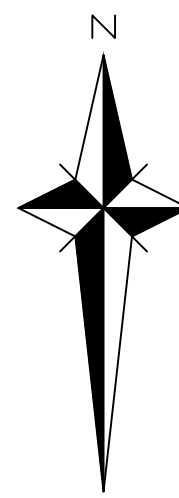


Appendix (H)

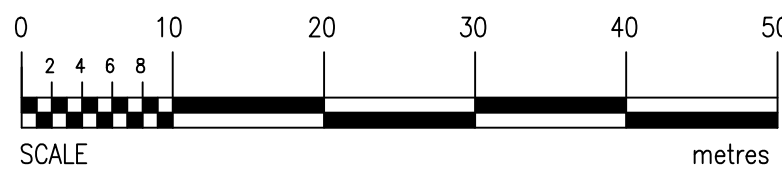
Proposed Surface Water Strategy

GENERAL NOTES

1. The location, size, depth and identification of existing services that may be shown or referred to on this drawing have been assessed from non-invasive observations, record drawings or the file. The contractor shall safely carry out intrusive investigations, trial holes or soundings prior to commencing work to satisfy himself that it is safe to proceed and that the assessments are accurate. Any discrepancies shall be notified to gta prior to works commencing.
2. Tender or billing drawings shall not be used for construction or the ordering of materials.
3. Do not scale. All dimensions and levels to be site confirmed.
4. This drawing shall be read in conjunction with all relevant architects, consultants drawings and specifications, together with H&S plan requirements.
5. Copyright : This drawing must not be copied, amended nor reproduced without the prior written agreement of gta.
6. All drawings specifications and recommendations made by gta are subject to Local Authority and other relevant Statutory Authorities approval. Any works or services made abortive due to the client proceeding prior to these approvals is considered wholly at the Client's risk. gta hold no responsibility for resulting abortive works or costs.

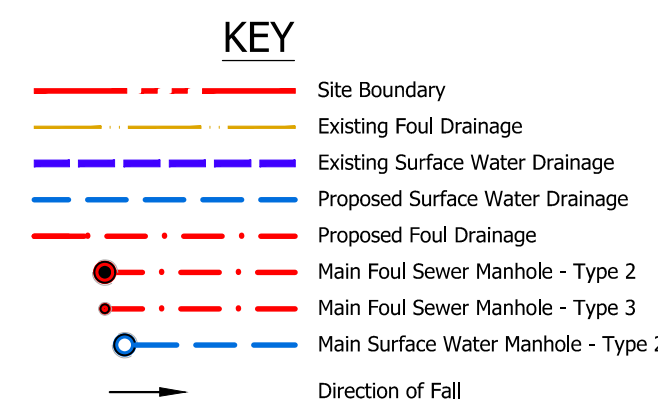
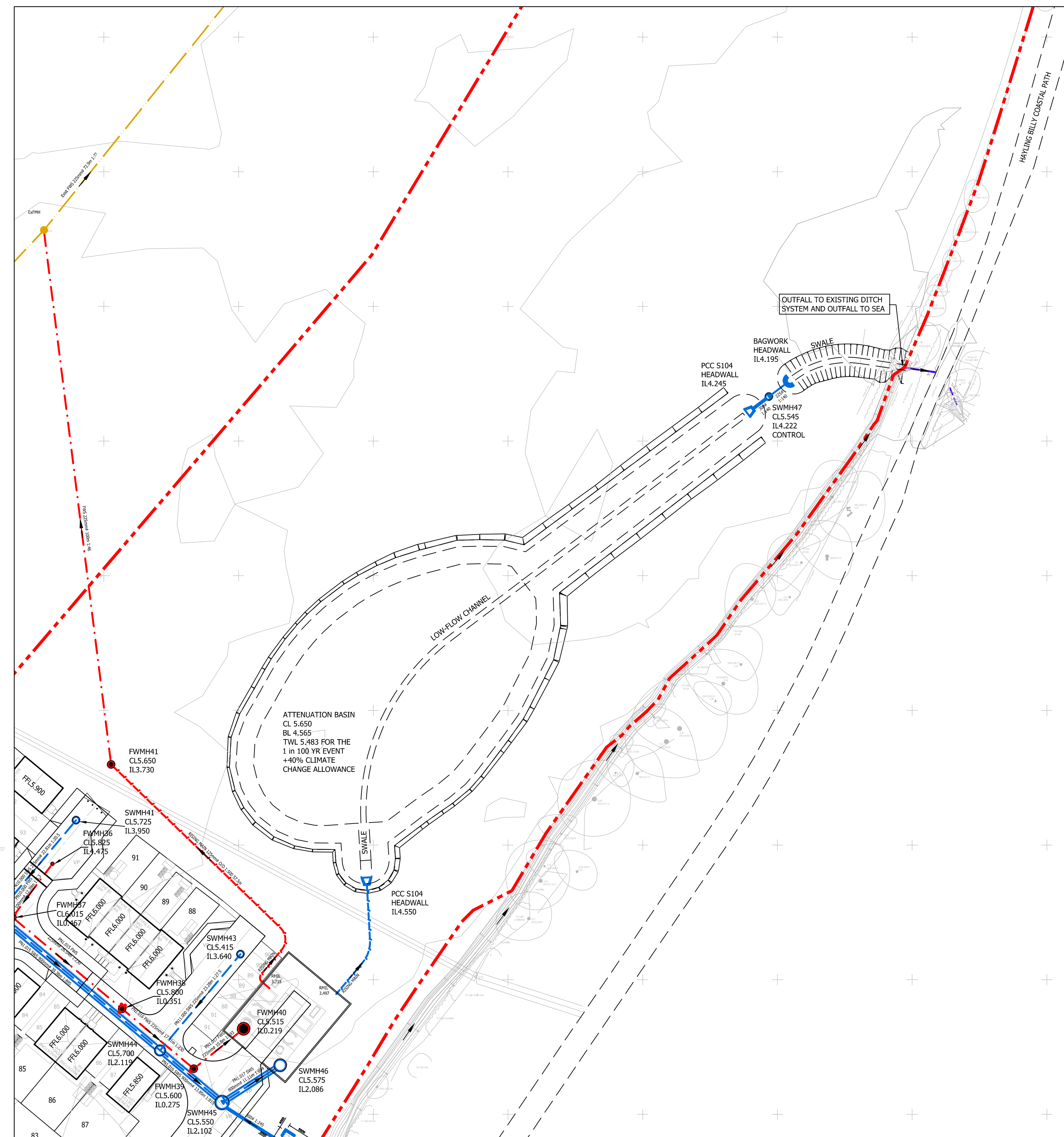
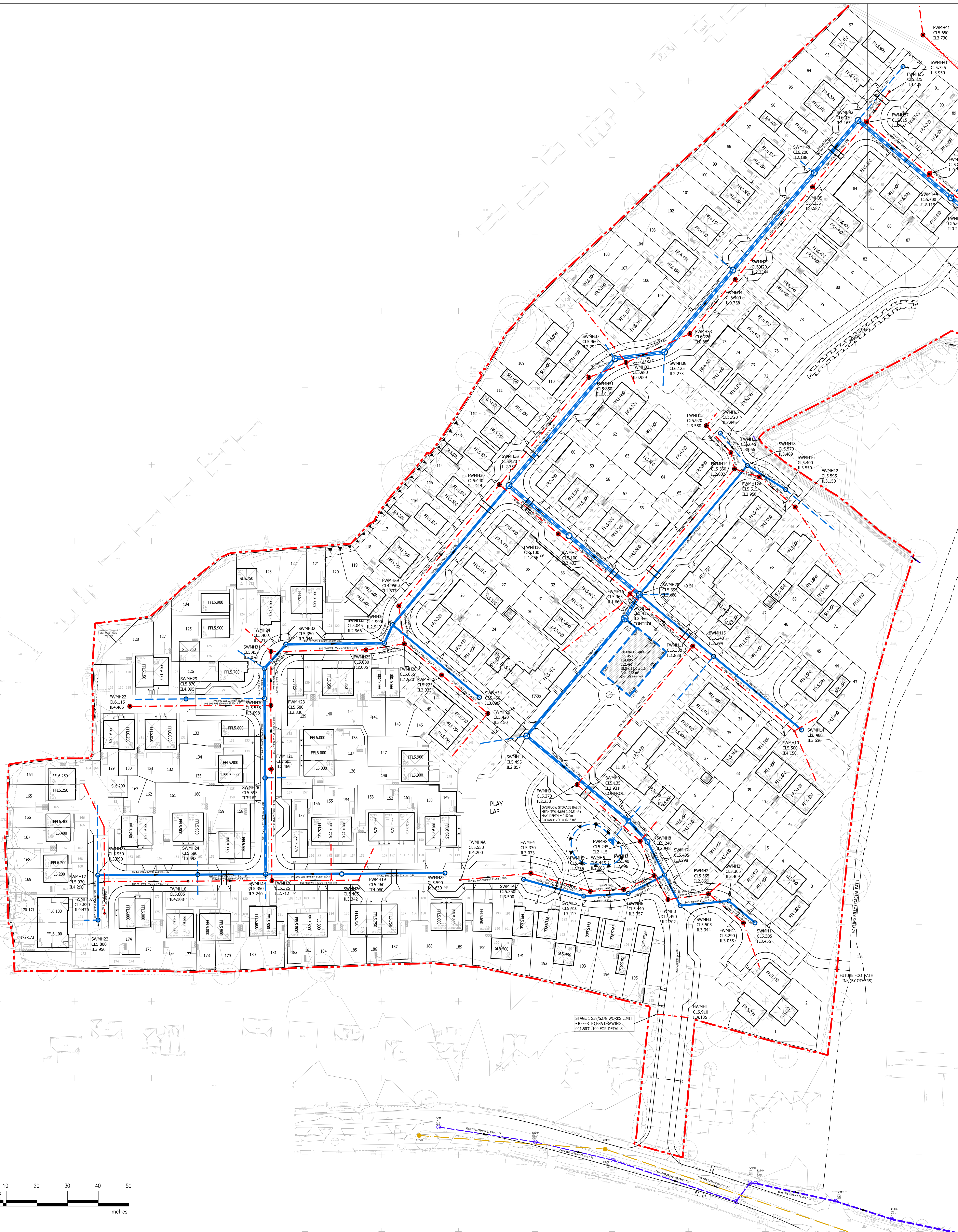
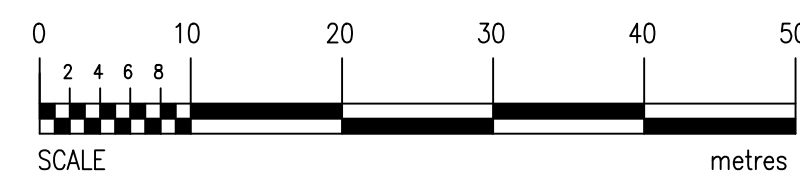


INSET DETAIL BELOW



Rev	PI	INITIAL ISSUE	20.11.20	DMS	ds
Status	Amendments	Date	Des	Chk	
Client	PLANNING				
Project	BARRATT HOMES				
Title	PEBBLE WALK, SINAH LANE HAYLING ISLAND, HANTS				
Date	NOVEMBER 2020	Scale @ A0	1:500		
Base Layout Ref.		CAD File ref.			
Client's Ref.		Project Ref.	10162		
Drawing Number	10162/101	Rev.	P1		

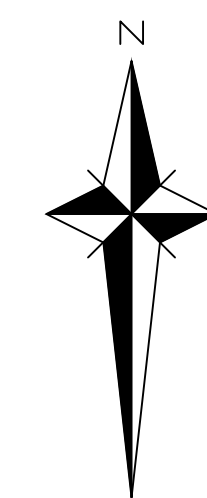
gta Civils & Transport
Gloverston House, 66a Church Walk,
Burgess Hill, West Sussex, RH15 9AS
Tel 01444 871444 Web: www.gtaivils.co.uk



GENERAL NOTES

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2. Tender or billing drawings shall not be used for construction or the ordering of materials.
3. Do not scale. All dimensions and levels to be site confirmed.
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INSET DETAIL BELOW



Rev	INITIAL ISSUE	20.11.20	DMS	ds
Status	Amendments	Date	Des	Chk
Client	PLANNING			
Project	PEBBLE WALK, SINAH LANE HAYLING ISLAND, HANTS			
Title	OUTLINE SITE DRAINAGE PLANNING LAYOUT			
Date	NOVEMBER 2020	Scale @ A0	1:500	
Base Layout Ref.		CAD File ref.		
Client's Ref.		Project Ref.	10162	
Drawing Number	10162/102	Rev.	P1	



Appendix (I)

MicroDrainage Calculations

GTA Civils Ltd		Page 1
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Date 14/05/2020 File 10162 SWS.mdx	Designed by DMS Checked by	
Micro Drainage	Network 2018.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales			
Return Period (years)	1	Foul Sewage (l/s/ha)	0.000
M5-60 (mm)	19.000	Volumetric Runoff Coeff.	0.750
Ratio R	0.350	PIMP (%)	100
Maximum Rainfall (mm/hr)	100	Add Flow / Climate Change (%)	0
Maximum Time of Concentration (mins)	30	Minimum Backdrop Height (m)	0.200
		Maximum Backdrop Height (m)	1.500
		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

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.272	4-8	1.323	8-12	1.192	12-16	0.028

Total Area Contributing (ha) = 2.814

Total Pipe Volume (m³) = 294.687

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	11.130	0.046	242.0	0.093	5.00	0.0	0.600	o	300	Pipe/Conduit	
S1.001	15.910	0.065	244.8	0.022	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.002	11.200	0.046	243.5	0.054	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.000	20.320	0.083	244.8	0.084	5.00	0.0	0.600	o	300	Pipe/Conduit	
S2.001	14.560	0.060	242.7	0.025	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.002	13.280	0.059	225.1	0.027	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.003	12.160	0.050	243.2	0.029	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.004	9.280	0.017	545.9	0.019	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.005	43.190	0.074	583.6	0.121	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.006	47.900	0.381	125.7	0.097	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.007	8.130	0.010	813.0	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S3.000	37.390	0.336	111.3	0.129	5.00	0.0	0.600	o	300	Pipe/Conduit	
S3.001	31.440	0.228	137.9	0.070	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.000	14.760	0.061	242.0	0.117	5.00	0.0	0.600	o	300	Pipe/Conduit	
S5.000	13.710	0.381	36.0	0.043	5.00	0.0	0.600	o	225	Pipe/Conduit	
S4.001	54.790	0.423	129.5	0.041	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.008	29.910	0.034	879.7	0.076	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	47.92	5.18	3.455	0.093	0.0	0.0	0.0	1.01	71.1	12.1
S1.001	46.91	5.45	3.409	0.115	0.0	0.0	0.0	1.00	70.7	14.6
S1.002	46.23	5.64	3.344	0.169	0.0	0.0	0.0	1.00	70.9	21.2
S2.000	47.33	5.34	3.500	0.084	0.0	0.0	0.0	1.00	70.7	10.8
S2.001	46.43	5.58	3.417	0.109	0.0	0.0	0.0	1.00	71.0	13.7
S2.002	45.68	5.79	3.357	0.136	0.0	0.0	0.0	1.04	73.8	16.8
S1.003	44.98	5.99	3.298	0.334	0.0	0.0	0.0	1.00	70.9	40.7
S1.004	44.49	6.14	2.948	0.353	0.0	0.0	0.0	1.04	292.7	42.5
S1.005	42.27	6.86	2.931	0.474	0.0	0.0	0.0	1.00	283.0	54.3
S1.006	41.23	7.23	2.857	0.571	0.0	0.0	0.0	2.17	613.7	63.8
S1.007	40.89	7.35	2.476	0.571	0.0	0.0	0.0	1.09	694.0	63.8
S3.000	47.03	5.42	3.630	0.129	0.0	0.0	0.0	1.49	105.3	16.4
S3.001	45.61	5.81	3.294	0.199	0.0	0.0	0.0	1.34	94.5	24.6
S4.000	47.69	5.24	3.550	0.117	0.0	0.0	0.0	1.01	71.1	15.1
S5.000	48.23	5.10	3.945	0.043	0.0	0.0	0.0	2.19	87.0	5.6
S4.001	45.28	5.91	3.489	0.201	0.0	0.0	0.0	1.38	97.5	24.6
S1.008	39.65	7.83	2.466	1.047	0.0	0.0	0.0	1.05	666.8	112.4

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Micro Drainage	Network 2018.1	

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
S1.019	10.000	0.011	909.1	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S1.020	10.000	0.011	909.1	0.000	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)
S1.019	30.78	12.71	2.080	2.814	0.0	0.0	0.0	1.03	655.8	237.0
S1.020	30.57	12.87	2.069	2.814	0.0	0.0	0.0	1.03	655.8	237.0

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.093	0.093	0.093
1.001	-	-	100	0.022	0.022	0.022
1.002	-	-	100	0.054	0.054	0.054
2.000	-	-	100	0.084	0.084	0.084
2.001	-	-	100	0.025	0.025	0.025
2.002	-	-	100	0.027	0.027	0.027
1.003	-	-	100	0.029	0.029	0.029
1.004	-	-	100	0.019	0.019	0.019
1.005	-	-	100	0.121	0.121	0.121
1.006	-	-	100	0.097	0.097	0.097
1.007	-	-	100	0.000	0.000	0.000
3.000	-	-	100	0.129	0.129	0.129
3.001	-	-	100	0.070	0.070	0.070
4.000	-	-	100	0.117	0.117	0.117
5.000	-	-	100	0.043	0.043	0.043
4.001	-	-	100	0.041	0.041	0.041
1.008	-	-	100	0.076	0.076	0.076
1.009	-	-	100	0.089	0.089	0.089
6.000	-	-	100	0.065	0.065	0.065
6.001	-	-	100	0.061	0.061	0.061
6.002	-	-	100	0.097	0.097	0.097
7.000	-	-	100	0.077	0.077	0.077
7.001	-	-	100	0.098	0.098	0.098
6.003	-	-	100	0.072	0.072	0.072
6.004	-	-	100	0.050	0.050	0.050
8.000	-	-	100	0.079	0.079	0.079
6.005	-	-	100	0.010	0.010	0.010
6.006	-	-	100	0.022	0.022	0.022
6.007	-	-	100	0.112	0.112	0.112
6.008	-	-	100	0.036	0.036	0.036
9.000	-	-	100	0.098	0.098	0.098
6.009	-	-	100	0.158	0.158	0.158
1.010	-	-	100	0.091	0.091	0.091
1.011	-	-	100	0.083	0.083	0.083
1.012	-	-	100	0.074	0.074	0.074
1.013	-	-	100	0.058	0.058	0.058
1.014	-	-	100	0.120	0.120	0.120
10.000	-	-	100	0.052	0.052	0.052
1.015	-	-	100	0.042	0.042	0.042
11.000	-	-	100	0.035	0.035	0.035
1.016	-	-	100	0.054	0.054	0.054
1.017	-	-	100	0.034	0.034	0.034
1.018	-	-	100	0.000	0.000	0.000
1.019	-	-	100	0.000	0.000	0.000
1.020	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				2.814	2.814	2.814

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)
S1.020	Sswale	5.575	2.058	0.000	0	0

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Online Controls for Storm

Orifice Manhole: S9, DS/PN: S1.005, Volume (m³): 6.1

Diameter (m) 0.140 Discharge Coefficient 0.600 Invert Level (m) 2.931

Hydro-Brake® Optimum Manhole: S12, DS/PN: S1.007, Volume (m³): 23.2

Unit Reference	MD-SHE-0056-2000-2200-2000	Sump Available	Yes
Design Head (m)	2.200	Diameter (mm)	56
Design Flow (l/s)	2.0	Invert Level (m)	2.476
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	75
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1200
Application	Surface		

Control Points			Control Points		
Head (m)	Flow (l/s)		Head (m)	Flow (l/s)	
Design Point (Calculated)	2.200	2.0	Kick-Flo®	0.495	1.0
Flush-Flo™	0.244	1.2	Mean Flow over Head Range	-	1.5

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)	Depth (m)	Flow (l/s)
0.100	1.1	0.600	1.1	1.600	1.7	2.600	2.2	5.000	2.9	7.500	3.5
0.200	1.2	0.800	1.3	1.800	1.8	3.000	2.3	5.500	3.0	8.000	3.6
0.300	1.2	1.000	1.4	2.000	1.9	3.500	2.5	6.000	3.2	8.500	3.7
0.400	1.2	1.200	1.5	2.200	2.0	4.000	2.6	6.500	3.3	9.000	3.8
0.500	1.0	1.400	1.6	2.400	2.1	4.500	2.8	7.000	3.4	9.500	3.9

Hydro-Brake® Optimum Manhole: S45, DS/PN: S1.017, Volume (m³): 16.6

Unit Reference	MD-SHE-0413-1250-2600-1250
Design Head (m)	2.600
Design Flow (l/s)	125.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	413
Invert Level (m)	2.102
Minimum Outlet Pipe Diameter (mm)	450
Suggested Manhole Diameter (mm)	Site Specific Design (Contact Hydro International)

Control Points			Control Points		
Head (m)	Flow (l/s)		Head (m)	Flow (l/s)	
Design Point (Calculated)	2.600	124.9	Kick-Flo®	1.776	103.8
Flush-Flo™	0.819	125.0	Mean Flow over Head Range	-	107.0

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)	Depth (m)	Flow (l/s)
0.100	11.2	0.600	122.9	1.600	113.4	2.600	124.9	5.000	171.7	7.500	209.4
0.200	40.4	0.800	125.0	1.800	104.4	3.000	133.9	5.500	179.9	8.000	216.2
0.300	78.6	1.000	124.2	2.000	109.9	3.500	144.3	6.000	187.8	8.500	222.7
0.400	113.1	1.200	122.2	2.200	115.1	4.000	154.0	6.500	195.3	9.000	229.0
0.500	119.9	1.400	119.1	2.400	120.1	4.500	163.1	7.000	202.5	9.500	235.2

Pump Manhole: SPUMP, DS/PN: S1.018, Volume (m³): 14.8

Invert Level (m) 2.086

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)	Depth (m)	Flow (l/s)
0.200	100.0000	1.200	100.0000	2.200	100.0000	3.200	100.0000	4.200	100.0000	5.200	100.0000
0.400	100.0000	1.400	100.0000	2.400	100.0000	3.400	100.0000	4.400	100.0000	5.400	100.0000
0.600	100.0000	1.600	100.0000	2.600	100.0000	3.600	100.0000	4.600	100.0000	5.600	100.0000
0.800	100.0000	1.800	100.0000	2.800	100.0000	3.800	100.0000	4.800	100.0000	5.800	100.0000
1.000	100.0000	2.000	100.0000	3.000	100.0000	4.000	100.0000	5.000	100.0000	6.000	100.0000

Hydro-Brake® Optimum Manhole: SCONTROL, DS/PN: S1.020, Volume (m³): 14.1

Unit Reference	MD-SHE-0145-9900-1000-9900	Sump Available	Yes
Design Head (m)	1.000	Diameter (mm)	145
Design Flow (l/s)	9.9	Invert Level (m)	2.069
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	225
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1200
Application	Surface		

Control Points			Control Points		
Head (m)	Flow (l/s)		Head (m)	Flow (l/s)	
Design Point (Calculated)	1.000	9.9	Flush-Flo™	0.305	9.9

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Hydro-Brake® Optimum Manhole: SCONTROL, DS/PN: S1.020, Volume (m³): 14.1

Control Points			Control Points		
Head (m)	Flow (l/s)		Head (m)	Flow (l/s)	
Kick-Flo®	0.675	8.2	Mean Flow over Head Range	-	8.5

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)	Depth (m)	Flow (l/s)
0.100	5.2	0.600	9.1	1.600	12.4	2.600	15.6	5.000	21.3	7.500	25.9
0.200	9.6	0.800	8.9	1.800	13.1	3.000	16.7	5.500	22.3	8.000	26.7
0.300	9.9	1.000	9.9	2.000	13.7	3.500	17.9	6.000	23.2	8.500	27.5
0.400	9.8	1.200	10.8	2.200	14.4	4.000	19.1	6.500	24.1	9.000	28.2
0.500	9.5	1.400	11.6	2.400	15.0	4.500	20.2	7.000	25.0	9.500	29.0

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Storage Structures for Storm

Tank or Pond Manhole: S9, DS/PN: S1.005

Invert Level (m) 4.435

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	98.5	1.600	0.0	3.200	0.0	4.800	0.0	6.400	0.0	8.000	0.0	9.600	0.0
0.400	147.6	2.000	0.0	3.600	0.0	5.200	0.0	6.800	0.0	8.400	0.0	10.000	0.0
0.800	205.7	2.400	0.0	4.000	0.0	5.600	0.0	7.200	0.0	8.800	0.0		
1.200	0.0	2.800	0.0	4.400	0.0	6.000	0.0	7.600	0.0	9.200	0.0		

Cellular Storage Manhole: S12, DS/PN: S1.007

Invert Level (m) 2.496 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	222.0	0.0	2.800	0.0	0.0	5.600	0.0	0.0	8.400	0.0	0.0
0.400	222.0	0.0	3.200	0.0	0.0	6.000	0.0	0.0	8.800	0.0	0.0
0.800	222.0	0.0	3.600	0.0	0.0	6.400	0.0	0.0	9.200	0.0	0.0
1.200	222.0	0.0	4.000	0.0	0.0	6.800	0.0	0.0	9.600	0.0	0.0
1.600	222.0	0.0	4.400	0.0	0.0	7.200	0.0	0.0	10.000	0.0	0.0
2.000	0.0	0.0	4.800	0.0	0.0	7.600	0.0	0.0			
2.400	0.0	0.0	5.200	0.0	0.0	8.000	0.0	0.0			

Cellular Storage Manhole: S45, DS/PN: S1.017

Invert Level (m) 2.102 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	195.5	0.0	2.800	0.0	0.0	5.600	0.0	0.0	8.400	0.0	0.0
0.400	195.5	0.0	3.200	0.0	0.0	6.000	0.0	0.0	8.800	0.0	0.0
0.800	195.5	0.0	3.600	0.0	0.0	6.400	0.0	0.0	9.200	0.0	0.0
1.200	195.5	0.0	4.000	0.0	0.0	6.800	0.0	0.0	9.600	0.0	0.0
1.600	195.5	0.0	4.400	0.0	0.0	7.200	0.0	0.0	10.000	0.0	0.0
2.000	195.5	0.0	4.800	0.0	0.0	7.600	0.0	0.0			
2.400	0.0	0.0	5.200	0.0	0.0	8.000	0.0	0.0			

Tank or Pond Manhole: SCONTROL, DS/PN: S1.020

Invert Level (m) 2.069

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	1724.0	1.200	2465.0

GTA Civils Ltd		Page 10
66a Church Walk Burgess Hill West Sussex RH15 9AS	PEBBLE WALK HAYLING ISLAND	
Date 14/05/2020 File 10162 SWS.mdx	Designed by DMS Checked by	
Micro Drainage	Network 2018.1	

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

PN	US/MH Name	Status	Level Exceeded
S1.005	S9	FLOOD RISK	
S1.006	S11	SURCHARGED	
S1.007	S12	SURCHARGED	
S3.000	S14	SURCHARGED	
S3.001	S15	SURCHARGED	
S4.000	S16	SURCHARGED	
S5.000	S17	SURCHARGED	
S4.001	S18	SURCHARGED	
S1.008	S20	SURCHARGED	
S1.009	S21	FLOOD RISK	
S6.000	S22	SURCHARGED	
S6.001	S23	SURCHARGED	
S6.002	S24	FLOOD RISK	
S7.000	S25	FLOOD RISK	
S7.001	S26	FLOOD RISK	
S6.003	S27	FLOOD RISK	
S6.004	S28	SURCHARGED	
S8.000	S29	SURCHARGED	
S6.005	S30	SURCHARGED	
S6.006	S31	SURCHARGED	
S6.007	S32	SURCHARGED	
S6.008	S33	FLOOD RISK	
S9.000	S34	SURCHARGED	
S6.009	S35	FLOOD RISK	
S1.010	S36	SURCHARGED	
S1.011	S37	SURCHARGED	
S1.012	S38	SURCHARGED	
S1.013	S39	SURCHARGED	
S1.014	S40	SURCHARGED	
S10.000	S41	SURCHARGED	
S1.015	S42	SURCHARGED	
S11.000	S43	SURCHARGED	
S1.016	S44	SURCHARGED	
S1.017	S45	SURCHARGED	
S1.018	SPUMP	SURCHARGED	
S1.019	Sswale	SURCHARGED	
S1.020	SCONTROL	SURCHARGED	

GTA Civils Ltd		Page 2
66a Church Walk Burgess Hill West Sussex RH15 9AS	PEBBLE WALK HAYLING ISLAND 1 in 1 yr sim	
Date 23/11/2020 File 10162 SWS.mdx	Designed by DMS Checked by	
Micro Drainage	Network 2020.1	

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

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S1.005	S9	27.4	SURCHARGED	
S1.006	S11	35.8	OK	
S1.007	S12	1.2	OK	
S3.000	S14	16.0	OK	
S3.001	S15	23.6	OK	
S4.000	S16	14.6	OK	
S5.000	S17	5.4	OK	
S4.001	S18	24.5	OK	
S1.008	S20	42.6	OK	
S1.009	S21	42.8	OK	
S6.000	S22	8.1	OK	
S6.001	S23	14.6	OK	
S6.002	S24	24.9	OK	
S7.000	S25	9.7	OK	
S7.001	S26	19.7	OK	
S6.003	S27	49.5	OK	
S6.004	S28	51.9	OK	
S8.000	S29	10.0	OK	
S6.005	S30	58.6	OK	
S6.006	S31	59.9	OK	
S6.007	S32	67.9	OK	
S6.008	S33	69.7	OK	
S9.000	S34	12.2	OK	
S6.009	S35	87.6	OK	
S1.010	S36	124.6	OK	
S1.011	S37	122.2	OK	
S1.012	S38	122.5	OK	
S1.013	S39	119.4	OK	
S1.014	S40	118.5	OK	
S10.000	S41	6.6	OK	
S1.015	S42	118.2	OK	
S11.000	S43	4.4	OK	
S1.016	S44	110.3	OK	
S1.017	S45	72.5	OK	
S1.018	SPUMP	72.4	OK	
S1.019	Sswale	72.4	OK	
S1.020	SCONTROL	8.0	OK	

GTA Civils Ltd		Page 1
66a Church Walk Burgess Hill West Sussex RH15 9AS	PEBBLE WALK HAYLING ISLAND 1 in 30 yr sim	
Date 23/11/2020 File 10162 SWS.mdx	Designed by DMS Checked by	
Micro Drainage	Network 2020.1	

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 4 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 19.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.350 Cv (Winter) 0.840

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

Profile(s)

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880,
4320, 5760, 7200, 8640, 10080

Return Period(s) (years) 30
Climate Change (%) 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S1.000	S1	15 Winter	30	+0%	30/15 Summer				4.658	0.903	0.000	0.40		
S1.001	S2	15 Winter	30	+0%	30/15 Summer				4.642	0.933	0.000	0.46		
S1.002	S3	15 Winter	30	+0%	30/15 Summer				4.617	0.973	0.000	0.68		
S2.000	S4	15 Winter	30	+0%	30/15 Summer				4.658	0.858	0.000	0.33		
S2.001	S5	15 Winter	30	+0%	30/15 Summer				4.638	0.921	0.000	0.42		
S2.002	S6	15 Winter	30	+0%	30/15 Summer				4.616	0.959	0.000	0.50		
S1.003	S7	30 Winter	30	+0%	30/15 Summer				4.592	0.994	0.000	1.16		
S1.004	S8	30 Winter	30	+0%	30/15 Summer				4.563	1.015	0.000	0.45		
S1.005	S9	30 Winter	30	+0%	30/15 Summer				4.559	1.028	0.000	0.18		
S1.006	S11	1440 Winter	30	+0%	30/960 Winter				3.482	0.025	0.000	0.02		
S1.007	S12	1440 Winter	30	+0%	30/480 Winter				3.482	0.106	0.000	0.00		
S3.000	S14	15 Winter	30	+0%					3.764	-0.166	0.000	0.40		
S3.001	S15	15 Winter	30	+0%					3.485	-0.109	0.000	0.71		
S4.000	S16	15 Winter	30	+0%					3.721	-0.129	0.000	0.60		
S5.000	S17	15 Winter	30	+0%					4.009	-0.161	0.000	0.18		
S4.001	S18	15 Winter	30	+0%					3.672	-0.117	0.000	0.68		
S1.008	S20	60 Winter	30	+0%					3.077	-0.289	0.000	0.18		
S1.009	S21	60 Winter	30	+0%					3.076	-0.256	0.000	0.10		
S6.000	S22	15 Winter	30	+0%					4.072	-0.178	0.000	0.34		
S6.001	S23	15 Winter	30	+0%					4.024	-0.166	0.000	0.40		
S6.002	S24	15 Winter	30	+0%	30/15 Winter				3.926	0.034	0.000	0.73		
S7.000	S25	15 Winter	30	+0%					3.906	-0.024	0.000	0.35		
S7.001	S26	15 Winter	30	+0%	30/15 Summer				3.882	0.090	0.000	0.24		
S6.003	S27	15 Winter	30	+0%	30/15 Summer				3.867	0.177	0.000	0.75		
S6.004	S28	15 Winter	30	+0%	30/15 Summer				3.819	0.207	0.000	0.83		
S8.000	S29	15 Winter	30	+0%					4.178	-0.142	0.000	0.29		
S6.005	S30	15 Winter	30	+0%	30/15 Summer				3.772	0.224	0.000	1.33		
S6.006	S31	15 Winter	30	+0%	30/15 Summer				3.737	0.214	0.000	1.35		
S6.007	S32	15 Winter	30	+0%	30/15 Summer				3.700	0.204	0.000	1.11		
S6.008	S33	15 Winter	30	+0%	30/15 Summer				3.598	0.182	0.000	1.54		
S9.000	S34	15 Winter	30	+0%					3.646	-0.194	0.000	0.27		
S6.009	S35	15 Winter	30	+0%	30/15 Summer				3.554	0.155	0.000	1.43		
S1.010	S36	60 Winter	30	+0%					3.075	-0.177	0.000	0.43		
S1.011	S37	60 Winter	30	+0%					3.068	-0.124	0.000	0.86		
S1.012	S38	60 Winter	30	+0%					3.063	-0.110	0.000	0.54		
S1.013	S39	60 Winter	30	+0%					3.056	-0.078	0.000	0.48		
S1.014	S40	60 Winter	30	+0%					3.049	-0.039	0.000	0.75		
S10.000	S41	15 Winter	30	+0%					4.009	-0.166	0.000	0.15		
S1.015	S42	60 Winter	30	+0%					3.042	-0.021	0.000	0.50		
S11.000	S43	15 Winter	30	+0%					3.692	-0.173	0.000	0.12		
S1.016	S44	60 Winter	30	+0%	30/60 Winter				3.026	0.007	0.000	0.79		
S1.017	S45	60 Winter	30	+0%	30/60 Winter				3.019	0.017	0.000	0.31		
S1.018	SPUMP	60 Winter	30	+0%					2.656	-0.330	0.000	0.20		
S1.019	Sswale	1440 Winter	30	+0%					2.551	-0.429	0.000	0.11		
S1.020	SCONTROL	1440 Winter	30	+0%					2.550	-0.419	0.000	0.03		

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PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	22.8	SURCHARGED	
S1.001	S2	27.2	SURCHARGED	
S1.002	S3	38.4	SURCHARGED	
S2.000	S4	20.4	SURCHARGED	
S2.001	S5	25.2	SURCHARGED	
S2.002	S6	30.3	SURCHARGED	
S1.003	S7	66.9	SURCHARGED	
S1.004	S8	70.1	SURCHARGED	

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

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S1.005	S9	43.9	SURCHARGED	
S1.006	S11	8.6	SURCHARGED	
S1.007	S12	1.4	SURCHARGED	
S3.000	S14	39.1	OK	
S3.001	S15	61.4	OK	
S4.000	S16	35.7	OK	
S5.000	S17	13.3	OK	
S4.001	S18	62.6	OK	
S1.008	S20	74.9	OK	
S1.009	S21	81.1	OK	
S6.000	S22	19.9	OK	
S6.001	S23	39.1	OK	
S6.002	S24	67.9	SURCHARGED	
S7.000	S25	22.6	OK	
S7.001	S26	42.2	SURCHARGED	
S6.003	S27	103.6	SURCHARGED	
S6.004	S28	112.0	SURCHARGED	
S8.000	S29	24.4	OK	
S6.005	S30	131.5	SURCHARGED	
S6.006	S31	136.2	SURCHARGED	
S6.007	S32	155.2	SURCHARGED	
S6.008	S33	162.0	SURCHARGED	
S9.000	S34	29.8	OK	
S6.009	S35	211.1	SURCHARGED	
S1.010	S36	233.0	OK	
S1.011	S37	235.8	OK	
S1.012	S38	242.2	OK	
S1.013	S39	239.8	OK	
S1.014	S40	242.1	OK	
S10.000	S41	16.1	OK	
S1.015	S42	242.4	OK	
S11.000	S43	10.8	OK	
S1.016	S44	234.0	SURCHARGED	
S1.017	S45	106.1	SURCHARGED	
S1.018	SPUMP	100.0	OK	
S1.019	Sswale	38.4	OK	
S1.020	SCONTROL	9.9	OK	

GTA Civils Ltd		Page 1
66a Church Walk	PEBBLE WALK	
Burgess Hill	HAYLING ISLAND	
West Sussex RH15 9AS	1 in 100yr +40% 6 hr storm	
Date 23/11/2020	Designed by DMS	
File 10162 SWS.mdx	Checked by	
Micro Drainage	Network 2020.1	

Summary of Results for 360 minute 100 year Winter (Storm)

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

PN	US/MH Name	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Discharge Vol (m³)	Pipe Flow (l/s)	Status
S1.000	S1	5.305	4.356	0.601	0.000	0.13		67.628	7.6	SURCHARGED
S1.001	S2	5.305	4.351	0.642	0.000	0.16		82.445	9.3	SURCHARGED
S1.002	S3	5.505	4.343	0.699	0.000	0.24		120.318	13.7	SURCHARGED
S2.000	S4	5.350	4.356	0.556	0.000	0.11		61.110	6.9	SURCHARGED
S2.001	S5	5.410	4.350	0.633	0.000	0.15		77.441	8.8	SURCHARGED
S2.002	S6	5.440	4.342	0.685	0.000	0.18		95.602	11.0	SURCHARGED
S1.003	S7	5.405	4.333	0.735	0.000	0.47		234.619	27.0	SURCHARGED
S1.004	S8	5.240	4.313	0.765	0.000	0.18		245.997	28.4	SURCHARGED
S1.005	S9	5.135	4.309	0.778	0.000	0.16		330.019	38.2	SURCHARGED
S1.006	S11	5.495	4.136	0.679	0.000	0.08		386.361	42.3	SURCHARGED
S1.007	S12	5.415	4.136	0.760	0.000	0.00		56.241	1.7	SURCHARGED
S3.000	S14	5.480	3.697	-0.233	0.000	0.11		95.615	11.1	OK
S3.001	S15	5.240	3.557	-0.037	0.000	0.20		147.496	17.2	OK
S4.000	S16	5.400	3.632	-0.218	0.000	0.17		86.722	10.1	OK
S5.000	S17	5.720	3.977	-0.193	0.000	0.05		31.872	3.7	OK
S4.001	S18	5.570	3.576	-0.213	0.000	0.19		148.980	17.3	OK
S1.008	S20	5.320	3.547	0.181	0.000	0.10		408.884	40.5	SURCHARGED
S1.009	S21	5.100	3.545	0.213	0.000	0.05		474.753	43.1	SURCHARGED
S6.000	S22	5.800	4.012	-0.238	0.000	0.09		48.178	5.6	OK
S6.001	S23	5.950	3.956	-0.234	0.000	0.11		93.392	10.9	OK
S6.002	S24	5.580	3.684	-0.208	0.000	0.21		165.289	19.2	OK
S7.000	S25	5.590	3.694	-0.236	0.000	0.10		57.073	6.6	OK
S7.001	S26	5.405	3.628	-0.164	0.000	0.09		129.716	15.1	OK
S6.003	S27	5.350	3.625	-0.065	0.000	0.29		348.358	40.6	OK
S6.004	S28	5.595	3.615	0.003	0.000	0.33		385.405	44.8	SURCHARGED
S8.000	S29	5.870	4.138	-0.182	0.000	0.08		58.556	6.8	OK
S6.005	S30	5.555	3.605	0.057	0.000	0.53		451.345	52.5	SURCHARGED
S6.006	S31	5.455	3.598	0.075	0.000	0.54		467.706	54.4	SURCHARGED
S6.007	S32	5.530	3.590	0.094	0.000	0.46		550.716	64.0	SURCHARGED
S6.008	S33	5.040	3.575	0.159	0.000	0.64		577.360	67.0	SURCHARGED
S9.000	S34	5.390	3.594	-0.246	0.000	0.08		72.638	8.5	OK
S6.009	S35	4.990	3.569	0.170	0.000	0.60		767.160	88.9	SURCHARGED
S1.010	S36	5.395	3.543	0.291	0.000	0.24		1309.086	130.6	SURCHARGED
S1.011	S37	5.960	3.535	0.343	0.000	0.47		1370.368	128.7	SURCHARGED
S1.012	S38	6.125	3.530	0.357	0.000	0.30		1425.016	132.4	SURCHARGED
S1.013	S39	6.420	3.522	0.388	0.000	0.26		1467.811	131.4	SURCHARGED
S1.014	S40	6.200	3.515	0.427	0.000	0.42		1556.601	134.7	SURCHARGED
S10.000	S41	5.725	3.980	-0.195	0.000	0.04		38.543	4.5	OK
S1.015	S42	5.955	3.508	0.445	0.000	0.29		1626.163	138.8	SURCHARGED
S11.000	S43	5.415	3.666	-0.199	0.000	0.03		25.943	3.0	OK
S1.016	S44	5.700	3.499	0.480	0.000	0.48		1691.942	143.0	SURCHARGED
S1.017	S45	5.625	3.492	0.490	0.000	0.30		1710.084	102.4	SURCHARGED
S1.018	SPUMP	5.575	3.130	0.144	0.000	0.20		1710.170	100.0	SURCHARGED
S1.019	Sswale	5.575	2.842	-0.138	0.000	0.27		1706.792	100.0	OK
S1.020	SCONTROL	5.575	2.842	-0.127	0.000	0.03		314.180	9.9	OK

Appendix (J)

Flood Plan



**PROPOSED RESIDENTIAL DEVELOPMENT
SINAH LANE, HAYLING ISLAND
HAVANT**

FLOOD PLAN

JUNE 2018

Document Control Sheet

Project name: Chapel Riverside, Southampton

Project ref: BSO/E4513

Report Title Flood Plan

Doc. ref: TRS/INL/E4513/17138

Date: 22nd June 2018

	Name	Position	Signature	Date
Prepared by:	Terry Seymour	Director		22.06.2018
Reviewed by:	Steve Vine	Associate Designate		22.06.2018
Approved by:	Terry Seymour	Director		22.06.2018

Revision	Date	Description	Prepared	Approved

1.0 Introduction and Objectives

Rogers Cory Partnership Limited have been instructed on behalf of Barratt David Wilson to prepare a Flood Plan in support of the planning application for the proposed residential development at the Sinah Lane, Hayling Island.

The development site seeks planning permission from Havant Borough Council for the erection of 195 dwellings, associated open space, pumping station, sub-station with vehicular access via Sinah Lane and change of use of land from agricultural to a Wader and Brent Geese refuge.

The intention of this flood plan is to provide an initial proposal to highlight the potential flood hazards and provide outline procedures to enable future occupants and users of the site to avoid being directly exposed to the hazard in any future flood events that may affect the site. This flood plan should be regularly reviewed and updated during the life of the development, by the appointed Management Company to ensure it takes into consideration any changes to legislation and the flood hazard to the site,

Site Location

The site is located off Sinah Lane within the south western part of Hayling Island. The site is bounded by residential properties to the west and south, open fields and a nature reserve to the north, Hayling Billy Trail and open fields to the east with National Grid reference 470733, 99841 (See **Figure 1**).



Figure 1- Site Location and Extent

Objectives

Whilst the development site itself is not at risk, Hayling Island could be subject to restricted highway access (on and off the island) in the event of a peak tidal flood event. The objective of the site flood plan is to raise awareness of the risk of flooding from tidal surge events and the potential impact this has on Langstone Road which

Flood Plan

could restrict access on and off Hayling Island, thus allowing future occupants to consider options available in such an event.

The site falls within an area where the Environment Agency issue flood warnings. As the risk of flooding is tidal from storm surge events there is an opportunity for an early warning of the potential risk of flooding from the Environment Agency ranging between 6 to 48 hours addition to this the approximate time of arrival of the storm surge can be predicted within an allowance of time.

The flood plan will highlight what mitigation measures should be implemented by the future users of the site.

2.0 Flood Risk to the Site

Tidal Flood Risk

Whilst the site lies wholly within Flood Zone 1, it is recognised that vehicular access on and off Hayling Island is only via Langstone Road, located further north of the site (see figure 2).



Figure 2: Extract from EA Flood Map

Flood Plan

Table 1 below outlines the proposed residual flood mitigation measures which will be implemented in the construction of the development:

Land use	Min Finished Floor Level	Further mitigation requirements
Residential	4.70mAOD	None

Table 1 – Proposed site wide minimum finished floor levels and further mitigation requirements

Table 2 provides residual mitigation measures proposed for the future users and occupants of the site.

Land use	Further mitigation requirements
Residential	Register with the EA flood warning services. In the event of a tidal flood event, propose occupant to remain at property until the tidal surge has passed

Table 2 – Proposed site wide residual mitigation measures

Safe means of access and egress.

In the event of a peak tidal flood event (1 in 200-year event), there is no risk to the development site itself, thus occupants could choose to stay on site. Should occupants wish to leave Hayling Island ahead of a tidal flood event then sufficient warning will be provided through the EA early warning notification system to allow residents to leave the island temporarily should they so wish to.