

64120: Observer Park, Reading Drainage Calculations Set 1		Date: 06/06/2025		
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: HW	Checked by: GF	
		PRP UK LTD: Catherine House, Brixworth NN6 9BX Northamptonshire		



FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Flooded Volume

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
S20	FSR: 100 years: +40 %: 15 mins: Summer	47.90 0	46.92 0	47.021	0.101	1.9	0.115	0.000	1.8	1.245	OK
S19	FSR: 100 years: +40 %: 15 mins: Summer	48.17 5	46.97 0	47.029	0.059	6.3	0.067	0.000	6.2	6.942	OK
S18	FSR: 100 years: +40 %: 15 mins: Summer	48.19 0	47.15 0	47.497	0.347	85.6	0.613	0.000	6.3	36.396	Surcharged
S17	FSR: 100 years: +40 %: 15 mins: Summer	48.67 0	47.17 0	47.498	0.328	73.0	0.579	0.000	3.1	28.648	OK
S16	FSR: 100 years: +40 %: 15 mins: Summer	48.67 0	47.17 0	47.498	0.328	1.9	0.579	0.000	0.1	0.024	OK
S15	FSR: 100 years: +40 %: 15 mins: Summer	49.20 0	47.27 0	47.496	0.226	62.3	0.399	0.000	46.6	24.477	OK
S14	FSR: 100 years: +40 %: 15 mins: Summer	49.20 0	47.64 5	47.946	0.301	3.8	0.430	0.000	2.6	3.010	OK
S10	FSR: 100 years: +40 %: 15 mins: Summer	49.41 0	48.05 0	48.309	0.259	153.7	0.370	0.000	152.2	66.598	OK
S11	FSR: 100 years: +40 %: 15 mins: Summer	49.30 0	47.93 5	48.125	0.190	152.2	0.271	0.000	150.3	66.607	OK
S12	FSR: 100 years: +40 %: 15 mins: Summer	49.32 0	47.64 5	47.946	0.301	73.0	0.430	0.000	92.8	31.080	OK
PP9	FSR: 100 years: +40 %: 15 mins: Summer	49.44 5	48.44 5	48.445	0.000	0.0	0.000	0.000	0.0	0.000	OK
S13	FSR: 100 years: +40 %: 15 mins: Summer	49.41 0	48.21 0	48.444	0.234	127.3	0.334	0.000	124.6	55.175	OK
S9	FSR: 100 years: +40 %: 15 mins: Summer	49.05 0	47.44 0	47.527	0.087	16.9	0.154	0.000	13.3	8.276	OK
S8	FSR: 100 years: +40 %: 15 mins: Summer	49.19 5	47.48 0	47.897	0.417	6.1	0.736	0.000	1.2	2.877	OK
S7	FSR: 100 years: +40 %: 15 mins: Summer	49.19 5	47.64 5	48.009	0.364	150.9	0.521	0.000	88.2	64.622	OK
S6	FSR: 100 years: +40 %: 15 mins: Summer	49.33 0	47.98 0	48.123	0.143	93.2	0.204	0.000	92.7	40.398	OK
S4	FSR: 100 years: +40 %: 15 mins: Summer	49.06 0	47.84 5	48.030	0.185	103.5	0.265	0.000	102.0	47.093	OK
S3	FSR: 100 years: +40 %: 15 mins: Summer	49.40 0	47.94 0	48.166	0.226	105.8	0.323	0.000	103.5	47.233	OK
S2	FSR: 100 years: +40 %: 15 mins: Summer	49.40 0	48.00 0	48.250	0.250	107.7	0.358	0.000	105.8	47.235	OK

64120: Observer Park, Reading Drainage Calculations Set 1		Date: 06/06/2025		
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S1	FSR: 100 years: +40 %: 15 mins: Summer	49.30 0	48.02 5	48.270	0.245	36.7	0.277	0.000	35.4	15.896	OK
Watercourse Outfall	FSR: 100 years: +40 %: 15 mins: Summer	47.90 0	46.88 0	46.909	0.029	1.8	0.000	0.000	1.8	1.208	OK
S5	FSR: 100 years: +40 %: 15 mins: Summer	49.00 0	47.73 0	47.901	0.171	102.0	0.193	0.000	101.1	46.789	OK

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FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S1	S2	49.300	48.118	0.099	4.007	0.4	0.16	8.3	OK
1.001	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S2	S3	49.400	48.104	0.101	11.919	1.0	0.14	24.8	OK
1.003	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S3	S4	49.400	48.037	0.086	11.912	1.3	0.13	24.0	OK
2.000	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S6	S7	49.330	48.045	0.117	10.200	0.7	0.07	21.8	OK
2.001	FSR: 1 years: +0 %: 15 mins: Summer	Pipe	S7	Cellular Storage 3	49.195	47.809	0.094	14.628	1.8	0.48	39.8	OK
1.006	FSR: 1 years: +0 %: 120 mins: Summer	Pipe	Cellular Storage 3	S8	49.100	47.750	0.112	11.185	0.4	0.01	1.8	OK
1.007	FSR: 1 years: +0 %: 2160 mins: Winter	Pipe	S8	S9	49.195	47.759	0.033	143.796	0.3	0.01	1.6	OK
1.008	FSR: 1 years: +0 %: 30 mins: Winter	Pipe	S9	S15	49.050	47.488	0.064	4.943	0.3	0.02	3.8	OK
3.000	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S10	S11	49.410	48.160	0.097	16.818	1.6	0.16	36.0	OK
3.001	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S11	Cellular Storage 2	49.300	48.018	0.060	16.821	3.1	0.08	35.4	OK
4.000	FSR: 1 years: +0 %: 720 mins: Winter	Pipe	PP9	S12	49.445	48.449	0.084	7.342	0.0	0	0.2	OK
4.001	FSR: 1 years: +0 %: 15 mins: Summer	Pipe	S12	Cellular Storage 2	49.320	47.764	0.075	7.018	1.3	0.24	19.7	OK
5.000	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S13	Cellular Storage 2	49.410	48.309	0.096	13.928	1.3	0.13	29.4	OK
3.002	FSR: 1 years: +0 %: 600 mins: Winter	Pipe	Cellular Storage 2	S14	49.320	47.809	0.164	111.154	0.1	0.03	2.9	OK
3.002 (1)	FSR: 1 years: +0 %: 600 mins: Winter	Pipe	S14	S15	49.200	47.809	0.024	111.052	1.0	0.01	2.9	OK
1.009	FSR: 1 years: +0 %: 30 mins: Winter	Pipe	S15	S18	49.200	47.350	0.107	14.939	0.3	0.05	11.0	OK
6.000	FSR: 1 years: +0 %: 120 mins: Winter	Pipe	S17	S18	48.670	47.338	0.178	0.000	0.0	0	0.6	OK
6.001	FSR: 1 years: +0 %: 120 mins: Winter	Pipe	Cellular Storage 1	S17	48.670	47.338	0.168	0.000	0.0	0	0.6	OK
6.002	FSR: 1 years: +0 %: 8640 mins: Winter	Pipe	S16	Cellular Storage 1	48.670	47.275	0.105	0.000	0.0	0	0.0	OK

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1.010	FSR: 1 years: +0 %: 360 mins: Winter	Pipe	S18	S19	48.190	47.356	0.116	136.007	0.6	0.13	5.0	OK
1.011	FSR: 1 years: +0 %: 480 mins: Winter	Pipe	S19	Pond	48.175	47.154	0.209	172.340	0.4	0.11	5.0	OK
1.012	FSR: 1 years: +0 %: 600 mins: Winter	Pipe	Pond	S20	47.900	47.154	0.225	198.394	0.1	0.16	4.7	Surcharged
1.013	FSR: 1 years: +0 %: 600 mins: Winter	Pipe	S20	Watercourse Outfall	47.900	47.154	0.050	198.204	0.9	0.22	4.7	Surcharged
PPO1	FSR: 1 years: +0 %: 960 mins: Winter	Pipe	PP1	S11	49.248	48.793	0.010	5.603	0.5	0	0.1	OK
PPO2	FSR: 1 years: +0 %: 720 mins: Winter	Pipe	PP2	PP9	49.247	48.786	0.005	3.693	0.6	0	0.1	OK
PPO4	FSR: 1 years: +0 %: 720 mins: Winter	Pipe	PP4	PP9	49.247	48.785	0.006	3.651	0.5	0	0.1	OK
PPO6	FSR: 1 years: +0 %: 960 mins: Winter	Pipe	PP6	S3	49.203	48.747	0.014	5.727	0.3	0	0.1	OK
1.004	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S4	S5	49.060	47.920	0.073	11.905	1.6	0.06	23.5	OK
1.005	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S5	Cellular Storage 3	49.000	47.801	0.051	11.903	2.7	0.05	23.4	OK
PPO5	FSR: 1 years: +0 %: 480 mins: Winter	Pipe	PP5	Cellular Storage 3	49.142	48.675	0.076	2.208	0.0	0	0.1	OK
PPO3	FSR: 1 years: +0 %: 480 mins: Winter	Pipe	PP3	Cellular Storage 2	49.247	48.783	0.083	2.787	0.0	0	0.1	OK

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FSR: 10 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FSR: 10 years: +0 %: 15 mins: Winter	Pipe	S1	S2	49.300	48.167	0.147	7.771	0.5	0.32	16.2	OK
1.001	FSR: 10 years: +0 %: 15 mins: Winter	Pipe	S2	S3	49.400	48.153	0.146	23.094	1.2	0.27	48.3	OK
1.003	FSR: 10 years: +0 %: 15 mins: Winter	Pipe	S3	S4	49.400	48.080	0.126	23.085	1.4	0.25	47.1	OK
2.000	FSR: 10 years: +0 %: 15 mins: Winter	Pipe	S6	S7	49.330	48.071	0.168	19.753	0.9	0.13	42.4	OK
2.001	FSR: 10 years: +0 %: 15 mins: Summer	Pipe	S7	Cellular Storage 3	49.195	47.882	0.142	28.224	1.9	0.86	71.5	OK
1.006	FSR: 10 years: +0 %: 60 mins: Summer	Pipe	Cellular Storage 3	S8	49.100	47.816	0.179	5.607	0.4	0.01	1.9	OK
1.007	FSR: 10 years: +0 %: 7200 mins: Winter	Pipe	S8	S9	49.195	47.747	0.033	313.385	0.3	0.01	1.6	OK
1.008	FSR: 10 years: +0 %: 15 mins: Winter	Pipe	S9	S15	49.050	47.503	0.093	4.695	0.3	0.03	6.7	OK
3.000	FSR: 10 years: +0 %: 15 mins: Winter	Pipe	S10	S11	49.410	48.209	0.139	32.561	1.9	0.3	69.8	OK
3.001	FSR: 10 years: +0 %: 15 mins: Winter	Pipe	S11	Cellular Storage 2	49.300	48.053	0.095	32.572	3.3	0.15	68.9	OK
4.000	FSR: 10 years: +0 %: 360 mins: Winter	Pipe	PP9	S12	49.445	48.452	0.168	9.619	0.0	0	0.6	OK
4.001	FSR: 10 years: +0 %: 15 mins: Summer	Pipe	S12	Cellular Storage 2	49.320	47.819	0.130	13.583	1.6	0.58	48.0	OK
5.000	FSR: 10 years: +0 %: 15 mins: Winter	Pipe	S13	Cellular Storage 2	49.410	48.354	0.137	26.975	1.6	0.26	57.1	OK
3.002	FSR: 10 years: +0 %: 120 mins: Winter	Pipe	Cellular Storage 2	S14	49.320	47.910	0.265	30.535	0.1	0.04	3.5	OK

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3.002 (1)	FSR: 10 years: +0 %: 240 mins: Summer	Pipe	S14	S15	49.200	47.911	0.025	65.125	1.0	0.01	3.4	OK
1.009	FSR: 10 years: +0 %: 30 mins: Winter	Pipe	S15	S18	49.200	47.385	0.174	25.634	0.4	0.1	21.0	OK
6.000	FSR: 10 years: +0 %: 180 mins: Winter	Pipe	S17	S18	48.670	47.453	0.293	0.000	0.0	0.01	1.8	OK
6.001	FSR: 10 years: +0 %: 180 mins: Winter	Pipe	Cellular Storage 1	S17	48.670	47.453	0.283	0.000	0.0	0.01	1.7	OK
6.002	FSR: 10 years: +0 %: 180 mins: Winter	Pipe	S16	Cellular Storage 1	48.670	47.453	0.283	0.000	0.0	0	0.0	OK
1.010	FSR: 10 years: +0 %: 240 mins: Summer	Pipe	S18	S19	48.190	47.437	0.154	121.219	0.6	0.16	6.3	Surh arged
1.011	FSR: 10 years: +0 %: 600 mins: Winter	Pipe	S19	Pond	48.175	47.364	0.225	244.459	0.5	0.14	6.2	Surh arged
1.012	FSR: 10 years: +0 %: 600 mins: Winter	Pipe	Pond	S20	47.900	47.363	0.225	213.822	0.1	0.18	5.3	Surh arged
1.013	FSR: 10 years: +0 %: 2880 mins: Winter	Pipe	S20	Waterco urse Outfall	47.900	47.207	0.054	696.537	0.9	0.25	5.3	Surh arged
PPO1	FSR: 10 years: +0 %: 600 mins: Winter	Pipe	PP1	S11	49.248	48.824	0.033	8.387	0.5	0.01	0.3	OK
PPO2	FSR: 10 years: +0 %: 480 mins: Winter	Pipe	PP2	PP9	49.247	48.815	0.008	5.808	0.8	0.01	0.3	OK
PPO4	FSR: 10 years: +0 %: 360 mins: Winter	Pipe	PP4	PP9	49.247	48.813	0.010	4.779	0.6	0.01	0.3	OK
PPO6	FSR: 10 years: +0 %: 600 mins: Winter	Pipe	PP6	S3	49.203	48.778	0.022	8.537	0.5	0.01	0.3	OK
1.004	FSR: 10 years: +0 %: 15 mins: Winter	Pipe	S4	S5	49.060	47.957	0.108	23.079	1.8	0.12	46.4	OK
1.005	FSR: 10 years: +0 %: 15 mins: Winter	Pipe	S5	Cellular Storage 3	49.000	47.834	0.092	23.025	2.9	0.1	46.0	OK
PPO5	FSR: 10 years: +0 %: 240 mins: Winter	Pipe	PP5	Cellular Storage 3	49.142	48.701	0.100	2.950	0.0	0.01	0.3	OK
PPO3	FSR: 10 years: +0 %: 360 mins: Winter	Pipe	PP3	Cellular Storage 2	49.247	48.810	0.100	4.794	0.0	0.01	0.3	OK

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FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S1	S2	49.300	48.191	0.171	9.828	0.5	0.4	20.5	OK
1.001	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S2	S3	49.400	48.176	0.168	29.210	1.3	0.34	61.2	OK
1.003	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S3	S4	49.400	48.101	0.145	29.201	1.5	0.32	59.8	OK
2.000	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S6	S7	49.330	48.082	0.200	24.985	0.9	0.17	53.7	OK
2.001	FSR: 30 years: +0 %: 15 mins: Summer	Pipe	S7	Cellular Storage 3	49.195	47.918	0.167	35.695	2.6	1.52	126.2	OK
1.006	FSR: 30 years: +0 %: 120 mins: Winter	Pipe	Cellular Storage 3	S8	49.100	47.940	0.303	13.747	0.4	0.01	1.9	OK
1.007	FSR: 30 years: +0 %: 10080 mins: Winter	Pipe	S8	S9	49.195	47.716	0.033	409.157	0.3	0.01	1.6	OK
1.008	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S9	S15	49.050	47.509	0.110	5.704	0.2	0.04	8.2	OK
3.000	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S10	S11	49.410	48.233	0.159	41.182	2.0	0.39	88.4	OK
3.001	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S11	Cellular Storage 2	49.300	48.070	0.118	41.195	3.4	0.19	87.2	OK
4.000	FSR: 30 years: +0 %: 360 mins: Winter	Pipe	PP9	S12	49.445	48.453	0.222	13.242	0.0	0	0.9	OK
4.001	FSR: 30 years: +0 %: 15 mins: Summer	Pipe	S12	Cellular Storage 2	49.320	47.843	0.165	17.168	1.2	0.53	44.0	OK
5.000	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S13	Cellular Storage 2	49.410	48.376	0.156	34.117	1.7	0.33	72.3	OK
3.002	FSR: 30 years: +0 %: 60 mins: Winter	Pipe	Cellular Storage 2	S14	49.320	47.939	0.294	13.199	0.1	0.04	3.6	OK

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3.002 (1)	FSR: 30 years: +0 %: 4320 mins: Winter	Pipe	S14	S15	49.200	47.876	0.074	480.236	1.0	0.01	3.4	OK
1.009	FSR: 30 years: +0 %: 30 mins: Winter	Pipe	S15	S18	49.200	47.433	0.223	29.792	0.4	0.12	25.6	OK
6.000	FSR: 30 years: +0 %: 60 mins: Winter	Pipe	S17	S18	48.670	47.481	0.321	0.000	0.0	0.01	1.8	OK
6.001	FSR: 30 years: +0 %: 60 mins: Winter	Pipe	Cellular Storage 1	S17	48.670	47.481	0.311	0.000	0.0	0.01	1.7	OK
6.002	FSR: 30 years: +0 %: 60 mins: Winter	Pipe	S16	Cellular Storage 1	48.670	47.481	0.311	0.000	0.0	0	0.0	OK
1.010	FSR: 30 years: +0 %: 180 mins: Winter	Pipe	S18	S19	48.190	47.557	0.098	78.555	0.7	0.16	6.3	Surcharged
1.011	FSR: 30 years: +0 %: 960 mins: Winter	Pipe	S19	Pond	48.175	47.441	0.225	410.550	0.4	0.14	6.2	Surcharged
1.012	FSR: 30 years: +0 %: 960 mins: Winter	Pipe	Pond	S20	47.900	47.440	0.225	374.686	0.1	0.18	5.3	Surcharged
1.013	FSR: 30 years: +0 %: 4320 mins: Summer	Pipe	S20	Watercourse Outfall	47.900	47.214	0.054	845.187	0.9	0.25	5.3	Surcharged
PPO1	FSR: 30 years: +0 %: 480 mins: Winter	Pipe	PP1	S11	49.248	48.843	0.087	9.973	0.1	0.02	0.5	OK
PPO2	FSR: 30 years: +0 %: 360 mins: Winter	Pipe	PP2	PP9	49.247	48.832	0.009	6.684	0.9	0.01	0.4	OK
PPO4	FSR: 30 years: +0 %: 240 mins: Winter	Pipe	PP4	PP9	49.247	48.831	0.012	5.051	0.7	0.02	0.4	OK
PPO6	FSR: 30 years: +0 %: 480 mins: Winter	Pipe	PP6	S3	49.203	48.797	0.048	10.134	0.2	0.01	0.5	OK
1.004	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S4	S5	49.060	47.974	0.125	29.195	1.8	0.16	58.9	OK
1.005	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S5	Cellular Storage 3	49.000	47.850	0.114	29.085	3.0	0.13	58.5	OK
PPO5	FSR: 30 years: +0 %: 240 mins: Winter	Pipe	PP5	Cellular Storage 3	49.142	48.716	0.100	4.059	0.0	0.02	0.4	OK
PPO3	FSR: 30 years: +0 %: 240 mins: Winter	Pipe	PP3	Cellular Storage 2	49.247	48.827	0.100	5.138	0.1	0.01	0.5	OK

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		PRP UK LTD: Catherine House, Brixworth NN6 9BX Northamptonshire		



FSR: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	S1	S2	49.300	48.223	0.203	12.713	0.5	0.52	26.6	OK
1.001	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	S2	S3	49.400	48.207	0.197	37.786	1.3	0.44	79.4	OK
1.003	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	S3	S4	49.400	48.128	0.170	37.777	1.6	0.42	77.7	OK
2.000	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	S6	S7	49.330	48.097	0.229	32.323	1.0	0.22	69.6	OK
2.001	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	S7	Cellular Storage 3	49.195	47.987	0.216	51.678	2.3	1.79	148.6	OK
1.006	FSR: 100 years: +0 %: 60 mins: Summer	Pipe	Cellular Storage 3	S8	49.100	47.936	0.299	5.747	0.4	0.01	2.0	OK
1.007	FSR: 100 years: +0 %: 8640 mins: Winter	Pipe	S8	S9	49.195	47.913	0.033	491.499	0.3	0.01	1.6	OK
1.008	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	S9	S15	49.050	47.517	0.130	7.108	0.2	0.05	10.3	OK
3.000	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	S10	S11	49.410	48.264	0.186	53.277	2.1	0.5	114.3	OK
3.001	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	S11	Cellular Storage 2	49.300	48.093	0.145	53.293	3.5	0.25	113.0	OK
4.000	FSR: 100 years: +0 %: 240 mins: Winter	Pipe	PP9	S12	49.445	48.455	0.225	14.690	0.0	0	1.3	OK
4.001	FSR: 100 years: +0 %: 15 mins: Summer	Pipe	S12	Cellular Storage 2	49.320	47.870	0.213	22.200	1.8	0.99	82.2	OK
5.000	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	S13	Cellular Storage 2	49.410	48.404	0.182	44.133	1.8	0.42	93.6	OK
3.002	FSR: 100 years: +0 %: 30 mins: Winter	Pipe	Cellular Storage 2	S14	49.320	47.959	0.314	6.825	0.2	0.05	4.0	OK

64120: Observer Park, Reading Drainage Calculations Set 1		Date: 06/06/2025		
		Designed by: HW	Checked by: GF	Approved By: HP
Report Details: Type: Connections Summary Storm Phase: Phase		PRP UK LTD: Catherine House, Brixworth NN6 9BX Northamptonshire		



3.002 (1)	FSR: 100 years: +0 %: 960 mins: Winter	Pipe	S14	S15	49.200	48.273	0.138	267.157	1.0	0.01	3.4	Surcharged
1.009	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	S15	S18	49.200	47.453	0.226	22.686	0.4	0.16	33.0	OK
6.000	FSR: 100 years: +0 %: 30 mins: Summer	Pipe	S17	S18	48.670	47.470	0.310	0.000	0.0	0.01	1.8	OK
6.001	FSR: 100 years: +0 %: 30 mins: Summer	Pipe	Cellular Storage 1	S17	48.670	47.470	0.300	0.000	0.0	0.01	1.7	OK
6.002	FSR: 100 years: +0 %: 30 mins: Summer	Pipe	S16	Cellular Storage 1	48.670	47.470	0.300	0.000	0.0	0	0.0	OK
1.010	FSR: 100 years: +0 %: 120 mins: Summer	Pipe	S18	S19	48.190	47.589	0.101	53.419	0.7	0.16	6.3	Surcharged
1.011	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	S19	Pond	48.175	47.051	0.103	8.511	1.1	0.14	6.3	OK
1.012	FSR: 100 years: +0 %: 1440 mins: Summer	Pipe	Pond	S20	47.900	47.511	0.225	592.170	0.1	0.18	5.3	Surcharged
1.013	FSR: 100 years: +0 %: 4320 mins: Winter	Pipe	S20	Watercourse Outfall	47.900	47.217	0.054	1186.302	0.9	0.25	5.3	Surcharged
PPO1	FSR: 100 years: +0 %: 360 mins: Winter	Pipe	PP1	S11	49.248	48.869	0.150	11.814	0.0	0.02	0.7	OK
PPO2	FSR: 100 years: +0 %: 240 mins: Winter	Pipe	PP2	PP9	49.247	48.856	0.011	7.389	1.1	0.01	0.7	OK
PPO4	FSR: 100 years: +0 %: 240 mins: Winter	Pipe	PP4	PP9	49.247	48.854	0.014	7.306	0.8	0.03	0.7	OK
PPO6	FSR: 100 years: +0 %: 360 mins: Winter	Pipe	PP6	S3	49.203	48.823	0.105	12.035	0.1	0.02	0.7	OK
1.004	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	S4	S5	49.060	47.998	0.147	37.772	1.9	0.2	76.6	OK
1.005	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	S5	Cellular Storage 3	49.000	47.872	0.158	37.573	3.1	0.17	76.0	OK
PPO5	FSR: 100 years: +0 %: 180 mins: Winter	Pipe	PP5	Cellular Storage 3	49.142	48.738	0.100	4.859	0.1	0.03	0.6	Surcharged
PPO3	FSR: 100 years: +0 %: 240 mins: Winter	Pipe	PP3	Cellular Storage 2	49.247	48.849	0.100	7.321	0.1	0.02	0.7	Surcharged

64120: Observer Park, Reading Drainage Calculations Set 1		Date: 06/06/2025		
Report Details: Type: Connections Summary Storm Phase: Phase		Designed by: HW	Checked by: GF	
		PRP UK LTD: Catherine House, Brixworth NN6 9BX Northamptonshire		



FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S1	S2	49.300	48.281	0.258	17.800	0.6	0.73	37.3	OK
1.001	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S2	S3	49.400	48.260	0.247	52.900	1.4	0.61	111.4	OK
1.003	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S3	S4	49.400	48.174	0.213	52.903	1.7	0.59	109.2	OK
2.000	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S6	S7	49.330	48.129	0.265	45.248	1.2	0.31	98.9	OK
2.001	FSR: 100 years: +40 %: 30 mins: Summer	Pipe	S7	Cellular Storage 3	49.195	47.974	0.329	84.944	2.4	1.84	152.0	OK
1.006	FSR: 100 years: +40 %: 60 mins: Winter	Pipe	Cellular Storage 3	S8	49.100	48.103	0.375	4.571	0.4	0.01	2.1	Surcharged
1.007	FSR: 100 years: +40 %: 1440 mins: Winter	Pipe	S8	S9	49.195	48.731	0.499	227.594	0.3	0.01	1.7	Surcharged
1.008	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S9	S15	49.050	47.530	0.174	8.220	0.3	0.07	14.2	OK
3.000	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S10	S11	49.410	48.318	0.233	74.582	2.2	0.7	160.1	OK
3.001	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S11	Cellular Storage 2	49.300	48.132	0.193	74.419	3.7	0.35	158.1	OK
4.000	FSR: 100 years: +40 %: 180 mins: Winter	Pipe	PP9	S12	49.445	48.458	0.225	19.083	0.1	0.01	2.3	OK
4.001	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S12	Cellular Storage 2	49.320	47.982	0.337	34.814	1.5	1.23	101.6	OK
5.000	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S13	Cellular Storage 2	49.410	48.452	0.225	61.790	1.9	0.6	131.2	OK
3.002	FSR: 100 years: +40 %: 720 mins: Winter	Pipe	Cellular Storage 2	S14	49.320	48.999	0.375	233.856	0.1	0.06	5.0	Surcharged

64120: Observer Park, Reading Drainage Calculations Set 1		Date: 06/06/2025		
		Designed by: HW	Checked by: GF	Approved By: HP
Report Details: Type: Connections Summary Storm Phase: Phase		PRP UK LTD: Catherine House, Brixworth NN6 9BX Northamptonshire		



3.002 (1)	FSR: 100 years: +40 %: 600 mins: Winter	Pipe	S14	S15	49.200	48.991	0.375	195.433	1.0	0.01	3.7	Flood Risk
1.009	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S15	S18	49.200	47.529	0.317	25.660	0.5	0.25	53.6	OK
6.000	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S17	S18	48.670	47.525	0.365	0.000	0.0	0.02	4.9	OK
6.001	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	Cellular Storage 1	S17	48.670	47.525	0.355	0.000	0.0	0.03	4.7	OK
6.002	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S16	Cellular Storage 1	48.670	47.525	0.355	0.000	0.0	0	0.1	OK
1.010	FSR: 100 years: +40 %: 960 mins: Summer	Pipe	S18	S19	48.190	47.853	0.225	493.312	0.5	0.24	9.6	Surcharged
1.011	FSR: 100 years: +40 %: 960 mins: Summer	Pipe	S19	Pond	48.175	47.588	0.225	491.673	0.5	0.24	10.4	Surcharged
1.012	FSR: 100 years: +40 %: 1440 mins: Summer	Pipe	Pond	S20	47.900	47.671	0.225	669.342	0.1	0.18	5.3	Surcharged
1.013	FSR: 100 years: +40 %: 8640 mins: Summer	Pipe	S20	Watercourse Outfall	47.900	47.220	0.054	1695.942	0.9	0.25	5.3	Surcharged
PPO1	FSR: 100 years: +40 %: 240 mins: Winter	Pipe	PP1	S11	49.248	48.912	0.150	14.218	0.1	0.04	1.2	Surcharged
PPO2	FSR: 100 years: +40 %: 180 mins: Winter	Pipe	PP2	PP9	49.247	48.894	0.015	9.599	1.3	0.02	1.1	Surcharged
PPO4	FSR: 100 years: +40 %: 180 mins: Winter	Pipe	PP4	PP9	49.247	48.892	0.019	9.491	0.9	0.05	1.2	Surcharged
PPO6	FSR: 100 years: +40 %: 240 mins: Winter	Pipe	PP6	S3	49.203	48.865	0.150	14.495	0.1	0.04	1.3	Surcharged
1.004	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S4	S5	49.060	48.038	0.186	52.654	2.0	0.29	107.7	OK
1.005	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S5	Cellular Storage 3	49.000	47.927	0.239	52.287	3.3	0.24	106.8	OK
PPO5	FSR: 100 years: +40 %: 180 mins: Winter	Pipe	PP5	Cellular Storage 3	49.142	48.770	0.100	7.452	0.1	0.05	1.0	Surcharged
PPO3	FSR: 100 years: +40 %: 180 mins: Winter	Pipe	PP3	Cellular Storage 2	49.247	48.884	0.100	9.531	0.2	0.04	1.2	Surcharged

64120: Observer Park, Reading Drainage Calculations Set 2	Date: 06/06/0025		
	Designed by: HW	Checked by: GF	Approved By: HP
Report Details: Type: Junctions Storm Phase: Phase	PRP UK LTD: Catherine House, Brixworth NN6 9BX Northamptonshire		

PRP

consulting engineers & surveyors

Outlets			
Junction	Outlet Name	Outgoing Connection	Outlet Type
S23	Outlet	7.000	Free Discharge
	Outlet	7.002	Hydro-Brake®
	Invert Level (m)	46.840	
	Design Depth (m)	0.750	
	Design Flow (L/s)	2.0	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☐	
	Unit Reference	CHE-0069-2000-0750-2000	

64120: Observer Park, Reading Drainage Calculations Set 2		Date: 06/06/0025	
		Designed by: HW	Checked by: GF
		Approved By: HP	
Report Details: Type: Connections Storm Phase: Phase		PRP UK LTD: Catherine House, Brixworth NN6 9BX Northamptonshire	



Name	Length (m)	Connection Type	Slope (1:X)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)	Upstream Cover Level (m)	Upstream Invert Level (m)
7.002	2.934	Pipe	20.960		0.6	100	47.800	46.840
7.000	3.318	Pipe	28.853		0.6	300	48.000	47.160
7.001	2.015	Pipe	0.000		0.6	300	47.762	46.840

Name	Downstream Cover Level (m)	Downstream Invert Level (m)	Lock	Flow Restriction (L/s)	Culvert Type	Culvert Entrance
7.002	48.000	46.700	None	2.2	(None)	(None)
7.000	47.045	47.045	Levels		(None)	(None)
7.001	47.800	46.840	None		(None)	(None)

64120: Observer Park, Reading Drainage Calculations Set 2		Date: 06/06/0025			
Report Details: Type: Manhole Schedule Storm Phase: Phase		Designed by: HW	Checked by: GF		Approved By: HP
		PRP UK LTD: Catherine House, Brixworth NN6 9BX Northamptonshire			

Name	Cover Level (m) Invert Level (m)	Manhole Size (m)	Connection Details				Type
Coordinates (m)	Depth (m)		Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type
			Outgoing Connections				Cover
S23	48.000 47.160	Diameter / Length: 1.200					Manhole
E:474913.182 N:167479.457	0.840		{a} 7.000	Pipe	47.160	Diam/Width:300	Not Applicable
S24	47.800 46.840	Diameter / Length: 1.200	{1} 7.001	Pipe	46.840	Diam/Width:300	Manhole
E:474913.958 N:167373.911	0.960		{a} 7.002	Pipe	46.840	Diam/Width:100	Not Applicable
Existing Watercourse	48.000 46.700	Diameter / Length: 1.200	{1} 7.002	Pipe	46.700	Diam/Width:100	Manhole
E:474911.428 N:167372.425	1.300						
							Not Applicable

64120: Observer Park, Reading Drainage Calculations Set 2		Date: 06/06/0025		
Report Details: Type: Inflow Summary Storm Phase: Phase		Designed by: HW	Checked by: GF	
		PRP UK LTD: Catherine House, Brixworth NN6 9BX Northamptonshire		

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Catchment Area	S23		Time of Concentration	0.18	100	0	100	0.18
TOTAL		0.0		0.18				0.18

64120: Observer Park, Reading Drainage Calculations Set 2	Date: 06/06/0025		
	Designed by: HW	Checked by: GF	Approved By: HP
Report Details: Type: Outfall Details Storm Phase: Phase	PRP UK LTD: Catherine House, Brixworth NN6 9BX Northamptonshire		



Outfalls

Outfall	Outfall Type	Gated	Fixed Surcharged Level (m)	Level Curve
Existing Watercourse	Free Discharge			

64120: Observer Park, Reading Drainage Calculations Set 2	Date: 06/06/0025		
	Designed by: HW	Checked by: GF	Approved By: HP
Report Title: Rainfall Analysis Criteria	PRP UK LTD: Catherine House, Brixworth NN6 9BX Northamptonshire		



Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall	
FSR	Type: FSR

Region	England And Wales
M5-60 (mm)	18.3
Ratio R	0.400
Summer	☒
Winter	☒

Return Period (years)	Increase Rainfall (%)
1.0	0.000
30.0	0.000
100.0	0.000
100.0	40.000

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
180	360
240	480
360	720
480	960
600	1200
720	1440
960	1920
1440	2880
2160	4320
2880	5760
4320	8640
5760	11520
7200	14400
8640	17280
10080	20160

64120: Observer Park, Reading Drainage Calculations Set 2		Date: 06/06/0025		
Report Details: Type: Inflows Summary Storm Phase: Phase		Designed by: HW	Checked by: GF	
		PRP UK LTD: Catherine House, Brixworth NN6 9BX Northamptonshire		



FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m³)
Catchment Area	FSR: 100 years: +40 %: 15 mins: Winter	0.18	102.5	47.365

64120: Observer Park, Reading Drainage Calculations Set 2		Date: 06/06/0025			
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: HW	Checked by: GF		
		PRP UK LTD: Catherine House, Brixworth NN6 9BX Northamptonshire			



FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Flooded Volume

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
S23	FSR: 100 years: +40 %: 15 mins: Summer	48.00 0	47.16 0	47.398	0.238	97.5	0.269	0.000	96.8	42.123	OK
S24	FSR: 100 years: +40 %: 15 mins: Summer	47.80 0	46.84 0	47.271	0.431	4.1	0.488	0.000	2.0	1.908	Surcharged
Existing Watercourse	FSR: 100 years: +40 %: 15 mins: Summer	48.00 0	46.70 0	46.726	0.026	2.0	0.000	0.000	2.0	1.880	OK

64120: Observer Park, Reading Drainage Calculations Set 2		Date: 06/06/0025			
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Designed by: HW	Checked by: GF		
		PRP UK LTD: Catherine House, Brixworth NN6 9BX Northamptonshire			



**FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By:
Max. Avg. Depth**

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residual Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Swale	FSR: 100 years: +40 %: 240 mins: Winter	47.452	47.452	0.410	0.612	19.7	90.024	0.000	0.000	2.0	46.661	47.096	OK

APPENDIX VII

MAINTENANCE AND MANAGEMENT PLAN

**MANAGEMENT AND MAINTENANCE SCHEDULE
FOR
SURFACE WATER DRAINAGE**

Project No: **64120 – Observer Park, Reading**

For: Tungsten Dev Co 4 Limited

Date: June 2025

Prepared by: PRP
Catherine House
Old Harbourough Road
Brixworth
Northampton
NN6 9BX

Type of Structure	Maintenance Schedule	Required Action	Typical Frequency	Party Responsible for Maintenance
Gutters and Rodding Eyes	Regular maintenance	Inspect all gutters for sediment and debris and remove as necessary to prevent it from entering the surface water system	Annually	
Channel Drains, Gullies and Inlet Kerbs	Regular maintenance	Inspect manholes, gullies and inlet kerbs. Remove any silt or debris from base and ensure that they are clean.	Six monthly	
		Jet pipework to remove debris/silt	As required	
Inspection chambers manholes and catchpits	Regular maintenance	Inspect catchpits & inspection chambers and note rate of sediment accumulation	Quarterly during first 12 months and then annually onwards	
		Clear catchpits & inspection chamber of any sediment & litter (including leaf litter) accumulation and jet pipework to remove debris and silt	Quarterly / as required	
Flow control	Monitoring	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly during autumn and winter	
	Occasional maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Quarterly	
		Remove sediment build-up from pre-treatment structures	Quarterly	
	Regular maintenance	Regular inspection to be carried out in accordance with manufacturer's instructions	As required	
	Remedial action	Filter blocks to be removed and replaced in the event they fail	As required	

Permeable paving surfacing (Hard Surfacing)	Monitoring	Inspect silt accumulation silt and debris rates on the surface to establish appropriate brushing of surface and replacing aggregate between block pavements as required.	Quarterly	
		Inspect evidence of ponding or poor operation and / or weed growth - remedial action to be completed as required.	Quarterly	
	Occasional maintenance	Removal of weed or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required	
	Regular maintenance	Brushing and vacuuming (Standard cosmetic sweep over whole surface)	Annually - After autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturers recommendations - pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect most sediment	
	Remedial action	Rehabilitation of surface and upper substructure by remedial sweeping.	Every 10 to 15 years or as required (if infiltration performance is reduced	

			due to significant clogging)	
Cellular Attenuation/Soakaway	Monitoring	Survey inside of tank for sediment build-up and remove as necessary	Every 5 years or as required	
		Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.	Annually	
	Occasional maintenance	Repair/rehabilitate inlets, outlets, overflows and vents.	As required	
		Remove sediment from road gullies and catchpit chambers	Annually or as required	
	Regular maintenance	Remove debris from catchment surface	Monthly	
		Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually	
General	Monitoring	The entire drainage system should be visually inspected during and after heavy rainfall, any flood levels and rise to expected flooding may be a warning sign that the drainage system is failing.	During and after heavy rainfall	
Bypass/Full Retention Separator	All as per Rain-Water Harvesting Tank Manufacturers Operation and maintenance guidance.			

Swale	Monitoring	Inspect and documents presence of wildlife.	As required.	
		Check for poor vegetation growth, prune and trim dying shrubs.	Six Monthly	
		Inspect/check all inlets, outlets and overflows to ensure that they are in good condition and operating as designed.	Monthly	
	Occasional Maintenance	Re-seed areas of poor vegetation growth. Alter plant types to better suit conditions, where required	Annually or as required	
		Remove nuisance and invasive vegetation	Annually or as required	
		Re-mulch re-turf and level to repair erosion.	Six monthly	
		Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface where required (typically every 60 month period)	As required or after heavy rainfall	
		Mow grasses (where required) and remove resultant clippings (during growing season only)	As required or after heavy rainfall	
	Regular maintenance	Remove litter debris from catchment surface	Monthly	
		Remove nuisance and invasive vegetation (for 12 months following installation)	Monthly for 1 year, then six monthly	
		Mow grasses (where required) and remove resultant clippings (during growing season only)	Monthly	
Pond	Occasional Maintenance	Reseed areas of poor vegetation growth	As required	
		Prune and trim any trees and remove cuttings	Every 2 years, or as required	

		Remove sediment from inlets, outlets, forebay and main basin when required	Every 5 years, or as required	
		Tidy all dead growth before start of growing season	Annually	
		Remove sediment from inlets, outlets.	Annually or as required	
		Manage wetland plants in outlet pools - where provided	Annually	
		Inspect bankside, structures, pipework etc for evidence of physical damage	Annually	
	Regular maintenance	Remove litter and debris	Monthly	
		Cut grass - for spillways and access routes	Monthly (during growing season), or as required.	
		Cut grass - mow grass in and around basin/pond	Monthly	
		Manage other vegetation and remove nuisance plants	Monthly at start, then as required	
		Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly	
		Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies	Monthly for first year, then annually or as required.	
	Remedial action	Repair erosion or other damage by reseedling and re-turfing	As required	
		Repair/rehabilitation of inlets, outlets and overflows	As required	
		Realignment of erosion protection system	As required	
		Relevel uneven surfaces and reinstate design levels	As required	

APPENDIX VIII

BYPASS SEPARATOR OPERATION AND MAINTENANCE GUIDANCE

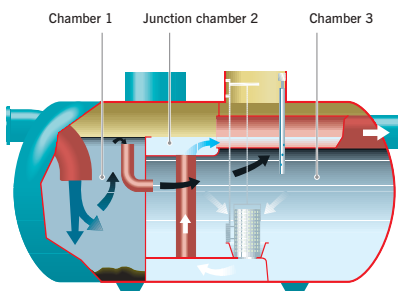
3.22 SPEL Stormceptor® By-Pass Separators

Maintenance

The SPEL Stormceptor® by-pass separator is a well proven high quality factory made unit, designed and tested in accordance with the European Standard BS EN 858-1 and meets the requirements of the Environment Agency and the Construction Products Regulations.

SPEL Stormceptors® are designed for long term performance and with SPEL high volume coalescer units, low maintenance.

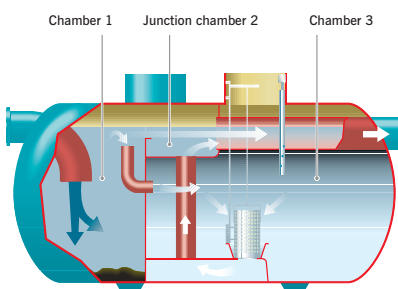
SPEL Stormceptor® by-pass separators are manufactured in class 1 and class 2 models and with or without silt capacity in accordance with BS EN 858-1. The range of models is listed in section 4 or on the SPEL Stormceptor® selection chart – available on request.



Flows according to nominal size (NSB)

The polluted surface water first enters the primary chamber where silt settles out and is retained. The fuel, oil and other pollutants lighter than water, rise to the surface and are efficiently skimmed off and transferred to the separation chamber.

In normal conditions all the flow is through the separation chamber, where the quiescent conditions allow the pollutants to separate out efficiently. Water from the cleanest zone in the separation chamber flows through a coalescer unit, to remove smaller globules of oil, up to the junction chamber and thence to the outlet.



Storm flows above NSB

During a storm the level in the primary chamber rises and the stormwater passes over the weir into the junction chamber and to the outlet.

The design keeps the turbulence within the separation chamber to a minimum which avoids disturbing the contaminants retained.

Maintenance requirements

The SPEL automatic alarm/monitoring system will automatically warn you when the SPEL Stormceptor® requires emptying of light liquids, however, silt will accumulate and require removing at intervals depending on the site conditions.

We recommend the SPEL Stormceptor® is checked at 3, 6, or 12 monthly intervals to determine the depth of silt in the primary chamber.

Where a SPEL automatic alarm/monitoring system is not fitted, the SPEL Stormceptor® should be checked at 3, 6, 12 monthly intervals, depending upon site conditions, to determine the depth of retained pollutants. When the depth of light liquids retained has reached the predetermined design level in accordance with the European Standard BS EN 858-1, or if excessive silt has accumulated, it should be emptied.

When emptying ensure both chambers (primary - chamber 1 and separation - chamber 3) are emptied equally to prevent unequal pressure on the internal partition.

Chamber 1

The inlet connects directly into chamber 1 - the primary chamber where silt etc. is deposited and light liquids are skimmed off to be transferred to the main separation chamber, chamber 3.

Maintenance requires the removal of accumulated silt etc., checking the skim pipe is not blocked and removing floating debris.

Chamber 2

This is the junction chamber where the clean water passing out of the main separation chamber and the storm flow over the weir from the primary chamber meet and pass to the outlet. This chamber is an approved sampling point if samples are required for analysis. As it is mainly clean water passing through the chamber, maintenance is confined to checking the weir plate is free of debris.

Chamber 3

The main separation chamber is where the light liquids are retained and in the case of class 1 Stormceptors®, where the coalescer units are incorporated.

If coalescer units are incorporated, these should be removed and cleaned in accordance with the requirements set out in Data Sheet ref. 3.23 steps 1 to 5.

Retained light liquids should be removed from the top and any sediment from the bottom. Small Stormceptor® by-pass separators generally need to be completely emptied.

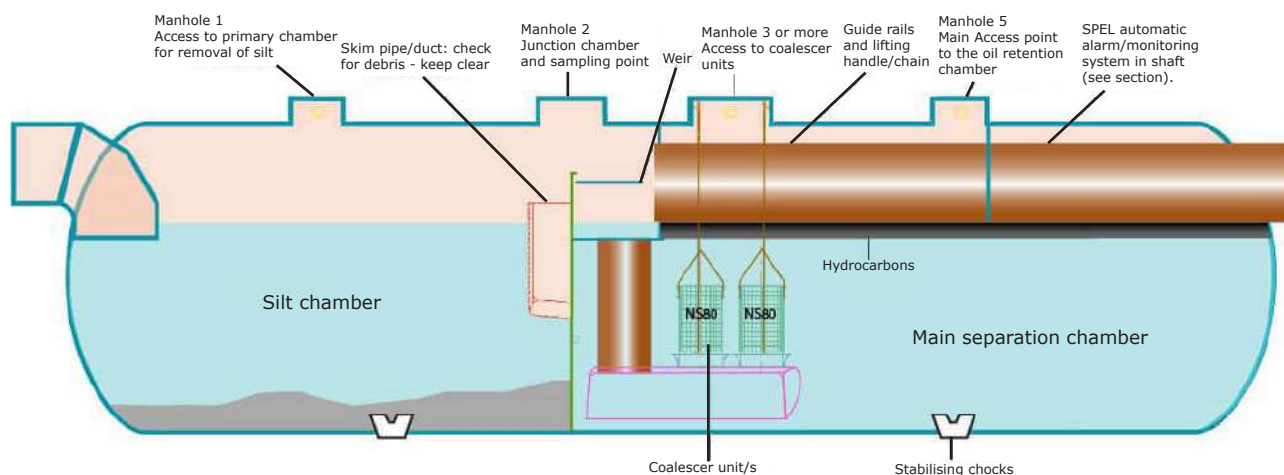
SPEL automatic alarm/monitoring system

If a SPEL automatic alarm/monitoring system is fitted this will automatically signal when the Stormceptor® requires light liquids to be removed. If this system is fitted see 3.10 – 3.19.

When emptying take care not to damage or shift the probe protection tube situated in the access shaft of chamber 3.

Maintenance Access

SPEL Stormceptor® class 1 by-pass separators 400, 500 & 600 Series



A wide range of SPEL Stormceptor® class 1 by-pass separators is available incorporating coalescer unit/s for small to large catchment areas.

When emptying ensure both chambers (primary – chamber 1 and separation – chamber 3) are emptied equally to prevent unequal pressure on the internal partition.

Manhole access 1

This is the access to the primary chamber for removal of silt, the inspection of the skim pipe and clearing of any floating debris.

Manhole access 2

This provides access to the junction chamber which is suitable as a sampling point for the final discharge.

Manhole access 3 & 4 (larger models)

These provide access for the inspection, the removal and reinsertion of the coalescer units and the removal of hydrocarbons and silt.

The SPEL automatic alarm/monitoring system probe is generally situated at the base of this access shaft (see section on alarms).

3.24 SPEL Puraceptor® Class 1 Separators

Maintenance

SPEL Puraceptor® class 1 separators

The SPEL Puraceptor® class 1 separator is available in single chamber or two chamber models.

Single chamber models (Figure 1)

These incorporate a coalescer unit and an automatic closure device type 'R'. For maintenance see 3.20.

Two chamber models (Figure 2)

The maintenance procedure for the SPEL Puraceptor® class 1 two chamber models is detailed on sheet 3.20.

Figure 1

Maintenance requirements

The SPEL automatic alarm/monitoring system will automatically warn you when the SPEL Separator requires emptying of light liquids. See ref. 3.10 – 3.19. However, silt will accumulate and require removing at intervals depending on the site conditions.

We recommend the SPEL Separator is checked at 3, 6 or 12 monthly intervals to determine the depth of silt in the primary chamber.

Separators must be provided with a remote device to provide visual and audible warning when the level of oil reaches 90 per cent of the oil storage volume (V) under static liquid level conditions. This automatic warning device indicates that the separator is in need of immediate emptying for it to continue to work effectively.

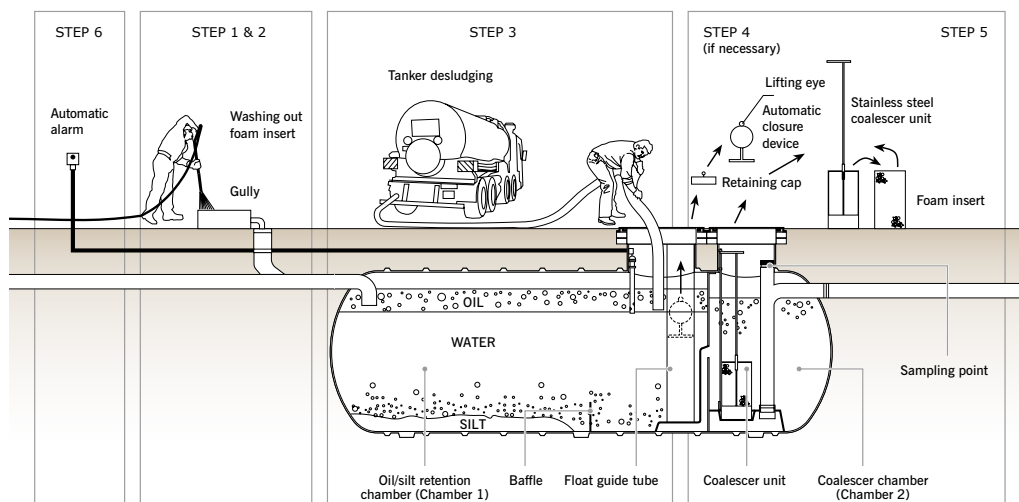
Figure 2

REV 06.20

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Maintenance

SPEL Puraceptor® separator - two chamber model



Step 1: Coalescer unit

Use the lifting handle or unclip the retaining clip for the wire rope and lift the coalescer unit out of the tank and place ahead of the Puraceptor®.

Step 2: Cleaning foam insert

Remove foam insert and wash with normal water pressure ensuring the dirty water runs into the Puraceptor®.

Step 3: Sucking out oil/fuel and silt

Suck off the retained oil from both chambers of the Puraceptor® and then the silt deposited on the bottom, leaving sufficient water to ensure the ACD remains floating.

Step 4: Sucking out complete contents (if necessary)

If the quantity of pollutants exceeds recommended levels, the complete contents of the Puraceptor® may need to be removed.

After sucking out completely, remove the ACD in the ACD retaining tube by first removing the retaining cap (this is to safeguard against the removal of the float by unauthorised persons).

Then, by means of a pole with a hook, lift out the ACD using the lifting eye on the float. Check the seating at the base of the retaining tube is free of debris/silt that could prevent the ACD closing off in an emergency.

Step 5: Re-insert coalescer unit and ACD

Re-insert the foam insert into the stainless steel coalescer unit and re-insert the coalescer unit into the Puraceptor®. Re-clip the wire rope or location pin as provided with the SPEL lifting/locating/locking system (see 3.7).

Partially fill the Puraceptor® with clean water to ensure the ACD when re-inserted remains floating. Check the ACD is not damaged and the closure plate is clean. Re-insert the ACD.

Finally check the ACD is floating and the retaining cap has been replaced to safeguard against its removal by unauthorised persons, unless depth of tank precludes doing so from ground level.

ACD closes off in emergency due to oil spill

If the ACD closes off, the oil/fuel spill needs to be removed by a suction tanker. With a single chamber model, the complete contents will need to be removed in order to release the ACD. With the two chamber models, insert the suction hose into the first chamber (oil/silt retention chamber) and then the head in the second chamber will normally provide a back pressure and automatically release the ACD.

Precaution: never try to pull the ACD off its seating by force.

Step 6: SPEL automatic alarm /monitoring system

The SPEL automatic alarm/monitoring system probe should be lifted out of the probe protection tube, wiped clean and re-inserted. The system should now be reset according to instructions. See 3.10 – 3.19.

Maintenance procedure

The SPEL automatic alarm/monitoring system will automatically warn you when the Puraceptor® requires emptying. See 3.10 – 3.19. Where a SPEL automatic alarm/monitoring system is not fitted, SPEL Puraceptors® should be checked at three, six or twelve-monthly intervals depending on site conditions, to determine the depth of retained pollutants and silt in both chambers and the correct operating of the ACD (automatic closure device). When the depth of the oil/fuel retained has reached the predetermined design level, in accordance with BS EN 858-1, it should be emptied.

Important Note: When emptying, ensure both chambers are emptied equally starting with the oil retention chamber and then the coalescer chamber and back again until empty.

APPENDIX IX

SURFACE WATER QUALITY ASSESSMENT

SUMMARY TABLE		DESIGN CONDITIONS			
		1	2	3	4
Land Use Type	Non-residential parking with infrequent change (e.g. schools, offices, < 300 traffic movements a day)				
Pollution Hazard Level	Low				
Pollution Hazard Indices					
TSS	0.5				
Metals	0.4				
Hydrocarbons	0.4				
SuDS components proposed					
Component 1	Pervious pavement (where the pavement is not designed as an infiltration component)	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B	Ponds/wetlands should be preceded by an upstream component(s) that trap(s) silt, or designed specifically to retain sediment in a separate zone, easily accessible for maintenance, such that the sediment will not be re-suspended in subsequent events		
Component 2	Pond or wetland				
Component 3	None				
SuDS Pollution Mitigation Indices					
TSS	>0.95				
Metals	0.95				
Hydrocarbons	0.95				
Groundwater protection type	None				
Groundwater protection					
Pollution Mitigation Indices					
TSS	0				
Metals	0				
Hydrocarbons	0				
Combined Pollution Mitigation Indices					
TSS	>0.95				
Metals	0.95				
Hydrocarbons	0.95				
Acceptability of Pollution Mitigation					
TSS	Sufficient				
Metals	Sufficient				
Hydrocarbons	Sufficient				

SUMMARY TABLE		DESIGN CONDITIONS			
		1	2	3	4
Land Use Type	Low traffic roads (e.g. residential roads and general access roads, < 300 traffic movements/day)				
Pollution Hazard Level	Low				
Pollution Hazard Indices					
TSS	0.5				
Metals	0.4				
Hydrocarbons	0.4				
SuDS components proposed		SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B	Ponds/wetlands should be preceded by an upstream component(s) that trap(s) silt, or designed specifically to retain sediment in a separate zone, easily accessible for maintenance, such that the sediment will not be re-suspended in subsequent events		
Component 1	Pond or wetland				
Component 2	None				
Component 3	None				
SuDS Pollution Mitigation Indices					
TSS	0.7				
Metals	0.7				
Hydrocarbons	0.5				
Groundwater protection type	None				
Groundwater protection					
Pollution Mitigation Indices					
TSS	0				
Metals	0				
Hydrocarbons	0				
Combined Pollution Mitigation Indices		Note: In order to meet both Water Quality criteria set out in the SuDS Manual (Chapter 4), Interception should be delivered for all impermeable areas wherever possible. Interception delivery and treatment may be met by the same components, but Interception requires separate evaluation.	Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England		
TSS	0.7				
Metals	0.7				
Hydrocarbons	0.5				
Acceptability of Pollution Mitigation					
TSS	Sufficient				
Metals	Sufficient				
Hydrocarbons	Sufficient				

SUMMARY TABLE		DESIGN CONDITIONS			
		1	2	3	4
Land Use Type	Low traffic roads (e.g. residential roads and general access roads, < 300 traffic movements/day)				
Pollution Hazard Level	Low				
Pollution Hazard Indices					
TSS	0.5				
Metals	0.4				
Hydrocarbons	0.4				
SuDS components proposed		SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B			
Component 1	Swale				
Component 2	None				
Component 3	None				
SuDS Pollution Mitigation Indices					
TSS	0.5				
Metals	0.6				
Hydrocarbons	0.6				
Groundwater protection type	None				
Groundwater protection					
Pollution Mitigation					
Indices					
TSS	0				
Metals	0				
Hydrocarbons	0				
Combined Pollution Mitigation Indices		Note: In order to meet both Water Quality criteria set out in the SuDS Manual (Chapter 4), Interception should be delivered for all impermeable areas wherever possible. Interception delivery and treatment may be met by the same components, but Interception requires separate evaluation.	Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England		
TSS	0.5				
Metals	0.6				
Hydrocarbons	0.6				
Acceptability of Pollution Mitigation					
TSS	Sufficient				
Metals	Sufficient				
Hydrocarbons	Sufficient				

SUMMARY TABLE		DESIGN CONDITIONS			
		1	2	3	4
Land Use Type	Commercial/Industrial roofing: Inert materials				
Pollution Hazard Level	Very low				
Pollution Hazard Indices					
TSS	0.3				
Metals	0.2				
Hydrocarbons	0.05				
SuDS components proposed		SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B	Ponds/wetlands should be preceded by an upstream component(s) that trap(s) silt, or designed specifically to retain sediment in a separate zone, easily accessible for maintenance, such that the sediment will not be re-suspended in subsequent events		
Component 1	Pond or wetland				
Component 2	None				
Component 3	None				
SuDS Pollution Mitigation Indices					
TSS	0.7				
Metals	0.7				
Hydrocarbons	0.5				
Groundwater protection type	None				
Groundwater protection					
Pollution Mitigation Indices					
TSS	0				
Metals	0				
Hydrocarbons	0				
Combined Pollution Mitigation Indices		Note: In order to meet both Water Quality criteria set out in the SuDS Manual (Chapter 4), Interception should be delivered for all impermeable areas wherever possible. Interception delivery and treatment may be met by the same components, but Interception requires separate evaluation.	Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England		
TSS	0.7				
Metals	0.7				
Hydrocarbons	0.5				
Acceptability of Pollution Mitigation					
TSS	Sufficient				
Metals	Sufficient				
Hydrocarbons	Sufficient				

SUMMARY TABLE		DESIGN CONDITIONS			
		1	2	3	4
Land Use Type	Standard commercial yard or delivery area	This classification is not appropriate for haulage yards, lorry parks, waste management areas, or chemical storage/handling zones			
Pollution Hazard Level	Medium				
Pollution Hazard Indices					
TSS	0.7				
Metals	0.6				
Hydrocarbons	0.7				
SuDS components proposed		SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B	Ponds/wetlands should be preceded by an upstream component(s) that trap(s) silt, or designed specifically to retain sediment in a separate zone, easily accessible for maintenance, such that the sediment will not be re-suspended in subsequent events		
Component 1	Pond or wetland				
Component 2	SPEL Stormceptor Bypass Separator				
Component 3	None				
SuDS Pollution Mitigation Indices		Detailed assessment of performance of designed component in reducing inflow concentrations of each pollutant type required as evidence of adopted indices. Enter indices approved by the environmental regulator in appropriate 'User Defined Indices' row below			
TSS	>0.95				
Metals	>0.95				
Hydrocarbons	0.95				
Groundwater protection type	None				
Groundwater protection					
Pollution Mitigation Indices					
TSS	0				
Metals	0				
Hydrocarbons	0				
Combined Pollution Mitigation Indices		Note: In order to meet both Water Quality criteria set out in the SuDS Manual (Chapter 4), Interception should be delivered for all impermeable areas wherever possible. Interception delivery and treatment may be met by the same components, but Interception requires separate evaluation.	Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England		
TSS	>0.95				
Metals	>0.95				
Hydrocarbons	0.95				
Acceptability of Pollution Mitigation					
TSS	Sufficient				
Metals	Sufficient				
Hydrocarbons	Sufficient				

APPENDIX X**GENERAL CONDITIONS**

1. This report has been prepared and written specifically for the Client named in the introduction and is exclusively for his/her/their benefit. No reliance may be placed on the contents of this report by any third party except with the express agreement of the original Client and the written agreement of PRP. Such a written agreement may require the payment of an additional fee.
2. This report has been prepared and written in the context of the proposals for the development of the site as stated by the client and will not be valid in a different context. Furthermore, new information, improved practices, or legislation may necessitate alteration to the report in whole or in part after its submission. Therefore, with any change in circumstances or after the expiry of one year from the date of this report, it should be referred to us for re-assessment.
3. Factual reports received from third parties are included or summarised in this report. They have been used in the best faith and the context of the site and the proposals. We cannot be held responsible for any shortcomings in these third-party reports in any way whatsoever.
4. There may also be special conditions appertaining to the site which were not revealed by the investigation, and which will not, therefore, have been considered in this report. Any assessments may be subject to amendment in the light of additional information becoming available.
5. Whilst an opinion may be expressed or implied in this report on possible configurations or the possible presence of features based on either visual, verbal or published evidence, this is for guidance only and no liability can be accepted for the accuracy of such opinions.
6. Comments on groundwater conditions will have been based on observations made only at the time of any investigation or published data unless otherwise stated. It should be noted, however, that groundwater levels vary due to seasonal and other effects.
7. This report is not a site categorisation, and hazards could occur which have not been detected.
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