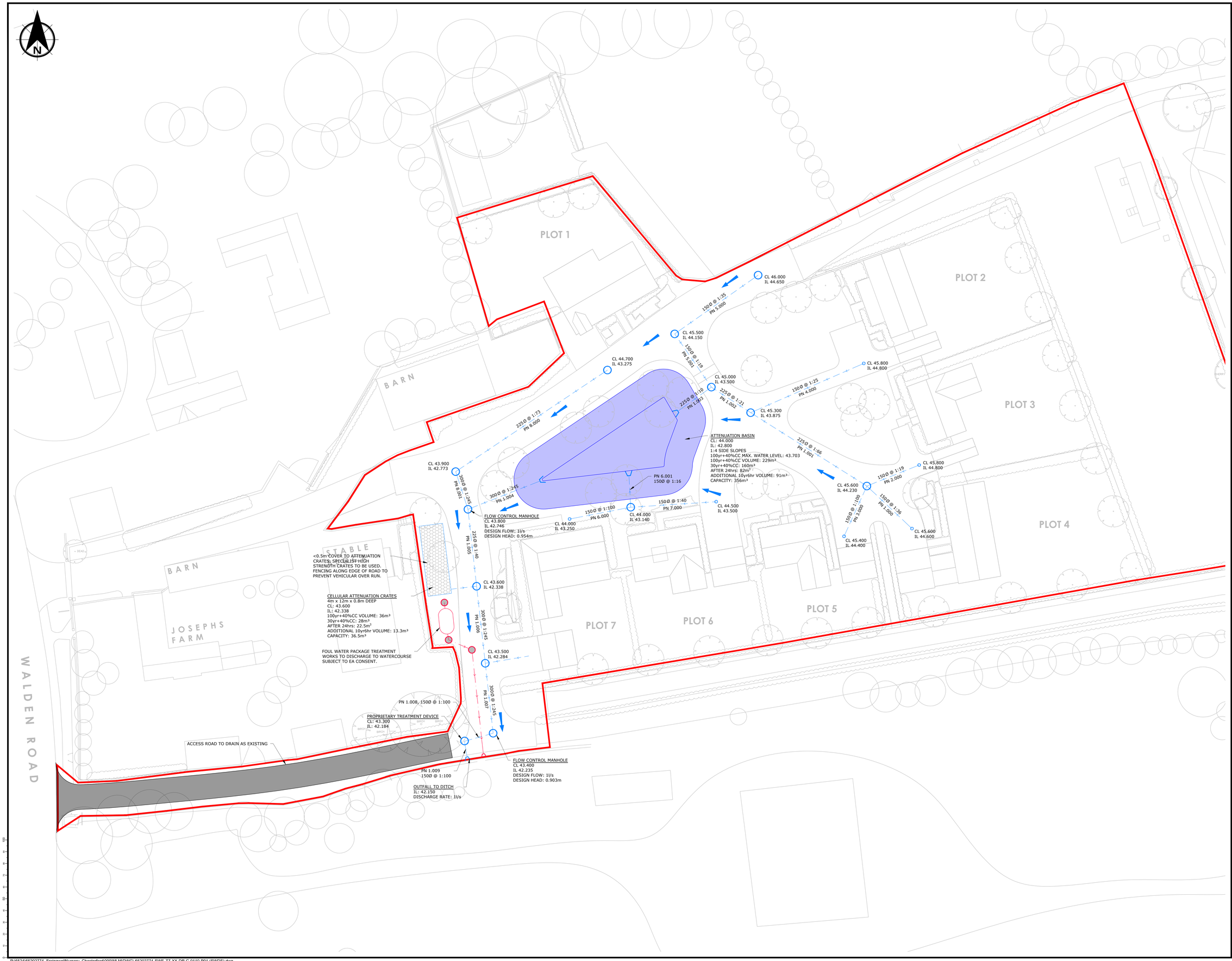

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.
2. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY. WRITTEN PERMISSION MUST BE OBTAINED FROM MLM PRIOR TO SCALING ELECTRONICALLY OR USING THIS ELECTRONIC FILE.
3. THIS DRAINAGE STRATEGY DRAWING SHOWS HOW SURFACE WATER RUN-OFF COULD BE MANAGED ON SITE WITH A RESTRICTED OFF-SITE DISCHARGE, FOR ALL RAINFALL EVENTS UP TO AND INCLUDING THE 100 YEAR RETURN PERIOD EVENT PLUS 40% CLIMATE CHANGE TO ENSURE NO INCREASED FLOOD RISK TO OTHERS AS A RESULT OF THE PROPOSED DEVELOPMENT.

   THIS IS NOT INTENDED TO BE A DETAILED DESIGN AT THIS STAGE. PLEASE NOTE THAT THE FINAL LAYOUT MAY BE SUBJECT TO REFINEMENT TO MEET CERTAIN TECHNICAL CRITERIA.

KEY

- SURFACE WATER DRAIN
- SURFACE WATER MANHOLE - 1200mmØ
- SURFACE WATER PPIC - 450mmØ
- CELLULAR ATTENUATION CRATES
- ATTENUATION BASIN
- AREA TO DRAIN AS EXISTING
- APPROX. SITE BOUNDARY
- OVERLAND FLOW ROUTE
- FOUL WATER DRAIN
- FOUL WATER MANHOLE

Rev	Date	Amendment Details	Drn	Chk	Appr
P01	09.06.2021	FIRST ISSUE	BP	JRC	JRC

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Web: www.sweco.co.uk

Client: SPRINGWELL NURSERY LTD

Project Title: SPRINGWELL NURSERY, CHESTERFORD

Drawing Title: SURFACE WATER DRAINAGE STRATEGY

Purpose Of Issue: PRELIMINARY

Status	Status Description		
S0	INITIAL STATUS OR WIP		
Designed	Drawn	Checked	Approved
BP	BP	JRC	JRC
Sheet Size	Scale	SWECO Ref	Revision
A0	1:200	65202774	P01

Drawing Number: 65202774-SWE-ZZ-XX-DR-C-0110

P:\6524\65202774_SpringwellNursery_Chesterford\000\MLM\DWG\ 65202774-SWE-ZZ-XX-DR-C-0110-P01 (SWDS).dwg

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	100
FEH Rainfall Version	1999
Site Location	GB 552100 241100 TL 52100 41100
C (1km)	-0.025
D1 (1km)	0.303
D2 (1km)	0.262
D3 (1km)	0.289
E (1km)	0.311
F (1km)	2.484
Maximum Rainfall (mm/hr)	0
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

- Indicates pipe length does not match coordinates

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	10.530	0.295	35.7	0.020	3.00	0.0	0.600	o	150	Pipe/Conduit	
S2.000	9.575	0.495	19.3	0.014	3.00	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	0.00	3.10	44.600	0.020	0.0	0.0	0.0	1.69	29.9	0.0
S2.000	0.00	3.07	44.800	0.014	0.0	0.0	0.0	2.30	40.7	0.0

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
S3.000	9.377	0.095	98.7	0.015	3.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	23.347	0.355	65.8	0.029	0.00	0.0	0.600	o	225	Pipe/Conduit	
S4.000	20.961	0.850	24.7	0.024	3.00	0.0	0.600	o	150	Pipe/Conduit	
S1.002	7.958	0.375	21.2	0.018	0.00	0.0	0.600	o	225	Pipe/Conduit	
S5.000	17.337	0.500	34.7	0.011	3.00	0.0	0.600	o	150	Pipe/Conduit	
S5.001	10.980	0.575	19.1	0.014	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.003	7.013#	0.700	10.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S6.000	10.571	0.110	96.1	0.012	3.00	0.0	0.600	o	150	Pipe/Conduit	
S7.000	14.545	0.360	40.4	0.025	3.00	0.0	0.600	o	150	Pipe/Conduit	
S6.001	5.373#	0.340	15.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.004	13.148	0.054	243.5	0.049	0.00	0.0	0.600	o	300	Pipe/Conduit	
S8.000	31.026	0.427	72.7	0.041	3.00	0.0	0.600	o	225	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)
S3.000	0.00	3.15	44.400	0.015	0.0	0.0	0.0	1.01	17.9	0.0
S1.001	0.00	3.40	44.230	0.078	0.0	0.0	0.0	1.62	64.2	0.0
S4.000	0.00	3.17	44.800	0.024	0.0	0.0	0.0	2.04	36.0	0.0
S1.002	0.00	3.44	43.875	0.120	0.0	0.0	0.0	2.85	113.4	0.0
S5.000	0.00	3.17	44.650	0.011	0.0	0.0	0.0	1.72	30.3	0.0
S5.001	0.00	3.25	44.150	0.025	0.0	0.0	0.0	2.32	40.9	0.0
S1.003	0.00	3.47	43.500	0.145	0.0	0.0	0.0	4.16	165.3	0.0
S6.000	0.00	3.17	43.250	0.012	0.0	0.0	0.0	1.03	18.1	0.0
S7.000	0.00	3.15	43.500	0.025	0.0	0.0	0.0	1.59	28.1	0.0
S6.001	0.00	3.21	43.140	0.037	0.0	0.0	0.0	2.55	45.0	0.0
S1.004	0.00	3.69	42.800	0.231	0.0	0.0	0.0	1.00	70.9	0.0
S8.000	0.00	3.34	43.275	0.041	0.0	0.0	0.0	1.54	61.1	0.0

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
S8.001	6.726	0.027	245.0	0.015	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.005	13.167	0.333	39.5	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.006	13.167	0.054	243.8	0.012	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.007	11.961	0.049	245.0	0.030	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.008	5.064	0.051	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.009	3.365	0.034	100.0	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)
S8.001	0.00	3.45	42.773	0.056	0.0	0.0	0.0	1.00	70.7	0.0
S1.005	0.00	3.79	42.746	0.287	0.0	0.0	0.0	2.09	83.0	0.0
S1.006	0.00	4.01	42.338	0.299	0.0	0.0	0.0	1.00	70.9	0.0
S1.007	0.00	4.21	42.284	0.329	0.0	0.0	0.0	1.00	70.7	0.0
S1.008	0.00	4.30	42.235	0.329	0.0	0.0	0.0	1.00	17.8	0.0
S1.009	0.00	4.35	42.184	0.329	0.0	0.0	0.0	1.00	17.8	0.0

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.020	0.020	0.020
2.000	-	-	100	0.014	0.014	0.014
3.000	-	-	100	0.015	0.015	0.015
1.001	-	-	100	0.029	0.029	0.029
4.000	-	-	100	0.024	0.024	0.024
1.002	-	-	100	0.018	0.018	0.018
5.000	-	-	100	0.011	0.011	0.011
5.001	-	-	100	0.014	0.014	0.014
1.003	-	-	100	0.000	0.000	0.000
6.000	-	-	100	0.012	0.012	0.012
7.000	-	-	100	0.025	0.025	0.025
6.001	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.049	0.049	0.049
8.000	-	-	100	0.041	0.041	0.041
8.001	-	-	100	0.015	0.015	0.015
1.005	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.012	0.012	0.012
1.007	-	-	100	0.030	0.030	0.030
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.329	0.329	0.329

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.009	S	43.300	42.150	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model FEH
Return Period (years) 100

Synthetic Rainfall Details

FEH Rainfall Version	1999
Site Location	GB 552100 241100 TL 52100 41100
C (1km)	-0.025
D1 (1km)	0.303
D2 (1km)	0.262
D3 (1km)	0.289
E (1km)	0.311
F (1km)	2.484
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Online Controls for Storm

Hydro-Brake® Optimum Manhole: S15 - FLOW CONTROL, DS/PN: S1.005, Volume (m³): 2.4

Unit Reference	MD-SHE-0047-1000-0954-1000
Design Head (m)	0.954
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	47
Invert Level (m)	42.746
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.954	1.0
Flush-Flo™	0.208	0.8
Kick-Flo®	0.421	0.7
Mean Flow over Head Range	-	0.8

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)
0.100	0.8	1.200	1.1	3.000	1.7	7.000	2.5
0.200	0.8	1.400	1.2	3.500	1.8	7.500	2.6
0.300	0.8	1.600	1.3	4.000	1.9	8.000	2.6
0.400	0.7	1.800	1.3	4.500	2.0	8.500	2.7
0.500	0.7	2.000	1.4	5.000	2.1	9.000	2.8
0.600	0.8	2.200	1.5	5.500	2.2	9.500	2.9
0.800	0.9	2.400	1.5	6.000	2.3		
1.000	1.0	2.600	1.6	6.500	2.4		

Hydro-Brake® Optimum Manhole: S17 - FLOW CONTROL, DS/PN: S1.008, Volume (m³): 2.1

Unit Reference	MD-SHE-0048-1000-0903-1000
Design Head (m)	0.903
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	48
Invert Level (m)	42.235
Minimum Outlet Pipe Diameter (mm)	75

Hydro-Brake® Optimum Manhole: S17 - FLOW CONTROL, DS/PN: S1.008, Volume (m³): 2.1

Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.903	1.0
Flush-Flo™	0.210	0.9
Kick-Flo®	0.426	0.7
Mean Flow over Head Range	-	0.8

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)
0.100	0.8	1.200	1.1	3.000	1.7	7.000	2.5
0.200	0.9	1.400	1.2	3.500	1.8	7.500	2.6
0.300	0.8	1.600	1.3	4.000	2.0	8.000	2.7
0.400	0.8	1.800	1.4	4.500	2.1	8.500	2.8
0.500	0.8	2.000	1.4	5.000	2.2	9.000	2.8
0.600	0.8	2.200	1.5	5.500	2.3	9.500	2.9
0.800	0.9	2.400	1.5	6.000	2.4		
1.000	1.0	2.600	1.6	6.500	2.4		

Storage Structures for Storm

Infiltration Basin Manhole: SBASIN, DS/PN: S1.004

Invert Level (m) 42.800 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	138.5	1.200	492.4

Cellular Storage Manhole: SCRATES, DS/PN: S1.006

Invert Level (m) 42.338 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	48.0	0.0	0.801	0.0	0.0
0.800	48.0	0.0			

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	2
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 552100 241100 TL 52100 41100
C (1km)	-0.025
D1 (1km)	0.303
D2 (1km)	0.262
D3 (1km)	0.289
E (1km)	0.311
F (1km)	2.484
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440, 2160, 2880
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	S1	60 Summer	1	+0%					44.625
S2.000	S2	60 Summer	1	+0%					44.818
S3.000	S3	60 Summer	1	+0%					44.429
S1.001	S4	60 Summer	1	+0%					44.280
S4.000	S5	60 Summer	1	+0%					44.825
S1.002	S6	60 Summer	1	+0%					43.926
S5.000	S7	60 Summer	1	+0%					44.668
S5.001	S8	60 Summer	1	+0%					44.173
S1.003	S9	60 Summer	1	+0%					43.548
S6.000	S11	60 Summer	1	+0%	100/60 Summer				43.275
S7.000	S11	60 Summer	1	+0%	100/360 Winter				43.530

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.125	0.000	0.07		1.8	OK	
S2.000	S2	-0.132	0.000	0.04		1.3	OK	
S3.000	S3	-0.121	0.000	0.09		1.4	OK	
S1.001	S4	-0.175	0.000	0.11		6.6	OK	
S4.000	S5	-0.125	0.000	0.06		2.2	OK	
S1.002	S6	-0.174	0.000	0.12		10.2	OK	
S5.000	S7	-0.132	0.000	0.04		1.0	OK	
S5.001	S8	-0.127	0.000	0.06		2.1	OK	
S1.003	S9	-0.177	0.000	0.10		12.2	OK	
S6.000	S11	-0.125	0.000	0.07		1.1	OK	
S7.000	S11	-0.120	0.000	0.09		2.3	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
S6.001	S12	60 Summer	1	+0%	30/240 Winter		
S1.004	SBASIN	480 Winter	1	+0%	30/60 Summer		
S8.000	S13	60 Summer	1	+0%	100/60 Winter		
S8.001	S14	480 Winter	1	+0%	30/60 Summer		
S1.005	S15 - FLOW CONTROL	480 Winter	1	+0%	1/120 Winter		
S1.006	SCRATES	960 Winter	1	+0%	30/360 Winter		
S1.007	S16	960 Winter	1	+0%	30/240 Winter		
S1.008	S17 - FLOW CONTROL	960 Winter	1	+0%	1/60 Summer		
S1.009	S18 - TREATMENT	2880 Summer	1	+0%			

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
S6.001	S12		43.171	-0.119	0.000	0.09		3.3
S1.004	SBASIN		43.005	-0.095	0.000	0.01		0.8
S8.000	S13		43.312	-0.188	0.000	0.06		3.7
S8.001	S14		43.005	-0.068	0.000	0.02		0.9
S1.005	S15 - FLOW CONTROL		43.005	0.034	0.000	0.01		0.8
S1.006	SCRATES		42.464	-0.174	0.000	0.01		0.9
S1.007	S16		42.463	-0.120	0.000	0.02		0.9
S1.008	S17 - FLOW CONTROL		42.463	0.078	0.000	0.06		0.9
S1.009	S18 - TREATMENT		42.211	-0.123	0.000	0.08		0.9

PN	US/MH Name	Status	Level Exceeded
S6.001	S12	OK	
S1.004	SBASIN	OK	
S8.000	S13	OK	
S8.001	S14	OK	
S1.005	S15 - FLOW CONTROL	SURCHARGED	
S1.006	SCRATES	OK	
S1.007	S16	OK	
S1.008	S17 - FLOW CONTROL	SURCHARGED	
S1.009	S18 - TREATMENT	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	2
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 552100 241100 TL 52100 41100
C (1km)	-0.025
D1 (1km)	0.303
D2 (1km)	0.262
D3 (1km)	0.289
E (1km)	0.311
F (1km)	2.484
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440, 2160, 2880
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	S1	60 Summer	30	+0%					44.645
S2.000	S2	60 Summer	30	+0%					44.832
S3.000	S3	60 Summer	30	+0%					44.450
S1.001	S4	60 Summer	30	+0%					44.320
S4.000	S5	60 Summer	30	+0%					44.843
S1.002	S6	60 Summer	30	+0%					43.968
S5.000	S7	60 Summer	30	+0%					44.682
S5.001	S8	60 Summer	30	+0%					44.192
S1.003	S9	60 Summer	30	+0%					43.586
S6.000	S11	480 Winter	30	+0%	100/60 Summer				43.323
S7.000	S11	60 Summer	30	+0%	100/360 Winter				43.551

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.105	0.000	0.19		5.2	OK	
S2.000	S2	-0.118	0.000	0.10		3.6	OK	
S3.000	S3	-0.100	0.000	0.25		3.9	OK	
S1.001	S4	-0.135	0.000	0.34		20.0	OK	
S4.000	S5	-0.107	0.000	0.18		6.2	OK	
S1.002	S6	-0.132	0.000	0.36		30.7	OK	
S5.000	S7	-0.118	0.000	0.10		2.8	OK	
S5.001	S8	-0.108	0.000	0.17		6.4	OK	
S1.003	S9	-0.139	0.000	0.31		37.0	OK	
S6.000	S11	-0.077	0.000	0.03		0.5	OK	
S7.000	S11	-0.099	0.000	0.25		6.5	OK	

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
S6.001	S12	480 Winter	30	+0%	30/240 Winter		
S1.004	SBASIN	480 Winter	30	+0%	30/60 Summer		
S8.000	S13	60 Summer	30	+0%	100/60 Winter		
S8.001	S14	480 Winter	30	+0%	30/60 Summer		
S1.005	S15 - FLOW CONTROL	480 Winter	30	+0%	1/120 Winter		
S1.006	SCRATES	2160 Winter	30	+0%	30/360 Winter		
S1.007	S16	2160 Winter	30	+0%	30/240 Winter		
S1.008	S17 - FLOW CONTROL	2160 Winter	30	+0%	1/60 Summer		
S1.009	S18 - TREATMENT	2880 Winter	30	+0%			

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
S6.001	S12		43.323	0.033	0.000	0.04		1.5
S1.004	SBASIN		43.323	0.223	0.000	0.01		0.8
S8.000	S13		43.340	-0.160	0.000	0.19		10.6
S8.001	S14		43.323	0.250	0.000	0.04		2.2
S1.005	S15 - FLOW CONTROL		43.324	0.353	0.000	0.01		0.8
S1.006	SCRATES		42.753	0.116	0.000	0.01		0.9
S1.007	S16		42.756	0.173	0.000	0.02		0.9
S1.008	S17 - FLOW CONTROL		42.757	0.372	0.000	0.06		0.9
S1.009	S18 - TREATMENT		42.211	-0.123	0.000	0.08		0.9

PN	US/MH Name	Status	Level Exceeded
S6.001	S12	SURCHARGED	
S1.004	SBASIN	SURCHARGED	
S8.000	S13	OK	
S8.001	S14	SURCHARGED	
S1.005	S15 - FLOW CONTROL	SURCHARGED	
S1.006	SCRATES	SURCHARGED	
S1.007	S16	SURCHARGED	
S1.008	S17 - FLOW CONTROL	SURCHARGED	
S1.009	S18 - TREATMENT	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	2
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 552100 241100 TL 52100 41100
C (1km)	-0.025
D1 (1km)	0.303
D2 (1km)	0.262
D3 (1km)	0.289
E (1km)	0.311
F (1km)	2.484
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440, 2160, 2880
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	S1	60 Summer	100	+40%					44.665
S2.000	S2	60 Summer	100	+40%					44.846
S3.000	S3	60 Summer	100	+40%					44.475
S1.001	S4	60 Summer	100	+40%					44.368
S4.000	S5	60 Summer	100	+40%					44.863
S1.002	S6	60 Summer	100	+40%					44.018
S5.000	S7	60 Summer	100	+40%					44.696
S5.001	S8	60 Summer	100	+40%					44.212
S1.003	S9	960 Winter	100	+40%					43.704
S6.000	S11	960 Winter	100	+40%	100/60 Summer				43.704
S7.000	S11	960 Winter	100	+40%	100/360 Winter				43.704

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.085	0.000	0.40		10.6	OK	
S2.000	S2	-0.104	0.000	0.21		7.4	OK	
S3.000	S3	-0.075	0.000	0.50		7.9	OK	
S1.001	S4	-0.087	0.000	0.69		40.8	OK	
S4.000	S5	-0.087	0.000	0.37		12.7	OK	
S1.002	S6	-0.082	0.000	0.73		62.7	OK	
S5.000	S7	-0.104	0.000	0.21		5.8	OK	
S5.001	S8	-0.088	0.000	0.35		13.0	OK	
S1.003	S9	-0.021	0.000	0.05		6.2	OK	
S6.000	S11	0.304	0.000	0.03		0.5	FLOOD RISK	
S7.000	S11	0.054	0.000	0.04		1.1	SURCHARGED	

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
S6.001	S12	960 Winter	100	+40%	30/240 Winter		
S1.004	SBASIN	960 Winter	100	+40%	30/60 Summer		
S8.000	S13	960 Winter	100	+40%	100/60 Winter		
S8.001	S14	960 Winter	100	+40%	30/60 Summer		
S1.005	S15 - FLOW CONTROL	960 Winter	100	+40%	1/120 Winter		
S1.006	SCRATES	1440 Winter	100	+40%	30/360 Winter		
S1.007	S16	1440 Winter	100	+40%	30/240 Winter		
S1.008	S17 - FLOW CONTROL	1440 Winter	100	+40%	1/60 Summer		
S1.009	S18 - TREATMENT	1440 Winter	100	+40%			

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
S6.001	S12		43.704	0.414	0.000	0.04		1.5
S1.004	SBASIN		43.703	0.603	0.000	0.01		0.8
S8.000	S13		43.703	0.203	0.000	0.03		1.7
S8.001	S14		43.703	0.630	0.000	0.04		2.2
S1.005	S15 - FLOW CONTROL		43.703	0.732	0.000	0.01		0.9
S1.006	SCRATES		43.083	0.446	0.000	0.02		1.1
S1.007	S16		43.087	0.503	0.000	0.02		1.0
S1.008	S17 - FLOW CONTROL		43.087	0.702	0.000	0.07		1.0
S1.009	S18 - TREATMENT		42.213	-0.121	0.000	0.08		1.0

PN	US/MH Name	Status	Level Exceeded
S6.001	S12	FLOOD RISK	
S1.004	SBASIN	FLOOD RISK	
S8.000	S13	SURCHARGED	
S8.001	S14	FLOOD RISK	
S1.005	S15 - FLOW CONTROL	FLOOD RISK	
S1.006	SCRATES	SURCHARGED	
S1.007	S16	FLOOD RISK	
S1.008	S17 - FLOW CONTROL	FLOOD RISK	
S1.009	S18 - TREATMENT	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	2
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 552100 241100 TL 52100 41100
C (1km)	-0.025
D1 (1km)	0.303
D2 (1km)	0.262
D3 (1km)	0.289
E (1km)	0.311
F (1km)	2.484
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440, 2160, 2880
Return Period(s) (years)	30
Climate Change (%)	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	S1	60 Summer	30	+40%					44.653
S2.000	S2	60 Summer	30	+40%					44.837
S3.000	S3	60 Summer	30	+40%					44.461
S1.001	S4	60 Summer	30	+40%					44.339
S4.000	S5	60 Summer	30	+40%					44.851
S1.002	S6	60 Summer	30	+40%					43.987
S5.000	S7	60 Summer	30	+40%					44.687
S5.001	S8	60 Summer	30	+40%					44.200
S1.003	S9	60 Summer	30	+40%					43.604
S6.000	S11	960 Winter	30	+40%	30/240 Winter				43.510
S7.000	S11	60 Summer	30	+40%					43.561

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.097	0.000	0.27		7.2	OK	
S2.000	S2	-0.113	0.000	0.14		5.1	OK	
S3.000	S3	-0.089	0.000	0.34		5.4	OK	
S1.001	S4	-0.116	0.000	0.47		28.0	OK	
S4.000	S5	-0.099	0.000	0.26		8.7	OK	
S1.002	S6	-0.113	0.000	0.50		42.9	OK	
S5.000	S7	-0.113	0.000	0.14		4.0	OK	
S5.001	S8	-0.100	0.000	0.24		8.9	OK	
S1.003	S9	-0.121	0.000	0.44		51.7	OK	
S6.000	S11	0.110	0.000	0.02		0.4	SURCHARGED	
S7.000	S11	-0.089	0.000	0.35		9.1	OK	

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
S6.001	S12	960 Winter	30	+40%	30/60 Summer		
S1.004	SBASIN	960 Winter	30	+40%	30/60 Summer		
S8.000	S13	960 Winter	30	+40%	30/960 Winter		
S8.001	S14	960 Winter	30	+40%	30/60 Summer		
S1.005	S15 - FLOW CONTROL	960 Winter	30	+40%	30/60 Summer		
S1.006	SCRATES	1440 Winter	30	+40%	30/60 Winter		
S1.007	S16	1440 Winter	30	+40%	30/60 Summer		
S1.008	S17 - FLOW CONTROL	1440 Winter	30	+40%	30/60 Summer		
S1.009	S18 - TREATMENT	1440 Winter	30	+40%			

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
S6.001	S12		43.510	0.220	0.000	0.03		1.1
S1.004	SBASIN		43.509	0.409	0.000	0.01		0.8
S8.000	S13		43.509	0.009	0.000	0.02		1.3
S8.001	S14		43.509	0.436	0.000	0.03		1.7
S1.005	S15 - FLOW CONTROL		43.509	0.538	0.000	0.01		0.9
S1.006	SCRATES		42.920	0.283	0.000	0.02		1.0
S1.007	S16		42.924	0.340	0.000	0.02		0.9
S1.008	S17 - FLOW CONTROL		42.924	0.539	0.000	0.06		0.9
S1.009	S18 - TREATMENT		42.211	-0.123	0.000	0.08		0.9

PN	US/MH Name	Status	Level Exceeded
S6.001	S12	SURCHARGED	
S1.004	SBASIN	SURCHARGED	
S8.000	S13	SURCHARGED	
S8.001	S14	FLOOD RISK	
S1.005	S15 - FLOW CONTROL	FLOOD RISK	
S1.006	SCRATES	SURCHARGED	
S1.007	S16	SURCHARGED	
S1.008	S17 - FLOW CONTROL	SURCHARGED	
S1.009	S18 - TREATMENT	OK	

SWECO	Project	Springwell Nursery, Chesterford	Made	Ref
			BP	65202774
	Section	Basin Volume After 24 Hours	Checked	
			JRC	Sheet No.
	Rev	Date / Description / Made / Checked		1 of 1
	P01	07.06.21		

Ref.	Calculation	Output

After 24 Hours (2392 mins)

960 minute 30 year Winter
Average Rainfall Intensity 3.887 mm/hr (2 of 2)

Time (mins)	US Level (m)	DS Level (m)	Surcharged Depth (m)	Pipe Velocity (m/s)	Pipe Flow (l/s)
2374	43.329	42.829	0.358	0.1	0.8
2375	43.295	42.830	0.325	0.1	0.8
2376	43.268	42.831	0.298	0.1	0.8
2377	43.235	42.831	0.265	0.1	0.8
2378	43.222	42.830	0.251	0.1	0.8
2379	43.217	42.829	0.247	0.1	0.8
2380	43.235	42.829	0.264	0.1	0.8
2381	43.260	42.831	0.290	0.1	0.8
2382	43.294	42.831	0.323	0.1	0.8
2383	43.322	42.830	0.352	0.1	0.8
2384	43.344	42.828	0.373	0.1	0.8
2385	43.350	42.829	0.380	0.1	0.8
2386	43.354	42.830	0.384	0.1	0.8
2387	43.338	42.831	0.368	0.1	0.8
2388	43.326	42.830	0.356	0.1	0.8
2389	43.297	42.828	0.326	0.1	0.8
2390	43.277	42.828	0.306	0.1	0.8
2391	43.254	42.830	0.283	0.1	0.8
2392	43.229	42.831	0.258	0.1	0.8
2393	43.221	42.830	0.251	0.1	0.8
2394	43.210	42.828	0.240	0.1	0.8
2395	43.215	42.828	0.244	0.1	0.8
2396	43.230	42.830	0.259	0.1	0.8
2397	43.242	42.831	0.272	0.1	0.8
2398	43.270	42.830	0.300	0.1	0.8
2399	43.293	42.828	0.322	0.1	0.8
2400	43.310	42.828	0.340	0.1	0.8
2401	43.338	42.829	0.367	0.1	0.8
2402	43.344	42.830	0.373	0.1	0.8
2403	43.345	42.830	0.374	0.1	0.8
2404	43.356	42.828	0.386	0.1	0.8
2405	43.358	42.827	0.387	0.1	0.8
2406	43.351	42.829	0.380	0.1	0.8
2407	43.336	42.830	0.366	0.1	0.8
2408	43.332	42.830	0.361	0.1	0.8

Summary of Results for 10 year Return Period

Half Drain Time exceeds 7 days.

Outflow is too low. Design is unsatisfactory.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	43.027	0.227	0.0	36.9	O K
30 min Summer	43.062	0.262	0.0	43.8	O K
60 min Summer	43.103	0.303	0.0	52.0	O K
120 min Summer	43.148	0.348	0.0	61.7	O K
180 min Summer	43.177	0.377	0.0	68.1	O K
240 min Summer	43.199	0.399	0.0	73.2	O K
360 min Summer	43.232	0.432	0.0	80.8	O K
480 min Summer	43.256	0.456	0.0	86.8	O K
600 min Summer	43.276	0.476	0.0	91.7	O K
720 min Summer	43.292	0.492	0.0	95.9	O K
960 min Summer	43.315	0.515	0.0	101.8	O K
1440 min Summer	43.348	0.548	0.0	110.6	O K
2160 min Summer	43.382	0.582	0.0	120.3	O K
2880 min Summer	43.408	0.608	0.0	127.6	O K
4320 min Summer	43.450	0.650	0.0	140.2	O K
5760 min Summer	43.482	0.682	0.0	149.9	O K
7200 min Summer	43.507	0.707	0.0	157.9	O K
8640 min Summer	43.528	0.728	0.0	164.8	O K
10080 min Summer	43.546	0.746	0.0	170.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	68.587	0.0	19
30 min Summer	40.690	0.0	34
60 min Summer	24.140	0.0	64
120 min Summer	14.321	0.0	124
180 min Summer	10.552	0.0	184
240 min Summer	8.496	0.0	244
360 min Summer	6.260	0.0	364
480 min Summer	5.041	0.0	484
600 min Summer	4.261	0.0	604
720 min Summer	3.714	0.0	724
960 min Summer	2.955	0.0	964
1440 min Summer	2.142	0.0	1444
2160 min Summer	1.552	0.0	2164
2880 min Summer	1.235	0.0	2884
4320 min Summer	0.905	0.0	4324
5760 min Summer	0.726	0.0	5768
7200 min Summer	0.611	0.0	7208
8640 min Summer	0.532	0.0	8648
10080 min Summer	0.472	0.0	10088

Summary of Results for 10 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Winter	43.050	0.250	0.0	41.3	O K
30 min Winter	43.088	0.288	0.0	49.0	O K
60 min Winter	43.132	0.332	0.0	58.2	O K
120 min Winter	43.181	0.381	0.0	69.1	O K
180 min Winter	43.213	0.413	0.0	76.3	O K
240 min Winter	43.236	0.436	0.0	81.9	O K
360 min Winter	43.271	0.471	0.0	90.6	O K
480 min Winter	43.297	0.497	0.0	97.2	O K
600 min Winter	43.318	0.518	0.0	102.7	O K
720 min Winter	43.336	0.536	0.0	107.4	O K
960 min Winter	43.360	0.560	0.0	114.0	O K
1440 min Winter	43.395	0.595	0.0	123.9	O K
2160 min Winter	43.432	0.632	0.0	134.7	O K
2880 min Winter	43.459	0.659	0.0	142.9	O K
4320 min Winter	43.504	0.704	0.0	157.0	O K
5760 min Winter	43.538	0.738	0.0	167.9	O K
7200 min Winter	43.565	0.765	0.0	176.9	O K
8640 min Winter	43.587	0.787	0.0	184.5	O K
10080 min Winter	43.606	0.806	0.0	191.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Winter	68.587	0.0	19
30 min Winter	40.690	0.0	34
60 min Winter	24.140	0.0	64
120 min Winter	14.321	0.0	124
180 min Winter	10.552	0.0	184
240 min Winter	8.496	0.0	244
360 min Winter	6.260	0.0	364
480 min Winter	5.041	0.0	484
600 min Winter	4.261	0.0	604
720 min Winter	3.714	0.0	724
960 min Winter	2.955	0.0	964
1440 min Winter	2.142	0.0	1444
2160 min Winter	1.552	0.0	2164
2880 min Winter	1.235	0.0	2884
4320 min Winter	0.905	0.0	4324
5760 min Winter	0.726	0.0	5768
7200 min Winter	0.611	0.0	7208
8640 min Winter	0.532	0.0	8648
10080 min Winter	0.472	0.0	10088

SWECO	Project: Springwell Nursery, Chesterford			Made: BP	Ref: 65202774
	Section: Crate Volume After 24 Hours			Checked: JRC	Sheet No.: 1 of 1
	Rev: P01	Date: 07.06.21	Description:	Made:	Checked:

Ref.	Calculation	Output

After 24 Hours (2872 mins)

1440 minute 30 year Winter I+40%
Average Rainfall Intensity 3.898 mm/hr (2 of 2)

Time (mins)	US Level (m)	DS Level (m)	Surcharged Depth (m)	Pipe Velocity (m/s)	Pipe Flow (l/s)	Infil. by Cellular Storage (l/s)
2838	42.833	42.837	0.195	0.0	0.9	0.0
2839	42.833	42.835	0.195	0.0	0.8	0.0
2840	42.833	42.833	0.195	0.0	0.8	0.0
2841	42.833	42.831	0.195	0.0	0.7	0.0
2842	42.833	42.829	0.195	0.0	0.7	0.0
2843	42.833	42.828	0.195	0.0	0.7	0.0
2844	42.833	42.828	0.195	0.0	0.8	0.0
2845	42.833	42.828	0.195	0.0	0.8	0.0
2846	42.833	42.829	0.195	0.0	0.9	0.0
2847	42.833	42.831	0.195	0.0	0.9	0.0
2848	42.833	42.833	0.195	0.0	0.9	0.0
2849	42.833	42.835	0.195	0.0	0.9	0.0
2850	42.832	42.836	0.195	0.0	0.9	0.0
2851	42.832	42.836	0.195	0.0	0.9	0.0
2852	42.832	42.835	0.194	0.0	0.8	0.0
2853	42.832	42.833	0.194	0.0	0.8	0.0
2854	42.832	42.831	0.194	0.0	0.7	0.0
2855	42.832	42.829	0.194	0.0	0.7	0.0
2856	42.832	42.828	0.195	0.0	0.7	0.0
2857	42.832	42.827	0.195	0.0	0.8	0.0
2858	42.832	42.828	0.195	0.0	0.8	0.0
2859	42.832	42.829	0.195	0.0	0.9	0.0
2860	42.832	42.830	0.195	0.0	0.9	0.0
2861	42.832	42.832	0.195	0.0	0.9	0.0
2862	42.832	42.834	0.194	0.0	0.9	0.0
2863	42.832	42.835	0.194	0.0	0.9	0.0
2864	42.831	42.835	0.194	0.0	0.9	0.0
2865	42.831	42.834	0.194	0.0	0.8	0.0
2866	42.831	42.832	0.194	0.0	0.8	0.0
2867	42.831	42.830	0.194	0.0	0.7	0.0
2868	42.831	42.828	0.194	0.0	0.7	0.0
2869	42.831	42.827	0.194	0.0	0.7	0.0
2870	42.832	42.827	0.194	0.0	0.8	0.0
2871	42.832	42.827	0.194	0.0	0.8	0.0
2872	42.832	42.828	0.194	0.0	0.9	0.0
2873	42.832	42.829	0.194	0.0	0.9	0.0
2874	42.831	42.831	0.194	0.0	0.9	0.0
2875	42.831	42.833	0.194	0.0	0.9	0.0
2876	42.831	42.835	0.193	0.0	0.9	0.0

Summary of Results for 10 year Return Period

Half Drain Time exceeds 7 days.

Outflow is too low. Design is unsatisfactory.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	42.456	0.118	0.0	5.4	O K
30 min Summer	42.479	0.141	0.0	6.4	O K
60 min Summer	42.505	0.167	0.0	7.6	O K
120 min Summer	42.536	0.198	0.0	9.0	O K
180 min Summer	42.557	0.219	0.0	10.0	O K
240 min Summer	42.573	0.235	0.0	10.7	O K
360 min Summer	42.597	0.259	0.0	11.8	O K
480 min Summer	42.617	0.279	0.0	12.7	O K
600 min Summer	42.632	0.294	0.0	13.4	O K
720 min Summer	42.646	0.308	0.0	14.0	O K
960 min Summer	42.665	0.327	0.0	14.9	O K
1440 min Summer	42.693	0.355	0.0	16.2	O K
2160 min Summer	42.724	0.386	0.0	17.6	O K
2880 min Summer	42.747	0.409	0.0	18.7	O K
4320 min Summer	42.788	0.450	0.0	20.5	O K
5760 min Summer	42.819	0.481	0.0	21.9	O K
7200 min Summer	42.845	0.507	0.0	23.1	O K
8640 min Summer	42.867	0.529	0.0	24.1	O K
10080 min Summer	42.886	0.548	0.0	25.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	68.587	0.0	19
30 min Summer	40.690	0.0	34
60 min Summer	24.140	0.0	64
120 min Summer	14.321	0.0	124
180 min Summer	10.552	0.0	184
240 min Summer	8.496	0.0	244
360 min Summer	6.260	0.0	364
480 min Summer	5.041	0.0	484
600 min Summer	4.261	0.0	604
720 min Summer	3.714	0.0	724
960 min Summer	2.955	0.0	964
1440 min Summer	2.142	0.0	1444
2160 min Summer	1.552	0.0	2164
2880 min Summer	1.235	0.0	2884
4320 min Summer	0.905	0.0	4324
5760 min Summer	0.726	0.0	5768
7200 min Summer	0.611	0.0	7208
8640 min Summer	0.532	0.0	8648
10080 min Summer	0.472	0.0	10088

Summary of Results for 10 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Winter	42.471	0.133	0.0	6.0	O K
30 min Winter	42.495	0.157	0.0	7.2	O K
60 min Winter	42.525	0.187	0.0	8.5	O K
120 min Winter	42.560	0.222	0.0	10.1	O K
180 min Winter	42.583	0.245	0.0	11.2	O K
240 min Winter	42.601	0.263	0.0	12.0	O K
360 min Winter	42.629	0.291	0.0	13.3	O K
480 min Winter	42.650	0.312	0.0	14.2	O K
600 min Winter	42.668	0.330	0.0	15.0	O K
720 min Winter	42.683	0.345	0.0	15.7	O K
960 min Winter	42.704	0.366	0.0	16.7	O K
1440 min Winter	42.736	0.398	0.0	18.1	O K
2160 min Winter	42.770	0.432	0.0	19.7	O K
2880 min Winter	42.797	0.459	0.0	20.9	O K
4320 min Winter	42.842	0.504	0.0	23.0	O K
5760 min Winter	42.877	0.539	0.0	24.6	O K
7200 min Winter	42.906	0.568	0.0	25.9	O K
8640 min Winter	42.930	0.592	0.0	27.0	O K
10080 min Winter	42.952	0.614	0.0	28.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Winter	68.587	0.0	19
30 min Winter	40.690	0.0	34
60 min Winter	24.140	0.0	64
120 min Winter	14.321	0.0	124
180 min Winter	10.552	0.0	184
240 min Winter	8.496	0.0	244
360 min Winter	6.260	0.0	364
480 min Winter	5.041	0.0	484
600 min Winter	4.261	0.0	604
720 min Winter	3.714	0.0	724
960 min Winter	2.955	0.0	964
1440 min Winter	2.142	0.0	1444
2160 min Winter	1.552	0.0	2164
2880 min Winter	1.235	0.0	2884
4320 min Winter	0.905	0.0	4324
5760 min Winter	0.726	0.0	5768
7200 min Winter	0.611	0.0	7208
8640 min Winter	0.532	0.0	8648
10080 min Winter	0.472	0.0	10088

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	2
Number of Online Controls	2	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	0.444
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60
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
S1.000	S1	15 Summer	1	+0%			
S2.000	S2	15 Summer	1	+0%			
S3.000	S3	15 Summer	1	+0%			
S1.001	S4	15 Summer	1	+0%			
S4.000	S5	15 Summer	1	+0%			
S1.002	S6	15 Summer	1	+0%			
S5.000	S7	15 Summer	1	+0%			
S5.001	S8	15 Summer	1	+0%			
S1.003	S9	15 Summer	1	+0%			
S6.000	S11	15 Summer	1	+0%	100/60 Winter		
S7.000	S11	15 Summer	1	+0%			
S6.001	S12	15 Summer	1	+0%	100/30 Winter		
S1.004	SBASIN	60 Winter	1	+0%	30/30 Winter		
S8.000	S13	15 Summer	1	+0%			
S8.001	S14	60 Winter	1	+0%	30/15 Summer		
S1.005	S15 - FLOW CONTROL	60 Winter	1	+0%	30/15 Summer		
S1.006	SCRATES	60 Winter	1	+0%	100/60 Summer		
S1.007	S16	30 Winter	1	+0%	100/15 Summer		
S1.008	S17 - FLOW CONTROL	30 Winter	1	+0%	1/15 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 (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
S1.000	S1		44.636	-0.114	0.000	0.13		3.5
S2.000	S2		44.826	-0.124	0.000	0.07		2.5
S3.000	S3		44.441	-0.109	0.000	0.17		2.6
S1.001	S4		44.299	-0.156	0.000	0.20		11.5
S4.000	S5		44.835	-0.115	0.000	0.12		4.2
S1.002	S6		43.946	-0.154	0.000	0.21		17.9
S5.000	S7		44.676	-0.124	0.000	0.07		1.9
S5.001	S8		44.181	-0.119	0.000	0.10		3.5
S1.003	S9		43.566	-0.159	0.000	0.18		21.7
S6.000	S11		43.286	-0.114	0.000	0.13		2.1
S7.000	S11		43.542	-0.108	0.000	0.17		4.4
S6.001	S12		43.183	-0.107	0.000	0.17		6.2
S1.004	SBASIN		42.969	-0.131	0.000	0.01		0.8
S8.000	S13		43.328	-0.172	0.000	0.12		6.9
S8.001	S14		42.968	-0.105	0.000	0.08		3.9
S1.005	S15 - FLOW CONTROL		42.968	-0.002	0.000	0.01		0.8
S1.006	SCRATES		42.414	-0.224	0.000	0.01		0.9
S1.007	S16		42.418	-0.166	0.000	0.03		1.9
S1.008	S17 - FLOW CONTROL		42.417	0.033	0.000	0.06		0.9

PN	US/MH Name	Status	Level Exceeded
S1.000	S1	OK	
S2.000	S2	OK	
S3.000	S3	OK	
S1.001	S4	OK	
S4.000	S5	OK	
S1.002	S6	OK	
S5.000	S7	OK	
S5.001	S8	OK	
S1.003	S9	OK	
S6.000	S11	OK	
S7.000	S11	OK	
S6.001	S12	OK	
S1.004	SBASIN	OK	
S8.000	S13	OK	
S8.001	S14	OK	
S1.005	S15 - FLOW CONTROL	OK	
S1.006	SCRATES	OK	
S1.007	S16	OK	
S1.008	S17 - FLOW CONTROL	SURCHARGED	

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	Overflow Act.
S1.009	S18 - TREATMENT	30 Winter	1	+0%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.009	S18 - TREATMENT	42.211	-0.123	0.000	0.08		0.9	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 Storage Structures	2
Number of Online Controls	2	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	0.444
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60
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
S1.000	S1	15 Summer	30	+0%			
S2.000	S2	15 Summer	30	+0%			
S3.000	S3	15 Summer	30	+0%			
S1.001	S4	15 Summer	30	+0%			
S4.000	S5	15 Summer	30	+0%			
S1.002	S6	15 Summer	30	+0%			
S5.000	S7	15 Summer	30	+0%			
S5.001	S8	15 Summer	30	+0%			
S1.003	S9	15 Summer	30	+0%			
S6.000	S11	15 Summer	30	+0%	100/60 Winter		
S7.000	S11	15 Summer	30	+0%			
S6.001	S12	15 Summer	30	+0%	100/30 Winter		
S1.004	SBASIN	60 Winter	30	+0%	30/30 Winter		
S8.000	S13	15 Summer	30	+0%			
S8.001	S14	60 Winter	30	+0%	30/15 Summer		
S1.005	S15 - FLOW CONTROL	60 Winter	30	+0%	30/15 Summer		
S1.006	SCRATES	60 Winter	30	+0%	100/60 Summer		
S1.007	S16	15 Winter	30	+0%	100/15 Summer		
S1.008	S17 - FLOW CONTROL	15 Winter	30	+0%	1/15 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 (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
S1.000	S1		44.659	-0.091	0.000	0.32		8.6
S2.000	S2		44.842	-0.108	0.000	0.17		6.0
S3.000	S3		44.468	-0.082	0.000	0.41		6.5
S1.001	S4		44.350	-0.105	0.000	0.53		31.0
S4.000	S5		44.857	-0.093	0.000	0.30		10.3
S1.002	S6		43.999	-0.101	0.000	0.56		48.4
S5.000	S7		44.692	-0.108	0.000	0.17		4.7
S5.001	S8		44.204	-0.096	0.000	0.27		9.8
S1.003	S9		43.615	-0.110	0.000	0.50		59.1
S6.000	S11		43.309	-0.091	0.000	0.32		5.2
S7.000	S11		43.568	-0.082	0.000	0.42		10.8
S6.001	S12		43.210	-0.080	0.000	0.42		15.4
S1.004	SBASIN		43.175	0.075	0.000	0.01		0.7
S8.000	S13		43.362	-0.138	0.000	0.30		16.9
S8.001	S14		43.175	0.102	0.000	0.19		9.7
S1.005	S15 - FLOW CONTROL		43.175	0.205	0.000	0.01		0.8
S1.006	SCRATES		42.523	-0.115	0.000	0.01		0.8
S1.007	S16		42.529	-0.054	0.000	0.07		3.9
S1.008	S17 - FLOW CONTROL		42.528	0.144	0.000	0.06		0.9

PN	US/MH Name	Status	Level Exceeded
S1.000	S1	OK	
S2.000	S2	OK	
S3.000	S3	OK	
S1.001	S4	OK	
S4.000	S5	OK	
S1.002	S6	OK	
S5.000	S7	OK	
S5.001	S8	OK	
S1.003	S9	OK	
S6.000	S11	OK	
S7.000	S11	OK	
S6.001	S12	OK	
S1.004	SBASIN	SURCHARGED	
S8.000	S13	OK	
S8.001	S14	SURCHARGED	
S1.005	S15 - FLOW CONTROL	SURCHARGED	
S1.006	SCRATES	OK	
S1.007	S16	OK	
S1.008	S17 - FLOW CONTROL	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	Overflow Act.
S1.009	S18 - TREATMENT	60 Winter	30	+0%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.009	S18 - TREATMENT	42.211	-0.123	0.000	0.08		0.9	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 Storage Structures	2
Number of Online Controls	2	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	0.444
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60
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
S1.000		S1 15 Summer	100	+40%			
S2.000		S2 15 Summer	100	+40%			
S3.000		S3 15 Summer	100	+40%			
S1.001		S4 15 Summer	100	+40%			
S4.000		S5 15 Summer	100	+40%			
S1.002		S6 15 Summer	100	+40%			
S5.000		S7 15 Summer	100	+40%			
S5.001		S8 15 Summer	100	+40%			
S1.003		S9 15 Summer	100	+40%			
S6.000		S11 60 Winter	100	+40%	100/60 Winter		
S7.000		S11 15 Summer	100	+40%			
S6.001		S12 60 Winter	100	+40%	100/30 Winter		
S1.004		SBASIN 60 Winter	100	+40%	30/30 Winter		
S8.000		S13 60 Winter	100	+40%			
S8.001		S14 60 Winter	100	+40%	30/15 Summer		
S1.005	S15 - FLOW CONTROL	60 Winter	100	+40%	30/15 Summer		
S1.006		SCRATES 60 Winter	100	+40%	100/60 Summer		
S1.007		S16 60 Winter	100	+40%	100/15 Summer		
S1.008	S17 - FLOW CONTROL	60 Winter	100	+40%	1/15 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 (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
S1.000	S1		44.684	-0.066	0.000	0.59		15.7
S2.000	S2		44.857	-0.093	0.000	0.31		11.0
S3.000	S3		44.499	-0.051	0.000	0.74		11.7
S1.001	S4		44.436	-0.019	0.000	0.97		57.2
S4.000	S5		44.881	-0.069	0.000	0.56		18.8
S1.002	S6		44.094	-0.006	0.000	1.00		86.2
S5.000	S7		44.707	-0.093	0.000	0.30		8.6
S5.001	S8		44.225	-0.075	0.000	0.49		17.8
S1.003	S9		43.665	-0.060	0.000	0.88		104.2
S6.000	S11		43.408	0.008	0.000	0.24		4.0
S7.000	S11		43.600	-0.050	0.000	0.76		19.6
S6.001	S12		43.407	0.117	0.000	0.33		12.2
S1.004	SBASIN		43.407	0.307	0.000	0.01		0.8
S8.000	S13		43.410	-0.090	0.000	0.24		13.5
S8.001	S14		43.407	0.334	0.000	0.33		16.7
S1.005	S15 - FLOW CONTROL		43.407	0.436	0.000	0.01		0.8
S1.006	SCRATES		42.707	0.069	0.000	0.01		0.8
S1.007	S16		42.709	0.126	0.000	0.04		2.0
S1.008	S17 - FLOW CONTROL		42.709	0.325	0.000	0.06		0.9

PN	US/MH Name	Status	Level Exceeded
S1.000	S1	OK	
S2.000	S2	OK	
S3.000	S3	OK	
S1.001	S4	OK	
S4.000	S5	OK	
S1.002	S6	OK	
S5.000	S7	OK	
S5.001	S8	OK	
S1.003	S9	OK	
S6.000	S11	SURCHARGED	
S7.000	S11	OK	
S6.001	S12	SURCHARGED	
S1.004	SBASIN	SURCHARGED	
S8.000	S13	OK	
S8.001	S14	SURCHARGED	
S1.005	S15 - FLOW CONTROL	FLOOD RISK	
S1.006	SCRATES	SURCHARGED	
S1.007	S16	SURCHARGED	
S1.008	S17 - FLOW CONTROL	SURCHARGED	

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	Overflow Act.
S1.009	S18 - TREATMENT	60 Winter	100	+40%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.009	S18 - TREATMENT	42.211	-0.123	0.000	0.08		0.9	OK	

Stormwater Treatment Device Performance Declaration

Stormwater Treatment Devices compliant with Chapter 26 of the CIRIA SuDS manual

Treatment Device Tested: AquaTreat SWT030 stormwater treatment device

General description: A device for the collection and retention of hydrocarbons, particulate and metals.

Envisaged application: Surface water runoff for trafficked areas for subsequent infiltration into ground and water course.

Pollutant(s) captured: Hydrocarbons, particulate, zinc and copper

Parameter	Value
Treatment device capacity:	9,150 l
Particulate storage capacity:	3,000 l
Hydrocarbons storage capacity:	300 l
Treatment flow rate:	30 l/s
Connectable area:	3,735 m²
Hydrocarbon retention	99.65%
Particulate retention efficiency	85.5%
Zinc retention efficiency*	64%
Copper retention efficiency*	64%

*Reduction of heavy metals by collecting and retaining suspended solids is assumed as 75%.

Appendix E – SuDS Management & Maintenance

Document ref: 65202774-SWE-ZZ-XX-RP-C-0002 - SuDS & Surface Water Management & Maintenance Plan

Surface Water Drainage & SuDS Management & Maintenance Plan

Project Name: Springwell Nursery, Little Chesterford	Author: Beverley Hunter	
Project Reference: JRC/65202774	Date: 11 June 2021	
Project Manager: Beverley Hunter	Document Reference: 65202774-SWE-ZZ-XX-RP-C-0002	Revision: 0

1 Introduction

Sustainable drainage systems (SuDS) are utilised to manage rainfall and use landscape features to deal with surface water. SuDS control the flow rate and volume of water leaving the development area and prevent pollution by intercepting silt and other pollutants that run-off from hard surfaces.

Like all aspects of drainage systems, SuDS components should be regularly inspected and maintained. This ensures efficient operation and reduces the likelihood of failure. The level of inspection and maintenance will vary depending on the type of SuDS component. Further information on maintenance can be found in The SuDS Manual (CIRIA publication C753).

At this stage it is envisaged that the SuDS and drainage features for the development are to be maintained by either Anglian Water (AW), Essex County Council (ECC) Highways and/or a Private Management Company who will be employed by the owners of the dwellings on site. The maintenance responsibilities are outlined in Table 1.

Table 1 – Maintenance responsibilities

Company responsible	SuDS feature
AW	Pipe network in road up to headwall in basins.
ECC Highways	Gullies and laterals.
Management Company	Attenuation basin including headwalls.

2 Managing SuDS

The SuDS features have been designed for easy maintenance to comprise:

- Regular day to day care – litter collection and checking the inlets and outlets where water enters or leaves the SuDS feature.
- Occasional tasks – removing any silt that builds up.
- Remedial work – repairing damage where necessary.

3 SuDS Maintenance

The drainage an attenuation infiltration basin, underground attenuation, pipes and manholes, and flow control/proprietary devices.

Table 1 below provides a breakdown of general maintenance requirements to be undertaken, appropriate to the types of SuDS and surface water drainage systems proposed at this site.

Table 1: SuDS General Maintenance Requirements

Regular Maintenance		Frequency
1	**Litter Management** Check for and pick up litter around the entire site.	Monthly
2	**Outlets** Remove silt and debris from slab aprons.	Monthly
3	**Respond to reported blockages, etc.**	As required
Occasional Maintenance		Frequency
4	**Inspection of Control Chambers** Inspection of chambers for silt build up and visually check pipes appear clear and free flowing. Remove silt as required. Jetting as required.	Annually
5	**Inspection of Attenuation** Inspect manholes downstream of attenuation. Remove silt build up and check for blockages within the connection pipe. CCTV if required.	3 monthly and following storms
Remedial Work		Frequency
6	**Inspect SuDS systems to check for damage or failure** Undertake remedial work as required.	Annually
7	**Silt control and removal** Wash or replace filter medium when required.	As required

Table 2 below provides a breakdown of typical maintenance requirements appropriate to the types of SuDS proposed at this site.

Table 2: Typical maintenance requirements

SuDS on Site	Frequency	Typical Tasks
Open attenuation basin	Weekly	Channelling checks should be undertaken every week until vegetation is established.
	Monthly	Remove litter and large debris. Inspect inlets/outlets, flow controls are clear of debris. Inspect bankside, structure, pipework etc for evidence of physical damage. During the first year, inspect inlets and facility surface for silt accumulation.
	Quarterly	Removal of weeds/vegetation.
	Annually	Check mechanical devices associated with the SuDS basins, report faults or failures and suggest appropriate remedial action. Repair inlets, outlets as required. Remove sediment.
	As required	Signage maintenance. Grass cutting/strimming around inlets/outlets. Grass on side slopes to be maintained at longer length (refer to LEMP for grass length requirements).
Attenuation storage tanks	Monthly	Remove debris from the catchment surface (where it may cause risks to performance).
	Annually	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.
	Remedial work, as required	Repair/rehabilitate inlets, outlet, overflows and vents. Survey inside of tank for sediment build-up and remove if necessary
Proprietary device/Flow control	Monthly for 6 months, then annually	Inspect sediment accumulation rates and establish appropriate removal frequencies.
	Biannually	Remove litter and debris and inspect for sediment, oil and grease accumulation. Inspect for evidence of poor operation. Inspect filter media and establish appropriate replacement frequencies.
	Remedial work, as required	Replace malfunctioning parts or structures.
	As recommended by manufacturer	Change filter media.
Pipes, gullies and manholes	Annually	Inspect for litter, silt build-up and blockages, remove as required.
	As required	Jetting pipes/gullies of poor performance to assess requirements for CCTV survey and potential replacement of pipes.