100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for NETWORK 3.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	1	69.740	-0.100	0.000	0.20			15.6	OK
1.001	2	69.735	0.220	0.000	0.44			31.3	SURCHARGED*
1.002	3	69.728	0.473	0.000	0.13			14.2	SURCHARGED
2.000	10	69.724	0.324	0.000	0.03			2.7	SURCHARGED
1.003	4	69.722	0.537	0.000	0.13			16.6	SURCHARGED
1.004	5	69.713	0.668	0.000	0.15			17.1	FLOOD RISK
1.005	6	69.708	0.743	8.226	0.14			17.6	FLOOD
1.006	7	69.703	0.838	0.000	0.13			23.6	SURCHARGED
3.000	11	69.737	0.187	0.000	0.16			3.0	SURCHARGED
3.001	12	69.731	0.426	0.000	0.42			7.5	SURCHARGED
3.002	13	69.722	0.567	0.000	0.50		86	6.8	SURCHARGED
3.003	12	69.708	0.668	0.000	0.16		114	7.0	SURCHARGED
1.007	8	69.699	1.184	0.000	0.55			14.5	SURCHARGED

PN	US/MH Name	Level Exceeded
1.000	1	
1.001	2	
1.002	3	
2.000	10	
1.003	4	
1.004	5	
1.005	6	4
1.006	7	
3.000	11	
3.001	12	
3.002	13	
3.003	12	
1.007	8	

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200 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for NETWORK 3.SWS

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	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	0.388
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.200	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	50.0
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, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	200
Climate Change (%)	40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	120 Winter	200	+40%	200/60 Winter			
1.001	2	120 Winter	200	+40%	200/15 Summer			
1.002	3	120 Winter	200	+40%	200/30 Summer			
2.000	10	120 Winter	200	+40%	200/30 Summer			
1.003	4	120 Winter	200	+40%	200/15 Summer			
1.004	5	120 Winter	200	+40%	200/15 Summer	200/60 Winter		
1.005	6	120 Winter	200	+40%	200/15 Summer	200/60 Summer		
1.006	7	120 Winter	200	+40%	200/15 Summer			
3.000	11	120 Winter	200	+40%	200/15 Summer			
3.001	12	120 Winter	200	+40%	200/15 Summer			
3.002	13	120 Winter	200	+40%	200/15 Summer			
3.003	12	180 Winter	200	+40%	200/15 Summer			
1.007	8	180 Winter	200	+40%	200/15 Summer			

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200 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for NETWORK 3.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	1	69.877	0.037	0.000	0.23			18.3	SURCHARGED*
1.001	2	69.872	0.357	0.000	0.51			36.7	SURCHARGED*
1.002	3	69.860	0.605	0.000	0.21			22.9	SURCHARGED
2.000	10	69.852	0.452	0.000	0.04			3.1	SURCHARGED
1.003	4	69.849	0.664	0.000	0.22			28.7	SURCHARGED
1.004	5	69.754	0.709	4.313	0.25			27.9	FLOOD
1.005	6	69.740	0.775	40.046	0.14			17.9	FLOOD
1.006	7	69.734	0.869	0.000	0.17			29.1	SURCHARGED
3.000	11	69.799	0.249	0.000	0.26			4.8	SURCHARGED
3.001	12	69.785	0.480	0.000	0.50			8.9	SURCHARGED
3.002	13	69.763	0.608	0.000	0.52		134	7.0	SURCHARGED
3.003	12	69.737	0.697	0.000	0.16		162	7.0	SURCHARGED
1.007	8	69.730	1.215	0.000	0.57			15.0	SURCHARGED

PN	US/MH Name	Level Exceeded
1.000	1	
1.001	2	
1.002	3	
2.000	10	
1.003	4	
1.004	5	4
1.005	6	15
1.006	7	
3.000	11	
3.001	12	
3.002	13	
3.003	12	
1.007	8	

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for NETWORK 4.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1	PIMP (%)	100
M5-60 (mm)	19.100	Add Flow / Climate Change (%)	0
Ratio R	0.389	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for NETWORK 4.SWS

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.361	4-8	0.205	8-12	0.000

Total Area Contributing (ha) = 0.566

Total Pipe Volume (m³) = 15.135

Network Design Table for NETWORK 4.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	9.549	0.120	79.6	0.018	5.00	0.0	0.600	o	150	Pipe/Conduit	🔒
1.001	24.454	0.305	80.2	0.019	0.00	0.0	0.600	o	150	Pipe/Conduit	🔒
1.002	62.832	0.625	100.5	0.030	0.00	0.0	0.600	o	225	Pipe/Conduit	🔒
1.003	27.854	0.280	99.5	0.060	0.00	0.0	0.600	o	225	Pipe/Conduit	🔒
1.004	8.857	0.090	98.4	0.015	0.00	0.0	0.600	o	225	Pipe/Conduit	🔒
2.000	37.288	0.295	126.4	0.072	5.00	0.0	0.600	o	150	Pipe/Conduit	🔒

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.14	70.225	0.018	0.0	0.0	0.0	1.13	19.9	2.4
1.001	49.44	5.50	70.105	0.037	0.0	0.0	0.0	1.12	19.9	5.0
1.002	46.42	6.31	69.725	0.067	0.0	0.0	0.0	1.30	51.8	8.4
1.003	45.22	6.66	69.100	0.127	0.0	0.0	0.0	1.31	52.1	15.6
1.004	44.85	6.77	68.820	0.142	0.0	0.0	0.0	1.32	52.4	17.2
2.000	48.67	5.70	69.155	0.072	0.0	0.0	0.0	0.89	15.8	9.5

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Network Design Table for NETWORK 4.SWS

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
2.001	6.958	0.055	126.5	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.005	60.721	0.355	171.0	0.016	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.006	10.950	0.145	75.5	0.017	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.000	51.583	0.120	429.9	0.040	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.007	7.550	0.050	151.0	0.040	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.000	51.583	0.570	90.5	0.021	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.008	9.582	0.065	147.4	0.021	0.00	0.0	0.600	o	300	Pipe/Conduit	
5.000	28.168	0.470	59.9	0.008	5.00	0.0	0.600	o	150	Pipe/Conduit	
6.000	29.021	0.665	43.6	0.035	5.00	0.0	0.600	o	150	Pipe/Conduit	
6.001	11.894	0.160	74.3	0.035	0.00	0.0	0.600	o	150	Pipe/Conduit	
7.000	36.821	0.600	61.4	0.041	5.00	0.0	0.600	o	150	Pipe/Conduit	
6.002	11.340	0.235	48.3	0.041	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
2.001	48.17	5.83	68.860	0.072	0.0	0.0	0.0	0.89	15.8	9.5
1.005	41.83	7.79	68.730	0.230	0.0	0.0	0.0	1.00	39.6	26.1
1.006	41.55	7.89	68.300	0.247	0.0	0.0	0.0	1.81	128.0	27.8
3.000	44.78	6.80	69.425	0.040	0.0	0.0	0.0	0.48	8.5	4.9
1.007	41.29	7.99	68.155	0.327	0.0	0.0	0.0	1.28	90.3	36.6
4.000	48.22	5.81	69.300	0.021	0.0	0.0	0.0	1.06	18.7	2.7
1.008	40.96	8.11	68.105	0.369	0.0	0.0	0.0	1.29	91.4	40.9
5.000	50.00	5.36	68.870	0.008	0.0	0.0	0.0	1.30	23.0	1.1
6.000	50.00	5.32	69.460	0.035	0.0	0.0	0.0	1.53	27.0	4.7
6.001	49.51	5.49	68.795	0.070	0.0	0.0	0.0	1.17	20.6	9.4
7.000	49.55	5.48	69.235	0.041	0.0	0.0	0.0	1.29	22.7	5.5
6.002	48.99	5.62	68.635	0.152	0.0	0.0	0.0	1.45	25.7	20.2

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Network Design Table for NETWORK 4.SWS

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
8.000	13.000	0.085	152.9	0.007	5.00	0.0	0.600	o	150	Pipe/Conduit	
8.001	46.959	0.885	53.1	0.008	0.00	0.0	0.600	o	150	Pipe/Conduit	
8.002	19.946	0.375	53.2	0.011	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.009	2.213	0.200	11.1	0.011	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
8.000	50.00	5.27	69.745	0.007	0.0	0.0	0.0	0.81	14.3	0.9
8.001	48.15	5.83	69.660	0.015	0.0	0.0	0.0	1.38	24.5	2.0
8.002	47.25	6.07	68.775	0.026	0.0	0.0	0.0	1.38	24.4	3.3
1.009	40.94	8.12	68.040	0.566	0.0	0.0	0.0	3.96	157.3	62.8

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Manhole Schedules for NETWORK 4.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
1	71.075	0.850	Open Manhole	600	1.000	70.225	150				
2	71.075	0.970	Open Manhole	600	1.001	70.105	150	1.000	70.105	150	
3	71.075	1.350	Open Manhole	600	1.002	69.725	225	1.001	69.800	150	
4	71.050	1.950	Open Manhole	900	1.003	69.100	225	1.002	69.100	225	
5	71.050	2.230	Open Manhole	900	1.004	68.820	225	1.003	68.820	225	
14	69.965	0.810	Open Manhole	1200	2.000	69.155	150				
15	71.000	2.140	Open Manhole	1200	2.001	68.860	150	2.000	68.860	150	
7	70.900	2.170	Open Manhole	900	1.005	68.730	225	1.004	68.730	225	
								2.001	68.805	150	
8	70.190	1.890	Open Manhole	900	1.006	68.300	300	1.005	68.375	225	
16	70.625	1.200	Open Manhole	900	3.000	69.425	150				
9	70.035	1.880	Open Manhole	900	1.007	68.155	300	1.006	68.155	300	
								3.000	69.305	150	1000
17	70.500	1.200	Open Manhole	900	4.000	69.300	150				
10	69.930	1.825	Open Manhole	900	1.008	68.105	300	1.007	68.105	300	
								4.000	68.730	150	475
18	69.870	1.000	Open Manhole	900	5.000	68.870	150				
19	70.660	1.200	Open Manhole	900	6.000	69.460	150				
20	69.995	1.200	Open Manhole	900	6.001	68.795	150	6.000	68.795	150	
22	70.435	1.200	Open Manhole	900	7.000	69.235	150				
21	69.835	1.200	Open Manhole	900	6.002	68.635	150	6.001	68.635	150	
								7.000	68.635	150	
23	70.945	1.200	Open Manhole	900	8.000	69.745	150				
24	71.000	1.340	Open Manhole	900	8.001	69.660	150	8.000	69.660	150	
25	69.975	1.200	Open Manhole	900	8.002	68.775	150	8.001	68.775	150	
12	69.600	1.560	Open Manhole	1500	1.009	68.040	225	1.008	68.040	300	
								5.000	68.400	150	285
								6.002	68.400	150	285
								8.002	68.400	150	285
13	70.500	2.660	Open Manhole	0		OUTFALL		1.009	67.840	225	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
1	473320.157	153766.222	473320.157	153766.222	Required	

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Manhole Schedules for NETWORK 4.SWS

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
2	473320.157	153775.772	473320.157	153775.772	Required	
3	473320.157	153800.226	473320.157	153800.226	Required	
4	473257.325	153800.226	473257.325	153800.226	Required	
5	473257.217	153772.372	473257.217	153772.372	Required	
14	473286.468	153762.563	473286.468	153762.563	Required	
15	473249.193	153761.575	473249.193	153761.575	Required	
7	473249.235	153768.533	473249.235	153768.533	Required	
8	473188.514	153768.634	473188.514	153768.634	Required	
16	473240.099	153779.555	473240.099	153779.555	Required	
9	473188.514	153779.584	473188.514	153779.584	Required	
17	473240.097	153787.134	473240.097	153787.134	Required	
10	473188.514	153787.134	473188.514	153787.134	Required	
18	473175.699	153769.028	473175.699	153769.028	Required	
19	473232.289	153803.214	473232.289	153803.214	Required	
20	473203.268	153803.214	473203.268	153803.214	Required	

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Manhole Schedules for NETWORK 4.SWS

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
22	473232.268	153794.125	473232.268	153794.125	Required	
21	473195.495	153794.212	473195.495	153794.212	Required	
23	473239.100	153801.276	473239.100	153801.276	Required	
24	473239.100	153814.205	473239.100	153814.205	Required	
25	473192.141	153814.205	473192.141	153814.205	Required	
12	473184.437	153795.806	473184.437	153795.806	Required	
13	473182.559	153796.977			No Entry	

Free Flowing Outfall Details for NETWORK 4.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.009	13	70.500	67.840	0.000	0	0

Simulation Criteria for NETWORK 4.SWS

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

Number of Input Hydrographs	0	Number of Storage Structures	14
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 Return Period (years) 1

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Synthetic Rainfall Details

Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.100	Cv (Winter)	0.840
Ratio R	0.389	Storm Duration (mins)	30
Profile Type	Summer		

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Storage Structures for NETWORK 4.SWS

Porous Car Park Manhole: 7, DS/PN: 1.005

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	30.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	41.7	Slope (1:X)	40.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	68.655	Cap Volume Depth (m)	0.500

Porous Car Park Manhole: 8, DS/PN: 1.006

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	30.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	41.7	Slope (1:X)	40.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	68.300	Cap Volume Depth (m)	0.500

Porous Car Park Manhole: 16, DS/PN: 3.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	26.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	36.1	Slope (1:X)	40.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	69.425	Cap Volume Depth (m)	0.500

Porous Car Park Manhole: 9, DS/PN: 1.007

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	26.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	36.1	Slope (1:X)	40.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	68.155	Cap Volume Depth (m)	0.500

Porous Car Park Manhole: 17, DS/PN: 4.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	26.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	36.1	Slope (1:X)	40.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	69.300	Cap Volume Depth (m)	0.500

Porous Car Park Manhole: 10, DS/PN: 1.008

Infiltration Coefficient Base (m/hr)	0.00000	Max Percolation (l/s)	36.1
Membrane Percolation (mm/hr)	1000	Safety Factor	2.0

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Porous Car Park Manhole: 10, DS/PN: 1.008

Porosity	0.30	Slope (1:X)	40.0
Invert Level (m)	68.105	Depression Storage (mm)	5
Width (m)	26.0	Evaporation (mm/day)	3
Length (m)	5.0	Cap Volume Depth (m)	0.500

Porous Car Park Manhole: 18, DS/PN: 5.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	25.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	34.7	Slope (1:X)	40.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	68.870	Cap Volume Depth (m)	0.500

Porous Car Park Manhole: 19, DS/PN: 6.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	14.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	19.4	Slope (1:X)	60.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	69.460	Cap Volume Depth (m)	0.500

Porous Car Park Manhole: 20, DS/PN: 6.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	14.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	19.4	Slope (1:X)	60.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	68.795	Cap Volume Depth (m)	0.500

Porous Car Park Manhole: 22, DS/PN: 7.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	18.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	25.0	Slope (1:X)	40.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	69.235	Cap Volume Depth (m)	0.500

Porous Car Park Manhole: 21, DS/PN: 6.002

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	18.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	25.0	Slope (1:X)	40.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	68.635	Cap Volume Depth (m)	0.500

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Porous Car Park Manhole: 23, DS/PN: 8.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	20.5
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	28.5	Slope (1:X)	60.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	69.745	Cap Volume Depth (m)	0.500

Porous Car Park Manhole: 24, DS/PN: 8.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	20.5
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	28.5	Slope (1:X)	60.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	69.660	Cap Volume Depth (m)	0.500

Porous Car Park Manhole: 25, DS/PN: 8.002

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	20.5
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	28.5	Slope (1:X)	60.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	68.775	Cap Volume Depth (m)	0.500

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for NETWORK 4.SWS

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Storage Structures 14
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 0.389
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 19.100 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 50.0
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, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	15 Winter	1	+0%	100/15 Winter			
1.001	2	15 Winter	1	+0%	100/15 Summer			
1.002	3	15 Winter	1	+0%	100/15 Summer			
1.003	4	15 Winter	1	+0%	100/15 Summer			
1.004	5	15 Winter	1	+0%	30/15 Summer			
2.000	14	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
2.001	15	15 Winter	1	+0%	30/15 Summer			
1.005	7	15 Winter	1	+0%	30/15 Summer			
1.006	8	60 Winter	1	+0%	30/15 Summer			
3.000	16	15 Winter	1	+0%	100/15 Summer			
1.007	9	60 Winter	1	+0%	30/15 Summer			
4.000	17	15 Winter	1	+0%	100/60 Summer			
1.008	10	60 Winter	1	+0%	1/30 Winter			
5.000	18	120 Winter	1	+0%	100/15 Winter			
6.000	19	15 Winter	1	+0%	100/60 Winter			
6.001	20	15 Winter	1	+0%	30/60 Winter			
7.000	22	15 Winter	1	+0%	100/30 Winter			
6.002	21	15 Winter	1	+0%	30/15 Summer			

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for NETWORK 4.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	1	70.262	-0.113	0.000	0.13			2.4	OK
1.001	2	70.155	-0.100	0.000	0.24			4.5	OK
1.002	3	69.784	-0.166	0.000	0.15			7.6	OK
1.003	4	69.183	-0.142	0.000	0.29			14.0	OK
1.004	5	68.915	-0.130	0.000	0.37			15.5	OK
2.000	14	69.241	-0.064	0.000	0.60			9.2	OK
2.001	15	68.951	-0.059	0.000	0.68			9.2	OK
1.005	7	68.841	-0.114	0.000	0.48		11	18.4	OK
1.006	8	68.450	-0.150	0.000	0.16		22	14.9	OK
3.000	16	69.490	-0.085	0.000	0.39		7	3.2	OK
1.007	9	68.447	-0.008	0.000	0.13		37	8.1	OK
4.000	17	69.332	-0.118	0.000	0.10		5	1.8	OK
1.008	10	68.439	0.034	0.000	0.13		43	8.5	SURCHARGED
5.000	18	68.879	-0.141	0.000	0.01		10	0.3	OK
6.000	19	69.501	-0.109	0.000	0.17		5	4.3	OK
6.001	20	68.861	-0.084	0.000	0.40		6	7.4	OK
7.000	22	69.284	-0.101	0.000	0.23		5	5.0	OK
6.002	21	68.725	-0.060	0.000	0.67		6	15.6	OK

PN	US/MH Name	Level Exceeded
1.000	1	
1.001	2	
1.002	3	
1.003	4	
1.004	5	
2.000	14	7
2.001	15	
1.005	7	
1.006	8	
3.000	16	
1.007	9	
4.000	17	
1.008	10	
5.000	18	
6.000	19	
6.001	20	
7.000	22	
6.002	21	

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for NETWORK 4.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
8.000	23	120 Winter	1	+0%				
8.001	24	120 Winter	1	+0%				
8.002	25	60 Winter	1	+0%	30/60 Winter			
1.009	12	60 Winter	1	+0%	1/15 Summer	100/60 Winter		

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
8.000	23	69.758	-0.137	0.000	0.02		13	0.2	OK
8.001	24	69.675	-0.135	0.000	0.02		13	0.5	OK
8.002	25	68.794	-0.131	0.000	0.04		16	0.9	OK
1.009	12	68.435	0.170	0.000	0.14			8.9	SURCHARGED

PN	US/MH Name	Level Exceeded
8.000	23	
8.001	24	
8.002	25	
1.009	12	4

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for NETWORK 4.SWS

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Storage Structures 14
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 0.389
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 19.100 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 50.0
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, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	15 Winter	30	+0%	100/15 Winter			
1.001	2	15 Winter	30	+0%	100/15 Summer			
1.002	3	15 Winter	30	+0%	100/15 Summer			
1.003	4	15 Winter	30	+0%	100/15 Summer			
1.004	5	15 Winter	30	+0%	30/15 Summer			
2.000	14	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
2.001	15	15 Winter	30	+0%	30/15 Summer			
1.005	7	15 Winter	30	+0%	30/15 Summer			
1.006	8	120 Winter	30	+0%	30/15 Summer			
3.000	16	15 Winter	30	+0%	100/15 Summer			
1.007	9	120 Winter	30	+0%	30/15 Summer			
4.000	17	15 Winter	30	+0%	100/60 Summer			
1.008	10	120 Winter	30	+0%	1/30 Winter			
5.000	18	120 Winter	30	+0%	100/15 Winter			
6.000	19	15 Winter	30	+0%	100/60 Winter			
6.001	20	120 Winter	30	+0%	30/60 Winter			
7.000	22	15 Winter	30	+0%	100/30 Winter			
6.002	21	120 Winter	30	+0%	30/15 Summer			

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for NETWORK 4.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	1	70.284	-0.091	0.000	0.33			5.8	OK
1.001	2	70.194	-0.061	0.000	0.64			12.2	OK
1.002	3	69.831	-0.119	0.000	0.43			21.5	OK
1.003	4	69.263	-0.062	0.000	0.84			40.6	OK
1.004	5	69.076	0.031	0.000	1.06			44.7	SURCHARGED
2.000	14	69.553	0.248	0.000	1.27			19.4	SURCHARGED
2.001	15	69.091	0.081	0.000	1.36			18.2	SURCHARGED
1.005	7	68.997	0.042	0.000	1.06		7	40.7	SURCHARGED
1.006	8	68.970	0.370	0.000	0.13		96	12.6	SURCHARGED
3.000	16	69.541	-0.034	0.000	0.95		7	7.9	OK
1.007	9	68.965	0.510	0.000	0.19		130	11.9	SURCHARGED
4.000	17	69.358	-0.092	0.000	0.32		5	5.8	OK
1.008	10	68.959	0.554	0.000	0.22		141	13.8	SURCHARGED
5.000	18	68.952	-0.068	0.000	0.05		23	1.1	OK
6.000	19	69.527	-0.083	0.000	0.41		5	10.6	OK
6.001	20	68.972	0.027	0.000	0.39		37	7.3	SURCHARGED
7.000	22	69.316	-0.069	0.000	0.55		5	12.2	OK
6.002	21	68.966	0.181	0.000	0.68		52	15.6	SURCHARGED

PN	US/MH Name	Level Exceeded
1.000	1	
1.001	2	
1.002	3	
1.003	4	
1.004	5	
2.000	14	7
2.001	15	
1.005	7	
1.006	8	
3.000	16	
1.007	9	
4.000	17	
1.008	10	
5.000	18	
6.000	19	
6.001	20	
7.000	22	
6.002	21	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for NETWORK 4.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
8.000	23	30 Winter	30	+0%				
8.001	24	30 Winter	30	+0%				
8.002	25	120 Winter	30	+0%	30/60 Winter			
1.009	12	120 Winter	30	+0%	1/15 Summer	100/60 Winter		

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
8.000	23	69.777	-0.118	0.000	0.10		8	1.4	OK
8.001	24	69.694	-0.116	0.000	0.12		8	2.8	OK
8.002	25	68.955	0.030	0.000	0.12		34	2.7	SURCHARGED
1.009	12	68.953	0.688	0.000	0.21			13.1	SURCHARGED

PN	US/MH Name	Level Exceeded
8.000	23	
8.001	24	
8.002	25	
1.009	12	4

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for NETWORK 4.SWS

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Storage Structures 14
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 0.389
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 19.100 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 50.0
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, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	15 Winter	100	+40%	100/15 Winter			
1.001	2	15 Winter	100	+40%	100/15 Summer			
1.002	3	60 Winter	100	+40%	100/15 Summer			
1.003	4	60 Winter	100	+40%	100/15 Summer			
1.004	5	60 Winter	100	+40%	30/15 Summer			
2.000	14	60 Winter	100	+40%	30/15 Summer	100/15 Summer		
2.001	15	60 Winter	100	+40%	30/15 Summer			
1.005	7	60 Winter	100	+40%	30/15 Summer			
1.006	8	120 Winter	100	+40%	30/15 Summer			
3.000	16	120 Winter	100	+40%	100/15 Summer			
1.007	9	120 Winter	100	+40%	30/15 Summer			
4.000	17	120 Winter	100	+40%	100/60 Summer			
1.008	10	120 Winter	100	+40%	1/30 Winter			
5.000	18	120 Winter	100	+40%	100/15 Winter			
6.000	19	180 Winter	100	+40%	100/60 Winter			
6.001	20	180 Winter	100	+40%	30/60 Winter			
7.000	22	180 Winter	100	+40%	100/30 Winter			
6.002	21	180 Winter	100	+40%	30/15 Summer			

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for NETWORK 4.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	1	70.402	0.027	0.000	0.55			9.8	SURCHARGED
1.001	2	70.368	0.113	0.000	1.07			20.2	SURCHARGED
1.002	3	70.181	0.231	0.000	0.41			20.7	SURCHARGED
1.003	4	70.133	0.808	0.000	0.76			36.8	SURCHARGED
1.004	5	70.055	1.010	0.000	0.93			39.4	SURCHARGED
2.000	14	69.970	0.665	4.849	1.26			19.2	FLOOD
2.001	15	69.966	0.956	0.000	1.25			16.8	SURCHARGED
1.005	7	69.962	1.007	0.000	0.99			37.8	SURCHARGED
1.006	8	69.784	1.184	0.000	0.33			31.5	SURCHARGED
3.000	16	69.735	0.160	0.000	0.87		38	7.2	SURCHARGED
1.007	9	69.735	1.280	0.000	0.65			39.7	SURCHARGED
4.000	17	69.651	0.201	0.000	0.27		48	5.0	SURCHARGED
1.008	10	69.667	1.262	0.000	0.67			43.1	SURCHARGED
5.000	18	69.612	0.592	0.000	0.21		81	4.6	SURCHARGED
6.000	19	69.652	0.042	0.000	0.19		53	5.0	SURCHARGED
6.001	20	69.643	0.698	0.000	0.45		128	8.5	SURCHARGED
7.000	22	69.642	0.257	0.000	0.27		66	5.8	SURCHARGED
6.002	21	69.631	0.846	0.000	0.64		156	14.8	SURCHARGED

PN	US/MH Name	Level Exceeded
1.000	1	
1.001	2	
1.002	3	
1.003	4	
1.004	5	
2.000	14	7
2.001	15	
1.005	7	
1.006	8	
3.000	16	
1.007	9	
4.000	17	
1.008	10	
5.000	18	
6.000	19	
6.001	20	
7.000	22	
6.002	21	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for NETWORK 4.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
8.000	23	15 Winter	100	+40%				
8.001	24	15 Winter	100	+40%				
8.002	25	120 Winter	100	+40%	30/60 Winter			
1.009	12	120 Winter	100	+40%	1/15 Summer	100/60 Winter		

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
8.000	23	69.793	-0.102	0.000	0.22		6	2.9	OK
8.001	24	69.711	-0.099	0.000	0.25		7	5.9	OK
8.002	25	69.614	0.689	0.000	0.18		130	4.1	SURCHARGED
1.009	12	69.610	1.345	10.172	0.34			21.5	FLOOD

PN	US/MH Name	Level Exceeded
8.000	23	
8.001	24	
8.002	25	
1.009	12	4

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200 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for NETWORK 4.SWS

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	14
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	0.389
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.100	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	50.0
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, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	200
Climate Change (%)	40

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	15 Winter	200	+40%	200/15 Summer			
1.001	2	15 Winter	200	+40%	200/15 Summer			
1.002	3	30 Winter	200	+40%	200/15 Summer			
1.003	4	30 Winter	200	+40%	200/15 Summer			
1.004	5	30 Winter	200	+40%	200/15 Summer			
2.000	14	60 Winter	200	+40%	200/15 Summer	200/15 Summer		
2.001	15	30 Winter	200	+40%	200/15 Summer			
1.005	7	30 Winter	200	+40%	200/15 Summer			
1.006	8	60 Winter	200	+40%	200/15 Summer			
3.000	16	180 Winter	200	+40%	200/15 Summer			
1.007	9	120 Winter	200	+40%	200/15 Summer			
4.000	17	180 Winter	200	+40%	200/30 Summer			
1.008	10	180 Winter	200	+40%	200/15 Summer			
5.000	18	180 Winter	200	+40%	200/15 Summer			
6.000	19	120 Winter	200	+40%	200/60 Summer			

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200 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for NETWORK 4.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	1	70.765	0.390	0.000	0.61			10.8	SURCHARGED
1.001	2	70.728	0.473	0.000	1.13			21.3	SURCHARGED
1.002	3	70.530	0.580	0.000	0.66			33.3	SURCHARGED
1.003	4	70.439	1.114	0.000	1.19			57.5	SURCHARGED
1.004	5	70.283	1.238	0.000	1.51			63.8	SURCHARGED
2.000	14	69.981	0.676	16.113	1.36			20.7	FLOOD
2.001	15	70.126	1.116	0.000	1.63			21.9	SURCHARGED
1.005	7	70.182	1.227	0.000	1.36			52.2	SURCHARGED
1.006	8	69.878	1.278	0.000	0.43			41.0	SURCHARGED
3.000	16	69.807	0.232	0.000	0.76		60	6.2	SURCHARGED
1.007	9	69.785	1.330	0.000	0.72			44.3	SURCHARGED
4.000	17	69.713	0.263	0.000	0.28		87	5.0	SURCHARGED
1.008	10	69.707	1.302	0.000	0.61			39.1	SURCHARGED
5.000	18	69.643	0.623	0.000	0.21		113	4.6	SURCHARGED
6.000	19	69.732	0.122	0.000	0.30		74	7.9	SURCHARGED

PN	US/MH Name	Level Exceeded
1.000	1	
1.001	2	
1.002	3	
1.003	4	
1.004	5	
2.000	14	12
2.001	15	
1.005	7	
1.006	8	
3.000	16	
1.007	9	
4.000	17	
1.008	10	
5.000	18	
6.000	19	

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200 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for NETWORK 4.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
6.001	20	120 Winter	200	+40%	200/15 Summer			
7.000	22	120 Winter	200	+40%	200/15 Summer			
6.002	21	120 Winter	200	+40%	200/15 Summer			
8.000	23	15 Winter	200	+40%				
8.001	24	15 Winter	200	+40%				
8.002	25	60 Winter	200	+40%	200/15 Summer			
1.009	12	180 Winter	200	+40%	200/15 Summer	200/60 Summer		

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
6.001	20	69.714	0.769	0.000	0.60			11.2	SURCHARGED
7.000	22	69.712	0.327	0.000	0.41		95	9.1	SURCHARGED
6.002	21	69.690	0.905	0.000	0.78			18.0	SURCHARGED
8.000	23	69.798	-0.097	0.000	0.27		6	3.5	OK
8.001	24	69.716	-0.094	0.000	0.30		7	7.1	OK
8.002	25	69.664	0.739	0.000	0.28			6.4	SURCHARGED
1.009	12	69.641	1.376	41.363	0.36			22.9	FLOOD

PN	US/MH Name	Level Exceeded
6.001	20	
7.000	22	
6.002	21	
8.000	23	
8.001	24	
8.002	25	
1.009	12	11

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Appendix D – Documents/Reports

- Site Investigation Report Extracts
- Thames Water – Sewer Records
- SFRA Extracts
- SUDS Maintenance Plan

Looking northeast at the area of raised soft landscaping comprising bark chippings and tree trunks to the south of the western building with a small undercover refuse area.

Looking south at the western building with circular water feature located to the north of the entrance within the car park.

2.2 Site Proposals

Based on the information provided, it is understood the proposals for the site comprise demolition of existing buildings and redevelopment of the site to provide 9No. industrial units (Flexible Use Class B1/B8/E(g)(i)-(iii)) and 1No. food store (Use Class E(a)), together with associated parking, a new vehicular access off Griffin Way South, landscaping and other associated works. The proposals are shown on the Proposed Site Plan by PRC Architects (Drawing no. 11248_PL_102P2) located in Appendix A.

3.0 DESK STUDY INFORMATION

The desk study findings are summarised below with the full GroundSure Report and Historical Ordnance Survey Maps included in Appendix B.

Site History	• **1871-1875** – The site and immediate surrounding area are agricultural fields. Hardings Farm is labelled as being adjacent to the north of the site, with Holt Farm with associated well just beyond. A track is shown travelling northeast to southwest, adjacent to the eastern boundary of the site. A stream is shown flowing south to north, crossing through the western half of the site, originating at the heathland shown to the south of the site. The London and South Western Railway on an embankment is shown, orientated west-east c.150m north of the site. Bartley Heath is shown adjacent to the southern boundary of the site. Hook is c.750m northwest of the site. • **1894-1896** – Ponds are shown c.100m west, c.300m west, 100m northeast and c.450m southeast of the site. Wells are present on the north-eastern boundary and 15m northeast. The stream following south to north is now shown to extend through the heathland to the south of the site, indicated to widen as it passes through the southern site boundary and crosses the site. • **1909 -1932 –** No significant changes. • **1940 –** Electricity pylons are shown to be c.100m northeast and c.50m southeast of the site, with an electricity line running between them. A building has been developed to the east. • **1961 –** No significant changes. • **1972 –** The M3 motorway has now been constructed c.400m south of the site, orientated southwest-northeast. • **1975** – The north-eastern corner of the site is shown to be part of two

	parcels of residential land (Summerlea and Harding's Cottage). Two buildings of different sizes labelled 'Summerlea' are now shown to be on site, situated in the southern half of the northeast section of the site. Further farm buildings have been constructed in the vicinity of Bridge Farm, north of the site. • **1982-1987** – No significant changes. A pond is now shown at Scotland Farm, c. 250m to the southeast of the site, a similar distance as a licence request for the same property to abstract sand and gravel. • **1992** – No buildings are now shown on site. Part of the business park has been developed, reaching the north-western site boundary. A surface water balancing pond is present adjacent to the northwest, as part of the business park development. An electricity substation is now present c.200m northwest of the site. Hook has been further developed, and now extends c. 150m north of the site. • **1994** – No significant changes. • **2002** – Site and surrounding Bartley Wood Business Park appear to be as they are today. Hardings Farm to the north of the site is no longer present. • **Aerial Imagery** – By 1993 the land adjacent to the northwest of the site had been developed as an industrial estate and Griffin Way South is shown at the north-western boundary. Aerial imagery dating from 1999 shows the site under development in its current layout with three commercial office blocks. By 2005 the site appears complete with no further notable changes to the present day.
Anticipated Geology and Ground Conditions	• Published BGS Map indicates site underlain by Solid geology of the London Clay Formation with overlying River Terrace Deposits in the west of the site only. Alluvium is indicated to be present c.350m north. • The nearest BGS archive borehole (250m to southeast) indicates Topsoil to 0.2m below ground level (bgl), underlain by possible Head comprising orange and brown clay with gravel of flint to 1.1m bgl, London Clay Formation comprising silty orange and brown clay was encountered beneath, to the base of the borehole at 3.70m bgl. • The site is not in a radon affected area, with <1% of homes above the Action Level. No radon protection measures are therefore considered necessary for new properties.
Mining/Quarrying	• The site is not indicated to be within area of underground coal or other mining. • An historical sand and gravel pit was located c.300m southeast of the site. • The site is not in area associated with natural cavity formation.
Hydrology	• The nearest surface watercourse is described as an inland river and runs through the site travelling south to north. • There is no water quality data available within 1500m of the site. • There are no surface water abstractions license indicated to be within 500m of the site. • There is a licensed discharge consent in the west of the site for the discharge of treated effluent into Alluvium/ Upper Chalk issued in 1989 and revoked in 2007. • The site is indicated to be at a very low risk of flooding from rivers and the sea.
Hydrogeology	• The London Clay Formation underlying the site is classified as an unproductive stratum. The River Terrace Deposits indicated to be on site is classified as a Secondary A Aquifer. • The nearest groundwater abstraction license is c.1.25km south of the site, and is used for spray irrigation. • The site is not within a Groundwater Source Protection Zone. • Likely groundwater flow direction is likely to be to the south, following the topography.
Other Environmental data	• An historic landfill is noted to have been present approximately 350m southeast of the site. The Groundsure report does not have any information regarding the type of waste received at this landfill. • 20 current industrial land usages are indicated to be within 250m of the site. None are considered to present a significant risk to the site, most

	associated with electrical infrastructure. • There are indicated to be no recorded petrol/fuel sites within 250m, • There have been no recorded pollution incidents within 500m. • There are three electrical substations shown to be present on site, associated with the development of the business park in the 1990's and thus do not present a risk from PCBs used in historical sub-stations. • There is one environmentally sensitive ecological designation within 250m, this is Hook Common and Bartley Heath which is situated c.35m south.
Other ground related risks	• The BGS have established the following potential for ground stability hazards on site as: o Shrink-Swell Clay- Low o Landslides- Very Low o Ground Dissolution of Soluble Rocks- Negligible o Compressible Deposits- Negligible o Collapsible Deposits- Very Low o Running Sands- Very Low
Online Planning Records	• Prior approval has been granted for the change of use of the office buildings adjacent to the site (buildings 260, and 270) into residential flats - Planning ref 18/02748/PRIOR. There were no conditions imposed in relation to contaminated land, although Environmental Health suggested they had no objection to the proposal subject to a contaminated land condition. • Planning ref 19/00393/PRIOR - Phase I Geo-Environmental Site Assessment submitted as part of planning permission to north of site for similar proposals (change in use from office to residential units). Found no viable sources of contaminants. • Planning ref 19/00344/PRIOR - A Site Investigation Report (ref 6053/KPG) and Ground Contamination Report (ref 1500a/KOG) covering the site and the areas to the north and west, were submitted as part of the planning permission for the site adjacent to the west of the site. The site investigation report and ground investigation reports were issued in 1998, and 1995 respectively, and precedes the development currently on this plot. During the course of the site investigation, ground conditions generally comprised Head Deposits over London Clay Formation. It was concluded that the ground conditions encountered would be suitable for conventional foundations to be used for 'light to moderate loads', and for 'high column loads' a piled foundation solution would be more appropriate. The Ground Contamination Report encountered only natural soils, and in the subsequent testing found no contamination, and concluded that there were no serious hazards anticipated for the proposed scheme.

4.0 CONCEPTUAL SITE MODEL

Sources

The site has been identified as being part of open agricultural fields, with residential properties later. In more recent years the site has become part of a business park. Previous ground investigations undertaken in the vicinity of the site, prior to the business park being developed, have not encountered any contamination. As such, no sources of potential gross contamination that could impact potential receptors have been identifies by the desk study. However, the following potential sources are still considered:

- Only limited initial layer of Made Ground soils on site associated with existing site development is expected - natural soils are anticipated to be at shallow depths;
- Localised hydrocarbon spillages of fuels on site from parked cars;
- Sulphates in underlying natural strata (London Clay Formation).

KEY:

TP1 — Trial Pit

BH1 — Cable Percussion Borehole

DCS1 — Driven Continuous Sampling Borehole

TRL1 — Transport Research Laboratory Dynamic Cone Penetrometer

Drawing based on Greenhatch Group, drawing No:36938_T Revision 1 dated 25/11/2020.

APPLiED GEOLOGY

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Client: PATRON HOOK LTD

Project: BARTLEY WOOD BUSINESS PARK, HOOK

Title: EXPLORATORY HOLE LOCATION PLAN

Drawn By:	Checked By:	Paper Size:
JS	FC	A3

Scale:	Date:
1:1250	18.05.2021

Drawing No:	Revision:
AG3265-21-02	0

BOREHOLE LOG - CABLE PERCUSSION

BH1

Project	Bartley Wood Business Park, Hook	**Project No.**	AG3265-21
Client	Patron Hook Ltd	**Sheet**	1 of 1
Start	11/05/2021	**Coordinates**	E 473385.50 N 153878.25
Scale	1:50		
End	11/05/2021	**Ground Level**	74.63m AOD
Total Depth	10.00m		

Sample / Test Type	Depth (m)	Result	Casing Depth (m)	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install
B	0.10			74.53	(0.10)	Asphalt.			
				74.48	0.10	(MADE GROUND)			
					(0.05)	Greyish brown and reddish brown slightly sandy GRAVEL. Gravel is fine to medium subangular limestone.			
B	0.60			74.03	0.15	(MADE GROUND - SUBBASE)			
					(0.45)	Greyish brown and grey slightly sandy GRAVEL with occasional cobbles. Gravel is fine to coarse angular to subangular concrete, brick, flint and limestone. Cobbles are subangular concrete and occasional brick.			
					0.60	(MADE GROUND - SUBBASE)			
UT	1.50	(25)			(1.40)	Firm locally stiff orangish brown mottled greyish brown fine sandy silty CLAY.			
D	1.90			72.63	2.00	(LONDON CLAY FORMATION)			
D	2.50					Firm brown and greyish brown locally mottled orangish brown slightly fine sandy silty CLAY. (LONDON CLAY FORMATION)			
S	2.50	N = 11	1.20		(1.50)				
UT	3.50	(30)		71.13	3.50	Firm to stiff grey locally brownish grey sandy silty CLAY with occasional bands of clayey silt. Sand is fine. (LONDON CLAY FORMATION)			
D	3.95								
D	4.50					*Below 4.50m bgl: slightly sandy.*			
S	4.50	N = 15	1.20						
UT	5.50	(40)							
D	5.90					*Below 6.00m bgl: stiff.*			
D	6.50								
S	6.50	N = 19	1.20		(6.50)				
D	7.50								
UT	8.00	(55)							
D	8.45					*Below 8.50m bgl: becoming very stiff.*			
D	9.00								
D	9.50								
S	9.50	N = 27	1.20						
				64.63	10.00	End of Borehole at 10.00m			

DRAFT

Chiselling			Groundwater Strikes				
From	To	Duration (hh:mm)	Depth Strike	Rose to	Remarks	Cased	Sealed

Drilled: Gap Drilling Services Ltd

Logged: FC

Checked: AS

Remarks: Hand dug service inspection pit excavated to 1.20m bgl.

Installation: 50mm diameter standpipe installed to 3.00m bgl.

Diameter: 150mm to 10.00m

Exploratory hole logs should be read in conjunction with key sheets

APPLiED GEOLOGY

BOREHOLE LOG - CABLE PERCUSSION

BH2

Project	Bartley Wood Business Park, Hook	**Project No.**	AG3265-21
Client	Patron Hook Ltd	**Sheet**	1 of 1
Start	11/05/2021	**Coordinates**	E 473385.37 N 153824.95
Scale	1:50		
End	11/05/2021	**Ground Level**	72.04m AOD
Total Depth	10.00m		

Sample / Test Type	Depth (m)	Result	Casing Depth (m)	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install
B	0.10			71.99	(0.05)	Asphalt.			
					0.05	(MADE GROUND)			
					(1.05)	Greyish brown and grey slightly sandy GRAVEL with occasional cobbles. Gravel is fine to coarse subangular to subrounded concrete, flint, brick and asphalt. Cobbles are subangular concrete and brick. (MADE GROUND - SUBBASE)			
				70.94	1.10				
B	1.20					Loose slightly gravelly to gravelly silty fine to medium SAND. Gravel is fine to coarse subangular to subrounded flint and occasional chalk. (RIVER TERRACE DEPOSITS)			
C	1.20	N = 6							
					(0.90)				
B	2.00			70.04	2.00	Firm locally soft orangish brown mottled brown fine sandy silty CLAY. (LONDON CLAY FORMATION) *From 2.00m to 2.30m bgl: soft.*			
D	2.50				(1.00)				
S	2.50	N = 13	1.50						
B	3.00			69.04	3.00	Firm to stiff grey slightly sandy silty CLAY with rare fine shell fragments. (LONDON CLAY FORMATION)			
UT	3.50	(55)							
D	3.95								
D	4.50								
S	4.50	N = 19	1.50						
UT	5.50	(55)							
D	5.90								
D	5.95					*Below 6.00m bgl: stiff.*			
D	6.50				(7.00)				
S	6.50	N = 20	1.50						
D	7.50								
UT	8.00	(60)							
D	8.40					*Below 8.50m bgl: very stiff.*			
D	9.00								
D	9.50								
S	9.50	N = 30	1.50						
				62.04	10.00	End of Borehole at 10.00m			

DRAFT

Chiselling			Groundwater Strikes				
From	To	Duration (hh:mm)	Depth Strike	Rose to	Remarks	Cased	Sealed

Drilled: Gap Drilling Services Ltd

Logged: FC

Checked: AS

Remarks: Hand dug service inspection pit excavated to 1.20m bgl. Borehole backfilled with arisings on completion.

Installation:

Diameter: 150mm to 10.00m

Exploratory hole logs should be read in conjunction with key sheets

APPLiED GEOLOGY

BOREHOLE LOG - CABLE PERCUSSION

BH3

Project	Bartley Wood Business Park, Hook	**Project No.**	AG3265-21
Client	Patron Hook Ltd	**Sheet**	1 of 2
Start	05/05/2021	**Coordinates**	E 473373.20 N 153746.63
Scale	1:50		
End	05/05/2021	**Ground Level**	72.07m AOD
Total Depth	10.45m		

Sample / Test Type	Depth (m)	Result	Casing Depth (m)	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install
				72.02	(0.05)	Asphalt.			
B	0.20			71.97	0.05	(MADE GROUND)			
					(0.05)	Grey and reddish brown slightly sandy GRAVEL. Gravel is fine to medium occasionally coarse angular to subangular limestone, rare brick and concrete.			
B	0.60			71.47	0.10				
					(0.50)				
					0.60	(MADE GROUND - SUBBASE)			
					(1.10)	Brownish grey and brown sandy GRAVEL with occasional cobbles. Gravel is fine to coarse angular to subrounded brick, concrete, limestone, asphalt and concrete. Cobbles are subangular concrete and brick.			
D	1.50								
S	1.50	N = 19	1.50	70.37	1.70	(MADE GROUND - SUBBASE)			
UT	2.00	(20)				Firm orangish, brown and grey slightly gravelly sandy silty CLAY. Sand is fine to medium. Gravel is fine to coarse subangular to subrounded flint and chalk. (REWORKED LONDON CLAY FORMATION)			
D	2.40				(2.10)	Firm orangish brown silty slightly fine sandy CLAY. (REWORKED LONDON CLAY FORMATION) *From 2.00m to 2.45m bgl: slightly gravelly, rare fine subrounded gravel of chalk and flint.*			
D	3.00								
S	3.00	N = 12	1.50						
				68.27	3.80	Firm becoming stiff grey silty locally slightly fine sandy CLAY with rare fine shell fragments. (LONDON CLAY FORMATION)			
UT	4.00	(40)							
D	4.45								
D	5.00								
S	5.00	N = 15	1.50						
UT	6.00	(40)				*Below 6.00m bgl: stiff.*			
D	6.45								
D	7.00				(6.65)				
D	7.50								
S	7.50	N = 25	1.50						
D	8.50								
UT	9.00	(55)							
D	9.45								
D	10.00								

Continued next sheet

DRAFT

Chiselling		
From	To	Duration (hh:mm)

Groundwater Strikes				
Depth Strike	Rose to	Remarks	Cased	Sealed

Drilled: Gap Drilling Services Ltd

Logged: FC

Checked: AS

Remarks: Hand dug service inspection pit excavated to 1.20m bgl.

Installation: 50mm diameter standpipe installed to 4.00m bgl.

Diameter: 150mm to 10.00m

Exploratory hole logs should be read in conjunction with key sheets

APPLiED GEOLOGY

BOREHOLE LOG - CABLE PERCUSSION

BH3

Project	Bartley Wood Business Park, Hook			**Project No.**	AG3265-21
Client	Patron Hook Ltd			**Sheet**	2 of 2
Start	05/05/2021	**Coordinates**	E 473373.20 N 153746.63	**Scale**	1:50
End	05/05/2021	**Ground Level**	72.07m AOD	**Total Depth**	10.45m

Sample / Test Type	Depth (m)	Result	Casing Depth (m)	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install
S	10.45	N = 31	1.50	61.62	10.45	Firm becoming stiff grey silty locally slightly fine sandy CLAY with rare fine shell fragments. (LONDON CLAY FORMATION)			
						End of Borehole at 10.45m			

DRAFT

Chiselling			Groundwater Strikes				
From	To	Duration (hh:mm)	Depth Strike	Rose to	Remarks	Cased	Sealed

Drilled: Gap Drilling Services Ltd

Logged: FC

Checked: AS

Remarks: Hand dug service inspection pit excavated to 1.20m bgl.

Installation: 50mm diameter standpipe installed to 4.00m bgl.

Diameter: 150mm to 10.00m

Exploratory hole logs should be read in conjunction with key sheets

APPLiED GEOLOGY

BOREHOLE LOG - CABLE PERCUSSION

BH4

Project	Bartley Wood Business Park, Hook	**Project No.**	AG3265-21
Client	Patron Hook Ltd	**Sheet**	1 of 2
Start	04/05/2021	**Coordinates**	E 473287.33 N 153789.22
Scale	1:50		
End	04/05/2021	**Ground Level**	71.27m AOD
Total Depth	10.45m		

Sample / Test Type	Depth (m)	Result	Casing Depth (m)	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install
				71.22	(0.05)	Block paving.			
B	0.20			71.02	0.05	(MADE GROUND)			
B	0.45				(0.20)	Yellowish brown slightly silty fine to medium SAND.			
					0.25	(MADE GROUND - SUBBASE)			
					(0.75)	Firm friable orangish brown gravelly sandy CLAY. Gravel is fine to coarse angular to subangular flint and quartzite.			
B	1.00			70.27	1.00	(MADE GROUND)			
WAC	1.00					*At 0.40m bgl: black plastic membrane.*			
D	1.20					*From 0.40m to 0.90m bgl: slightly gravelly.*			
S	1.20	N = 11				Firm orangish brown mottled light grey slightly sandy silty slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to coarse angular to subangular flint. (REWORKED LONDON CLAY FORMATION)			
UT	2.00	(20)			(1.70)				
D	2.45								
B	2.70			68.57	2.70	Stiff locally very stiff brownish grey and grey slightly fine sandy silty CLAY with rare fine gravel sized shell fragments. (LONDON CLAY FORMATION)			
D	3.00					*From 3.20m to 3.30m bgl: silt.*			
S	3.00	N = 18	1.50						
UT	4.00	(35)							
D	4.45								
D	5.00								
S	5.00	N = 15	1.50						
UT	6.00	(40)							
D	6.45				(7.75)				
D	7.00					*From 7.00m to 7.05m bgl: dark brown silt band with frequent fine gravel sized pyrite nodules.*			
D	7.50								
S	7.50	N = 22	1.50						
D	8.50								
UT	9.00	(50)							
D	9.40								
D	10.00								

Continued next sheet

DRAFT

Chiselling			Groundwater Strikes				
From	To	Duration (hh:mm)	Depth Strike	Rose to	Remarks	Cased	Sealed

Drilled: Gap Drilling Services Ltd

Logged: FC

Checked: AS

Remarks: Hand dug service inspection pit excavated to 1.20m bgl.

Installation: 50mm diameter standpipe installed to 5.00m bgl.

Diameter: 150mm to 10.45m

Exploratory hole logs should be read in conjunction with key sheets

APPLiED GEOLOGY

BOREHOLE LOG - CABLE PERCUSSION

BH4

Project	Bartley Wood Business Park, Hook	**Project No.**	AG3265-21
Client	Patron Hook Ltd	**Sheet**	2 of 2
Start	04/05/2021	**Coordinates**	E 473287.33 N 153789.22
Scale	1:50		
End	04/05/2021	**Ground Level**	71.27m AOD
Total Depth	10.45m		

Sample / Test Type	Depth (m)	Result	Casing Depth (m)	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install
S	10.00	N = 20	1.50	60.82	10.45	Stiff locally very stiff brownish grey and grey slightly fine sandy silty CLAY with rare fine gravel sized shell fragments. (LONDON CLAY FORMATION)			
						End of Borehole at 10.45m			

DRAFT

Chiselling			Groundwater Strikes				
From	To	Duration (hh:mm)	Depth Strike	Rose to	Remarks	Cased	Sealed

Drilled: Gap Drilling Services Ltd

Logged: FC

Checked: AS

Remarks: Hand dug service inspection pit excavated to 1.20m bgl.

Installation: 50mm diameter standpipe installed to 5.00m bgl.

Diameter: 150mm to 10.45m

Exploratory hole logs should be read in conjunction with key sheets

APPLiED GEOLOGY

BOREHOLE LOG - CABLE PERCUSSION

BH5

Project	Bartley Wood Business Park, Hook	**Project No.**	AG3265-21
Client	Patron Hook Ltd	**Sheet**	1 of 1
Start	05/05/2021	**Coordinates**	E 473336.31 N 153712.06
Scale	1:50		
End	05/05/2021	**Ground Level**	72.10m AOD
Total Depth	10.00m		

Sample / Test Type	Depth (m)	Result	Casing Depth (m)	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install
B	0.10			72.05	(0.05)	Asphalt.			
				72.00	0.05	(MADE GROUND)			
				71.90	(0.05)	Grey and reddish brown slightly sandy GRAVEL. Gravel is fine to medium occasionally coarse angular to subangular limestone and rare brick.			
					0.10				
B	0.80			71.30	(0.10)				
					0.20	(MADE GROUND - SUBBASE)			
					(0.60)	Weak light grey CONCRETE.			
					0.80	(MADE GROUND)			
					(0.70)	Grey and brownish grey slightly sandy to sandy GRAVEL with occasional cobbles. Gravel is fine to coarse subangular brick, concrete, flint and rare asphalt. Cobbles are subangular concrete and brick.			
B	1.50			70.60	1.50				
S	1.50	N = 31	1.50						
					(0.60)				
				70.00	2.10	(MADE GROUND - SUBBASE) *At 0.80m bgl: black plastic membrane.*			
D	2.50					Firm brown slightly sandy gravelly CLAY with occasional cobbles. Gravel is fine to coarse subangular brick, concrete and flint. Cobbles are subangular brick.			
S	2.50	N = 13	1.50						
					(2.00)	Dense orangish brown slightly sandy clayey GRAVEL. Gravel is fine to coarse angular to subangular flint and occasional chalk. (RIVER TERRACE DEPOSITS)			
UT	3.50	(40)				Firm locally stiff orangish brown and brown slightly gravelly slightly sandy silty CLAY. Gravel is fine subangular chalk and flint. (REWORKED LONDON CLAY FORMATION)			
D	3.95								
D	4.10			68.00	4.10	Stiff brownish grey and grey silty CLAY with rare fine shell fragments. (LONDON CLAY FORMATION)			
D	4.50								
S	4.50	N = 18	1.50						
UT	5.50	(45)							
D	5.95					*From 5.95m to 6.50m bgl: very stiff, slightly fine sandy.*			
D	6.50								
S	6.50	N = 22	1.50						
					(5.90)				
D	7.50								
UT	8.00	(50)							
D	8.40								
D	9.00					*Below 9.00m bgl: very stiff.*			
D	9.50								
S	9.50	N = 23	1.50						
				62.10	10.00	End of Borehole at 10.00m			

DRAFT

Chiselling			Groundwater Strikes				
From	To	Duration (hh:mm)	Depth Strike	Rose to	Remarks	Cased	Sealed

Drilled: Gap Drilling Services Ltd

Logged: FC

Checked: AS

Remarks: Hand dug service inspection pit excavated to 1.20m bgl. Borehole backfilled with arisings on completion.

Installation:

Diameter: 150mm to 9.50m

Exploratory hole logs should be read in conjunction with key sheets

APPLiED GEOLOGY

BOREHOLE LOG - CABLE PERCUSSION

BH6

Project	Bartley Wood Business Park, Hook	**Project No.**	AG3265-21
Client	Patron Hook Ltd	**Sheet**	1 of 2
Start	06/05/2021	**Coordinates**	E 473288.95 N 153710.40
Scale	1:50		
End	06/05/2021	**Ground Level**	71.02m AOD
Total Depth	10.50m		

Sample / Test Type	Depth (m)	Result	Casing Depth (m)	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install
B	0.10			70.92	(0.10)	Asphalt.			
					0.10	(MADE GROUND)			
B	0.50			70.52	(0.40)	Brown, grey and reddish brown slightly sandy GRAVEL with occasional cobbles. Gravel is fine to coarse subangular brick, asphalt, concrete and flint. Cobbles are subangular brick. (MADE GROUND - SUBBASE)			
				70.42	0.50				
					(0.10)				
					0.60				
					(0.90)	Brown and locally grey slightly sandy gravelly CLAY. Gravel is fine to coarse subangular brick, flint and rare glass. (MADE GROUND)			
D	1.50			69.52	1.50	Orangish brown and brown slightly silty sandy GRAVEL with cobble sized pockets of gravelly clay. Gravel is fine to coarse angular to subangular occasionally subrounded flint and rare chalk. (RIVER TERRACE DEPOSITS)			
S	1.50	N = 9	1.50						
					(1.50)	Firm brown mottled orangish brown locally grey slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to subrounded flint and chalk. (REWORKED LONDON CLAY FORMATION)			
D	2.40								
UT	2.50	(20)							
B	3.00			68.02	3.00	Firm becoming stiff grey locally greyish brown silty CLAY with rare fine shell fragments. (LONDON CLAY FORMATION)			
D	3.50								
S	3.50	N = 15	1.50						
UT	4.50	(30)							
D	4.95								
D	5.50								
S	5.50	N = 20	1.50						
D	6.50								
					(7.50)				
UT	7.00	(45)							
D	7.45								
D	8.00					*Below 8.00m bgl: very stiff.*			
D	8.50								
S	8.50	N = 26	1.50						
D	9.50								
UT	10.00	(55)							

Continued next sheet

DRAFT

Chiselling		
From	To	Duration (hh:mm)

Groundwater Strikes				
Depth Strike	Rose to	Remarks	Cased	Sealed

Drilled: Gap Drilling Services Ltd

Logged: FC

Checked: AS

Remarks: Hand dug service inspection pit excavated to 1.20m bgl.

Installation: 50mm diameter standpipe installed to 4.00m bgl.

Diameter: 150mm to 10.50m

Exploratory hole logs should be read in conjunction with key sheets

APPLiED GEOLOGY

BOREHOLE LOG - CABLE PERCUSSION

BH6

Project	Bartley Wood Business Park, Hook	**Project No.**	AG3265-21
Client	Patron Hook Ltd	**Sheet**	2 of 2
Start	06/05/2021	**Coordinates**	E 473288.95 N 153710.40
Scale	1:50		
End	06/05/2021	**Ground Level**	71.02m AOD
Total Depth	10.50m		

Sample / Test Type	Depth (m)	Result	Casing Depth (m)	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install
D	10.45			60.52	10.50	Firm becoming stiff grey locally greyish brown silty CLAY with rare fine shell fragments. (LONDON CLAY FORMATION)			
						End of Borehole at 10.50m			

DRAFT

Chiselling			Groundwater Strikes				
From	To	Duration (hh:mm)	Depth Strike	Rose to	Remarks	Cased	Sealed

Drilled: Gap Drilling Services Ltd

Logged: FC

Checked: AS

Remarks: Hand dug service inspection pit excavated to 1.20m bgl.

Installation: 50mm diameter standpipe installed to 4.00m bgl.

Diameter: 150mm to 10.50m

Exploratory hole logs should be read in conjunction with key sheets

APPLiED GEOLOGY

BOREHOLE LOG - CABLE PERCUSSION

BH7

Project	Bartley Wood Business Park, Hook	**Project No.**	AG3265-21
Client	Patron Hook Ltd	**Sheet**	1 of 2
Start	10/05/2021	**Coordinates**	E 473208.20 N 153789.01
Scale	1:50		
End	10/05/2021	**Ground Level**	69.32m AOD
Total Depth	10.45m		

Sample / Test Type	Depth (m)	Result	Casing Depth (m)	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install
				69.22	(0.10)	Block paving.			
B	0.20			69.17	0.10	(MADE GROUND)			
					(0.05)	Yellowish brown fine to medium SAND.			
					0.15	(MADE GROUND - SUBBASE)			
					(0.75)	Brown and grey slightly silty SAND and GRAVEL with occasional cobbles. Gravel is fine to coarse subangular brick, limestone, asphalt and concrete. Cobbles are subangular brick and concrete.			
B	0.90			68.42	0.90				
					(0.30)				
				68.12	1.20	(MADE GROUND - SUBBASE)			
					(0.50)	Firm grey and brown slightly gravelly to gravelly sandy CLAY. Gravel is fine to coarse subangular flint, brick and concrete.			
UT	1.50	(20)							
				67.62	1.70	(MADE GROUND)			
					(0.65)	Soft locally firm brown mottled orangish brown and grey silty slightly fine sandy CLAY.			
D	1.95					(LONDON CLAY FORMATION)			
				66.97	2.35	Firm grey locally mottled brown silty CLAY.			
D	2.35					(LONDON CLAY FORMATION)			
D	2.50					*From 1.95m bgl: closely spaced fissured.*			
S	2.50	N = 10	1.50						
						Firm becoming stiff grey silty CLAY with rare fine shell fragments.			
						(LONDON CLAY FORMATION)			
UT	3.50	(25)							
D	3.95					*Below 4.00m bgl: stiff.*			
D	4.50								
S	4.50	N = 16	1.50						
UT	5.50	(30)							
D	5.95								
					(8.10)				
D	6.50								
D	7.00								
S	7.00	N = 19	1.50						
D	8.00					*Below 8.00m bgl: very stiff.*			
						From 8.00m to 9.00m bgl: slightly fine sandy.			
UT	8.50	(45)							
D	8.95								
D	10.00								

Continued next sheet

DRAFT

Chiselling			Groundwater Strikes				
From	To	Duration (hh:mm)	Depth Strike	Rose to	Remarks	Cased	Sealed
			0.35	0.35	Slight seepage		

Drilled: Gap Drilling Services Ltd

Logged: FC

Checked: AS

Remarks: Hand dug service inspection pit excavated to 1.20m bgl. Borehole backfilled with arisings on completion.

Installation:

Diameter: 150mm to 10.00m

Exploratory hole logs should be read in conjunction with key sheets

APPLiED GEOLOGY

BOREHOLE LOG - CABLE PERCUSSION

BH7

Project	Bartley Wood Business Park, Hook	**Project No.**	AG3265-21
Client	Patron Hook Ltd	**Sheet**	2 of 2
Start	10/05/2021	**Coordinates**	E 473208.20 N 153789.01
Scale	1:50		
End	10/05/2021	**Ground Level**	69.32m AOD
Total Depth	10.45m		

Sample / Test Type	Depth (m)	Result	Casing Depth (m)	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install
S	10.00	N = 26	1.50			Firm becoming stiff grey silty CLAY with rare fine shell fragments. (LONDON CLAY FORMATION)			
				58.87	10.45	End of Borehole at 10.45m			

DRAFT

Chiselling			Groundwater Strikes				
From	To	Duration (hh:mm)	Depth Strike	Rose to	Remarks	Cased	Sealed
			0.35	0.35	Slight seepage		

Drilled: Gap Drilling Services Ltd

Logged: FC

Checked: AS

Remarks: Hand dug service inspection pit excavated to 1.20m bgl. Borehole backfilled with arisings on completion.

Installation:

Diameter: 150mm to 10.00m

Exploratory hole logs should be read in conjunction with key sheets

APPLiED GEOLOGY

BOREHOLE LOG - CABLE PERCUSSION

BH8

Project	Bartley Wood Business Park, Hook	**Project No.**	AG3265-21
Client	Patron Hook Ltd	**Sheet**	1 of 1
Start	06/05/2021	**Coordinates**	E 473203.27 N 153716.06
Scale	1:50		
End	06/05/2021	**Ground Level**	70.39m AOD
Total Depth	10.00m		

Sample / Test Type	Depth (m)	Result	Casing Depth (m)	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata
				70.34	(0.05)	Asphalt.
B	0.20			70.29	0.05	(MADE GROUND)
				70.19	(0.05)	Grey and reddish brown slightly sandy GRAVEL. Gravel is fine to medium angular to subangular limestone and rare brick.
					0.10	(MADE GROUND - SUBBASE)
					(0.10)	
B	0.90			69.49	0.20	Weak light grey CONCRETE.
					(0.70)	(MADE GROUND)
B	1.20				0.90	Brown, grey and reddish brown slightly silty sandy GRAVEL with occasional cobbles. Gravel is fine to coarse subangular brick, concrete, flint and asphalt. Cobbles are subangular concrete.
C	1.20	N = 31	1.50		(0.80)	
				68.69	1.70	(MADE GROUND - SUBBASE)
UT	2.00	(20)				Dense orangish brown slightly clayey to clayey sandy GRAVEL. Gravel is fine to coarse subangular to subrounded flint and rare fine chalk. (RIVER TERRACE DEPOSITS)
D	2.45					Firm brown mottled orangish brown silty slightly fine sandy CLAY. (REWORKED LONDON CLAY FORMATION) *From 1.70m to 2.00m bgl: slightly gravelly, gravel is fine subangular chalk and flint.*
					(2.00)	
D	3.00					
S	3.00	N = 10	1.50			
				66.69	3.70	
D	3.80					Stiff brownish grey and grey silty slightly fine sandy CLAY. (LONDON CLAY FORMATION) *From 3.95m and 4.00m bgl: Driller notes claystone band.*
UT	4.50	(35)				
D	4.95					
D	5.00					
S	5.00	N = 11	1.50			
D	6.00					
UT	6.50	(30)				
D	6.95				(6.30)	
D	7.50					
D	8.00					
S	8.00	N = 19	1.50			*Below 8.00m bgl: grey, very stiff.*
D	9.00					
UT	9.50	(35)				
D	9.95			60.39	10.00	End of Borehole at 10.00m

DRAFT

Chiselling

From	To	Duration (hh:mm)

Groundwater Strikes

Depth Strike	Rose to	Remarks	Cased	Sealed
4.00	3.82	Seepage	1.50	

Drilled: Gap Drilling Services Ltd

Logged: FC

Checked: AS

Remarks: Hand dug service inspection pit excavated to 1.20m bgl.

Installation: 50mm diameter standpipe installed to 5.00m bgl.

Diameter: 150mm to 10.00m

Exploratory hole logs should be read in conjunction with key sheets

APPLiED GEOLOGY

BOREHOLE LOG - CABLE PERCUSSION

BH9

Project	Bartley Wood Business Park, Hook	**Project No.**	AG3265-21
Client	Patron Hook Ltd	**Sheet**	1 of 2
Start	07/05/2021	**Coordinates**	E 473140.48 N 153724.31
Scale	1:50		
End	07/05/2021	**Ground Level**	70.03m AOD
Total Depth	10.50m		

Sample / Test Type	Depth (m)	Result	Casing Depth (m)	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install
B	0.20			69.93	(0.10)	Asphalt.			
				69.88	0.10	(MADE GROUND)			
					(0.05)	Orangish brown and reddish brown slightly sandy GRAVEL. Gravel is fine to medium angular to subangular limestone and rare asphalt.			
					0.15	(MADE GROUND - SUBBASE)			
					(1.25)	Brownish grey occasionally grey and brown slightly sandy to sandy GRAVEL with occasional cobbles and rare wood fragments. Gravel is fine to coarse subangular brick, concrete, asphalt, glass and flint. Cobbles are concrete and brick.			
				68.63	1.40	(MADE GROUND - SUBBASE)			
B	1.50			68.43	(0.20)				
C	1.50	N = 11	1.50		1.60	Firm grey and brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded brick, flint and chalk. (MADE GROUND)			
					(1.20)	Firm orangish brown locally brown silty fine sandy slightly gravelly CLAY. Gravel is fine to medium subangular to subrounded flint and chalk. (REWORKED LONDON CLAY FORMATION)			
UT	2.50	(20)				*From 1.60m to 1.80m bgl: gravelly.*			
				67.23	2.80	Firm orangish brown locally brown silty fine sandy CLAY. (LONDON CLAY FORMATION)			
D	2.95								
					(0.70)				
B	3.50			66.53	3.50	Firm becoming stiff grey silty CLAY with rare shell fragments. (LONDON CLAY FORMATION)			
D	3.50								
S	3.50	N = 12	1.50						
UT	4.50	(30)							
D	4.95					*Between 5.00m and 5.20m bgl: band of hard silt.*			
D	5.50								
S	5.50	N = 18	1.50						
D	6.50								
UT	7.00	(40)			(7.00)	*Below 7.00m bgl: stiff.*			
D	7.45								
D	8.00								
D	8.50					*Below 8.50m bgl: very stiff.*			
S	8.50	N = 26	1.50						
D	9.50								
UT	10.00	(50)							

Continued next sheet

DRAFT

Chiselling		
From	To	Duration (hh:mm)

Groundwater Strikes				
Depth Strike	Rose to	Remarks	Cased	Sealed

Drilled: Gap Drilling Services Ltd

Logged: FC

Checked: AS

Remarks: Hand dug service inspection pit excavated to 1.20m bgl.

Installation: 50mm diameter standpipe installed to 4.00m bgl.

Diameter: 150mm to 10.50m

Exploratory hole logs should be read in conjunction with key sheets

APPLiED GEOLOGY

BOREHOLE LOG - CABLE PERCUSSION

BH9

Project	Bartley Wood Business Park, Hook	**Project No.**	AG3265-21
Client	Patron Hook Ltd	**Sheet**	2 of 2
Start	07/05/2021	**Coordinates**	E 473140.48 N 153724.31
Scale	1:50		
End	07/05/2021	**Ground Level**	70.03m AOD
Total Depth	10.50m		

Sample / Test Type	Depth (m)	Result	Casing Depth (m)	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install
D	10.45			59.53	10.50	Firm becoming stiff grey silty CLAY with rare shell fragments. (LONDON CLAY FORMATION)			
						End of Borehole at 10.50m			

DRAFT

Chiselling			Groundwater Strikes				
From	To	Duration (hh:mm)	Depth Strike	Rose to	Remarks	Cased	Sealed

Drilled: Gap Drilling Services Ltd

Logged: FC

Checked: AS

Remarks: Hand dug service inspection pit excavated to 1.20m bgl.

Installation: 50mm diameter standpipe installed to 4.00m bgl.

Diameter: 150mm to 10.50m

Exploratory hole logs should be read in conjunction with key sheets

APPLiED GEOLOGY

BOREHOLE LOG - DRIVEN CONTINUOUS SAMPLING

DCS1

Project	Bartley Wood Business Park, Hook			**Project No.**	AG3265-21
Client	Patron Hook Ltd			**Sheet**	1 of 2
Start	06/05/2021	**Coordinates**	E 473357.17 N 153886.92	**Scale**	1:25
End	06/05/2021	**Ground Level**	75.35m AOD	**Total Depth**	5.45m

Sample / Test Type	Depth (m)	Result	Dia./ Rec.	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install
					(0.15)	Asphalt.			
				75.20	0.15	(MADE GROUND)			
ES	0.40				(0.45)	Grey and brown slightly sandy GRAVEL with rare cobbles. Gravel is fine to coarse subangular brick, concrete, asphalt and igneous stone. (MADE GROUND - SUBBASE)			
				74.75	0.60	Firm orangish brown slightly sandy gravelly CLAY. Gravel is fine to medium subangular flint. (REWORKED LONDON CLAY)			
					(0.40)				
				74.35	1.00	Firm locally stiff orangish brown locally grey slightly fine sandy silty CLAY with occasional thin bands of silt. (LONDON CLAY FORMATION)			
D S	1.20 1.20	N = 11							
			101mm /80%						
D S	2.00 2.00	N = 11							
			92mm /100%		(2.90)				
D S	3.00 3.00	N = 11				*From 3.00m to 3.20m bgl: soft.*			
			79mm /100%						
				71.45	3.90	Firm locally stiff grey locally dark orangish brown silty CLAY. (LONDON CLAY FORMATION)			
D S	4.00 4.00	N = 12							
			70mm /100%		(1.55)				
D	5.00					Continued next sheet			

DRAFT

Installation:
Remarks: Hand dug service inspection pit excavated to 1.20m bgl. Borehole backfilled with arisings on completion.

Groundwater Strikes				
Depth Strike	Rose to	Remarks	Cased	Sealed

Drilled: DH

Logged: FC

Checked: AS

Exploratory hole logs to be read in conjunction with key sheet

APPLiED GEOLOGY