

Title: Surface Water Design Calculations

Project: Proposed Caravan Park & Sales Showroom

Location: Land North of Vicarage Road, Long Sutton

Client: Mr J Hoey

Project Ref: 38718

Prepared By: M.Pett

Date: March 2019

Doc Ref: 38718-MD-01

SRC Ltd.		Page 1
15 High Street Spalding, Lincs PE11 1TW	Proposed Caravan Park Land North of Vicarage Lane, Long Sutton, Lincs.	
Date 06/03/2019 10:10 File 38718-DESIGN MODEL.MDX	Designed by MP Checked by APW	
XP Solutions	Network 2018.1	

Existing Network Details for Existing

- 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
E1.000	80.375	0.322	250.0	0.116	5.00	0.0	0.600	o	225	Pipe/Conduit
E1.001	11.277	0.045	250.6	0.015	0.00	0.0	0.600	o	225	Pipe/Conduit
E2.000	37.500	0.150	250.0	0.051	5.00	0.0	0.600	o	225	Pipe/Conduit
E2.001	5.646	0.021	268.9	0.028	0.00	0.0	0.600	o	225	Pipe/Conduit
E1.002	17.000	0.067	253.7	0.012	0.00	0.0	0.600	o	225	Pipe/Conduit
E1.003	17.000	0.067	253.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit
E3.000	20.581	0.085	242.1	0.017	5.00	0.0	0.600	o	225	Pipe/Conduit
E4.000	90.000	0.360	250.0	0.069	5.00	0.0	0.600	o	225	Pipe/Conduit
E4.001	10.835	0.040	270.9	0.008	0.00	0.0	0.600	o	225	Pipe/Conduit
E5.000	40.386	0.165	244.8	0.031	5.00	0.0	0.600	o	225	Pipe/Conduit
E1.004	7.900#	0.035	225.7	0.008	0.00	0.0	0.600	o	225	Pipe/Conduit
E6.000	32.500	0.130	250.0	0.025	5.00	0.0	0.600	o	225	Pipe/Conduit
E6.001	5.304	0.020	265.2	0.010	0.00	0.0	0.600	o	225	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
E1.000	3.500	0.116	0.0	0.82	32.7
E1.001	3.179	0.131	0.0	0.82	32.7
E2.000	3.305	0.051	0.0	0.82	32.7
E2.001	3.155	0.078	0.0	0.79	31.5
E1.002	3.134	0.221	0.0	0.82	32.5
E1.003	3.067	0.221	0.0	0.82	32.5
E3.000	3.085	0.017	0.0	0.84	33.2
E4.000	3.400	0.069	0.0	0.82	32.7
E4.001	3.040	0.076	0.0	0.79	31.4
E5.000	3.165	0.031	0.0	0.83	33.1
E1.004	3.000	0.352	0.0	0.87	34.4
E6.000	3.500	0.025	0.0	0.82	32.7
E6.001	3.370	0.035	0.0	0.80	31.7

SRC Ltd.		Page 2
15 High Street Spalding, Lincs PE11 1TW	Proposed Caravan Park Land North of Vicarage Lane, Long Sutton, Lincs.	
Date 06/03/2019 10:10 File 38718-DESIGN MODEL.MDX	Designed by MP Checked by APW	
XP Solutions	Network 2018.1	

Existing Network Details for Existing

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
E6.002	78.500	0.314	250.0	0.094	0.00	0.0	0.600	o	225	Pipe/Conduit
E6.003	11.550	0.051	226.5	0.020	0.00	0.0	0.600	o	225	Pipe/Conduit
E7.000	21.144	0.085	248.8	0.013	5.00	0.0	0.600	o	225	Pipe/Conduit
E8.000	7.069	0.030	235.6	0.024	5.00	0.0	0.600	o	225	Pipe/Conduit
E6.004	8.600#	0.035	245.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit
E9.000	34.084	0.165	206.6	0.052	5.00	0.0	0.600	o	225	Pipe/Conduit
E1.005	12.500#	0.050	250.0	0.139	0.00	0.0	0.600	o	225	Pipe/Conduit
E10.000	50.563	0.205	246.6	0.039	5.00	0.0	0.600	o	225	Pipe/Conduit
E1.006	12.215	0.050	244.3	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit
E11.000	24.993	0.100	249.9	0.022	5.00	0.0	0.600	o	225	Pipe/Conduit
E11.001	20.220	0.080	252.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit
E1.007	17.599	0.070	251.4	0.007	0.00	0.0	0.600	o	225	Pipe/Conduit
E1.008	4.229	0.020	211.5	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit

Network Results Table

PN	US/IL (m)	I.Area (ha)	Base Flow (l/s)	Vel (m/s)	Cap (l/s)
E6.002	3.350	0.129	0.0	0.82	32.7
E6.003	3.036	0.148	0.0	0.86	34.4
E7.000	3.070	0.013	0.0	0.82	32.8
E8.000	3.015	0.024	0.0	0.85	33.7
E6.004	2.985	0.186	0.0	0.83	33.0
E9.000	1.965	0.052	0.0	0.91	36.0
E1.005	2.900	0.729	0.0	0.82	32.7
E10.000	3.055	0.039	0.0	0.83	32.9
E1.006	2.850	0.768	0.0	0.83	33.1
E11.000	2.980	0.022	0.0	0.82	32.7
E11.001	2.880	0.022	0.0	0.82	32.5
E1.007	2.800	0.797	0.0	0.82	32.6
E1.008	2.730	0.797	0.0	0.90	35.6

SRC Ltd.		Page 3
15 High Street Spalding, Lincs PE11 1TW	Proposed Caravan Park Land North of Vicarage Lane, Long Sutton, Lincs.	
Date 06/03/2019 10:10 File 38718-DESIGN MODEL.MDX	Designed by MP Checked by APW	
XP Solutions	Network 2018.1	

Manhole Schedules for Existing

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdr (mm)
ESW01	4.250	0.750	Open Manhole	450	E1.000	3.500	225				
ESW02	3.930	0.752	Open Manhole	450	E1.001	3.179	225	E1.000	3.179	225	
ESW04	4.055	0.750	Open Manhole	450	E2.000	3.305	225				
ESW05	3.905	0.750	Open Manhole	450	E2.001	3.155	225	E2.000	3.155	225	
ESW03	3.884	0.750	Open Manhole	450	E1.002	3.134	225	E1.001	3.134	225	
								E2.001	3.134	225	
ESW06	3.817	0.750	Open Manhole	450	E1.003	3.067	225	E1.002	3.067	225	
ESW11a	3.820	0.735	Open Manhole	450	E3.000	3.085	225				
ESW09	4.150	0.750	Open Manhole	450	E4.000	3.400	225				
ESW10	3.790	0.750	Open Manhole	450	E4.001	3.040	225	E4.000	3.040	225	
ESW08	3.915	0.750	Open Manhole	450	E5.000	3.165	225				
ESW07	4.000	1.000	Open Manhole	450	E1.004	3.000	225	E1.003	3.000	225	
								E3.000	3.000	225	
								E4.001	3.000	225	
								E5.000	3.000	225	
ESW12	4.250	0.750	Open Manhole	450	E6.000	3.500	225				
ESW13	4.120	0.750	Open Manhole	450	E6.001	3.370	225	E6.000	3.370	225	
ESW14	4.100	0.750	Open Manhole	450	E6.002	3.350	225	E6.001	3.350	225	
ESW15	3.735	0.699	Open Manhole	450	E6.003	3.036	225	E6.002	3.036	225	
ESW11b	3.820	0.750	Open Manhole	450	E7.000	3.070	225				
ESW17	3.765	0.750	Open Manhole	450	E8.000	3.015	225				
ESW16	4.000	1.015	Open Manhole	450	E6.004	2.985	225	E6.003	2.985	225	
								E7.000	2.985	225	
								E8.000	2.985	225	
ESW34	3.900	1.935	Open Manhole	450	E9.000	1.965	225				
ETANK	4.000	2.200	Open Manhole	450	E1.005	2.900	225	E1.004	2.965	225	
								E6.004	2.950	225	
								E9.000	1.800	225	
ESW19	3.900	0.845	Open Manhole	450	E10.000	3.055	225				
ESW18	4.000	1.150	Open Manhole	450	E1.006	2.850	225	E1.005	2.850	225	
								E10.000	2.850	225	
ESW21	3.750	0.770	Open Manhole	450	E11.000	2.980	225				
E23	3.700	0.820	Junction		E11.001	2.880	225	E11.000	2.880	225	
ESW20	3.900	1.100	Open Manhole	450	E1.007	2.800	225	E1.006	2.800	225	
								E11.001	2.800	225	
ESW22	3.800	1.070	Open Manhole	450	E1.008	2.730	225	E1.007	2.730	225	
E	3.800	1.090	Open Manhole	0		OUTFALL		E1.008	2.710	225	

SRC Ltd.		Page 4
15 High Street Spalding, Lincs PE11 1TW	Proposed Caravan Park Land North of Vicarage Lane, Long Sutton, Lincs.	
Date 06/03/2019 10:10 File 38718-DESIGN MODEL.MDX	Designed by MP Checked by APW	
XP Solutions	Network 2018.1	

PIPELINE SCHEDULES for Existing

Upstream Manhole

- Indicates pipe length does not match coordinates

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
E1.000	o	225	ESW01	4.250	3.500	0.525	Open Manhole	450
E1.001	o	225	ESW02	3.930	3.179	0.526	Open Manhole	450
E2.000	o	225	ESW04	4.055	3.305	0.525	Open Manhole	450
E2.001	o	225	ESW05	3.905	3.155	0.525	Open Manhole	450
E1.002	o	225	ESW03	3.884	3.134	0.525	Open Manhole	450
E1.003	o	225	ESW06	3.817	3.067	0.525	Open Manhole	450
E3.000	o	225	ESW11a	3.820	3.085	0.510	Open Manhole	450
E4.000	o	225	ESW09	4.150	3.400	0.525	Open Manhole	450
E4.001	o	225	ESW10	3.790	3.040	0.525	Open Manhole	450
E5.000	o	225	ESW08	3.915	3.165	0.525	Open Manhole	450
E1.004	o	225	ESW07	4.000	3.000	0.775	Open Manhole	450
E6.000	o	225	ESW12	4.250	3.500	0.525	Open Manhole	450

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
E1.000	80.375	250.0	ESW02	3.930	3.179	0.527	Open Manhole	450
E1.001	11.277	250.6	ESW03	3.884	3.134	0.525	Open Manhole	450
E2.000	37.500	250.0	ESW05	3.905	3.155	0.525	Open Manhole	450
E2.001	5.646	268.9	ESW03	3.884	3.134	0.525	Open Manhole	450
E1.002	17.000	253.7	ESW06	3.817	3.067	0.525	Open Manhole	450
E1.003	17.000	253.7	ESW07	4.000	3.000	0.775	Open Manhole	450
E3.000	20.581	242.1	ESW07	4.000	3.000	0.775	Open Manhole	450
E4.000	90.000	250.0	ESW10	3.790	3.040	0.525	Open Manhole	450
E4.001	10.835	270.9	ESW07	4.000	3.000	0.775	Open Manhole	450
E5.000	40.386	244.8	ESW07	4.000	3.000	0.775	Open Manhole	450
E1.004	7.900#	225.7	ETANK	4.000	2.965	0.810	Open Manhole	450
E6.000	32.500	250.0	ESW13	4.120	3.370	0.525	Open Manhole	450

SRC Ltd.		Page 5
15 High Street Spalding, Lincs PE11 1TW	Proposed Caravan Park Land North of Vicarage Lane, Long Sutton, Lincs.	
Date 06/03/2019 10:10 File 38718-DESIGN MODEL.MDX	Designed by MP Checked by APW	
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PIPELINE SCHEDULES for Existing

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
E6.001	o	225	ESW13	4.120	3.370	0.525	Open Manhole	450
E6.002	o	225	ESW14	4.100	3.350	0.525	Open Manhole	450
E6.003	o	225	ESW15	3.735	3.036	0.474	Open Manhole	450
E7.000	o	225	ESW11b	3.820	3.070	0.525	Open Manhole	450
E8.000	o	225	ESW17	3.765	3.015	0.525	Open Manhole	450
E6.004	o	225	ESW16	4.000	2.985	0.790	Open Manhole	450
E9.000	o	225	ESW34	3.900	1.965	1.710	Open Manhole	450
E1.005	o	225	ETANK	4.000	2.900	0.875	Open Manhole	450
E10.000	o	225	ESW19	3.900	3.055	0.620	Open Manhole	450
E1.006	o	225	ESW18	4.000	2.850	0.925	Open Manhole	450
E11.000	o	225	ESW21	3.750	2.980	0.545	Open Manhole	450
E11.001	o	225	E23	3.700	2.880	0.595	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
E6.001	5.304	265.2	ESW14	4.100	3.350	0.525	Open Manhole	450
E6.002	78.500	250.0	ESW15	3.735	3.036	0.474	Open Manhole	450
E6.003	11.550	226.5	ESW16	4.000	2.985	0.790	Open Manhole	450
E7.000	21.144	248.8	ESW16	4.000	2.985	0.790	Open Manhole	450
E8.000	7.069	235.6	ESW16	4.000	2.985	0.790	Open Manhole	450
E6.004	8.600#	245.7	ETANK	4.000	2.950	0.825	Open Manhole	450
E9.000	34.084	206.6	ETANK	4.000	1.800	1.975	Open Manhole	450
E1.005	12.500#	250.0	ESW18	4.000	2.850	0.925	Open Manhole	450
E10.000	50.563	246.6	ESW18	4.000	2.850	0.925	Open Manhole	450
E1.006	12.215	244.3	ESW20	3.900	2.800	0.875	Open Manhole	450
E11.000	24.993	249.9	E23	3.700	2.880	0.595	Junction	
E11.001	20.220	252.8	ESW20	3.900	2.800	0.875	Open Manhole	450

SRC Ltd.		Page 6
15 High Street Spalding, Lincs PE11 1TW	Proposed Caravan Park Land North of Vicarage Lane, Long Sutton, Lincs.	
Date 06/03/2019 10:10 File 38718-DESIGN MODEL.MDX	Designed by MP Checked by APW	
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PIPELINE SCHEDULES for Existing

Upstream Manhole

PN	Hyd	Diam	MH	C.Level	I.Level	D.Depth	MH	MH DIAM., L*W
	Sect	(mm)	Name	(m)	(m)	(m)	Connection	(mm)
E1.007	o	225	ESW20	3.900	2.800	0.875	Open Manhole	450
E1.008	o	225	ESW22	3.800	2.730	0.845	Open Manhole	450

Downstream Manhole

PN	Length	Slope	MH	C.Level	I.Level	D.Depth	MH	MH DIAM., L*W
	(m)	(1:X)	Name	(m)	(m)	(m)	Connection	(mm)
E1.007	17.599	251.4	ESW22	3.800	2.730	0.845	Open Manhole	450
E1.008	4.229	211.5	E	3.800	2.710	0.865	Open Manhole	0

SRC Ltd.		Page 7
15 High Street Spalding, Lincs PE11 1TW	Proposed Caravan Park Land North of Vicarage Lane, Long Sutton, Lincs.	
Date 06/03/2019 10:10 File 38718-DESIGN MODEL.MDX	Designed by MP Checked by APW	
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Area Summary for Existing

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.057	0.057	0.057
	User	-	100	0.017	0.017	0.074
	User	-	100	0.012	0.012	0.086
	User	-	100	0.017	0.017	0.103
	User	-	50	0.005	0.003	0.106
	User	-	50	0.005	0.003	0.108
	User	-	50	0.005	0.003	0.111
	User	-	50	0.005	0.003	0.114
	User	-	50	0.005	0.003	0.116
1.001	User	-	100	0.012	0.012	0.012
	User	-	50	0.005	0.003	0.015
2.000	User	-	100	0.034	0.034	0.034
	User	-	100	0.012	0.012	0.046
	User	-	100	0.004	0.004	0.051
2.001	User	-	100	0.017	0.017	0.017
	User	-	100	0.010	0.010	0.028
1.002	User	-	50	0.005	0.003	0.003
	User	-	100	0.009	0.009	0.012
1.003	-	-	100	0.000	0.000	0.000
3.000	User	-	100	0.014	0.014	0.014
	User	-	50	0.005	0.003	0.017
4.000	User	-	50	0.005	0.003	0.003
	User	-	50	0.005	0.003	0.005
	User	-	50	0.005	0.003	0.008
	User	-	50	0.005	0.003	0.010
	User	-	50	0.005	0.003	0.013
	User	-	100	0.048	0.048	0.061
	User	-	50	0.005	0.003	0.063
	User	-	50	0.005	0.003	0.066
	User	-	50	0.005	0.003	0.069
4.001	User	-	50	0.005	0.003	0.003
	User	-	50	0.005	0.003	0.005
	User	-	50	0.005	0.003	0.008
5.000	User	-	100	0.031	0.031	0.031
1.004	User	-	100	0.008	0.008	0.008
6.000	User	-	100	0.017	0.017	0.017
	User	-	50	0.005	0.003	0.020
	User	-	50	0.005	0.003	0.022
	User	-	50	0.005	0.003	0.025
6.001	User	-	100	0.007	0.007	0.007
	User	-	50	0.005	0.003	0.010
6.002	User	-	100	0.040	0.040	0.040
	User	-	100	0.012	0.012	0.052
	User	-	100	0.017	0.017	0.069
	User	-	100	0.012	0.012	0.081
	User	-	50	0.005	0.003	0.084
	User	-	50	0.005	0.003	0.086
	User	-	50	0.005	0.003	0.089
	User	-	50	0.005	0.003	0.091
	User	-	50	0.005	0.003	0.094
6.003	User	-	100	0.017	0.017	0.017

SRC Ltd.		Page 8
15 High Street Spalding, Lincs PE11 1TW	Proposed Caravan Park Land North of Vicarage Lane, Long Sutton, Lincs.	
Date 06/03/2019 10:10 File 38718-DESIGN MODEL.MDX	Designed by MP Checked by APW	
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Area Summary for Existing

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
	User	-	50	0.005	0.003	0.020
7.000	User	-	100	0.011	0.011	0.011
	User	-	50	0.005	0.003	0.013
8.000	User	-	100	0.012	0.012	0.012
	User	-	100	0.012	0.012	0.024
6.004	-	-	100	0.000	0.000	0.000
9.000	User	-	100	0.052	0.052	0.052
1.005	User	-	100	0.139	0.139	0.139
10.000	User	-	100	0.039	0.039	0.039
1.006	-	-	100	0.000	0.000	0.000
11.000	User	-	100	0.022	0.022	0.022
11.001	-	-	100	0.000	0.000	0.000
1.007	User	-	100	0.007	0.007	0.007
1.008	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.875	0.797	0.797

Free Flowing Outfall Details for Existing

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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E1.008	E	3.800	2.710	0.000	0	0
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Simulation Criteria for Existing

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.900	Storm Duration (mins)	30
Ratio R	0.400		

SRC Ltd.		Page 9
15 High Street Spalding, Lincs PE11 1TW	Proposed Caravan Park Land North of Vicarage Lane, Long Sutton, Lincs.	
Date 06/03/2019 10:10 File 38718-DESIGN MODEL.MDX	Designed by MP Checked by APW	
XP Solutions	Network 2018.1	

Online Controls for Existing

Hydro-Brake® Optimum Manhole: ESW22, DS/PN: E1.008, Volume (m³): 0.9

Unit Reference	MD-SHE-0105-5000-1000-5000
Design Head (m)	1.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	105
Invert Level (m)	2.730
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

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

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

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

SRC Ltd.		Page 10
15 High Street Spalding, Lincs PE11 1TW	Proposed Caravan Park Land North of Vicarage Lane, Long Sutton, Lincs.	
Date 06/03/2019 10:10 File 38718-DESIGN MODEL.MDX	Designed by MP Checked by APW	
XP Solutions	Network 2018.1	

Storage Structures for Existing

Tank or Pond Manhole: ETANK, DS/PN: E1.005

Invert Level (m) 2.900

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	1175.0	0.500	1175.0	0.501	0.0

SRC Ltd.				Page 11				
15 High Street Spalding, Lincs PE11 1TW				Proposed Caravan Park Land North of Vicarage Lane, Long Sutton, Lincs.				
Date 06/03/2019 10:10 File 38718-DESIGN MODEL.MDX				Designed by MP Checked by APW				
XP Solutions				Network 2018.1				
1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Existing Simulation Criteria Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000 Hot Start Level (mm) 0 Inlet Coefficient 0.800 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000 Foul Sewage per hectare (l/s) 0.000 Number of Input Hydrographs 0 Number of Storage Structures 1 Number of Online Controls 1 Number of Time/Area Diagrams 0 Number of Offline Controls 0 Number of Real Time Controls 0 Synthetic Rainfall Details Rainfall Model FSR Ratio R 0.400 Region England and Wales Cv (Summer) 0.750 M5-60 (mm) 18.900 Cv (Winter) 0.840 Margin for Flood Risk Warning (mm) 300.0 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, 120, 240, 360, 480, 960, 1440 Return Period(s) (years) 1, 30, 100 Climate Change (%) 0, 0, 30								
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
E1.000	ESW01	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
E1.001	ESW02	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
E2.000	ESW04	15 Winter	1	+0%	30/15 Summer			
E2.001	ESW05	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
E1.002	ESW03	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
E1.003	ESW06	15 Winter	1	+0%	30/15 Summer			
E3.000	ESW11a	15 Winter	1	+0%	30/15 Summer			
E4.000	ESW09	15 Winter	1	+0%	100/15 Summer			
E4.001	ESW10	15 Winter	1	+0%	30/15 Summer			
E5.000	ESW08	15 Winter	1	+0%	30/15 Summer			
E1.004	ESW07	15 Winter	1	+0%	1/15 Winter			
E6.000	ESW12	15 Winter	1	+0%	100/15 Summer			
E6.001	ESW13	15 Winter	1	+0%	30/15 Summer			
E6.002	ESW14	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
E6.003	ESW15	15 Winter	1	+0%	30/15 Summer			
E7.000	ESW11b	15 Winter	1	+0%	100/15 Summer			
E8.000	ESW17	15 Winter	1	+0%	30/15 Summer			
E6.004	ESW16	15 Winter	1	+0%	30/15 Summer			
E9.000	ESW34	360 Winter	1	+0%	1/15 Summer			
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SRC Ltd.		Page 12
15 High Street Spalding, Lincs PE11 1TW	Proposed Caravan Park Land North of Vicarage Lane, Long Sutton, Lincs.	
Date 06/03/2019 10:10 File 38718-DESIGN MODEL.MDX	Designed by MP Checked by APW	
XP Solutions	Network 2018.1	

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

PN	US/MH Name	Water Surcharged Flooded			Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)		
E1.000	ESW01	3.610	-0.115	0.000	0.43	13.6	OK	5
E1.001	ESW02	3.318	-0.086	0.000	0.53	14.6	OK	6
E2.000	ESW04	3.376	-0.154	0.000	0.21	6.4	OK	
E2.001	ESW05	3.306	-0.074	0.000	0.35	8.2	OK	5
E1.002	ESW03	3.301	-0.058	0.000	0.80	23.2	OK	6
E1.003	ESW06	3.264	-0.028	0.000	0.75	21.7	OK	
E3.000	ESW11a	3.228	-0.082	0.000	0.06	1.9	OK	
E4.000	ESW09	3.482	-0.143	0.000	0.25	7.9	OK	
E4.001	ESW10	3.236	-0.029	0.000	0.25	6.5	OK	
E5.000	ESW08	3.232	-0.158	0.000	0.12	3.9	OK	
E1.004	ESW07	3.226	0.001	0.000	1.08	29.8	SURCHARGED	
E6.000	ESW12	3.549	-0.176	0.000	0.10	3.2	OK	
E6.001	ESW13	3.462	-0.133	0.000	0.18	4.3	OK	
E6.002	ESW14	3.457	-0.118	0.000	0.42	13.3	OK	4
E6.003	ESW15	3.156	-0.105	0.000	0.52	15.1	OK	
E7.000	ESW11b	3.127	-0.168	0.000	0.06	1.7	OK	
E8.000	ESW17	3.125	-0.115	0.000	0.11	2.9	OK	
E6.004	ESW16	3.123	-0.087	0.000	0.69	18.4	OK	
E9.000	ESW34	2.971	0.781	0.000	0.03	1.0	SURCHARGED	

SRC Ltd.		Page 13
15 High Street Spalding, Lincs PE11 1TW	Proposed Caravan Park Land North of Vicarage Lane, Long Sutton, Lincs.	
Date 06/03/2019 10:10 File 38718-DESIGN MODEL.MDX	Designed by MP Checked by APW	
XP Solutions	Network 2018.1	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
E1.005	ETANK	360	Winter	1	+0%	100/60	Summer	
E10.000	ESW19	15	Winter	1	+0%	100/15	Summer	
E1.006	ESW18	360	Winter	1	+0%	30/15	Summer	100/240 Winter
E11.000	ESW21	15	Winter	1	+0%	100/15	Summer	
E11.001	E23	15	Winter	1	+0%			
E1.007	ESW20	360	Winter	1	+0%	30/15	Summer	
E1.008	ESW22	360	Winter	1	+0%	30/15	Summer	100/15 Summer

PN	US/MH Name	Water	Surcharged	Flooded	Flow / Cap.	Overflow (l/s)	Pipe	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)			Flow (l/s)		
E1.005	ETANK	2.970	-0.155	0.000	0.16		4.5	OK	
E10.000	ESW19	3.116	-0.164	0.000	0.15		4.9	OK	
E1.006	ESW18	2.948	-0.127	0.000	0.16		4.6	OK	
E11.000	ESW21	3.027	-0.178	0.000	0.09		2.8	OK	
E11.001	E23	2.942	-0.163	0.000	0.08		2.6	OK*	
E1.007	ESW20	2.941	-0.084	0.000	0.17		4.8	OK	
E1.008	ESW22	2.931	-0.024	0.000	0.19		4.8	OK	13

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15 High Street
Spalding, Lincs
PE11 1TW

Date 06/03/2019 10:10
File 38718-DESIGN MODEL.MDX

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Proposed Caravan Park
Land North of Vicarage Lane,
Long Sutton, Lincs.

Designed by MP
Checked by APW

Network 2018.1

Page 14



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

Simulation Criteria			
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		
Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0
Synthetic Rainfall Details			
Rainfall Model	FSR	Ratio R	0.400
Region England and Wales Cv (Summer)	0.750		
M5-60 (mm)	18.900	Cv (Winter)	0.840
Margin for Flood Risk Warning (mm)			300.0
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, 120, 240, 360, 480, 960, 1440		
Return Period(s) (years)			1, 30, 100
Climate Change (%)			0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
E1.000	ESW01	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
E1.001	ESW02	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
E2.000	ESW04	15 Winter	30	+0%	30/15 Summer			
E2.001	ESW05	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
E1.002	ESW03	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
E1.003	ESW06	15 Winter	30	+0%	30/15 Summer			
E3.000	ESW11a	15 Winter	30	+0%	30/15 Summer			
E4.000	ESW09	15 Winter	30	+0%	100/15 Summer			
E4.001	ESW10	15 Winter	30	+0%	30/15 Summer			
E5.000	ESW08	15 Winter	30	+0%	30/15 Summer			
E1.004	ESW07	15 Winter	30	+0%	1/15 Winter			
E6.000	ESW12	15 Winter	30	+0%	100/15 Summer			
E6.001	ESW13	15 Winter	30	+0%	30/15 Summer			
E6.002	ESW14	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
E6.003	ESW15	15 Winter	30	+0%	30/15 Summer			
E7.000	ESW11b	15 Winter	30	+0%	100/15 Summer			
E8.000	ESW17	15 Winter	30	+0%	30/15 Summer			
E6.004	ESW16	15 Winter	30	+0%	30/15 Summer			
E9.000	ESW34	360 Winter	30	+0%	1/15 Summer			

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SRC Ltd.		Page 15
15 High Street Spalding, Lincs PE11 1TW	Proposed Caravan Park Land North of Vicarage Lane, Long Sutton, Lincs.	
Date 06/03/2019 10:10 File 38718-DESIGN MODEL.MDX	Designed by MP Checked by APW	
XP Solutions	Network 2018.1	

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

PN	US/MH Name	Water	Surcharged	Flooded	Flow / Cap.	Overflow (l/s)	Pipe	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)			Flow (l/s)		
E1.000	ESW01	4.015	0.290	0.000	0.89		28.4	FLOOD RISK	5
E1.001	ESW02	3.825	0.421	0.000	1.02		28.3	FLOOD RISK	6
E2.000	ESW04	3.807	0.277	0.000	0.42		13.0	FLOOD RISK	
E2.001	ESW05	3.776	0.396	0.000	0.79		18.6	FLOOD RISK	5
E1.002	ESW03	3.763	0.404	0.000	1.55		44.9	FLOOD RISK	6
E1.003	ESW06	3.602	0.310	0.000	1.54		44.5	FLOOD RISK	
E3.000	ESW11a	3.452	0.142	0.000	0.15		4.5	SURCHARGED	
E4.000	ESW09	3.544	-0.081	0.000	0.60		19.1	OK	
E4.001	ESW10	3.472	0.207	0.000	0.71		18.7	SURCHARGED	
E5.000	ESW08	3.462	0.072	0.000	0.27		8.4	SURCHARGED	
E1.004	ESW07	3.446	0.221	0.000	2.60		71.7	SURCHARGED	
E6.000	ESW12	3.719	-0.006	0.000	0.23		7.0	OK	
E6.001	ESW13	3.701	0.106	0.000	0.56		13.1	SURCHARGED	
E6.002	ESW14	3.694	0.119	0.000	1.00		31.9	SURCHARGED	4
E6.003	ESW15	3.342	0.081	0.000	1.23		35.9	SURCHARGED	
E7.000	ESW11b	3.272	-0.023	0.000	0.13		3.9	OK	
E8.000	ESW17	3.271	0.031	0.000	0.27		7.3	SURCHARGED	
E6.004	ESW16	3.265	0.055	0.000	1.65		44.3	SURCHARGED	
E9.000	ESW34	3.090	0.900	0.000	0.07		2.3	SURCHARGED	

SRC Ltd.		Page 16
15 High Street Spalding, Lincs PE11 1TW	Proposed Caravan Park Land North of Vicarage Lane, Long Sutton, Lincs.	
Date 06/03/2019 10:10 File 38718-DESIGN MODEL.MDX	Designed by MP Checked by APW	
XP Solutions	Network 2018.1	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
E1.005	ETANK	360	Winter	30	+0%	100/60	Summer	
E10.000	ESW19	30	Winter	30	+0%	100/15	Summer	
E1.006	ESW18	30	Winter	30	+0%	30/15	Summer	100/240 Winter
E11.000	ESW21	30	Winter	30	+0%	100/15	Summer	
E11.001	E23	15	Winter	30	+0%			
E1.007	ESW20	30	Winter	30	+0%	30/15	Summer	
E1.008	ESW22	30	Winter	30	+0%	30/15	Summer	100/15 Summer

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
E1.005	ETANK	3.089	-0.036	0.000	0.19		5.5	OK	
E10.000	ESW19	3.162	-0.118	0.000	0.30		9.5	OK	
E1.006	ESW18	3.129	0.054	0.000	0.42		12.0	SURCHARGED	
E11.000	ESW21	3.174	-0.031	0.000	0.18		5.4	OK	
E11.001	E23	3.105	0.000	0.000	0.32		10.5	SURCHARGED*	
E1.007	ESW20	3.512	0.487	0.000	0.34		9.9	SURCHARGED	
E1.008	ESW22	3.604	0.649	0.000	0.20		5.0	FLOOD RISK	13

SRC Ltd.

15 High Street
Spalding, Lincs
PE11 1TW

Proposed Caravan Park
Land North of Vicarage Lane,
Long Sutton, Lincs.

Date 06/03/2019 10:10
File 38718-DESIGN MODEL.MDX

Designed by MP
Checked by APW

XP Solutions

Network 2018.1

Page 17



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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.400
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.900 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
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, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
E1.000	ESW01	15 Winter	100	+30%	30/15 Summer	100/15 Summer		
E1.001	ESW02	30 Winter	100	+30%	30/15 Summer	100/15 Summer		
E2.000	ESW04	15 Winter	100	+30%	30/15 Summer			
E2.001	ESW05	15 Winter	100	+30%	30/15 Summer	100/15 Summer		
E1.002	ESW03	15 Winter	100	+30%	30/15 Summer	100/15 Summer		
E1.003	ESW06	15 Winter	100	+30%	30/15 Summer			
E3.000	ESW11a	15 Winter	100	+30%	30/15 Summer			
E4.000	ESW09	15 Winter	100	+30%	100/15 Summer			
E4.001	ESW10	15 Winter	100	+30%	30/15 Summer			
E5.000	ESW08	15 Winter	100	+30%	30/15 Summer			
E1.004	ESW07	15 Winter	100	+30%	1/15 Winter			
E6.000	ESW12	15 Winter	100	+30%	100/15 Summer			
E6.001	ESW13	15 Winter	100	+30%	30/15 Summer			
E6.002	ESW14	15 Winter	100	+30%	30/15 Summer	100/15 Summer		
E6.003	ESW15	15 Winter	100	+30%	30/15 Summer			
E7.000	ESW11b	15 Winter	100	+30%	100/15 Summer			
E8.000	ESW17	15 Winter	100	+30%	30/15 Summer			
E6.004	ESW16	15 Winter	100	+30%	30/15 Summer			
E9.000	ESW34	480 Winter	100	+30%	1/15 Summer			

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SRC Ltd.		Page 18
15 High Street Spalding, Lincs PE11 1TW	Proposed Caravan Park Land North of Vicarage Lane, Long Sutton, Lincs.	
Date 06/03/2019 10:10 File 38718-DESIGN MODEL.MDX	Designed by MP Checked by APW	
XP Solutions	Network 2018.1	

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

PN	US/MH Name	Water	Surcharged	Flooded			Pipe	Status	Level
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)		Exceeded
E1.000	ESW01	4.255	0.530	5.179	1.00		32.0	FLOOD	5
E1.001	ESW02	3.936	0.532	5.542	1.51		41.8	FLOOD	6
E2.000	ESW04	4.026	0.496	0.000	0.80		24.7	FLOOD RISK	
E2.001	ESW05	3.907	0.527	2.484	1.09		25.8	FLOOD	5
E1.002	ESW03	3.888	0.529	4.022	1.82		52.7	FLOOD	6
E1.003	ESW06	3.813	0.521	0.000	1.83		53.0	FLOOD RISK	
E3.000	ESW11a	3.693	0.383	0.000	0.26		7.8	FLOOD RISK	
E4.000	ESW09	4.109	0.484	0.000	0.92		29.5	FLOOD RISK	
E4.001	ESW10	3.779	0.514	0.000	1.20		31.9	FLOOD RISK	
E5.000	ESW08	3.709	0.319	0.000	0.46		14.4	FLOOD RISK	
E1.004	ESW07	3.677	0.452	0.000	3.47		95.8	SURCHARGED	
E6.000	ESW12	4.152	0.427	0.000	0.41		12.5	FLOOD RISK	
E6.001	ESW13	4.117	0.522	0.000	0.74		17.4	FLOOD RISK	
E6.002	ESW14	4.103	0.528	3.200	1.39		44.3	FLOOD	4
E6.003	ESW15	3.568	0.307	0.000	1.72		50.4	FLOOD RISK	
E7.000	ESW11b	3.417	0.122	0.000	0.22		6.6	SURCHARGED	
E8.000	ESW17	3.414	0.174	0.000	0.46		12.1	SURCHARGED	
E6.004	ESW16	3.403	0.193	0.000	2.51		67.4	SURCHARGED	
E9.000	ESW34	3.260	1.070	0.000	0.09		3.1	SURCHARGED	

SRC Ltd.		Page 19
15 High Street Spalding, Lincs PE11 1TW	Proposed Caravan Park Land North of Vicarage Lane, Long Sutton, Lincs.	
Date 06/03/2019 10:10 File 38718-DESIGN MODEL.MDX	Designed by MP Checked by APW	
XP Solutions	Network 2018.1	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
E1.005	ETANK	480	Winter	100	+30%	100/60	Summer	
E10.000	ESW19	480	Winter	100	+30%	100/15	Summer	
E1.006	ESW18	480	Winter	100	+30%	30/15	Summer	100/240 Winter
E11.000	ESW21	480	Winter	100	+30%	100/15	Summer	
E11.001	E23	60	Winter	100	+30%			
E1.007	ESW20	60	Summer	100	+30%	30/15	Summer	
E1.008	ESW22	30	Winter	100	+30%	30/15	Summer	100/15 Summer

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
E1.005	ETANK	3.259	0.134	0.000	0.44		12.3	SURCHARGED	
E10.000	ESW19	3.443	0.163	0.000	0.09		2.7	SURCHARGED	
E1.006	ESW18	3.944	0.869	0.007	0.45		12.7	FLOOD	
E11.000	ESW21	3.603	0.398	0.000	0.10		3.2	FLOOD RISK	
E11.001	E23	3.105	0.000	0.000	0.37		12.1	SURCHARGED*	
E1.007	ESW20	3.759	0.734	0.000	0.34		9.9	FLOOD RISK	
E1.008	ESW22	3.800	0.845	0.050	0.20		5.0	FLOOD	13