possible
- Indicative swales within catchment - subject to detailed design
- Flow routing
- Flow control
- Indicative connections between attenuation features
- Existing ditch
- Existing bund

REVISIONS

Rev	Date	Description	By	Ckd	App
P05	25/07/22	Minor amendment to key	EP	OD	OD
P04	18/07/22	Amendments to tertiary roads and swales	EP	OD	OD
P03	06/07/22	Minor amendments to Parcel A and areas	EP	OD	JC
P02	04/07/22	Parcel A information added.	EP	OD	JC
P01	28/06/22	First Issue.	EP	OD	JC

Hydrock
OVER COURT BARNS
OVER LANE
ALMONDSBURY
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CLIENT
COUNTRYSIDE

PROJECT
LOTMEAD FARM

TITLE
INDICATIVE SITE WIDE SURFACE WATER DRAINAGE STRATEGY

HYDROCK PROJECT NO.	SCALE @ A0
C-22006-C	1:2000

STATUS DESCRIPTION	STATUS
FOR PLANNING	S2

DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
22006-HYD-P0-XX-DR-C-2211	P05