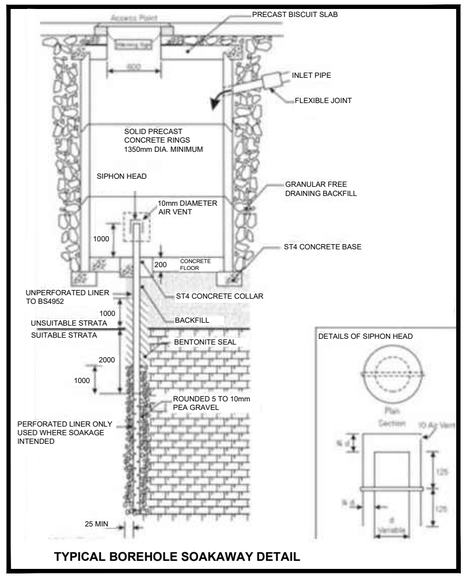
CAMERON DARROCH ASSOCIATES

APPENDIX IV

CAMERON DARROCH ASSOCIATES
KESTREL BUSINESS CENTRE, PRIVATE ROAD No. 2, COLWICK,
NOTTINGHAM, NG4 2JR

DO NOT SCALE FROM THIS DRAWING



TYPICAL BOREHOLE SOAKAWAY DETAIL

DRAINAGE STRATEGY

THE FOLLOWING TEXT DESCRIBES THE SURFACE WATER DRAINAGE DISPOSAL STRATEGY FOR THIS DEVELOPMENT.

THE SITE IS CLASSIFIED AS BROWNFIELD (BEING PREVIOUSLY USED FOR RESIDENTIAL PURPOSES.) KEY POINTS FOR THE STRATEGY ARE AS FOLLOWS:

- THE FIRST CHOICE FOR SURFACE WATER IS ATTENUATION WITH DIRECT INFILTRATION, HOWEVER SITE INVESTIGATIONS IDENTIFIED THAT SHALLOW INFILTRATION WAS NOT FEASIBLE DUE TO POOR INFILTRATION RATES ACHEIVED.
- THERE ARE NO WATERCOURSES WITHIN CLOSE PROXIMITY OF THE SITE. NEITHER IS THERE A SURFACE WATER SEWER.
- FURTHER DEEP BORE INVESTIGATION FOUND GOOD INFILTRATION RATES AS INDICATED BELOW. DRILLING CONTINUED TO 30.0M AND NO GROUND WATER WAS ENCOUNTERED;

Location	Depth (m)	Run	Permeability k (m/s)
BH01	10	1	1.74X10⁻⁶
	15	1	5.73X10⁻⁶
		2	2.61X10⁻⁶
	20	1	4.31X10⁻⁶
		2	3.76X10⁻⁶
BH02	10	1	2.46X10⁻⁶
		2	4.12X10⁻⁶
	15	1	3.37X10⁻⁶
		2	4.03X10⁻⁶
	20	1	2.28X10⁻⁶
		2	4.58X10⁻⁶

- FOR THIS DESIGN, DISCHARGE HAS BEEN USED IN TWO LOCATIONS (BH1 & BH2) WITH THE HIGHLIGHTED VALUES (ABOVE) USED FOR THE CALCULATIONS.
- THE PROPOSED DEVELOPMENT HAS AN IMPERMEABLE AREA OF APPROXIMATELY 2653m2 (0.2653ha) AND HAS A LEVEL DIFFERENCE, FALLING FROM NORTH TO SOUTH BY APPROXIMATELY 6.5M.
- THE SURFACE WATER FLOW HAS BEEN DESIGNED TO CAPTURE AND ATTENUATE RUNOFF IN 4No. CRATED TANKS WITH FLOW RESTRICTED TO 1.2L/S FROM THE UPPER LEVEL TANKS.
- DUE TO THE SITE TOPOGRAPHY AND PROPOSED LAYOUT THERE IS NO SPACE FOR ANY OTHER SUDS FEATURES SUCH AS SWALES AND PONDS ETC.
- FOUL WATER FLOW ASSUMED TO BE UNRESTRICTED INTO THE PUBLIC SEWER WHICH THE NEAREST POINT IS FOUND IN THE JUNCTION OF MABLE ROAD JUST OFF THE SOUTH-WESTERN CORNER OF THE PROPOSED SITE.
- THE SURFACE WATER DESIGN CATERS FOR ALL STORM EVENTS UP TO AND INCLUDING THE 1 IN 100 YEAR EVENT PLUS 40% CLIMATE CHANGE.

PRELIMINARY

REV	INITIALS	DATE	DETAIL
P2	MJC	05.03.24	AMENDED TO SUIT CONTRACTORS PREFERRED ATTENUATION CRATE MANUFACTURER.
P1	MJC	26.06.23	PRELIMINARY

STATUS

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CLIENT: BARCHESTER	JOB NO: CDA-2601
PROJECT: PROPOSED CARE HOME, TOP DARTFORD ROAD, HEXTABLE.	DRG NO: DD100
TITLE: DRAINAGE DESIGN DRAWING	REVISION: P2
	SCALE: 1:125 @ A0
	DATE: APR 2023
	DRAWN BY: MJC
	CHKD: SEL

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.411	Preferred Cover Depth (m)	0.900
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Add Inflow (l/s)	Cover Level (m)	Diameter (mm)	Depth (m)
S1	0.029	5.00	0.0	61.160	450	0.900
S2	0.000	5.00	0.0	61.000	1200	4.120
S3	0.002	5.00	0.0	57.950	1200	1.100
S4	0.036	5.00	0.0	57.960	1200	1.560
S7	0.005	5.00	0.0	57.960	1200	1.660
S8	0.003	5.00	0.0	57.980	1200	1.740
S10	0.011	5.00	0.0	57.940	1200	1.800
S11	0.000	5.00	0.0	57.940	1200	1.815
S12	0.000	5.00	0.0	57.800	1200	1.700
BHSA07	0.000	5.00	0.0	57.600	1200	1.550

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S1	S2	37.700	0.600	60.260	59.800	0.460	82.0	150	5.57	50.0
1.001	S2	S3	4.500	0.600	56.880	56.850	0.030	150.0	225	5.64	50.0
1.002	S3	S4	9.870	0.600	56.850	56.400	0.450	21.9	225	5.69	50.0
1.003	S4	S7	22.200	0.600	56.400	56.300	0.100	222.0	225	6.12	50.0
1.004	S7	S8	9.250	0.600	56.300	56.240	0.060	154.2	225	6.27	50.0
1.005	S8	S10	19.400	0.600	56.240	56.140	0.100	194.0	225	6.61	50.0
1.006	S10	S11	2.520	0.600	56.140	56.125	0.015	168.0	225	6.65	50.0
1.007	S11	S12	7.800	0.600	56.125	56.100	0.025	312.0	225	6.83	50.0
1.008	S12	BHSA07	2.520	0.600	56.100	56.050	0.050	50.4	225	6.85	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.111	19.6	3.9	0.750	1.050	0.029	0.0	45	0.869
1.001	1.065	42.3	3.9	3.895	0.875	0.029	0.0	46	0.670
1.002	2.806	111.6	4.2	0.875	1.335	0.031	0.0	29	1.351
1.003	0.873	34.7	9.1	1.335	1.435	0.067	0.0	79	0.739
1.004	1.050	41.8	9.8	1.435	1.515	0.072	0.0	73	0.858
1.005	0.935	37.2	10.2	1.515	1.575	0.075	0.0	80	0.800
1.006	1.006	40.0	11.7	1.575	1.590	0.086	0.0	83	0.875
1.007	0.735	29.2	11.7	1.590	1.475	0.086	0.0	99	0.695
1.008	1.846	73.4	11.7	1.475	1.325	0.086	0.0	60	1.357

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	37.700	82.0	150	Circular	61.160	60.260	0.750	61.000	59.800	1.050
1.001	4.500	150.0	225	Circular	61.000	56.880	3.895	57.950	56.850	0.875
1.002	9.870	21.9	225	Circular	57.950	56.850	0.875	57.960	56.400	1.335
1.003	22.200	222.0	225	Circular	57.960	56.400	1.335	57.960	56.300	1.435
1.004	9.250	154.2	225	Circular	57.960	56.300	1.435	57.980	56.240	1.515
1.005	19.400	194.0	225	Circular	57.980	56.240	1.515	57.940	56.140	1.575
1.006	2.520	168.0	225	Circular	57.940	56.140	1.575	57.940	56.125	1.590
1.007	7.800	312.0	225	Circular	57.940	56.125	1.590	57.800	56.100	1.475
1.008	2.520	50.4	225	Circular	57.800	56.100	1.475	57.600	56.050	1.325

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	450	Manhole	Adoptable	S2	1200	Manhole	Adoptable
1.001	S2	1200	Manhole	Adoptable	S3	1200	Manhole	Adoptable
1.002	S3	1200	Manhole	Adoptable	S4	1200	Manhole	Adoptable
1.003	S4	1200	Manhole	Adoptable	S7	1200	Manhole	Adoptable
1.004	S7	1200	Manhole	Adoptable	S8	1200	Manhole	Adoptable
1.005	S8	1200	Manhole	Adoptable	S10	1200	Manhole	Adoptable
1.006	S10	1200	Manhole	Adoptable	S11	1200	Manhole	Adoptable
1.007	S11	1200	Manhole	Adoptable	S12	1200	Manhole	Adoptable
1.008	S12	1200	Manhole	Adoptable	BHSA07	1200	Manhole	Adoptable

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S1	61.160	0.900	450	0	1.000	60.260	150
S2	61.000	4.120	1200	1	1.000	59.800	150
				0	1.001	56.880	225
S3	57.950	1.100	1200	1	1.001	56.850	225
				0	1.002	56.850	225
S4	57.960	1.560	1200	1	1.002	56.400	225
				0	1.003	56.400	225
S7	57.960	1.660	1200	1	1.003	56.300	225
				0	1.004	56.300	225
S8	57.980	1.740	1200	1	1.004	56.240	225
				0	1.005	56.240	225

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S10	57.940	1.800	1200	1	1.005	56.140	225
				0	1.006	56.140	225
S11	57.940	1.815	1200	1	1.006	56.125	225
				0	1.007	56.125	225
S12	57.800	1.700	1200	1	1.007	56.100	225
				0	1.008	56.100	225
BHSA07	57.600	1.550	1200	1	1.008	56.050	225

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.411	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	40	0	0

Node S7 Online Orifice Control

Flap Valve	x	Invert Level (m)	56.300	Diameter (m)	0.024
Downstream Link	1.004	Design Depth (m)	1.000	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	1.2		

Node S7 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	56.300
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	0

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	133.0	0.0	0.300	133.0	0.0	0.600	133.0	0.0
0.100	133.0	0.0	0.400	133.0	0.0	0.700	133.0	0.0
0.200	133.0	0.0	0.500	133.0	0.0	0.800	133.0	0.0

Node BHSA07 Deep Bore Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.49320	Invert Level (m)	42.600	Borehole Diameter	0.200
Side Inf Coefficient (m/hr)	0.49320	Time to half empty (mins)	405	Borehole Depth **(m)**	15.000
Safety Factor	2.0	Diameter (m)	1.350	Inf Depth (m)	10.000
Porosity	1.00	Depth (m)		Number Required	4

Node S12 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	56.100
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	0

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	56.0	0.0	0.400	56.0	0.0	0.800	56.0	0.0	1.200	56.0	0.0
0.100	56.0	0.0	0.500	56.0	0.0	0.900	56.0	0.0			
0.200	56.0	0.0	0.600	56.0	0.0	1.000	56.0	0.0			
0.300	56.0	0.0	0.700	56.0	0.0	1.100	56.0	0.0			

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	11	60.313	0.053	5.3	0.0425	0.0000	OK
15 minute winter	S2	11	56.935	0.055	5.1	0.0625	0.0000	OK
15 minute winter	S3	11	56.884	0.034	5.4	0.0395	0.0000	OK
15 minute summer	S4	9	56.511	0.111	11.3	0.1771	0.0000	OK
240 minute winter	S7	232	56.389	0.089	2.6	11.2980	0.0000	OK
15 minute winter	S8	11	56.260	0.020	0.7	0.0237	0.0000	OK
15 minute winter	S10	10	56.186	0.046	2.6	0.0574	0.0000	OK
15 minute summer	S11	10	56.179	0.054	2.4	0.0612	0.0000	OK
60 minute winter	S12	43	56.119	0.019	1.5	1.0418	0.0000	OK
120 minute winter	BHSA07	96	42.618	-13.432	0.9	0.8030	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute winter	S1	1.000	S2	5.1	0.932	0.261	0.2072
15 minute winter	S2	1.001	S3	5.1	0.928	0.122	0.0254
15 minute winter	S3	1.002	S4	5.5	0.554	0.049	0.1118
15 minute summer	S4	1.003	S7	11.8	1.341	0.341	0.2255
240 minute winter	S7	Orifice	S8	0.3			
15 minute winter	S8	1.005	S10	0.6	0.261	0.017	0.0726
15 minute winter	S10	1.006	S11	2.6	0.427	0.065	0.0164
15 minute summer	S11	1.007	S12	2.6	0.865	0.089	0.0294
60 minute winter	S12	1.008	BHSA07	1.0	0.625	0.013	0.0039
120 minute winter	BHSA07	Infiltration		0.6			

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	60.337	0.077	10.1	0.0614	0.0000	OK
15 minute winter	S2	11	56.956	0.076	9.8	0.0865	0.0000	OK
15 minute winter	S3	11	56.897	0.047	10.5	0.0543	0.0000	OK
15 minute winter	S4	10	56.545	0.145	22.9	0.2315	0.0000	OK
600 minute winter	S7	465	56.471	0.171	2.3	21.7691	0.0000	OK
15 minute winter	S8	11	56.268	0.028	1.2	0.0321	0.0000	OK
15 minute winter	S10	9	56.205	0.065	4.9	0.0820	0.0000	OK
15 minute winter	S11	8	56.201	0.076	5.0	0.0858	0.0000	OK
30 minute winter	S12	23	56.130	0.030	3.9	1.6093	0.0000	OK
120 minute winter	BHSA07	90	42.635	-13.415	1.7	1.5390	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute winter	S1	1.000	S2	9.8	1.102	0.497	0.3345
15 minute winter	S2	1.001	S3	9.8	1.116	0.231	0.0400
15 minute winter	S3	1.002	S4	10.5	0.685	0.094	0.1625
15 minute winter	S4	1.003	S7	23.0	1.542	0.663	0.3528
600 minute winter	S7	Orifice	S8	0.5			
15 minute winter	S8	1.005	S10	1.2	0.293	0.032	0.1176
15 minute winter	S10	1.006	S11	5.0	0.537	0.124	0.0265
15 minute winter	S11	1.007	S12	5.1	1.060	0.174	0.0464
30 minute winter	S12	1.008	BHSA07	2.3	0.792	0.031	0.0073
120 minute winter	BHSA07	Infiltration		1.2			

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.411	Preferred Cover Depth (m)	0.900
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Add Inflow (l/s)	Cover Level (m)	Diameter (mm)	Depth (m)
S20	0.007	5.00	0.0	57.980	450	0.750
S21	0.003	5.00	0.0	57.830	450	0.750
S22	0.020	5.00	0.0	57.500	450	0.750
S23	0.022	5.00	0.0	57.980	450	1.380
S24	0.000	5.00	0.0	57.820	450	1.395
S25	0.072	5.00	0.0	57.710	1200	2.350
S26	0.000	5.00	0.0	57.360	1200	2.060
S27	0.018	5.00	0.0	57.230	1200	1.970
S29	0.000	5.00	0.0	56.430	1200	1.330
S31	0.007	5.00	0.0	56.170	1200	1.200
S32	0.013	5.00	0.0	56.400	1200	1.600
S33	0.000	5.00	0.0	57.400	1200	2.650
BHSA03	0.000	5.00	0.0	57.400	1350	2.700

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
20.000	S20	S21	7.400	0.600	57.230	57.080	0.150	49.3	150	5.09	50.0
20.001	S21	S24	5.200	0.600	57.080	56.425	0.655	7.9	150	5.11	50.0
21.000	S22	S23	18.080	0.600	56.750	56.600	0.150	120.5	150	5.33	50.0
21.001	S23	S24	11.840	0.600	56.600	56.425	0.175	67.7	150	5.49	50.0
20.002	S24	S25	2.550	0.600	56.425	56.390	0.035	72.9	225	5.52	50.0
20.003	S25	S26	13.000	0.600	55.360	55.300	0.060	216.7	225	5.76	50.0
20.004	S26	S27	5.670	0.600	55.300	55.260	0.040	141.8	225	5.85	50.0
20.005	S27	S29	16.370	0.600	55.260	55.100	0.160	102.3	225	6.06	50.0
20.006	S29	S31	3.580	0.600	55.100	54.970	0.130	27.5	225	6.08	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
20.000	1.436	25.4	0.9	0.600	0.600	0.007	0.0	20	0.680
20.001	3.598	63.6	1.4	0.600	1.245	0.010	0.0	15	1.438
21.000	0.914	16.2	2.7	0.600	1.230	0.020	0.0	41	0.678
21.001	1.224	21.6	5.7	1.230	1.245	0.042	0.0	52	1.034
20.002	1.534	61.0	7.0	1.170	1.095	0.052	0.0	51	1.030
20.003	0.884	35.2	16.8	2.125	1.835	0.124	0.0	109	0.874
20.004	1.096	43.6	16.8	1.835	1.745	0.124	0.0	97	1.028
20.005	1.292	51.4	19.2	1.745	1.105	0.142	0.0	95	1.202
20.006	2.502	99.5	19.2	1.105	0.975	0.142	0.0	66	1.940

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
20.007	S31	S32	3.870	0.600	54.970	54.800	0.170	22.8	225	6.11	50.0
20.008	S32	S33	8.000	0.600	54.800	54.750	0.050	160.0	225	6.24	50.0
20.009	S33	BHSA03	2.470	0.600	54.750	54.700	0.050	49.4	225	6.26	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
20.007	2.754	109.5	20.2	0.975	1.375	0.149	0.0	65	2.120
20.008	1.031	41.0	22.0	1.375	2.425	0.162	0.0	117	1.048
20.009	1.865	74.2	22.0	2.425	2.475	0.162	0.0	84	1.632

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
20.000	7.400	49.3	150	Circular	57.980	57.230	0.600	57.830	57.080	0.600
20.001	5.200	7.9	150	Circular	57.830	57.080	0.600	57.820	56.425	1.245
21.000	18.080	120.5	150	Circular	57.500	56.750	0.600	57.980	56.600	1.230
21.001	11.840	67.7	150	Circular	57.980	56.600	1.230	57.820	56.425	1.245
20.002	2.550	72.9	225	Circular	57.820	56.425	1.170	57.710	56.390	1.095
20.003	13.000	216.7	225	Circular	57.710	55.360	2.125	57.360	55.300	1.835
20.004	5.670	141.8	225	Circular	57.360	55.300	1.835	57.230	55.260	1.745
20.005	16.370	102.3	225	Circular	57.230	55.260	1.745	56.430	55.100	1.105
20.006	3.580	27.5	225	Circular	56.430	55.100	1.105	56.170	54.970	0.975
20.007	3.870	22.8	225	Circular	56.170	54.970	0.975	56.400	54.800	1.375
20.008	8.000	160.0	225	Circular	56.400	54.800	1.375	57.400	54.750	2.425
20.009	2.470	49.4	225	Circular	57.400	54.750	2.425	57.400	54.700	2.475

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
20.000	S20	450	Manhole	Adoptable	S21	450	Manhole	Adoptable
20.001	S21	450	Manhole	Adoptable	S24	450	Manhole	Adoptable
21.000	S22	450	Manhole	Adoptable	S23	450	Manhole	Adoptable
21.001	S23	450	Manhole	Adoptable	S24	450	Manhole	Adoptable
20.002	S24	450	Manhole	Adoptable	S25	1200	Manhole	Adoptable
20.003	S25	1200	Manhole	Adoptable	S26	1200	Manhole	Adoptable
20.004	S26	1200	Manhole	Adoptable	S27	1200	Manhole	Adoptable
20.005	S27	1200	Manhole	Adoptable	S29	1200	Manhole	Adoptable
20.006	S29	1200	Manhole	Adoptable	S31	1200	Manhole	Adoptable
20.007	S31	1200	Manhole	Adoptable	S32	1200	Manhole	Adoptable
20.008	S32	1200	Manhole	Adoptable	S33	1200	Manhole	Adoptable
20.009	S33	1200	Manhole	Adoptable	BHSA03	1350	Manhole	Adoptable

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S20	57.980	0.750	450				
				0	20.000	57.230	150

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S21	57.830	0.750	450	1	20.000	57.080	150
				0	20.001	57.080	150
S22	57.500	0.750	450	0	21.000	56.750	150
S23	57.980	1.380	450	1	21.000	56.600	150
				0	21.001	56.600	150
S24	57.820	1.395	450	1	21.001	56.425	150
				2	20.001	56.425	150
				0	20.002	56.425	225
S25	57.710	2.350	1200	1	20.002	56.390	225
				0	20.003	55.360	225
S26	57.360	2.060	1200	1	20.003	55.300	225
				0	20.004	55.300	225
S27	57.230	1.970	1200	1	20.004	55.260	225
				0	20.005	55.260	225
S29	56.430	1.330	1200	1	20.005	55.100	225
				0	20.006	55.100	225
S31	56.170	1.200	1200	1	20.006	54.970	225
				0	20.007	54.970	225
S32	56.400	1.600	1200	1	20.007	54.800	225
				0	20.008	54.800	225
S33	57.400	2.650	1200	1	20.008	54.750	225
				0	20.009	54.750	225
BHSA03	57.400	2.700	1350	1	20.009	54.700	225

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.411	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	40	0	0

Node S26 Online Orifice Control

Flap Valve	x	Design Depth (m)	1.200	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	1.2		
Invert Level (m)	55.300	Diameter (m)	0.022		

Node S26 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	55.300
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	0

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	180.0	0.0	0.300	180.0	0.0	0.600	180.0	0.0
0.100	180.0	0.0	0.400	180.0	0.0	0.700	180.0	0.0
0.200	180.0	0.0	0.500	180.0	0.0	0.800	180.0	0.0

Node S33 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	54.750
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	0

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	51.0	0.0	0.400	51.0	0.0	0.800	51.0	0.0	1.200	51.0	0.0
0.100	51.0	0.0	0.500	51.0	0.0	0.900	51.0	0.0			
0.200	51.0	0.0	0.600	51.0	0.0	1.000	51.0	0.0			
0.300	51.0	0.0	0.700	51.0	0.0	1.100	51.0	0.0			

Node BHSA03 Deep Bore Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.93960	Invert Level (m)	42.400	Borehole Diameter	0.200
Side Inf Coefficient (m/hr)	0.93960	Time to half empty (mins)	213	Borehole Depth (m)	15.000
Safety Factor	2.0	Diameter (m)	1.350	Inf Depth (m)	10.000
Porosity	1.00	Depth (m)		Number Required	4

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.79%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S20	10	57.255	0.025	1.3	0.0085	0.0000	OK
15 minute winter	S21	10	57.098	0.018	1.9	0.0042	0.0000	OK
15 minute winter	S22	10	56.798	0.048	3.7	0.0334	0.0000	OK
15 minute winter	S23	10	56.664	0.064	7.6	0.0305	0.0000	OK
15 minute winter	S24	10	56.494	0.069	9.4	0.0109	0.0000	OK
15 minute winter	S25	8	55.681	0.321	22.5	0.5601	0.0000	OK
720 minute winter	S26	675	55.434	0.134	1.8	23.1263	0.0000	OK
15 minute winter	S27	10	55.301	0.041	3.4	0.0542	0.0000	OK
15 minute winter	S29	11	55.130	0.030	3.4	0.0336	0.0000	OK
15 minute winter	S31	10	55.001	0.031	4.6	0.0391	0.0000	OK
15 minute winter	S32	10	54.869	0.069	7.0	0.0886	0.0000	OK
30 minute winter	S33	22	54.788	0.038	5.5	1.8884	0.0000	OK
60 minute winter	BHSA03	47	42.434	-12.266	3.1	1.4792	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute winter	S20	20.000	S21	1.3	0.849	0.050	0.0112
15 minute winter	S21	20.001	S24	1.9	0.442	0.029	0.0235
15 minute winter	S22	21.000	S23	3.6	0.608	0.226	0.1088
15 minute winter	S23	21.001	S24	7.5	1.005	0.348	0.0888
15 minute winter	S24	20.002	S25	9.3	1.004	0.152	0.0236
15 minute winter	S25	20.003	S26	25.5	1.612	0.726	0.2615
720 minute winter	S26	Orifice	S27	0.4			
15 minute winter	S27	20.005	S29	3.4	0.841	0.065	0.0658
15 minute winter	S29	20.006	S31	3.3	1.040	0.033	0.0115
15 minute winter	S31	20.007	S32	4.6	0.716	0.042	0.0262
15 minute winter	S32	20.008	S33	7.0	1.212	0.170	0.0515
30 minute winter	S33	20.009	BHSA03	3.7	0.906	0.050	0.0101
60 minute winter	BHSA03	Infiltration		2.2			

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.79%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S20	10	57.264	0.034	2.4	0.0116	0.0000	OK
15 minute winter	S21	10	57.104	0.024	3.4	0.0056	0.0000	OK
15 minute winter	S22	10	56.818	0.068	7.0	0.0473	0.0000	OK
15 minute winter	S23	10	56.697	0.097	14.6	0.0463	0.0000	OK
15 minute winter	S24	10	56.524	0.099	17.7	0.0158	0.0000	OK
15 minute winter	S25	7	55.739	0.379	42.7	0.6602	0.0000	SURCHARGED
720 minute winter	S26	690	55.550	0.250	3.2	43.0771	0.0000	SURCHARGED
15 minute winter	S27	10	55.317	0.057	6.5	0.0746	0.0000	OK
15 minute winter	S29	10	55.142	0.042	6.4	0.0471	0.0000	OK
15 minute winter	S31	10	55.014	0.044	8.7	0.0554	0.0000	OK
15 minute winter	S32	10	54.892	0.092	13.2	0.1189	0.0000	OK
15 minute winter	S33	13	54.810	0.060	13.1	2.9838	0.0000	OK
30 minute winter	BHSA03	31	42.685	-12.015	8.2	3.5383	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute winter	S20	20.000	S21	2.4	1.021	0.094	0.0174
15 minute winter	S21	20.001	S24	3.4	0.506	0.053	0.0367
15 minute winter	S22	21.000	S23	6.9	0.696	0.428	0.1792
15 minute winter	S23	21.001	S24	14.4	1.180	0.664	0.1442
15 minute winter	S24	20.002	S25	17.6	1.178	0.288	0.0382
15 minute winter	S25	20.003	S26	42.9	1.758	1.222	0.3032
720 minute winter	S26	Orifice	S27	0.5			
15 minute winter	S27	20.005	S29	6.4	0.998	0.124	0.1055
15 minute winter	S29	20.006	S31	6.3	1.198	0.063	0.0189
15 minute winter	S31	20.007	S32	8.7	0.865	0.079	0.0402
15 minute winter	S32	20.008	S33	13.1	1.368	0.320	0.0873
15 minute winter	S33	20.009	BHSA03	8.6	1.119	0.115	0.0189
30 minute winter	BHSA03	Infiltration		3.3			

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.79%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S20	10	57.276	0.046	4.4	0.0160	0.0000	OK
15 minute winter	S21	10	57.112	0.032	6.3	0.0076	0.0000	OK
15 minute winter	S22	11	56.954	0.204	12.7	0.1410	0.0000	SURCHARGED
15 minute winter	S23	11	56.856	0.256	24.9	0.1222	0.0000	SURCHARGED
15 minute winter	S24	11	56.564	0.139	30.9	0.0222	0.0000	OK
15 minute winter	S25	10	55.914	0.554	75.6	0.9657	0.0000	SURCHARGED
720 minute winter	S26	690	55.786	0.486	5.9	83.6717	0.0000	SURCHARGED
15 minute winter	S27	10	55.337	0.077	11.6	0.1012	0.0000	OK
15 minute winter	S29	10	55.158	0.058	11.5	0.0652	0.0000	OK
15 minute winter	S31	10	55.036	0.066	15.8	0.0818	0.0000	OK
15 minute winter	S32	10	54.926	0.126	23.9	0.1630	0.0000	OK
15 minute winter	S33	13	54.842	0.092	23.8	4.5389	0.0000	OK
60 minute winter	BHSA03	57	43.794	-10.906	11.8	9.8833	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute winter	S20	20.000	S21	4.4	1.204	0.172	0.0271
15 minute winter	S21	20.001	S24	6.2	0.614	0.098	0.0513
15 minute winter	S22	21.000	S23	11.8	0.736	0.731	0.3183
15 minute winter	S23	21.001	S24	24.9	1.414	1.150	0.2053
15 minute winter	S24	20.002	S25	30.9	1.353	0.507	0.0583
15 minute winter	S25	20.003	S26	75.8	2.351	2.157	0.4668
720 minute winter	S26	Orifice	S27	0.7			
15 minute winter	S27	20.005	S29	11.5	1.156	0.224	0.1638
15 minute winter	S29	20.006	S31	11.4	1.300	0.115	0.0315
15 minute winter	S31	20.007	S32	15.7	0.978	0.144	0.0628
15 minute winter	S32	20.008	S33	23.8	1.492	0.580	0.1451
15 minute winter	S33	20.009	BHSA03	17.8	1.336	0.240	0.0329
60 minute winter	BHSA03	Infiltration		3.3			

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.411	Preferred Cover Depth (m)	0.900
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
S30	0.012	5.00	55.000	1200	1.260
BHSA09	0.000	5.00	55.700	1350	2.040

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
40.000	S30	BHSA09	4.300	0.600	53.740	53.660	0.080	53.8	150	5.05	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
40.000	1.375	24.3	1.6	1.110	1.890	0.012	0.0	26	0.779

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
40.000	4.300	53.8	150	Circular	55.000	53.740	1.110	55.700	53.660	1.890

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
40.000	S30	1200	Manhole	Adoptable	BHSA09	1350	Manhole	Adoptable

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S30	55.000	1.260	1200	◯ 0	40.000	53.740	150
BHSA09	55.700	2.040	1350	1 ◯	40.000	53.660	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.411	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	40	0	0

Node BHSA09 Deep Bore Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.93960	Invert Level (m)	40.700	Borehole Diameter	0.200
Side Inf Coefficient (m/hr)	0.93960	Time to half empty (mins)	213	Borehole Depth **(m)**	15.000
Safety Factor	2.0	Diameter (m)	1.350	Inf Depth (m)	10.000
Porosity	1.00	Depth (m)		Number Required	1

Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S30	10	53.772	0.032	2.2	0.0426	0.0000	OK
30 minute winter	BHSA09	23	40.800	-12.860	1.7	0.6186	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute winter	S30	40.000	BHSA09	2.2	0.819	0.090	0.0114
30 minute winter	BHSA09	Infiltration		0.8			

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S30	10	53.786	0.046	4.2	0.0604	0.0000	OK
30 minute winter	BHSA09	26	41.417	-12.243	3.2	1.5023	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute winter	S30	40.000	BHSA09	4.1	0.970	0.170	0.0184
30 minute winter	BHSA09	Infiltration		0.8			

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S30	10	53.804	0.064	7.6	0.0850	0.0000	OK
60 minute winter	BHSA09	50	42.794	-10.866	3.9	3.4725	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute winter	S30	40.000	BHSA09	7.5	1.126	0.310	0.0288
60 minute winter	BHSA09	Infiltration		0.8			

CAMERON DARROCH ASSOCIATES

APPENDIX V

CAMERON DARROCH ASSOCIATES
KESTREL BUSINESS CENTRE, PRIVATE ROAD No. 2, COLWICK,
NOTTINGHAM, NG4 2JR

DO NOT SCALE FROM THIS DRAWING

N

SURFACE WATER DRAINAGE IS SUBJECT TO RECEIPT OF ALL RWP SETTING OUT FROM THE ARCHITECT

EXISTING GROUND TO BE BATTERED BACK, IF NECESSARY, TO FACILITATE CONSTRUCTION OF NEW RETAINING STRUCTURE & REINSTATED. ALL TO BE IN ACCORDANCE WITH THE LICENCE AGREEMENT BETWEEN BARCHESTER & THE ADJACENT LAND OWNER.

STEEL STAIR CASE DETAILS TO BE AGREED TO ENABLE OMISSION OF RETAINING WALL TO INSIDE LINE OF STAIR.

ELEVATED WALKWAY (61.225) TO ENABLE GROUND TO BE PROFILED UNDER TO SUIT EXISTING LEVELS & OMIT REQUIREMENT FOR RETAINING STRUCTURE AROUND TREE & ON BOUNDARY. FOOTPATH ROUTE TO BE AMENDED SUBJECT TO AGREEMENT WITH ARCHITECT

FLOW CONTROL
24mm DIA. ORIFICE PLATE TO RESTRICT FLOW TO 1.2 l/sec.
DESIGN HEAD 1.0m

FLOW CONTROL
21mm DIA. ORIFICE PLATE TO RESTRICT FLOW TO 1.2 l/sec.
DESIGN HEAD 1.0m

4No. 200mm DIA. DEEP BORE SOAKAWAYS TO 15m DEPTH BELOW EXISTING GROUND LEVEL.
1350mm DIA. PCC CHAMBERS
DISCHARGE USED IN THIS LOCATION BASED ON RESULTS FROM SITE INVESTIGATION BOREHOLE BH1. REFER TO TABLE.

4No. 200mm DIA. DEEP BORE SOAKAWAYS TO 15m DEPTH BELOW EXISTING GROUND LEVEL.
1350mm DIA. PCC CHAMBERS
DISCHARGE USED IN THIS LOCATION BASED ON RESULTS FROM SITE INVESTIGATION BOREHOLE BH2. REFER TO TABLE.

1No. 200mm DIA. DEEP BORE SOAKAWAY TO 15m DEPTH BELOW EXISTING GROUND LEVEL.

INDICATES DIRECTION OF FLOOD WATER DURING EXCEEDANCE EVENTS

INDICATES DIRECTION OF FLOOD WATER DURING EXCEEDANCE EVENTS

INDICATES AREAS OF PERMEABLE BLOCK PAVING CONSTRUCTION

VEHICLE BARRIER & PEDESTRIAN GUARDING ALONG TOP OF WALL. GUARDING TO BE DESIGNED & INSTALLED INTEGRAL WITH RET WALL & FOUNDATIONS - SEE SEPARATE DETAILS

PARTY WALL NOTICE/AGREEMENT MAY BE REQUIRED WITH NEIGHBOURING OWNER(S) - TO BE BY PROJECT MANAGER/ARCHITECT

ALL WORKS WITHIN EXISTING PUBLIC HIGHWAY TO BE APPROVED BY THE LOCAL HIGHWAYS AUTHORITY VIA S278 AGREEMENT TO BE SUBMITTED/OBTAINED BY THE MAIN CONTRACTOR.

EXISTING SITE ACCESS TO MODIFIED, CONSTRUCTED TO ADOPTABLE STANDARDS & INSTALLED FULLY IN ACCORDANCE WITH LOCAL HIGHWAYS AUTHORITY REQUIREMENTS & SECURED VIA S278 AGREEMENT OBTAINED BY THE MAIN CONTRACTOR. CONTRACTOR TO ALLOW FOR ANY DIVERSION, LOWERING OR PROTECTION OF EXISTING BURIED SERVICES AS NECESSARY.

Top Dartford Road (B258)

Herbert Road

Top Dartford Road

PRELIMINARY

REV	INITIALS	DATE	DETAIL
P2	MJC	05.03.24	AMENDED TO SUIT CONTRACTORS PREFERRED ATTENUATION CRATE MANUFACTURER.
P1	MJC	28.06.23	PRELIMINARY

STATUS

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CLIENT: BARCHESTER	JOB NO: CDA-2601
PROJECT: PROPOSED CARE HOME, TOP DARTFORD ROAD, HEXTABLE.	DRG NO: DD150
TITLE: SURFACE WATER EXCEEDANCE ROUTES	REVISION: P2
	SCALE: 1:125 @ A3
	DATE: APR 2023
	DRAWN BY: MJC
	CHKD: SEL

CAMERON DARROCH ASSOCIATES

APPENDIX VI

CAMERON DARROCH ASSOCIATES
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REF: 8/2607

24 January 2023

Seven Oaks District Council
Argyle Road
Sevenoaks
Kent
TN13 1HG

For the attention of Mrs Anna Horn

Your reference: 22/00459/FUL

Location: 57 Top Dartford Road, Hextable, Swanley, Kent. BR8 7SG

Proposal: Demolition of the existing house and erection of a 67-bedroom care home including associated access and landscaping works.

Please find enclosed updated drainage plans and catchment assessment plans for the above scheme.
Drawings enclosed:
4400 -P5 – Drainage GA
4402-P3 – Catchment Areas Plan

These drawings have been updated to reflect the minor revisions to the current proposed landscape and architectural scheme.

Landscape - DJOGS Drawing 711 rev 1 dated 24/10/22.
Architects - Harris Irwin Site Plan – 0102 Rev P5 dated 20/10/22.

We can confirm that the catchment area draining to the below ground soakaway network is slightly reduced from the earlier scheme. This means that the current calculations and designs provided in the SUDS report remain current.

Comments were received from the LLFA (SEDC/2022/089508 19/4/22)

The LLFA were seeking clarification concerning the location of the deep bore soakaways in relation to the proposed foundations for the building structure. It is usual for deep bore soakaways to be sited at least 10m from building foundations. Due to the constraints of the existing trees it is not possible to achieve this distance and the nearest soakaway is approximately 8m to the centre of the BH.

The design of the foundations will take into consideration all the site constraints such as geology, groundwater, geotechnical, trees and drainage. In this instance, the drainage design and location of the borehole soakaways may affect the choice of foundation type and deep foundations or piled foundations may be required where the building is close to the soakaways.

It is standard practice for structural engineers to consider the drainage systems as part of their structural design. However, a note has been provided on the drainage strategy drawing for the designers of the foundations to take into account the location of the soakaways. As a structural engineering practice, we can confirm that a safe foundation solution can be achieved with the soakaways in this location.

Kind regards

Greg Scott CEng MIstructE
Director
Clancy Consulting Ltd

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clancy consulting

FLOOD RISK AND DRAINAGE STRATEGY REPORT 57 TOP DARTFORD ROAD, HEXTABLE, KENT, BR8 7SG

Report prepared on behalf of HARRIS IRWIN ASSOCIATES for BARCHESTER HEALTHCARE LTD

17 January 2021

Rev. 02

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FLOOD RISK ASSESSMENT & SUDS STRATEGY

Revision List

REVISION	REASON FOR ISSUE	DATE OF ISSUE
01	First Issue - Draft	16 December 2021
02	Second issue	14 January 2022

Prepared by: **Richard Hendry Eng. Tech MIHE, Senior Civil Engineer**
for and on behalf of CLANCY CONSULTING LTD

Checked by: **Greg Scott B.Eng. (Hons), C.Eng., M.I.Struct.E Director**
for and on behalf of CLANCY CONSULTING LTD

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Appendix A – Development Proposals

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Appendix C – Topo and Utilities

Appendix D – Thames Water utility information

Appendix E – Surface Water Flood Flows

Appendix F – Drainage Layout and Calculations

Appendix G – Kent County Council; LLFA proforma

1.0 Introduction

1.1 General

1.1.1 This report relates to a planning application for the development of a brownfield site, north of the B258 Top Dartford Road, Hextable, for a proposed care home.

1.1.2 This report sets out the results of a flood risk assessment required in support of a planning application for this development. The assessment has been carried out in accordance with the general principles set out in National Planning Policy Framework, Technical Guidance to the National Planning Policy Framework and Flood Risk and Coastal Change Planning Practice Guidance.

1.1.3 This report is prepared solely for the benefit of Harris Irwin Associates for Barchester Healthcare Ltd. This report may not be assigned without prior written permission from Clancy Consulting Ltd.

1.2 Background Information

1.2.1 In 2001 the Department for Transport, Local Government and the Regions (DTLR) published Planning Policy Guidance Note 25 (PPG25), which explains how flood risk should be taken into consideration during the planning and development process.

1.2.2 PPG25 was replaced by Planning Policy Statement 25: Development and Flood Risk published in March 2010. This Policy Statement was introduced to place more emphasis on the increased flood risk from climate change.

1.2.3 In March 2012, the Government released the National Planning Policy Framework (NPPF) aiming to make the planning system less complex and more accessible, to protect the environment and promote sustainable growth.

1.2.4 NPPF accompanied with the Technical Guidance superseded PPS25 although the principles set out in the new publication remain similar in terms of the flood risk aspect.

1.2.5 The flood risk Practice Guide was published online in March 2014 with the latest update in August 2021.

1.2.6 In July 2018 the NPPF was updated. This update has highlighted the need for further awareness of flood risk issues for new developments. This has since been revised in February 2021 to include minor clarifications.

2.0 Structure of the Report

2.1 The report has been structured to follow the general principles set out in the Technical Guidance published in March 2014 along with subsequent revisions.

2.2 The methodology for this FRA has comprised a desktop study making reference to the Environment Agency (EA) Mapping, Kent Council – Flood risk to communities - Sevenoaks and Kent Council SFRA with relevant plans including plans showing the location of local sewers.

2.3 Sources of information

- Flood maps from the Environment Agency published online
- Kent Council SFRA
- Thames Water utility asset data
- British Geological Survey / Magic Map
- Existing site records
- Dartford Borough Council Level 1 & 2 SFRA
- Water. People. Places. A guide for master planning sustainable drainage into developments Prepared by the Lead Local Flood Authorities of the South East of England _ AECOM

3.0 Site Description

3.1 Location

3.1.1 The site is located detailed as below.

OS X (Eastings)	-552520
OS Y (Northings)	170870
Nearest Post Code	BR8 7SD

Table 1 – Site Details

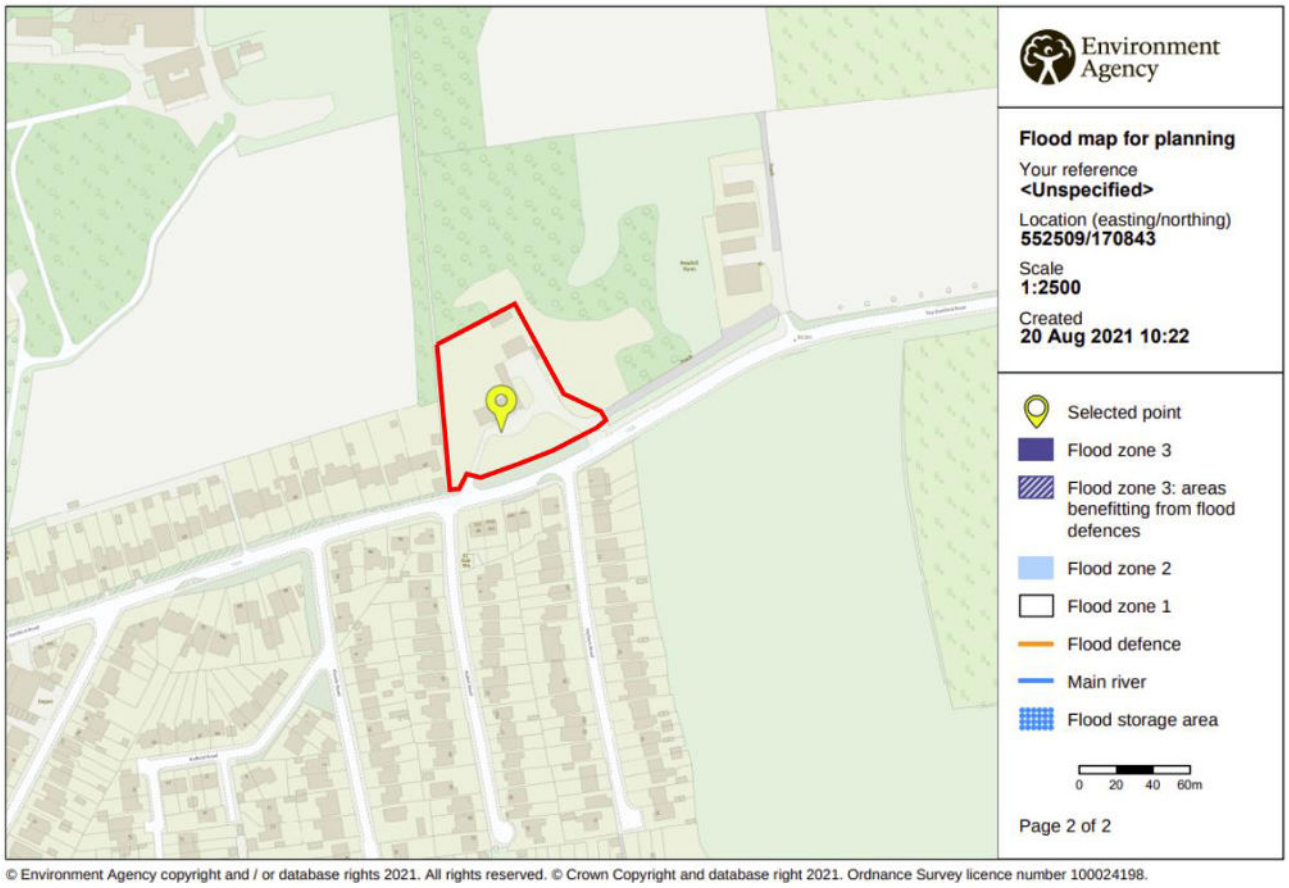


Figure 1- Existing Aerial Plan identifying the proposed site in relation to the wider area of Hextable (Extract taken from EA mapping)

Figure 2 - Site Location

(OS Maps: https://osmaps.ordnancesurvey.co.uk/51.41599,0.19221,18)

3.2 Existing Site Layout and Topography

3.2.1 The Existing site comprises a brownfield site of approximately 0.508 hectares which was formerly used as a single residential dwelling with outbuildings.

3.2.2 The site is accessible from the south off the (B258) Top Dartford Road.

3.2.3 A topographic survey has been undertaken and is included in Appendix C. The ground levels slope down from the Northern Boundary at approximately 60.5m AOD to 54.2m AO in the Southwest Corner.

3.3 Geology

3.3.1 The British Geological Survey's (BGS) online geological maps indicates the site has:
1:50 000 scale bedrock geology description: *Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation (undifferentiated) - Chalk. Sedimentary Bedrock formed approximately 72 to 94 million years ago in the Cretaceous Period. Local environment previously dominated by warm chalk seas.*

3.3.2 A ground investigation has been carried out by Clancy Consulting Geotechnical team in October 2021. Extensive infiltration testing was carried out. The investigations confirmed the presence of soft sand clay with occasional gravel over structureless chalk (Lewes Nodular Chalk Formation) to a depth of 1.45m. These included slightly sandy SILT, clay and subangular flint deposits as well as some areas of made ground. Refer to the report in Appendix B. Further discussion on infiltration results is included in Section 6.

3.4 Hydrology

3.4.1 There are no watercourse or surface drainage features within or in close proximity to the site.

3.5 Hydrogeolology

3.5.1 The ground water table was not located during the ground investigation works (noted in 3.3.2 above). Following further deep bore investigations, again, no ground water was encountered to a depth of 30m below nominal ground level.

3.5.2 The site is not within an inner or outer ground water source protection zone but is within the total catchment area. Refer to the extract from Magic Map below.

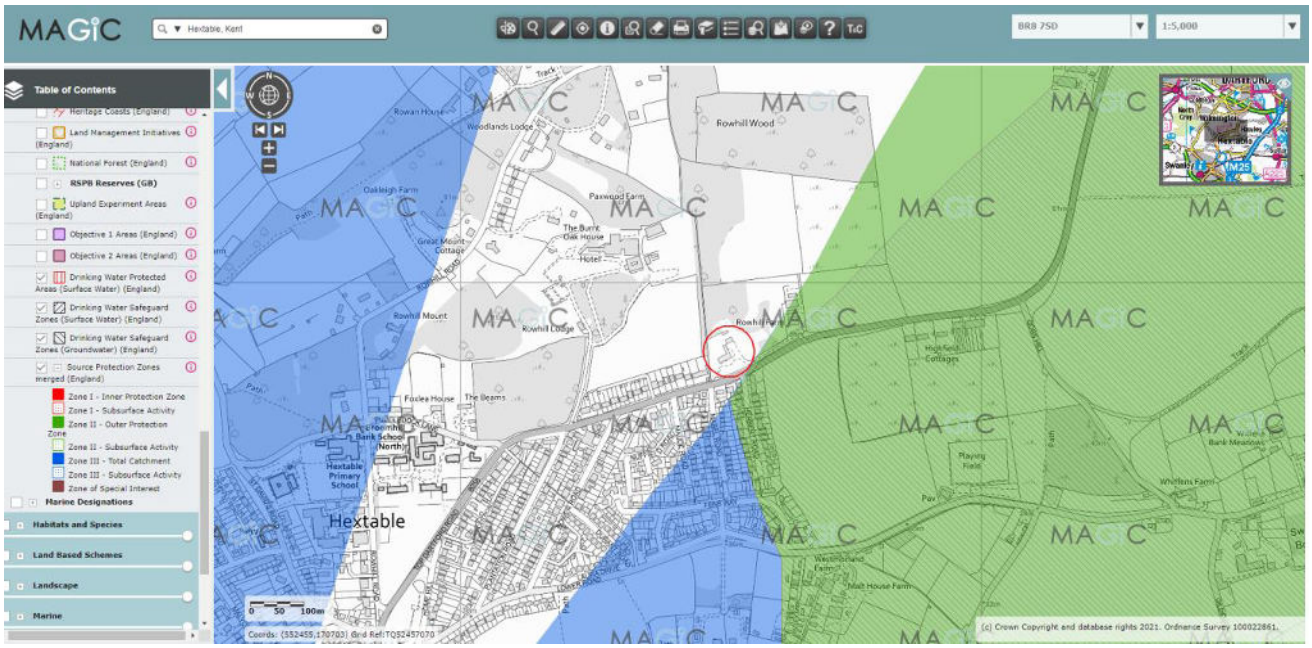


Figure 4 – Ground Water Source Protection.

(Magic Maps: https://magic.defra.gov.uk/MagicMap.aspx)

4.0 Proposed Development

4.1 Description

4.1.1 The proposed development comprises of a 67 bedroom care home across a new purpose built 3 storey building, located to the north-east of Hextable. The new building has a footprint of approximately 1480m². The Proposed development is serviced by an access road off Top Dartford Road.
A proposed plan of the development can be found in Appendix A.

4.1.2 The development will see a net increase in impermeable surfaces on the site by approximately 15.2%. These impermeable areas can be found on Drawing 01 in Appendix F.

4.2 Vulnerability and Classification

4.2.1 The gov.uk website provides information on the flood risk vulnerability for new development.

4.2.2 Table 2 of the NPPF indicates the intended Care Home use to be "**More Vulnerable"**.

5.0 Flood Potential

5.1 Rivers and Sea.

5.1.1 The following zones define the levels of flood risk from Rivers and the Sea:

Zone 1: Low Probability
This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any one year. (<0.1%)

Zone 2: Medium Probability
This zone comprises land assessed as having between 1 in 100 and 1 in 1000 annual probability of river flooding (1%-0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1%) in any year.

Zone 3a: High Probability
This zone comprises land assessed as having between 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of
flooding from the sea (>0.5%) in any year.

Zone 3b: Functional Flood Plain
This zone comprises land where water must flow or be stored in times of flood. SFRA should identify this zone.

5.1.2 As part of its general obligations under the Water Resources Act 1991, The Environment Agency has carried out surveys of its existing defences against flooding and has published a series of nationwide 'Indicative Floodplain Maps' based upon information from historic flood events and basic hydraulic modelling. In general terms, these maps give a good indication of the areas likely to be affected by flooding. More recently, the Environment Agency have published the 'Flood Map' on their website which is based on improved hydraulic modelling and detailed local data.

5.1.3

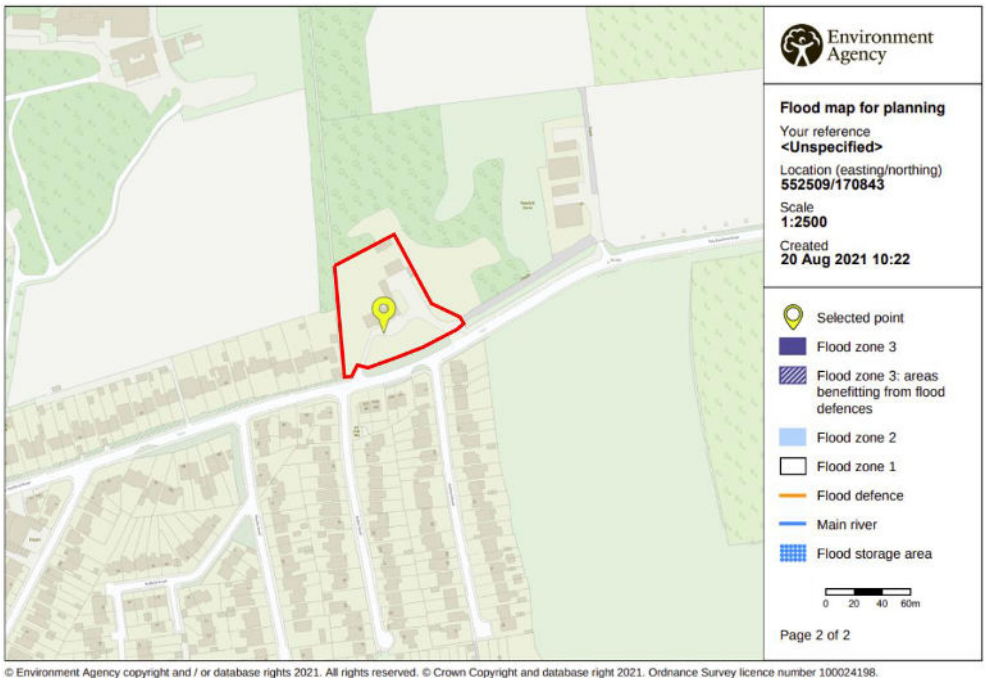


Figure 5 – EA Flood Map for Planning (Gov.uk)

5.1.4 The site is located within **Flood Zone 1** in terms of flooding from any nearby water course or the sea.

5.1.5 Flood Risk Vulnerability Classification.

	Flood Risk Vulnerability Classification				
Flood Zones	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Zone 1	✔	✔	✔	✔	✔
Zone 2	✔	Exception Test Required	✔	✔	✔
Zone 3a†	Exception Test Required†	✘	Exception Test Required	✔	✔
Zone 3b*	Exception Test Required*	✘	✘	✘	✔

Table 2 - Flood Risk Vulnerability and Flood Zone 'Compatibility' (Gov.uk)

Key:
✓ Development is appropriate
✗ Development should not be permitted

† In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

*" * " In Flood Zone 3b (functional floodplain) essential infrastructure that has to be there and has passed the Exception Test, and water-compatible uses, should be designed and constructed to:*

- *remain operational and safe for users in times of flood;*
- *result in no net loss of floodplain storage;*
- *not impede water flows and not increase flood risk elsewhere.*

5.1.6 The NPPF (Technical Guidance) Table 3, Flood Risk Vulnerability and Flood Zone Compatibility matrix, indicates that "**More Vulnerable**" development proposals in **Flood Zone 1** are acceptable.

5.2 Surface Water

5.2.1 During extreme rainfall events, or due to poor gully drainage maintenance, there will be times when gully capacity is exceeded which will lead to surface flow within surrounding roads. However, as can be seen from the map below, the proposed site is not affected by these flows Mapping for this form of flooding is shown on the Environment Agency website as below.

Risk Category	Definition
High	Each year, there is a chance of flooding of greater than 1 in 30 (3.3%)
Medium	Each year, there is a chance of flooding of between 1 in 30 (3.3%) and 1 in 100 (1%)
Low	Each year, there is a chance of flooding of between 1 in 100 (1%) and 1 in 1000 (0.1%)
Very Low	Each year, there is a chance of flooding of less than 1 in 1000 (0.1%)

Figure 6 - Flood Risk from Surface Water (Gov.uk)

5.2.2 It can be seen from the flood mapping (Fig 6) that the site is considered to be at “Very low” risk of surface water flooding.

5.3 Ground Water

5.3.1 Reference has been made to the Dartford borough Council level 1 & 2 for flood risk areas. Mapping has been provided for a "cumulative impact assessment" of flood risk. As can be seen below, Hextable sits in an area classified as – Low. scenarios which include areas susceptible to ground water flooding. The development site shown to be at low flood risk.

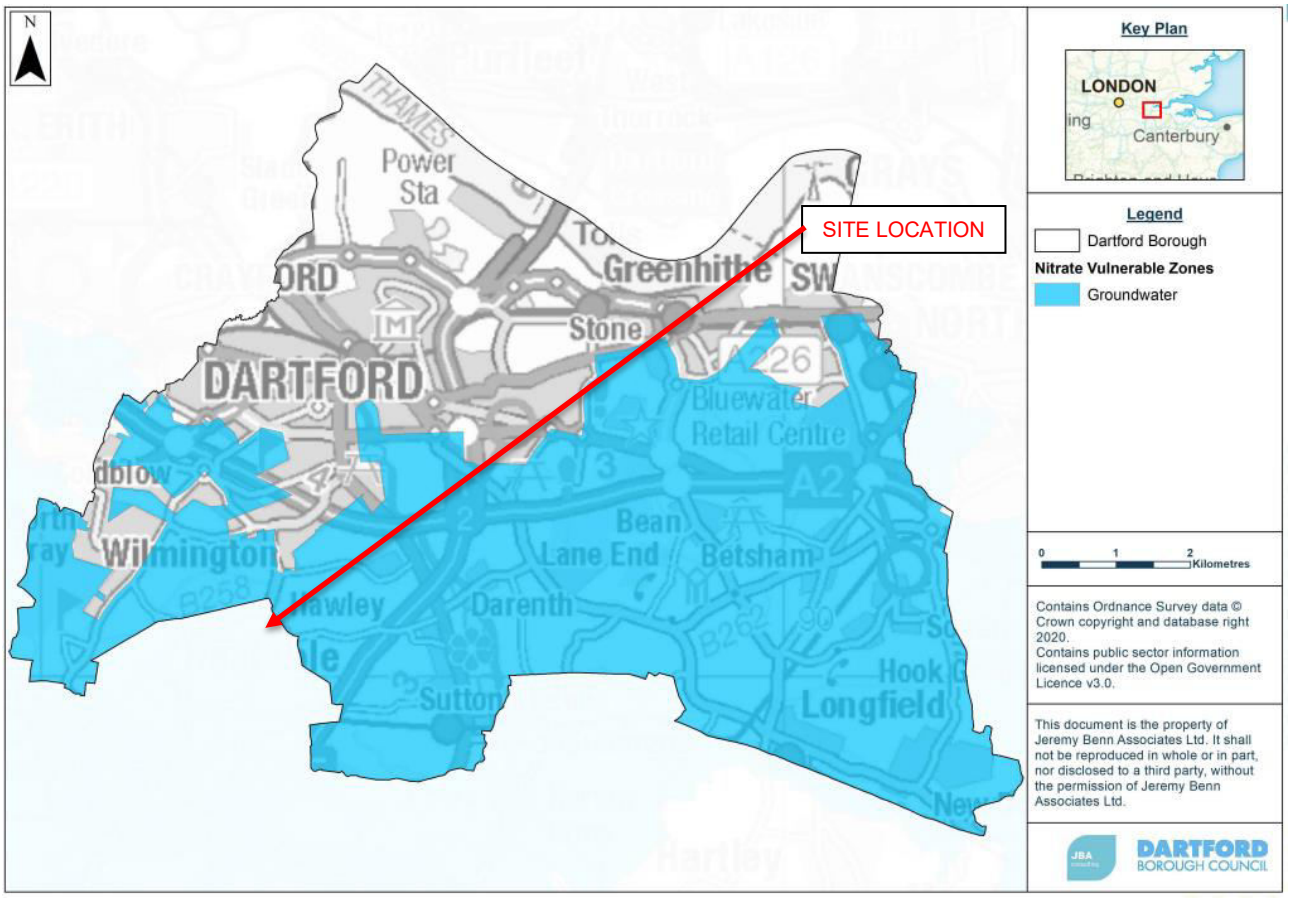


Figure 9 – SFRA mapping for potential ground water flooding.

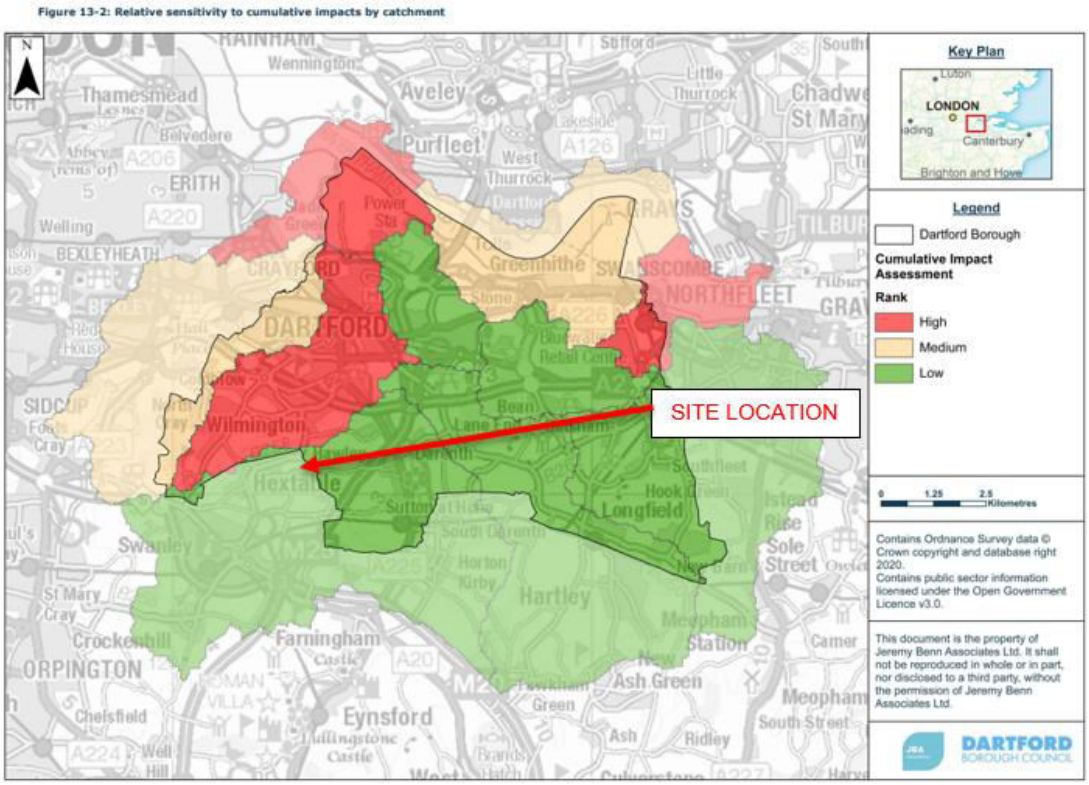


Figure 9 – SFRA mapping for Cumulative impact Assessment.

5.3.2 A ground investigation was carried out in July 2021. This found that the permeability of the ground across the site were not conducive for shallow infiltration features due to the size of attenuation needed to capture and infiltrate via soakaways. There was insufficient available space, given the dimensions of the proposed building.

5.3.3 Further ground investigation was undertaken during October 2021 that included 4 No. trial pits and infiltration tests. Again these determined that shallow infiltration was not a viable option to drain the site.

5.3.4 Given the above results, deep bore investigations where carried out early December 2021. The results confirmed that to a depth of 20m; no ground water was encountered to a depth of 30.0m and infiltration rates are acceptable to drain within the development site boundaries. All results of ground investigations can be found in Appendix B.

Permeability rates recorded from the falling head tests are presented in the table below:

Location	Depth (m)	Run	Permeability k (m/s)
BH01	10	1	$1.74X10^{-4}$
	15	1	$5.73X10^{-4}$
		2	$2.61X10^{-4}$
	20	1	$4.31X10^{-4}$
		2	$3.76X10^{-4}$
BH02	10	1	$2.46X10^{-4}$
		2	$4.12X10^{-4}$
	15	1	$1.37X10^{-4}$
		2	$4.03X10^{-4}$
	20	1	$2.29X10^{-4}$
		2	$4.98X10^{-4}$

Figure 10 – extract of tabled permeability results

5.4 Artificial Sources

5.4.1 Artificial sources of flooding are potentially from man-made structures and infrastructure. The Environment Agency have modelled the potential effect of flooding from failures in retaining structures containing reservoirs. As can be seen below in figure 11, there is no risk of flooding from reservoirs.

5.4.2 The risk of flooding from reservoirs at this site is **low**.

Figure 11 – Extent of Flooding from Reservoirs

(https://check-long-term-flood-risk.service.gov.uk/map?easting=552561&northing=170817&map=SurfaceWater)

5.5 Existing Drainage

5.5.1 Flooding could occur if the on-site drainage system becomes blocked or a rainfall event exceeds the design capacity. See Section 6 for details of the drainage system for the new development.

5.5.2 There are no other sewers known to be present within the site boundaries, therefore, no existing areas of the site are currently drained. It is assumed that rainfall is either discharged into the ground or runs-off site when the ground is saturated.

5.6 Existing Historical Flood Information

5.6.1 Reference has been made to the Dartford Borough Council – Level 1 & 2 SFRA and also Water. People. Places. A guide for master planning sustainable drainage into developments Prepared by the Lead Local Flood Authorities of the South East of England _ AECOM.

5.6.2 There are no specific recorded events of flooding at the development site.

5.6.3 For surface water flooding, this site is on a relatively steep slope, however, there are no records identifying any flooding at this location and no flow paths are evident that cross the site.

5.7 Sequential Testing

5.7.1 The site layout has been sequentially tested and the buildings have been located within an area of low flood risk.

6.0 Drainage

6.1 Existing Drainage

6.1.1 Greenfield Run-off rates.

6.1.1.1 The existing site area is brownfield in terms of run-off, however, the following rates were calculated using the HR Walligford UKsuds greenfield run-off tool.
Refer to Appendix F for details.

Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):	0.81	0.81
1 in 1 year (l/s):	0.69	0.69
1 in 30 years (l/s):	1.85	1.85
1 in 100 year (l/s):	2.57	2.57
1 in 200 years (l/s):	3.02	3.02

6.1.2 Thames Water Sewers.

6.1.2.1 No public sewers run through the developmentsite.

6.1.2.2 There is an existing Thames Water foul sewer south of Top Dartford Road within the junction of Maple Road. See Fig 12 Below.

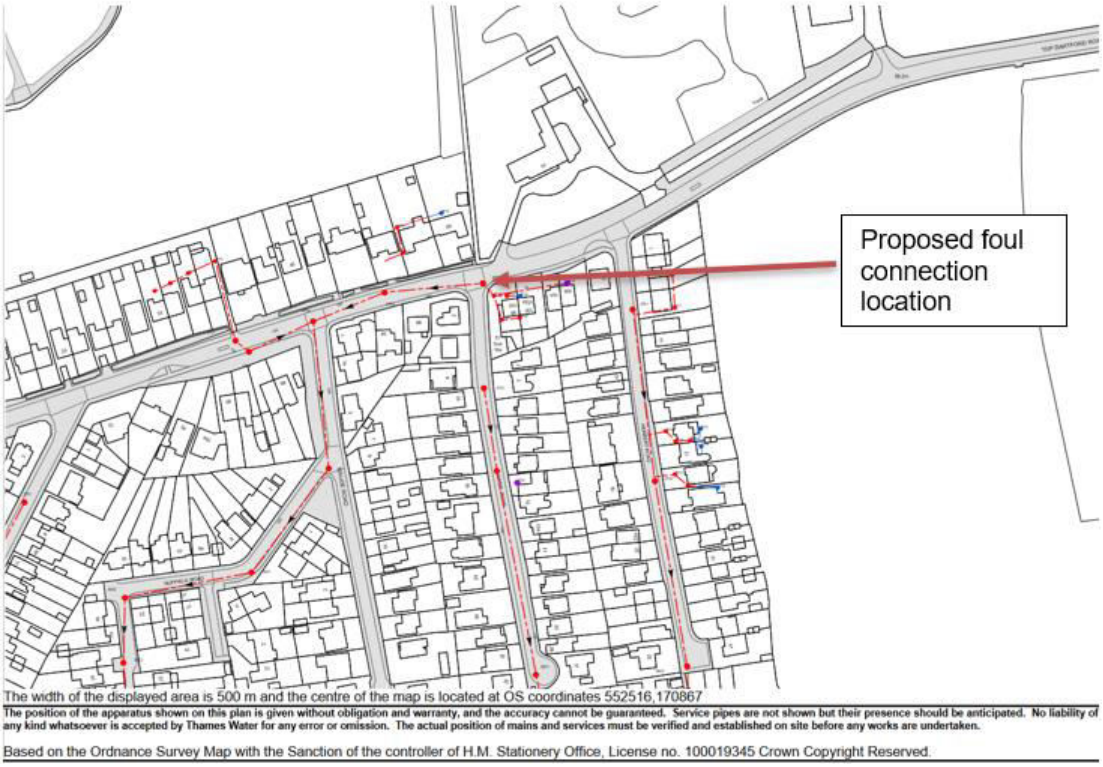


Fig 12 – Thames Water Asset Plan.

6.1.2.3 The foul water drainage connection point level taken from existing Thames Water data as being 52.43m AOD.

6.2 Proposed Drainage

6.2.1 Surface Water Disposal Hierarchy

6.2.1.1 The disposal of surface water should be considered in the following order of priority:

1. Infiltration into the subsoil via soakaways or permeable paving.
2. Discharge to a water course or the sea.
3. Discharge to a surface water sewer.
4. Discharge to a combined sewer.

6.2.1.2 If it is not possible to discharge to a soakaway, surface water should be controlled with the use of Sustainable Drainage Systems (SuDS) and considered using the SuDS Hierarchy.

6.2.1.3 In this instance, it is proposed to use direct infiltration through deep bore soakaways.

6.2.2 Disposal of Surface Water

6.2.2.1 Infiltration

Extensive testing has been carried out to determine the suitability of soakaways for the site. Refer to Appendix B for the full ground investigation report and summary mapping. As can be seen in these reports, while traditional shallow infiltration is not a viable solution for this development, a solution of attenuation, restriction and treatment prior to outfalling to a series of deep bores, has been recommended as a viable solution.

6.2.2.2 Connection to a Watercourse

There are no watercourses close to the proposed site therefore this has not been considered.

6.2.2.3 Connection to a surface water sewer.

There are no surface water sewers with in close proximity of the site.

6.2.3 SuDS Strategy – Control at Source

6.2.3.1 Permeable paving is proposed for all parking bays. Runoff from roof areas are considered to be of a low source of pollution under the indices as set out under the Simple index Guide - Section 26 of the CIRIA SuDS Manual 2015 (C753). This is discussed further in section 6.2.8. That said, it is intended to treat flows from that and other sources by the use of proprietary features like vortex separators prior to water entering attenuation tanks. Other measures include the use of orifice flow controls top slow water velocity to help control flows and reduce, run-off volumes and flow rates.

6.2.3.2 The above systems will provide adequate water quality improvements and help reduce surface water flows and volumes.

6.2.4 Proposed Surface Water Drainage

6.2.4.1 The proposed surface water strategy will split the site into two separate catchments, east & west.

6.2.4.2 **Catchment – West**

6.2.4.2.1 For this catchment all surface water runoff shall drain to a range of features including permeable parking bays, draining to a piped system through vortex separators before eventual outfall to 4No. deep bore soakaways. Sub-base materials used under the permeable parking bays shall provide necessary filtration and control should a contamination occurrence occur. To aid this, further filtration will be provided by the vortex separator units, thus providing adequate and necessary water quality improvements.

6.2.4.2.2 2 No. attenuation tanks with flows restricted by orifice plates to control flow will be used for the final control. This has been designed to cater for the storage of extreme rainfall events up to the 100 year plus 40% climate change events.

6.2.4.2.3 At the lowest part of the site is at the entrance off Top Dartford Road. Gullies are located to capture runoff before this can enter the public highway.

6.2.4.3 **Catchment – East**

6.2.4.3.1 Unlike the western catchment area there is no vehicular access. However, 2 attenuation tanks (upper & lower) are again proposed.

6.2.4.3.2 The tanks shall receive water via a piped system collecting runoff from all roof and hard paved areas, while passing through a vortex separator to remove any heavy or contaminated particles. This will ensure longevity of the attenuation tanks while reducing maintenance liability to the orifice plates and wider system.

6.2.4.3.3 Refer to Appendix F for all drawings and calculations for the proposed drainage.

6.2.5 Proposed Foul Water Drainage

6.2.5.1 It is proposed for the foul water to be routed around the building as necessary, with the final section of pipe leaving the site in the south-western corner. From there it is intended to cross Top Dartford Road, to the junction with Mable Road, where an existing Thames Water foul chamber (4801) is located. This is currently being negotiated with Thames Water and will be the subject of a Section 106 agreement.

6.2.6 Exceedance

6.2.6.1 During extreme rainfall events over and above those designed for or if blockages occur within the drainage systems, there will be times when there are additional overland flows. The site has been designed with this in mind and overland flows routes have been indicated on the drainage plan. (Appendix F Drg. 4400)

6.2.7 Drainage and SuDS Maintenance

6.2.7.1 All of the measures described in this document will form part of the building O&M manual. All of the measures and designs will need to be adhered to in order to maintain the design life and design capacity of the surface and foul water drainage systems. Health and Safety risks have been communicated on design drawings. All responsibility for the on-site surface, foul water drainage and maintenance will lie with the site owner or adopting body.

6.2.7.2 The below ground drainage network is to be designed in accordance with Building Regulations Part H 2015, BSEN 752-2008, LASOO Non-Statutory Technical Standards for Sustainable Drainage 2015 and Chapter 32 of CIRIA C753 – The SUDS Manual.

6.2.7.3 General Maintenance

Inspection chambers and access points are to be provided at regular intervals which can be jetted / cleaned. General checking of the below ground drainage systems should be every three (3) months. General maintenance / cleaning of the below ground systems should be after each major storm event and on an annual basis. This applies to all pipes, inspection chambers, manholes, rodding eyes, gullies, channels etc.

6.2.7.4 Drainage Gullies

To be maintained in accordance with the manufacturer's recommendations and the "General" Section above.

6.2.7.5 Foul Systems

To be maintained in accordance with the "General" Section above.

SUDS Maintenance Plan

Permeable paving

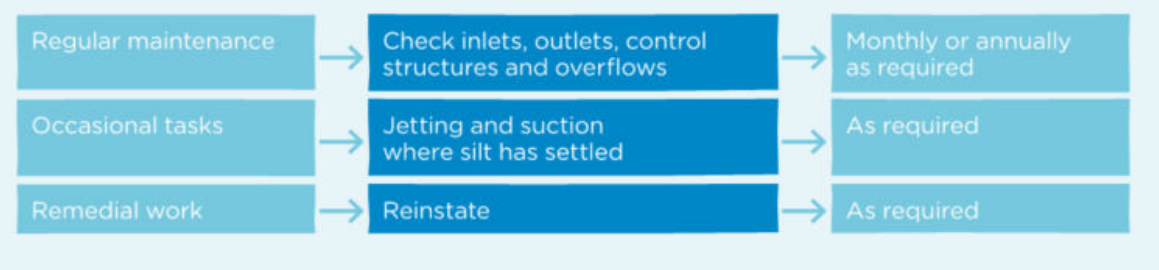
To be in accordance with the suppliers requirements otherwise as noted below;

Regular maintenance	Surface brushing for appearance and to reduce silt accumulation	Monthly
	Brushing and suction sweep or jet wash and suction sweep particularly for block pavement in autumn after leaf fall	Annually
	Mow grass edges to paving at 35-50mm and remove weeds and leaves	As required
	Check outlets and control structures	Monthly depending on detail
Occasional tasks	Jetting and suction where silt has accumulated in joints or voids. Replace grit and vibrate surface to lock for permeable block paving	As required
Remedial work	Where sinkage or surface damage occurs uplift blocks, remove grit bedding layer, geotextile if present and reinstate to design profile	As required

Filter Strips – (where feasible)

Maintenance	Action	Frequency
Regular maintenance	Litter and debris removal from site	Monthly
	Grass cut at 75-100mm not to exceed 150mm leaving cuttings in situ	Monthly or as required
Occasional tasks	Remove leaves in autumn to prevent damage to grass	As required
	Cut back overhanging branches to allow dense grass growth	
Remedial work	Repair erosion, level uneven surfaces or damage by re-turfing or seeding	As required
	Remove an oblique divot along the hard edge where silt has accumulated to reinstate flow over the edge	
	Remove silt and spread locally outside design profile and reinstate surface	

Attenuation (Geocellular) Tanks



Key Responsibilities for SUDS Features.

Deep Bore soakaways, Filter Strips, Vortex control separators, Flow Controls, GeoCellular Storage - Care Home operator/landowner
Permeable Paving - Care Home Operator.

6.2.8 Water Quality

6.2.9 All well designed SuDS should manage the quality of runoff so that receiving waters and / or groundwater are protected from pollution hazards. The methods to achieve the required water quality requirements specific to this site have been designed in accordance with The SuDS Manual (CIRIA 2015) using the simple Indices method.

6.2.10 The below table defines the pollution hazard indices for varying use classifications.

	Pollution hazard indices for different land use classifcations			
Land use	**Pollution hazard level**	**Total suspended solids (TSS)**	**Metals**	**Hydro-carbons**
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, home zones and general access roads) and non-residential car parking with infrequent change (eg schools, offces) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways[1]	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to	High	0.8[2]	0.8[2]	0.9[2]

industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways				

Table 3 - Pollution hazard indices for different land use classifications (The SuDS Manual 2015)

Notes

1. *Motorways and trunk roads should follow the guidance and risk assessment process set out in Highways Agency (2009).*
2. *These should only be used if considered appropriate as part of a detailed risk assessment – required for all these land use types (Table 4.3). When dealing with high hazard sites, the environmental regulator should frst be consulted for pre-permitting advice. This will help determine the most appropriate approach to the development of a design solution.*

Where a site land use falls outside the defned categories, the indices should be adapted (and agreed with the drainage approving body) or else the more detailed risk assessment method should be adopted.

Where nutrient or bacteria and pathogen removal is important for a particular receiving water, equivalent indices should be developed for these pollutants (if acceptable to the drainage approving body) or the risk assessment method adopted.

6.2.11 The use classifications for this site have been highlighted green in table 4. The site presents a low risk from runoff generated by roof areas, the access road and parking. However, pollution will be an important factor due to the deep bore soakaway requirements for the site. The ground investigation report confirmed that there was no ground water present within 10.0m of the base of the borehole. This solution is considered acceptable to the Environment Agency as confirmed by them. See Appendix D.

The following table indicates that permeable paving and the proposed vortex separator combinations will provide sufficient mitigation to protect receiving groundwaters.

Mitigation = 0.0

Mitigation index	**TSS**	**Metals**	**Hydrocarbons**
(Constructed permeable pavements)	*0.7*	*0.6*	*0.7*
(Proprietary features – Vortex separator (Downstream Defender))	*0.5*	*0.4*	*0.8*
Deep Bore soakaway	*0.8*	*0.8*	*0.8*

Table 4 - Proposed pollution mitigation

7.0 Flood Mitigation Measures

7.1 The site is at a low risk of flooding. While every effort has been made to prevent flooding on site during the design process, this is largely dependent upon the future maintenance activities of the site owner/ operator.

8.0 Conclusions and Recommendations

8.1 This report gives details of the flood risk assessment and drainage design, which has been carried out in relation to the proposed care home development on land at 57 Top Dartford Road, Hextable.

8.2 The site can be considered at low risk from all forms of flooding. The site ground levels, landscaping and floor levels of the building have all been designed to accommodate potential overland flow routes during extreme rainfall events.

8.3 The site drainage has been designed in accordance with LLFA guidance and recommendations. SuDS features have been introduced to reduce run-off velocity, flood water volume and to improve water quality before it is discharged to the deep bore sewers.

8.4 Allowances have been made for climate increases in rainfall events and systems have been designed for extreme rainfall events.

8.5 The Proposed development meets NPPF and Local Policy requirements.

Appendix A – Development Proposals

NOTES

All dimensions are in millimetres unless stated otherwise.

Drawings are not to be scaled for Construction purposes.

This drawing is to be read in conjunction with all other relevant drawings and specifications.

0102 - Proposed Ground Floor Site Plan

1 : 200

0m 2m 4m 6m 8m

VISUAL SCALE 1:200 @ A1

- Grass
- Low hedge
- Pathway
- Resin Bond Road surface
- Land under first floor garden

Retaining wall with 1800mm railing above

Retaining wall with 1800mm estate fence above

Thick red line denotes Site Boundary

Garden store under 1st floor walkway

Secure staff cycle storage

Sheffield hoop cycle storage

Raised Parking deck faced in Brick with Railings around up to 1100mm above FFL

Vehicular entrance

Access Road From Highway to Parking

Pedestrian Entrance

BELOW GROUND

store

fire exit

Service entrance

Kitchen

Service Wing

Laundry

Cinema

H&B

Wellness

Activity room

Office

Cafe

Office

Guest and Resident Entrance

Bin store

Plant room

Private Dining

East Garden

South Garden

Bed

Day

Fire Exit

Parking 01

Parking 02

Parking 03

Parking 04

Parking 05

Parking 06

Parking 07

Parking 08

Parking 09

Parking 10

Parking 11

Parking 12

Parking 13

Parking 14

Parking 15

Parking 16

Parking 17

Parking 18

Parking 19

Parking 20

Parking 21

Parking 22

Parking 23

flat

1:20

1:60

40m @ 1:15

Rev	Date	Description	Drawn By	Checked By
P2	11.10.21	Minor changes to plan	MLG	ID
P1	29.09.21	Second Draft Issue	MLG	ID

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e: enquiries@harrisirwin.com
w: www.harrisirwin.com

Project:

Hextable
57 Top Dartford Road
Hextable
BR8 7SG

Client:

Barchester

Drawing Title:
Proposed Ground Floor Site Plan

For Planning Submission

HIA Project Number	Scale @ A1	Suitability
3081	1:200	D0

Project	Originator	Volume	Level	Type	Role	Number
3081	HIA	01	00	DR	A	0102

Appendix B – Ground Investigation

clancy consulting	Project Title: 57 Top Dartford Road, Hextable		**WS01**
	Project Number: 10/1781	Client: Barchester Healthcare Ltd.	Sheet 1 Of 2
	GL (mAOD):	N Coord: 0.192202	E Coord: 51.416364
Date: 07/07/2021	Method: Window Sampler	Driller: CK Drilling Ltd	Logged By: EB

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
0.40	ES				0.40	MADE GROUND: Grass over very soft dark brown silty sandy gravelly clay, with low cobble content and rootlets. Sand is fine to coarse. Gravel is sub-rounded to sub-angular, fine to coarse of flint, chalk and brick. Cobbles are sub-rounded of flint.		
					1.00	Structureless white CHALK composed of uncompacted sandy gravelly SILT, with low cobble content. Gravel is sub-rounded to sub-angular, fine to coarse of weak to very weak, low density white chalk and flint. Cobbles are sub-rounded to sub-angular of flint (LEWES NODULAR CHALK FORMATION)		
1.50 - 1.60	GT				1.20	Structureless white CHALK composed of uncompacted sandy SILT, with localised iron staining. (LEWES NODULAR CHALK FORMATION)		
					1.50	Weak, medium density white CHALK composed of uncompacted SILT. No discernible fracture sets. (LEWES NODULAR CHALK FORMATION)		
					1.80	Structureless white CHALK composed of uncompacted sandy SILT, with low cobble content and localised iron staining. Cobbles are sub-rounded to sub-angular of flint. (LEWES NODULAR CHALK FORMATION)		
					2.00	Weak, medium density white CHALK. No discernible fracture sets. (LEWES NODULAR CHALK FORMATION)		
					2.40	Structureless white CHALK composed of uncompacted sandy SILT, with low cobble content and localised iron staining. Cobbles are sub-rounded to sub-angular of flint. (LEWES NODULAR CHALK FORMATION)		
					3.00	Borehole Continues		
					3.55			
					4.00			

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Location scanned with CAT prior to excavation. Borehole backfilled with arisings upon completion.

Scale: 1:25

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water

Chiselling

From	To	Hours

clancy consulting	Project Title: 57 Top Dartford Road, Hextable		**WS01**
	Project Number: 10/1781	Client: Barchester Healthcare Ltd.	Sheet 2 Of 2
	GL (mAOD):	N Coord: 0.192202	E Coord: 51.416364
Date: 07/07/2021	Method: Window Sampler	Driller: CK Drilling Ltd	Logged By: EB

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
					4.25	Structureless white CHALK composed of uncompacted sandy SILT, with low cobble content and localised iron staining. Cobbles are sub-rounded to sub-angular of flint. (LEWES NODULAR CHALK FORMATION)		
						End Of Borehole At 4.25 m		
					5.00			
					6.00			
					7.00			
					8.00			

KEY

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N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Location scanned with CAT prior to excavation. Borehole backfilled with arisings upon completion.

Scale: 1:25

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water

Chiselling

From	To	Hours

clancy consulting

Project Title: 57 Top Dartford Road, Hextable		WS02
Project Number: 10/1781	Client: Barchester Healthcare Ltd.	Sheet 1 Of 1
GL (mAOD):	N Coord: 0.192361	E Coord: 51.416238
Date: 07/07/2021	Method:	Driller: CK Drilling Ltd	Logged By: EB

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
0.20	ES				0.20	TOPSOIL: Grass over soft dark brown sandy gravelly CLAY, with low cobble content and rootlets. Sand is fine to coarse. Gravel is sub-rounded to sub-angular, fine to coarse of flint and chalk. Cobbles are sub-rounded of flint. Increasing chalk gravel content with depth. (LEWES NODULAR CHALK FORMATION)		
					0.50	Structureless white CHALK composed of uncompacted sandy gravelly SILT. Gravel is sub-rounded to sub-angular, fine to coarse of weak to very weak, low density white chalk and flint. (LEWES NODULAR CHALK FORMATION)		
					0.75	Weak, medium density white CHALK, with low cobble content. Cobbles are sub-rounded of flint. No discernible fracture sets. (LEWES NODULAR CHALK FORMATION)		
					1.00	Structureless white CHALK composed of uncompacted SILT. (LEWES NODULAR CHALK FORMATION)		
					1.16	Structureless white CHALK composed of uncompacted sandy gravelly SILT, with low cobble content. Gravel is sub-rounded to sub-angular, fine to coarse of weak to very weak, low density white chalk. Cobbles are sub-rounded of flint. (LEWES NODULAR CHALK FORMATION)		
					1.80	Structureless white CHALK composed of uncompacted SILT, with rare rounded flint gravel and occasional black specks. (LEWES NODULAR CHALK FORMATION)		
					2.00	Structureless white CHALK composed of uncompacted SILT, with low cobble content and localised iron staining. Cobbles are sub-rounded of flint. (LEWES NODULAR CHALK FORMATION)		
2.80 - 3.00	GT				2.10			
					3.00	End Of Borehole At 3.40 m		
					3.40			
					4.00			

KEY

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C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Location scanned with CAT prior to excavation. Borehole backfilled with arisings upon completion.

Scale: 1:25

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water

Chiselling

From	To	Hours

clancy consulting	Project Title: 57 Top Dartford Road, Hextable		**WS03**
	Project Number: 10/1781	Client: Barchester Healthcare Ltd.	Sheet 1 Of 1
	GL (mAOD):	N Coord: 0.192084	E Coord: 51.416154
Date: 07/07/2021	Method: Window Sampler	Driller: CK Drilling Ltd	Logged By: EB

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
0.15	ES				0.30	TOPSOIL: Grass over very soft dark brown silty sandy gravelly CLAY, with low cobble content, rootlets and roots. Sand is fine to coarse. Gravel is sub-rounded to sub-angular, fine to coarse of flint and chalk. Cobbles are sub-rounded of flint.		
					0.43	Structureless greyish white CHALK composed of uncompacted sandy gravelly SILT, with low cobble content. Gravel is sub-rounded to sub-angular, fine to coarse of weak to very weak, low density chalk. Cobbles are sub-angular of flint. (LEWES NODULAR CHALK FORMATION)		
					0.90			
					1.00	Structureless white CHALK composed of uncompacted sandy gravelly silt. Gravel is sub-rounded to sub-angular, fine to coarse of weak to very weak, low density white chalk. (LEWES NODULAR CHALK FORMATION)		
						Weak, medium density white CHALK, with shell fragments. No discernible fracture sets. (LEWES NODULAR CHALK FORMATION)		
					2.00			
					2.20	Structureless white CHALK composed of uncompacted SILT, with low cobble content. Cobbles are sub-rounded of flint. (LEWES NODULAR CHALK FORMATION)		
2.50	GT				2.75			
						Weak, medium density white CHALK, with localised iron staining. No discernible fracture sets. (LEWES NODULAR CHALK FORMATION)		
					3.00			
					3.30	End Of Borehole At 3.30 m		
					4.00			

KEY

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N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Location scanned with CAT prior to excavation. Borehole backfilled with arisings upon completion.

Scale: 1:25

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water

Chiselling

From	To	Hours

clancy consulting

	Project Title: 57 Top Dartford Road, Hextable		**WS04**
	Project Number: 10/1781	Client: Barchester Healthcare Ltd.	Sheet 1 Of 1
	GL (mAOD):	N Coord: 0.191532	E Coord: 51.416099
Date: 07/07/2021	Method: Window Sampler	Driller: CK Drilling Ltd	Logged By: EB

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
0.25	ES				0.20	MADE GROUND: Very soft dark brown silty sandy gravelly clay. Sand is fine. Gravel is sub-rounded to sub-angular fine to coarse of flint.		
					0.50	MADE GROUND: Grass over very soft dark brown sandy gravelly clay, with low cobble content and rootlets. Fragments of charcoal. Sand is fine to coarse. Gravel is sub-rounded to sub-angular, fine to coarse of flint, chalk and brick. Cobbles are sub-rounded of flint.		
					0.70			
					1.00	Structureless greyish white CHALK composed of uncompacted sandy gravelly SILT, with low cobble content. Gravel is sub-rounded to sub-angular, fine to coarse of weak to very weak, low density white chalk and flint. Cobbles are sub-rounded to sub-angular of flint. (LEWES NODULAR CHALK FORMATION)		
1.50	GT				1.10			
					1.40			
					1.76	Structureless yellowish white CHALK composed of uncompacted gravelly SILT, with low cobble content. Gravel is sub-rounded to sub-angular, fine to coarse of weak to very weak, low density white chalk. Cobbles are sub-rounded of flint. (LEWES NODULAR CHALK FORMATION)		
					2.00			
					2.35	Structureless brownish white CHALK composed of uncompacted sandy gravelly SILT. Gravel is sub-angular, fine to coarse of weak low density white chalk. (LEWES NODULAR CHALK FORMATION)		
					2.66	Structureless yellowish white CHALK composed of uncompacted SILT, with medium cobble content and localised iron staining. Cobbles are sub-rounded to sub-angular of flint. (LEWES NODULAR CHALK FORMATION)		
					3.00	Weak, medium density yellowish white CHALK, with low cobble content and localised iron staining. Cobbles are sub-rounded to sub-angular of flint. No discernible fracture sets. (LEWES NODULAR CHALK FORMATION)		
					3.40	Structureless white CHALK composed of uncompacted SILT, with medium cobble content and localised iron staining. Cobbles are rounded to sub-angular of flint. (LEWES NODULAR CHALK FORMATION)		
					4.00	Weak, medium density white CHALK, with low cobble content and localised iron staining. Cobbles are sub-rounded to sub-angular of flint. No discernible fracture sets. (LEWES NODULAR CHALK FORMATION)		
						End Of Borehole At 3.40 m		

KEY

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S - Standard Penetration Test
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N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Location scanned with CAT prior to excavation. Borehole backfilled with arisings upon completion.

Scale: 1:25

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water

Chiselling

From	To	Hours

clancy consulting	Project Title: 57 Top Dartford Road, Hextable		**WS05**
	Project Number: 10/1781	Client: Barchester Healthcare Ltd.	Sheet 1 Of 1
	GL (mAOD):	N Coord: 0.191476	E Coord: 51.416428
Date: 08/07/2021	Method:	Driller: CK Drilling Ltd	Logged By: EB

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
0.50	ES				0.30	MADE GROUND: Grass over soft dark brown sandy gravelly clay, with rootlets. Fragments of wood and charcoal. Sand is fine to coarse. Gravel is sub-rounded to angular, fine to coarse of flint, chalk and brick.		
					0.45			
					0.73	MADE GROUND: Soft brown very sandy gravelly clay, with lenses of increased clay content and rootlets. Sand is fine to coarse. Gravel is sub-rounded to angular, fine to coarse of flint, chalk, brick and glass.		
					0.85			
					1.00	MADE GROUND: Soft reddish brown very sandy gravelly clay, with rootlets. Sand is fine to coarse. Gravel is sub-rounded to angular, fine to coarse of chalk, flint and ceramic.		
					1.15			
1.45 - 1.60	GT					Structureless reddish white CHALK composed of uncompacted gravelly SILT, with low cobble content. Gravel is sub-rounded to sub-angular, fine to coarse of weak, low-density white chalk. Cobbles are sub-rounded to sub-angular of flint and chalk.		
					2.00	Structureless white CHALK composed of uncompacted SILT, with localised iron staining.		
					2.45	Structureless yellowish white CHALK composed of uncompacted SILT, with low cobble content. Cobbles are sub-rounded to sub-angular of flint.		
						End Of Borehole At 2.45 m		
					3.00			
					4.00			

KEY

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N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Location scanned with CAT prior to excavation. Borehole backfilled with arisings upon completion.

Scale: 1:25

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water

Chiselling

From	To	Hours

clancy consulting

Project Title: 57 Top Dartford Road, Hextable			WS06
Project Number: 10/1781	Client: Barchester Healthcare Ltd.		Sheet 1 Of 1
GL (mAOD):	N Coord: 0.191582		E Coord: 51.416552
Date: 08/07/2021	Method:	Driller: CK Drilling Ltd	Logged By: EB

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
0.30	ES				0.20	MADE GROUND: Grass over very soft dark brown silty sandy slightly gravelly clay, with rootlets. Sand is fine to coarse. Gravel is sub-rounded to sub-angular, fine to coarse of flint.		
					0.35	MADE GROUND: Very soft dark brown sandy gravelly clay, with low cobble content, rootlets and roots. Sand is fine to coarse. Gravel is rounded to sub-angular, fine to coarse of chalk, flint and brick. Cobbles are sub-rounded to sub-angular of flint.		
					0.90			
					1.00	Structureless yellowish white CHALK composed of uncompacted sandy gravelly SILT, with low cobble content. Gravel is sub-rounded to sub-angular, fine to coarse of weak to very weak, low density white chalk. Cobbles are sub-rounded to sub-angular of flint. (LEWES NODULAR CHALK FORMATION)		
1.70 - 1.80	GT				2.00	Structureless yellowish white CHALK composed of uncompacted SILT, with localised iron staining. (LEWES NODULAR CHALK FORMATION)		
					2.40	End Of Borehole At 2.40 m		
					3.00			
					4.00			

KEY

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N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Location scanned with CAT prior to excavation. Borehole backfilled with arisings upon completion.

Scale: 1:25

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water

Chiselling

From	To	Hours

clancy consulting

Project Title: 57 Top Dartford Road, Hextable			WS07
Project Number: 10/1781	Client: Barchester Healthcare Ltd.		Sheet 1 Of 1
GL (mAOD):	N Coord: 0.191707		E Coord: 51.41648
Date: 08/07/2021	Method: Window Sampler	Driller: CK Drilling Ltd	Logged By: EB

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
0.10	ES				0.25	MADE GROUND: Grass over very soft dark brown silty sandy gravelly clay, with rootlets. Sand is fine to coarse. Gravel is sub-rounded to sub-angular, fine to coarse of flint and chalk.		
					0.30	MADE GROUND: Soft brown sandy gravelly clay, with low cobble content and rootlets. Sand is fine to coarse. Gravel is sub-rounded to angular, fine to coarse of flint, chalk and rare brick. Cobbles are sub-angular to sub-rounded of flint.		
					0.90			
					1.00	Structureless yellowish white CHALK composed of uncompacted sandy gravelly SILT, with low cobble content. Gravel is sub-rounded to sub-angular, fine to coarse of weak, low density white chalk. Cobbles are sub-rounded to sub-angular of flint. (LEWES NODULAR CHALK FORMATION)		
					1.48	Structureless white CHALK composed of uncompacted SILT, with localised iron staining. (LEWES NODULAR CHALK FORMATION)		
					2.00	Structureless yellowish white CHALK composed of uncompacted sandy gravelly SILT, with localised iron staining. Gravel is sub-rounded to sub-angular, fine to coarse of weak, low density white chalk. (LEWES NODULAR CHALK FORMATION)		
					2.48	Structureless white CHALK composed of uncompacted SILT, with occasional black specks and localised iron staining. (LEWES NODULAR CHALK FORMATION)		
2.80 - 3.00	GT				3.00	Structureless yellowish white CHALK composed of uncompacted gravelly SILT, with localised iron staining. Gravel is sub-rounded to sub-angular, fine to coarse of weak, low density white chalk . (LEWES NODULAR CHALK FORMATION)		
					3.35	End Of Borehole At 3.35 m		
					4.00			

KEY

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N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Location scanned with CAT prior to excavation. Borehole backfilled with arisings upon completion.

Scale: 1:25

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water

Chiselling

From	To	Hours

Key

Soakaway locations

Rev	Date	Description	By	Check	App.
00	Oct 2021	Original Drawing	EB	RP	NR

Client: Barchester Healthcare Ltd

Project: 57 Top Dartford Road
Hextable
Kent

Office: London

Discipline: GeoEnvironmental

Title: Exploratory Hole
Location Plan

Scale @ A3: NTS

Status: Live

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Originator	Job Number	Discipline	Building/Zone
EB	10/1781	GEO	-

Type	Level	Drawing No.	Revision
GA	00	03	00

Birmingham 0121 200 7800. Glasgow 0141 222 1720. Liverpool 0151 227 5300. London 020 3077 0970. Manchester 0161 613 6000. Newcastle 0191 221 0702. Norwich 01603 305 190. Prestwich 01252 479375. Reading 0118 947 7888

clancy consulting	Project Title: 57 Top Dartford Road, Hextable		TP01
	Project Number: 10/1781	Client: Barchester Healthcare Ltd.	Sheet 1 Of 1
	GL (mAOD):	N Coord: 170880	E Coord: 552534
Date: 07/10/2021	Method: JCB	Logged By: EB	Scale: 1:10

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
						TOPSOIL: Grass over very soft dark brown sandy gravelly CLAY, with rootlets. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular of flint and chalk.	
					0.40	Structureless CHALK, composed of brownish white to white sandy gravelly SILT. Gravel is weak, low density, white, fine to coarse and subangular. (LEWES NODULAR CHALK FORMATION)	
					1.00	Structureless CHALK, composed of yellowish white silty slightly sandy GRAVEL and COBBLES. Clasts are weak, low density white with localised iron staining, fine to coarse and subangular. Low subangular flint cobble content. (LEWES NODULAR CHALK FORMATION) 1.10 - 1.30 Increased flint cobble content.	
					1.30	Structureless CHALK, composed of silty slightly sandy GRAVEL and COBBLES. Clasts are weak, low to medium density, white, fine to coarse and subangular. Low subangular flint cobble content. (LEWES NODULAR CHALK FORMATION)	
					1.50	End Of Trial Pit At 1.50 m	
					2.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Location scanned with CAT prior to excavation. Trial pit backfilled with arisings upon completion.

clancy consulting	Project Title: 57 Top Dartford Road, Hextable		TP02
	Project Number: 10/1781	Client: Barchester Healthcare Ltd.	Sheet 1 Of 1
	GL (mAOD):	N Coord: 170833	E Coord: 552513
Date: 07/10/2021	Method: JCB	Logged By: EB	Scale: 1:10

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
						MADE GROUND: Grass over very soft dark brown silty sandy gravelly CLAY, with roots and rootlets. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular of flint, chalk, brick and glass.	
					0.35	Very soft light orangish brown very sandy gravelly CLAY, with low cobble content, roots and rootlets. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular of flint and chalk. Cobbles are subangular of flint.	
					0.55	Structureless CHALK, composed of brownish white sandy gravelly SILT. Gravel is weak, low density, white, fine to coarse and subangular. Low subangular flint cobble content. (LEWES NODULAR CHALK FORMATION)	
					0.75	Structureless CHALK, composed of white silty slightly sandy GRAVEL and COBBLES. Clasts are weak, low to medium density, white with localised iron staining, fine to coarse and subangular. Medium subangular flint cobble content. (LEWES NODULAR CHALK FORMATION) 0.90 - 1.00 Increased flint cobble content.	
					1.00		
					1.30	Structureless CHALK, composed of yellowish white silty sandy GRAVEL and COBBLES. Clasts are weak, low to medium density, white with localised iron staining, fine to coarse and subangular. Low subangular flint cobble content. (LEWES NODULAR CHALK FORMATION)	
					1.50	End Of Trial Pit At 1.50 m	
					2.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Location scanned with CAT prior to excavation. Trial pit backfilled with arisings upon completion.

clancy consulting	Project Title: 57 Top Dartford Road, Hextable		TP03
	Project Number: 10/1781	Client: Barchester Healthcare Ltd.	Sheet 1 Of 1
	GL (mAOD):	N Coord: 170856	E Coord: 552485
Date: 07/10/2021	Method: JCB	Logged By: EB	Scale: 1:10

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
						MADE GROUND: Grass over very soft sandy gravelly CLAY, with roots and rootlets. Sand is fine to coarse. Gravel is fine to coarse, subrounded to angular of flint, chalk, brick, glass and metal.	
					0.36		
						Structureless CHALK, composed of brownish white sandy gravelly SILT. Gravel is weak, low density, white, fine to coarse and subangular. (LEWES NODULAR CHALK FORMATION)	
					0.50		
						Structureless CHALK, composed of white slightly sandy gravelly SILT. Gravel is weak, low density, white, fine to coarse and subangular. (LEWES NODULAR CHALK FORMATION)	
					1.00		
						Structureless CHALK, composed of white silty slightly sandy GRAVEL and COBBLES. Clasts are weak, medium density, white, fine to coarse and subangular. Low subangular flint cobble content. (LEWES NODULAR CHALK FORMATION)	
					1.35		
						Structureless CHALK, composed of yellowish white silty slightly sandy GRAVEL and COBBLES. Clasts are weak, medium density, white with localised iron staining, fine to coarse and subangular. Medium subangular flint cobble content. (LEWES NODULAR CHALK FORMATION)	
					1.45		
						End Of Trial Pit At 1.45 m	
					2.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Location scanned with CAT prior to excavation. Trial pit backfilled with arisings upon completion.

clancy consulting	Project Title: 57 Top Dartford Road, Hextable	TP04
	Project Number: 10/1781 / Client: Barchester Healthcare Ltd.	Sheet 1 Of 1
	GL (mAOD): / N Coord: 170833	E Coord: 552488
Date: 07/10/2021	Method: JCB / Logged By:	Scale: 1:10

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
						TOPSOIL: Grass over very soft dark brown silty sandy slightly gravelly CLAY, with roots and rootlets. Sand is fine to medium. Gravel is fine to coarse, subrounded to subangular of flint and chalk.	
					0.30	Very soft light orangish brown sandy gravelly CLAY, with rootlets. Sand is fine to medium. Gravel is fine to coarse, subrounded to subangular of flint and chalk.	
					0.46	Structureless CHALK, composed of brownish white sandy gravelly SILT. Gravel is weak, low density, white fine to coarse and subangular. (LEWES NODULAR CHALK FORMATION)	
					0.60	Structureless chalk composed of white sandy gravelly cobbly SILT. Clasts are weak, low density, white, fine to coarse and subangular. Medium subangular flint cobble content. (LEWES NODULAR CHALK FORMATION)	
					0.90	Structureless CHALK, composed of white silty sandy GRAVEL and COBBLES. Clasts are weak, medium density, white with localised iron staining, fine to coarse and subangular. Medium subangular flint cobble content. (LEWES NODULAR CHALK FORMATION)	
					1.00	1.35 - 1.45 Subangular flint boulder.	
					1.60	End Of Trial Pit At 1.60 m	
					2.00		

KEY

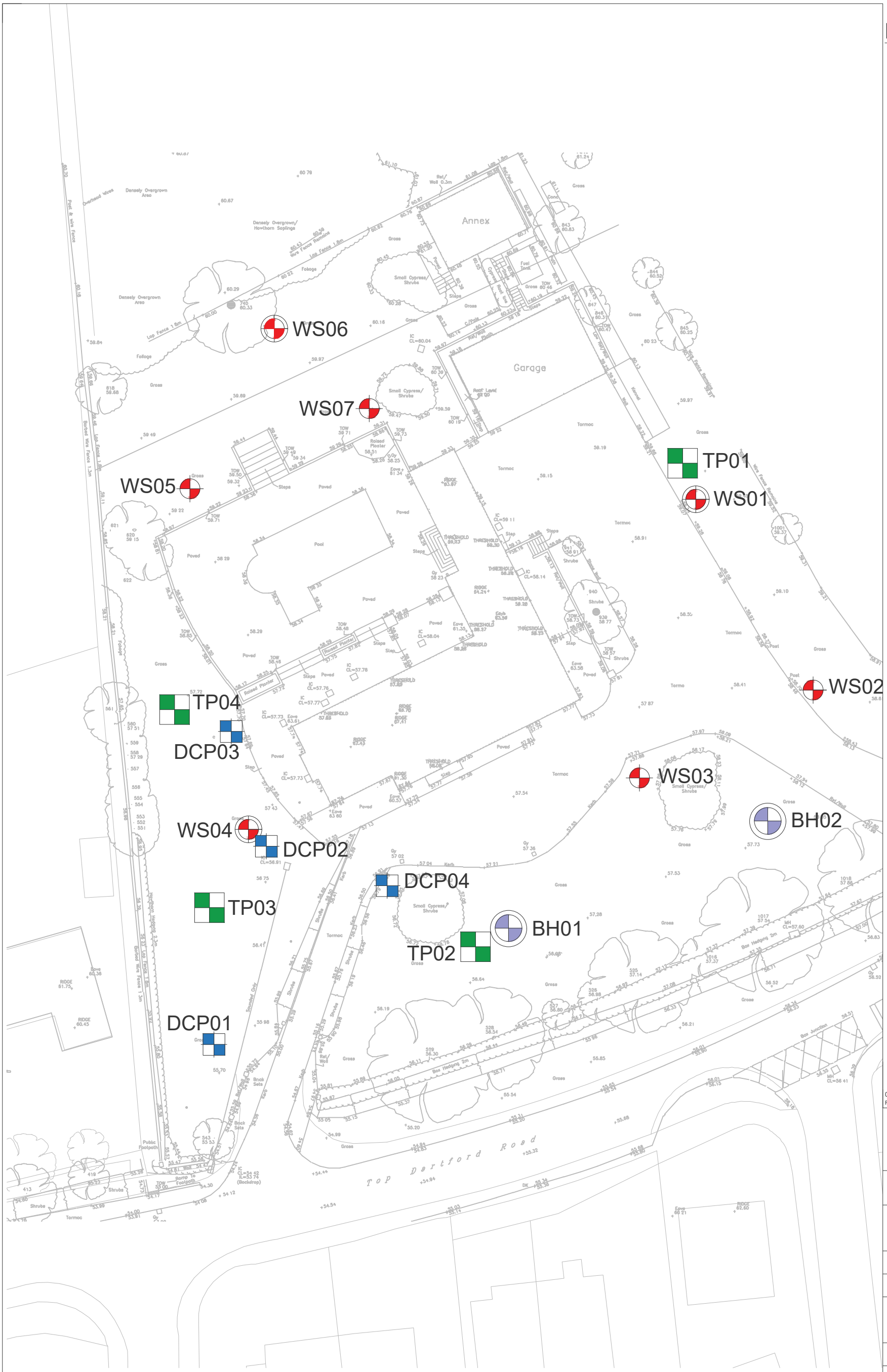
D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Location scanned with CAT prior to excavation. Trial pit backfilled with arisings upon completion.



Key

- Window sample borehole with falling head tests
- Window sample boreholes
- DCP test locations
- Soakaway locations
- Cable percussive boreholes with falling head tests

Rev	Date	Description	By	Check	App.
00	Dec 2021	Original Drawing	EB	RP	NR

Client: Barchester Healthcare Ltd

Project: 57 Top Dartford Road
Hextable
Kent

Office: London

Discipline: GeoEnvironmental

Title: Exploratory Hole
Location Plan

Scale @ A3: NTS

Status: Live

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www.clancy.co.uk

Originator	Job Number	Discipline	Building/Zone
EB	10/1781	GEO	-

Type	Level	Drawing No.	Revision
GA	00	04	00

Birmingham 0121 200 7800. Glasgow 0141 222 1720. Liverpool 0151 227 5300. London 020 3077 0970. Manchester 0161 613 6000. Newcastle 0191 221 0702. Norwich 01603 305 190. Prestwich 01252 479375. Reading 0118 947 7888

clancy consulting

	Project Title: 57 Top Dartford Road, Hextable		**BH01**
	Project Number: 10/1781	Client: Barchester Healthcare Ltd.	Sheet 1 Of 5
	GL (mAOD): 57.73	N Coord: 170835	E Coord: 552516
Date: 06/12/2021-07/12/2021	Method: Cable Percussion	Driller: South-Eastern Drilling Services	Logged By: EB

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
			57.48		0.25	MADE GROUND: Grass over very soft dark brown silty sandy gravelly CLAY, with roots and rootlets. Sand is fine to coarse. Gravel is fine to coarse, subrounded to angular of flint, chalk, brick and charcoal.		
			57.33		0.40			
			57.23		0.50	Soft light brown silty slightly sandy gravelly CLAY, with roots and rootlets. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular of flint and chalk. (LEWES NODULAR CHALK FORMATION)		
			56.73		1.00			
			56.63		1.10	Structureless CHALK, composed of brownish white sandy gravelly SILT. Gravel is weak, low to medium density, white and subangular. (LEWES NODULAR CHALK FORMATION)		
			55.73		2.00			
						Structureless CHALK, composed of brownish white sandy gravelly SILT, with medium cobble content. Clasts are weak, low to medium density, white and subangular. (LEWES NODULAR CHALK FORMATION)		
			54.73		3.00	Structureless CHALK, composed of white, sandy gravelly SILT with medium chalk cobble content. Clasts are weak, low density, white with localised iron staining and subangular. Low subangular flint gravel and cobble content. (LEWES NODULAR CHALK FORMATION)		
			53.73		4.00	Structureless CHALK, composed of cream gravelly SILT, with medium chalk cobble content. Clasts are weak, low density, white and subangular. Low subangular flint gravel and cobble content. (LEWES NODULAR CHALK FORMATION)		
			52.73		5.00	Structureless CHALK, composed of greyish white gravelly SILT, with medium chalk cobble content. Clasts are weak, low density, cream to white and subangular. Subrounded to subangular flint gravel. (LEWES NODULAR CHALK FORMATION)		
			51.73		6.00	Structureless CHALK, composed of cream gravelly SILT, with medium chalk cobble content. Clasts are weak, low density, white and subangular. Lenses of brownish white chalk silt with rare rootlets. Low subangular flint gravel and cobble content. (LEWES NODULAR CHALK FORMATION)		
						Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
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W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Location scanned with CAT prior to excavation. Borehole installed to a depth of 30.00m bgl.

Scale: 1:40

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water

Chiselling

From	To	Hours

clancy consulting	Project Title: 57 Top Dartford Road, Hextable		BH01
	Project Number: 10/1781	Client: Barchester Healthcare Ltd.	Sheet 2 Of 5
	GL (mAOD): 57.73	N Coord: 170835	E Coord: 552516
Date: 06/12/2021-07/12/2021	Method: Cable Percussion	Driller: South-Eastern Drilling Services	Logged By: EB

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
						Structureless CHALK, composed of cream gravelly SILT, with medium chalk cobble content. Clasts are weak, low density, white and subangular. Lenses of brownish white chalk silt with rare rootlets. Low subangular flint gravel and cobble content. (LEWES NODULAR CHALK FORMATION)		
						Structureless CHALK, composed of white to cream silty GRAVEL and occasional COBBLES. Clasts are weak, low density, white with localised iron staining and subangular. Rare subangular flint cobbles. (LEWES NODULAR CHALK FORMATION)		
			47.23		10.50			
						Structureless CHALK, composed of white silty GRAVEL and COBBLES. Clasts are weak, low density, white with localised iron staining and subangular. Low subangular flint cobble content. (LEWES NODULAR CHALK FORMATION)		
						Borehole Continues		

KEY

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▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered
Location scanned with CAT prior to excavation. Borehole installed to a depth of 30.00m bgl.

Scale: 1:40

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water

Chiselling

From	To	Hours

clancy consulting	Project Title: 57 Top Dartford Road, Hextable		BH01
	Project Number: 10/1781	Client: Barchester Healthcare Ltd.	Sheet 3 Of 5
	GL (mAOD): 57.73	N Coord: 170835	E Coord: 552516
Date: 06/12/2021-07/12/2021	Method: Cable Percussion	Driller: South-Eastern Drilling Services	Logged By: EB

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
						Structureless CHALK, composed of white silty GRAVEL and COBBLES. Clasts are weak, low density, white with localised iron staining and subangular. Low subangular flint cobble content. (LEWES NODULAR CHALK FORMATION)		
						Structureless CHALK, composed of cream with localised iron staining gravelly SILT, with occasional chalk cobbles. Clasts are weak, low to medium density, white and subangular. Low subangular flint gravel and cobble content. (LEWES NODULAR CHALK FORMATION)		
						Structureless CHALK, composed of white gravelly SILT, with medium chalk cobble content. Clasts are weak, low density, white with localised iron staining and subangular. Low subangular flint gravel and cobble content. (LEWES NODULAR CHALK FORMATION)		
						Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
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S - Standard Penetration Test
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V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered
Location scanned with CAT prior to excavation. Borehole installed to a depth of 30.00m bgl.

Scale: 1:40

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water

Chiselling

From	To	Hours

clancy consulting	Project Title: 57 Top Dartford Road, Hextable		BH01
	Project Number: 10/1781	Client: Barchester Healthcare Ltd.	Sheet 4 Of 5
	GL (mAOD): 57.73	N Coord: 170835	E Coord: 552516
Date: 06/12/2021-07/12/2021	Method: Cable Percussion	Driller: South-Eastern Drilling Services	Logged By: EB

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
						Structureless CHALK, composed of white gravelly SILT, with medium chalk cobble content. Clasts are weak, low density, white with localised iron staining and subangular. Low subangular flint gravel and cobble content. (LEWES NODULAR CHALK FORMATION)		
						25.00 - 28.00 Increased iron content.		
						Borehole Continues		

KEY

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▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Location scanned with CAT prior to excavation. Borehole installed to a depth of 30.00m bgl.

Scale: 1:40

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water

Chiselling

From	To	Hours

clancy consulting	Project Title: 57 Top Dartford Road, Hextable		BH01
	Project Number: 10/1781	Client: Barchester Healthcare Ltd.	Sheet 5 Of 5
	GL (mAOD): 57.73	N Coord: 170835	E Coord: 552516
Date: 06/12/2021-07/12/2021	Method: Cable Percussion	Driller: South-Eastern Drilling Services	Logged By: EB

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
						Structureless CHALK, composed of white gravelly SILT, with medium chalk cobble content. Clasts are weak, low density, white with localised iron staining and subangular. Low subangular flint gravel and cobble content. (LEWES NODULAR CHALK FORMATION)		
						End Of Borehole At 30.00 m		

KEY

D - Disturbed Sample
B - Bulk Sample
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S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered
Location scanned with CAT prior to excavation. Borehole installed to a depth of 30.00m bgl.

Scale: 1:40

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water

Chiselling

From	To	Hours

clancy consulting	Project Title: 57 Top Dartford Road, Hextable		**BH02**
	Project Number: 10/1781	Client: Barchester Healthcare Ltd.	Sheet 1 Of 4
	GL (mAOD): 56.98	N Coord: 170843	E Coord: 552541
Date:	Method: Cable Percussion	Driller: South-Eastern Drilling Services	Logged By: EB

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
			56.73		0.25	MADE GROUND: Grass over very soft dark brown silty sandy gravelly CLAY, with roots and rootlets. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular of flint, chalk, brick and charcoal.		
			56.08		0.90	MADE GROUND: Very soft light brown sandy gravelly CLAY, with roots and rootlets. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular of flint, chalk, brick and charcoal.		
			55.98		1.00	Structureless CHALK, composed of brownish white sandy gravelly SILT. Gravel is weak, low to medium density, white and subangular. (LEWES NODULAR CHALK FORMATION)		
			55.83		1.15	Structureless CHALK, composed of white silty GRAVEL. Gravel is weak, low to medium density, white and subangular. (LEWES NODULAR CHALK FORMATION)		
			55.48		1.50	Structureless CHALK, composed of white to greyish white gravelly SILT, with medium chalk cobble content. Clasts are weak, low density, white and subangular. Occasional subangular flint cobbles. (LEWES NODULAR CHALK FORMATION)		
			54.98		2.00	2.50 Subangular flint boulders.		
			53.98		3.00			
			52.98		4.00			
			51.98		5.00			
			50.98		6.00	Structureless CHALK, composed of white gravelly SILT, with chalk cobbles. Clasts are weak, low density, white and subangular. Low subangular flint cobble content. (LEWES NODULAR CHALK FORMATION) Borehole Continues		

KEY

D - Disturbed Sample
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S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Location scanned with CAT prior to excavation. Borehole backfilled with arisings upon completion.

Scale: 1:40

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water

Chiselling

From	To	Hours

clancy consulting	Project Title: 57 Top Dartford Road, Hextable		BH02
	Project Number: 10/1781	Client: Barchester Healthcare Ltd.	Sheet 2 Of 4
	GL (mAOD): 56.98	N Coord: 170843	E Coord: 552541
Date:	Method: Cable Percussion	Driller: South-Eastern Drilling Services	Logged By: EB

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
						Structureless CHALK, composed of white gravelly SILT, with chalk cobbles. Clasts are weak, low density, white and subangular. Low subangular flint cobble content. (LEWES NODULAR CHALK FORMATION)		
						Structureless CHALK, composed of white gravelly SILT. Gravel is weak, low to medium density, white and subangular. Rare subangular flint cobbles. (LEWES NODULAR CHALK FORMATION)		
						Structureless CHALK, composed of white to cream with localised iron staining, gravelly SILT, with chalk cobbles. Clasts are weak, low density, white and subangular. Low subangular flint cobble content. (LEWES NODULAR CHALK FORMATION) 12.50 - 13.50 Increased flint cobble content. Borehole Continues		

KEY

D - Disturbed Sample
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S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Location scanned with CAT prior to excavation. Borehole backfilled with arisings upon completion.

Scale: 1:40

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water

Chiselling

From	To	Hours

clancy consulting	Project Title: 57 Top Dartford Road, Hextable		**BH02**
	Project Number: 10/1781	Client: Barchester Healthcare Ltd.	Sheet 3 Of 4
	GL (mAOD): 56.98	N Coord: 170843	E Coord: 552541
Date:	Method: Cable Percussion	Driller: South-Eastern Drilling Services	Logged By: EB

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
						Structureless CHALK, composed of white to cream with localised iron staining, gravelly SILT, with chalk cobbles. Clasts are weak, low density, white and subangular. Low subangular flint cobble content. (LEWES NODULAR CHALK FORMATION) 13.50 - 14.00 Increased iron content.		
						Structureless CHALK, composed of white gravelly SILT, with chalk cobbles, localised iron staining and increasing silt content with depth. Clasts are weak, low density, white and subangular. Increasing subangular flint cobble content with depth. (LEWES NODULAR CHALK FORMATION)		
						Borehole Continues		

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Location scanned with CAT prior to excavation. Borehole backfilled with arisings upon completion.

Scale: 1:40

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water

Chiselling

From	To	Hours

clancy consulting	Project Title: 57 Top Dartford Road, Hextable		BH02
	Project Number: 10/1781	Client: Barchester Healthcare Ltd.	Sheet 4 Of 4
	GL (mAOD): 56.98	N Coord: 170843	E Coord: 552541
Date:	Method: Cable Percussion	Driller: South-Eastern Drilling Services	Logged By: EB

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
						Structureless CHALK, composed of white gravelly SILT, with chalk cobbles, localised iron staining and increasing silt content with depth. Clasts are weak, low density, white and subangular. Increasing subangular flint cobble content with depth. (LEWES NODULAR CHALK FORMATION)		
						End Of Borehole At 20.00 m		

KEY

D - Disturbed Sample
B - Bulk Sample
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S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Location scanned with CAT prior to excavation. Borehole backfilled with arisings upon completion.

Scale: 1:40

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water

Chiselling

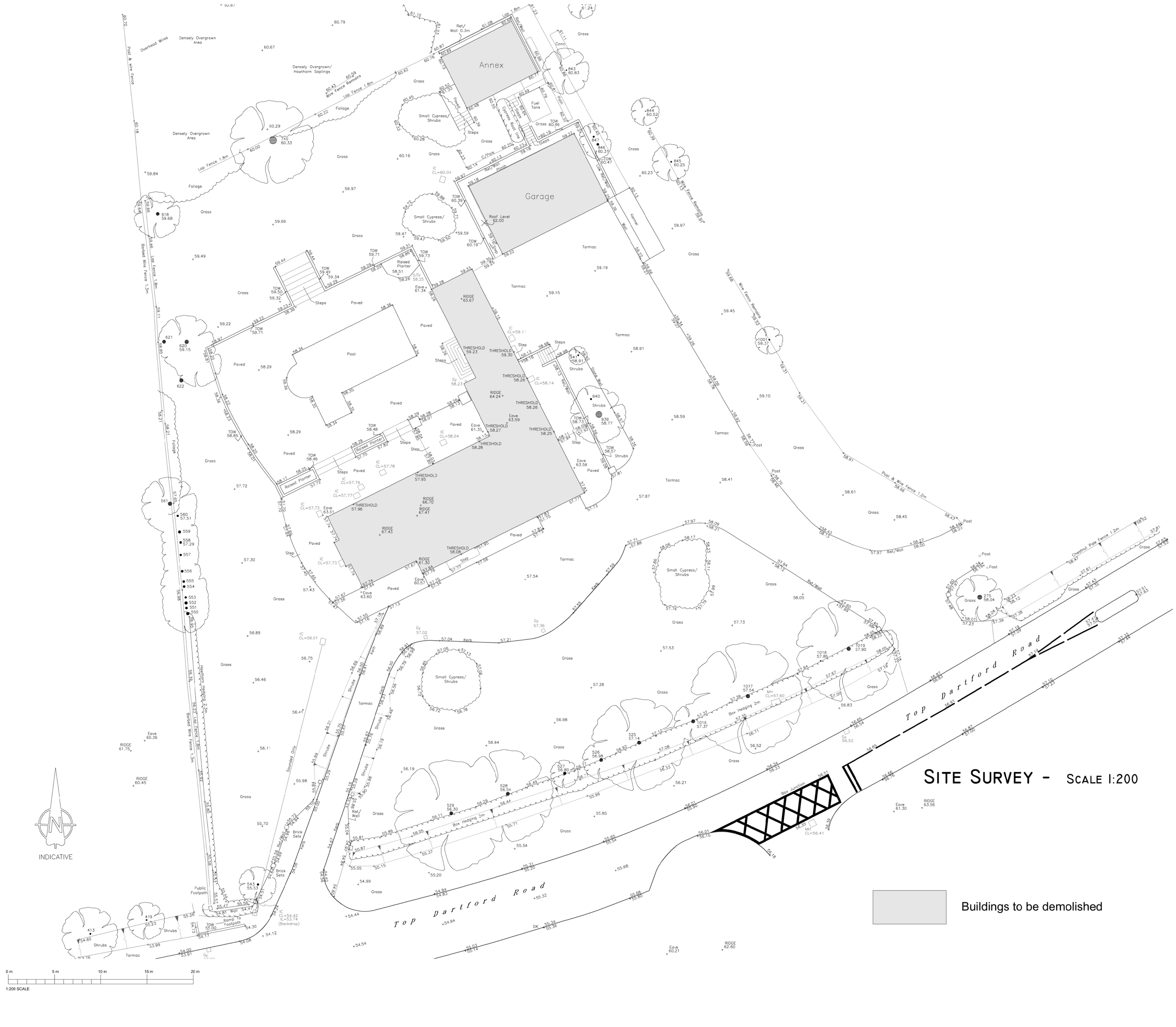
From	To	Hours

Appendix C – Topographical survey and Utilities

57 TOP DARTFORD ROAD:

Notes:

Do Not Scale. Use only figured dimensions.
All dimensions to be checked on site prior to construction.
Any discrepancies to be notified to the architect.



SITE SURVEY - SCALE 1:200

Buildings to be demolished

PLANNING

Rev	Date	Comments

Client
Mr Steve Webb

Project
57 Top Dartford Road
Hextable
Swanley
Kent
BR8 7SG

Title
Topographical Survey
Existing buildings to be demolished

Project No.	Date
4022	JAN 17
Drawing No.	Revision
PD28	
Scale	Drawn
1:200 @ A1	JJ
	Check
	JH

bhd architects
Oak House, London Road, Sevenoaks, Kent TN13 1AF
phone: 01732 452200 fax: 01732 452245
info@bhdarchitects.co.uk www.bhdarchitects.co.uk

Appendix D – Environment Agency correspondence & Thames Water asset plan

From: KSL Groundwater & contaminated land Team <ksl.gwcl@environment-agency.gov.uk>
Sent: 01 November 2021 09:16
To: Greg Scott <greg.scott@clancy.co.uk>
Subject: Re-development of a site for a new care home in Hextable

CAUTION: EXTERNAL EMAIL

Hi Greg.

My name is Matt and I work in the Groundwater and Contaminated Land team at the EA in Kent. I believe you recently emailed John Vincent for a response to a query (I've copied in below). Unfortunately he retired a few months back!

I see John has previously provided our standard guidance on deep borehole soakaways.

In answer to your questions:

- Yes the same guidance applies
- We would advise on the use of pollution prevention measures for car parking areas, as per the guidance.
- You should only sink the boreholes to the minimum depth at which you attain sufficient infiltration (which should be at least 10m from the highest seasonal water table)
- I'm afraid I don't have any further details on the GW depths at this location.

Regards,

Matt

Matthew Holloway
Groundwater and Contaminated Land Technical Officer
Kent, South London and East Sussex area
Environment Agency, Orchard House, Endeavour Park, London Road, West Malling, Kent, ME19 5SH

Asset location search

Property Searches

Clancy Consulting Ltd
Queens House
19Upper King Street
NORWICH
NR3 1RB

Search address supplied 57
Top Dartford Road
Swanley
BR8 7SG

Your reference Hextable

Our reference ALS/ALS Standard/2021_4486192

Search date 12 August 2021

Knowledge of features below the surface is essential for every development

The benefits of this knowledge not only include ensuring due diligence and avoiding risk, but also being able to ascertain the feasibility of any development.

Did you know that Thames Water Property Searches can also provide a variety of utility searches including a more comprehensive view of utility providers' assets (across up to 35-45 different providers), as well as more focused searches relating to specific major utility companies such as National Grid (gas and electric).

Contact us to find out more.

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0800 009 4540

Asset location search

Property Searches

Search address supplied: 57, Top Dartford Road, Swanley, BR8 7SG

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This searchprovides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0800 009 4540, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk
Web: www.thameswater-propertysearches.co.uk

Asset location search

Thames Water Property Searches

Waste Water Services

Please provide a copy extract from the public sewer map.

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an ‘as constructed’ record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and pressure test to be carried out for a fee.

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Asset Location Search Sewer Map - ALS/ALS Standard/2021_4486192

The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 552516,170867

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

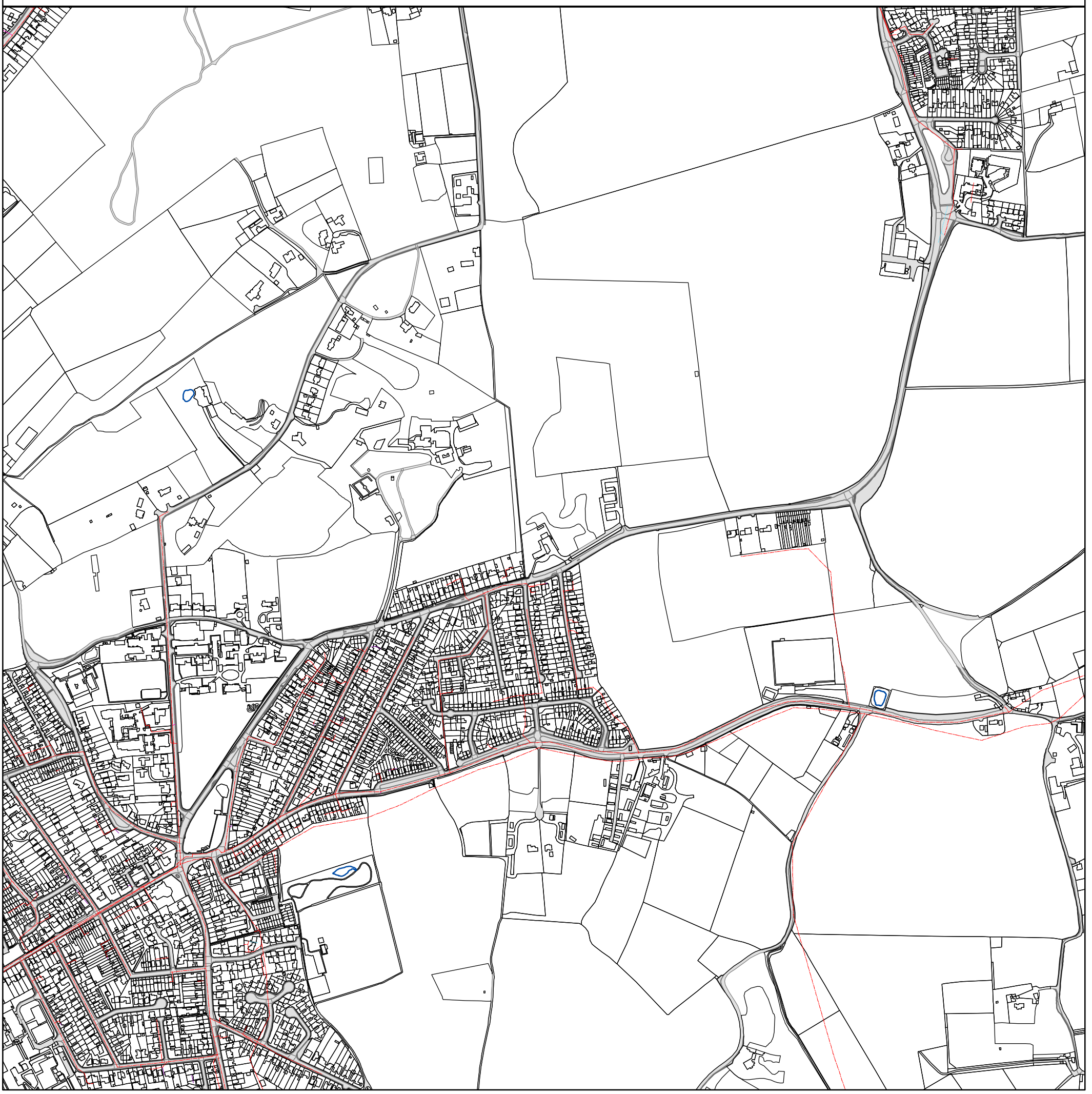
Based on the Ordnance Survey Map with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
571H	n/a	n/a
571C	n/a	n/a
4701	50.39	48.95
471E	n/a	n/a
471D	n/a	n/a
5701	54.51	52.89
571I	n/a	n/a
471C	n/a	n/a
471B	n/a	n/a
471A	n/a	n/a
4801	54.01	52.43
581A	n/a	n/a
581B	n/a	n/a
481C	n/a	n/a
481B	n/a	n/a
481A	n/a	n/a
5601	42.08	39.61
5603	43.43	41.39
571A	n/a	n/a
571D	n/a	n/a
471F	n/a	n/a
5702	49.56	48.26
571E	n/a	n/a
4702	48.07	45.35
571B	n/a	n/a
571G	n/a	n/a
571F	n/a	n/a
2701	54.17	52.03
3603	n/a	n/a
3602	49.57	46.1
37YT	n/a	n/a
38ZX	n/a	n/a
381A	n/a	n/a
381B	n/a	n/a
3701	53.55	51.9
3702	53.46	51.35
3601	48.24	46.51
4704	52.98	50.87
4705	48.27	46.91
4703	53.17	51.08

Based on the Ordnance Survey Map with the sanction of the Controller of H.M Stationary Office License Number 10019345

ALS/ALS Standard/2021_4486192



0 45 90 180 270 360
Meters

Scale:	1:7158
Width:	2000m
Printed By:	G1KANAGA
Print Date:	12/08/2021
Map Centre:	552515,170866
Grid Reference:	TQ5270NE

Comments:

ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

Trunk Surface Water

Trunk Foul

Storm Relief

Trunk Combined

Vent Pipe

Bio-solids (Sludge)

Proposed Thames Surface Water Sewer

Proposed Thames Water Foul Sewer

Gallery

Foul Rising Main

Surface Water Rising Main

Combined Rising Main

Sludge Rising Main

Proposed Thames Water Rising Main

Vacuum

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

Air Valve

Dam Chase

Fitting

Meter

Vent Column

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

Control Valve

Drop Pipe

Ancillary

Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

Outfall

Undefined End

Inlet

Other Symbols

Symbols used on maps which do not fall under other general categories

Public/Private Pumping Station

Change of characteristic indicator (C.O.C.I.)

Invert Level

Summit

Areas

Lines denoting areas of underground surveys, etc.

Agreement

Operational Site

Chamber

Tunnel

Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

Foul Sewer

Surface Water Sewer

Combined Sewer

Gulley

Culverted Watercourse

Proposed

Abandoned Sewer

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.

2) All measurements on the plans are metric.

3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.

4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.

5) 'na' or '0' on a manhole level indicates that data is unavailable.

6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Searches on 0800 009 4540.

Asset Location Search Water Map - ALS/ALS Standard/2021_4486192

The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 552516, 170867.

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

4"

Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.

16"

Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.

3" SUPPLY

Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.

3" FIRE

Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.

3" METERED

Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.

Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.

Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

Valves

- General Purpose Valve
- Air Valve
- Pressure Control Valve
- Customer Valve

Hydrants

- Single Hydrant

Meters

- Meter

End Items

Symbol indicating what happens at the end of a water main.

- Blank Flange
- Capped End
- Emptying Pit
- Undefined End
- Manifold
- Customer Supply
- Fire Supply

Operational Sites

- Booster Station
- Other
- Other (Proposed)
- Pumping Station
- Service Reservoir
- Shaft Inspection
- Treatment Works
- Unknown
- Water Tower

Other Symbols

- Data Logger

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

Other Water Pipes (Not Operated or Maintained by Thames Water)

Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.

Private Main: Indiates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment 14 days from due date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service, or will be held to be invalid.
4. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
5. In case of dispute TWUL`s terms and conditions shall apply.
6. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
8. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800

If you are unhappy with our service you can speak to your original goods or customer service provider. If you are not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to her at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0121 345 1000 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	**BACS Payment**	**Telephone Banking**	**Cheque**
Call **0800 009 4540** quoting your invoice number starting CBA or ADS / OSS	Account number **90478703** Sort code **60-00-01** A remittance advice must be sent to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.** or email **ps.billing@thameswater.co.uk**	By calling your bank and quoting: Account number **90478703** Sort code **60-00-01** and your invoice number	Made payable to '**Thames Water Utilities Ltd**' Write your Thames Water account number on the back. Send to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW** or by DX to **151280 Slough 13**

Thames Water Utilities Ltd Registered in England & Wales No. 2366661 Registered Office Clearwater Court, Vastern Rd, Reading, Berks, RG1 8DB.

Appendix E – Surface Water Flood Exceedance Flows

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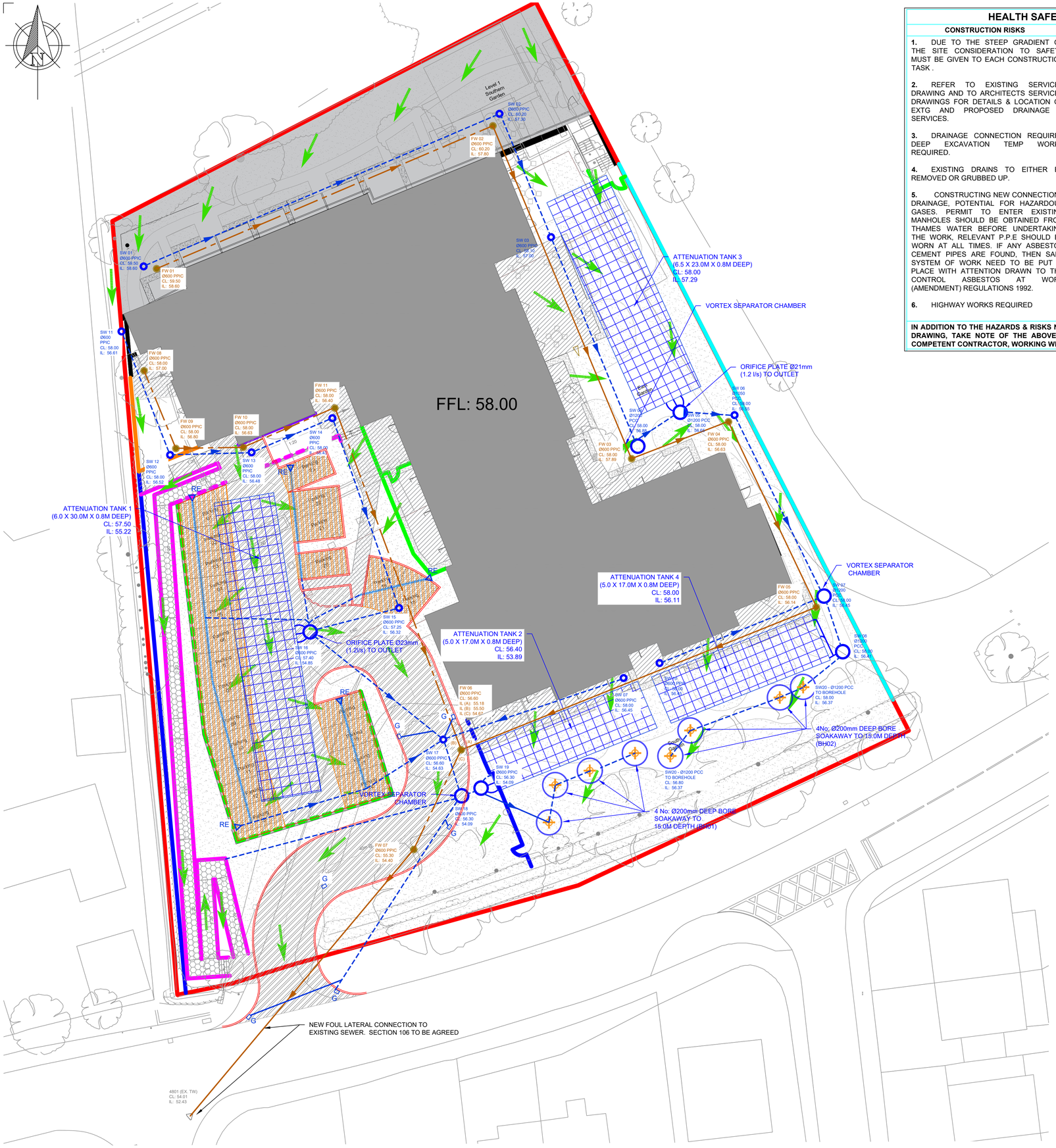


HEALTH SAFETY AND ENVIRONMENTAL RISKS BOX

CONSTRUCTION RISKS	MAINTENANCE RISKS	DEMOLITION/ ADAPTATION RISKS
1. DUE TO THE STEEP GRADIENT OF THE SITE CONSIDERATION TO SAFETY MUST BE GIVEN TO EACH CONSTRUCTION TASK . **2.** REFER TO EXISTING SERVICES DRAWING AND TO ARCHITECTS SERVICES DRAWINGS FOR DETAILS & LOCATION OF EXTG AND PROPOSED DRAINAGE & SERVICES. **3.** DRAINAGE CONNECTION REQUIRES DEEP EXCAVATION TEMP WORKS REQUIRED. **4.** EXISTING DRAINS TO EITHER BE REMOVED OR GRUBBED UP. **5.** CONSTRUCTING NEW CONNECTIONS DRAINAGE, POTENTIAL FOR HAZARDOUS GASES. PERMIT TO ENTER EXISTING MANHOLES SHOULD BE OBTAINED FROM THAMES WATER BEFORE UNDERTAKING THE WORK, RELEVANT P.P.E SHOULD BE WORN AT ALL TIMES. IF ANY ASBESTOS CEMENT PIPES ARE FOUND, THEN SAFE SYSTEM OF WORK NEED TO BE PUT IN PLACE WITH ATTENTION DRAWN TO THE CONTROL ASBESTOS AT WORK (AMENDMENT) REGULATIONS 1992. **6.** HIGHWAY WORKS REQUIRED	**1.** ATTENUATION TANKS, GULLIES, CHANNELS AND CHAMBERS REQUIRE THE STANDARD PERIODIC INSPECTION REGIME AND CLEANING ROUTINE TO ENSURE CONTINUED PERFORMANCE. **2.** CONFINED SPACE ENTRY. **3.** ALL MAINTENANCE MUST COMPLY WITH THAMES WATER AUTHORITY'S REGULATIONS.	**1.** APPARATUS LOCATED IN LANDSCAPED AREAS HAS NOT BEEN DESIGNED TO SUPPORT HEAVY VEHICLE LOADING. 2. THE SURFACE WATER DRAINAGE APPARATUS HAS BEEN DESIGNED TO ACCOMMODATE THE DESIGNED CATCHMENT AREA. NO ADDITIONAL AREAS OF HARDSTANDING CAN BE CONNECTION INTO THE SYSTEM WITHOUT RISK OF LOCALIZED FLOODING ON SITE. 3. HAZARDOUS WASTE MATERIALS

IN ADDITION TO THE HAZARDS & RISKS NORMALLY ASSOCIATED WITH THE TYPE OF WORK DETAILED ON THIS DRAWING, TAKE NOTE OF THE ABOVE. IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR, WORKING WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEER'S AND ARCHITECT'S DRAWINGS, DETAILS & SPECIFICATIONS.
2. THE EXTERNAL WORKS DESIGN IS BASED UPON HARRIS IRWIN ARCHITECTS PLAN 3081-HIA-01-00-DR-A-0102 REV P2 DATED 30.07.21
3. TOPOGRAPHICAL SURVEY DRAWING 4022-PD28 DATED JAN '17 BY bhdARCHITECTS HAS ALSO BEEN USED IN THE DESIGN.
4. REFER TO THE ARCHITECT FOR SETTING OUT OF ALL BUILDINGS & INTERNAL DOWN PIPES & RWP'S
5. REFER TO SERVICE ENGINEERS DRAWINGS FOR FINAL SETTING OUT OF RWP AND SVP'S (BASED ON GUTTER SYSTEM).
6. REFER TO SERVICE ENGINEERS DRAWINGS FOR ABOVE GROUND PLUMBING ROUTES FROM APPLIANCES TO STUB STACKS ETC.
7. ALL EXISTING DRAINAGE THAT IS TO BE ABANDONED TO BE 'PLUGGED' IN WITH MASS CONCRETE (150mm MIN) OR REMOVED ENTIRELY.
8. ANY EXISTING SERVICES TO BE LOCATED AND CLEARLY MARKED PRIOR TO EXCAVATIONS BY CONTRACTOR.
9. ALL LEVELS ARE TO BE CONFIRMED BY THE CONTRACTOR ON SITE PRIOR TO CONSTRUCTION.
10. IT IS ASSUMED THAT ALL SINK AND TOILET DRAINAGE POINTS WILL HAVE RODDING ACCESS AT THE APPLIANCE BASE.
11. CONTRACTOR TO AVOID UNDERMINING ANY EXISTING FOOTPATHS/ BUILDINGS DURING WORKS BY ALLOWING ADEQUATE PROTECTION ADJACENT TO THESE AREAS.
12. ALL RAINWATER DOWN PIPES TO HAVE RODDABLE ACCESS AT THE BASE OF THE VERTICAL SECTION.
13. ALL BELOW GROUND DRAINAGE PIPES WITH LESS THAN 900mm COVER TO SOFFIT LEVEL IN TRAFFICKED AREAS I.E. CAR PARK AND SERVICE YARD AREA TO HAVE CLASS Z BEDDING SURROUND. REFER TO THE MANHOLE SCHEDULE AND DETAIL SHEETS FOR FURTHER DETAILS.
14. ALL BELOW GROUND DRAINAGE WITHIN THE SITE BOUNDARY HAS BEEN DESIGNED TO BSEN 752:2008 AND BUILDING REGULATIONS - PART H:2015. THE OFF SITE DRAINAGE TO THE PUBLIC SEWER ARE DESIGNED TO SEWERS FOR ADOPTION 7th EDITION.

LEGEND:

FLOOD FLOW EXCEEDANCE

PRELIMINARY DRAWING

THIS DRAWING IS FOR PRELIMINARY INFORMATION PURPOSES ONLY AND MUST NOT BE READ AS A CONSTRUCTION ISSUE. IT INDICATES DESIGN INTENT ONLY AND IS SUBJECT TO AMENDMENT DURING FINAL DESIGN DEVELOPMENT

SCALE 1:200m

0m 2m 4m 6m 8m 10m 12m 14m 16m 18m 20m

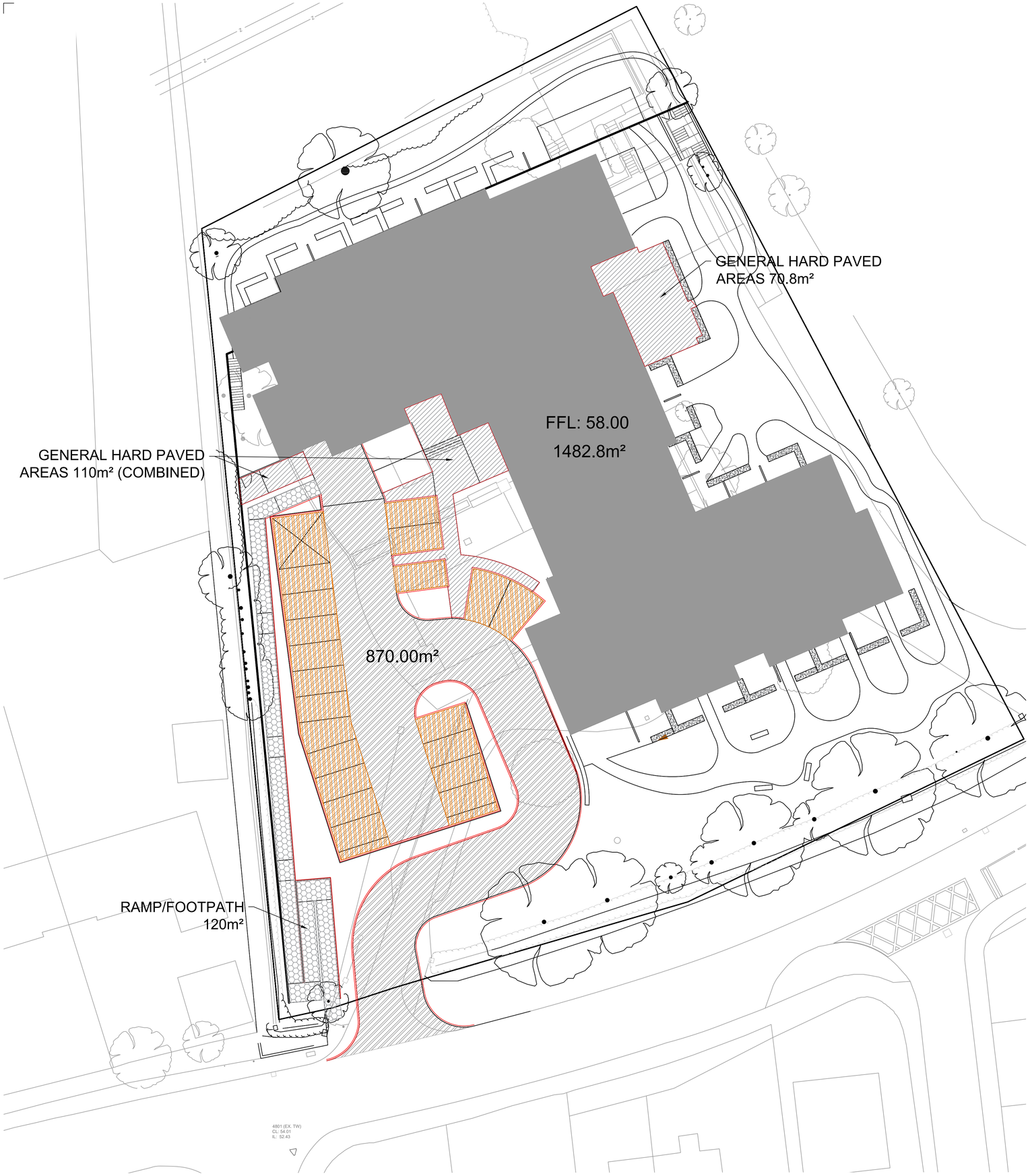
Rev	Date	Description	By	Check	App.
P2	17.01.22	ARCH LAYOUT AMENDED	RH	GS	GS
P1	17.12.21	PRELIMINARY ISSUE	RH	GS	GS

Client	BARCHESTER HEALTHCARE LTD
Project	57 TOP DARTFORD ROAD HEXTABLE, KENT BR8 7SG
Office	NORWICH 01603 305190
Discipline	CIVIL ENGINEERING
Title	FLOOD FLOW EXCEEDANCE

Scale @ A1	Status
1:200	PRELIMINARY

clancy consulting
www.clancy.co.uk
Birmingham 0121 200 3500 Glasgow 0141 222 1720 Liverpool 0151 227 3000 London 020 3277 0207 Manchester 0161 615 6300 Newcastle 0191 221 0707 Norwich 01603 305 090 Penrith 01253 475375 Reading 0118 941 7888

Originator	Job Number	Discipline	Building/Zone
CCL	8/2607	C	HEX
Type	**Level**	**Drawing No.**	**Revision**
GA	DRN	4402	P2



HEALTH SAFETY AND ENVIRONMENTAL RISKS BOX

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SCALE 1:200m
0m 2m 4m 6m 8m 10m 12m 14m 16m 18m 20m

Rev	Date	Description	By	Check	App.
P1	16.12.21	PRELIMINARY ISSUE	RH	--	--

Client: BARCHESTER HEALTHCARE LTD

Project: 57 TOP DARTFORD ROAD
HEXTABLE, KENT
BR8 7SG

Office: NORWICH 01603 305190

Discipline: CIVIL ENGINEERING

Title: GENERAL AREAS PLAN

Scale @ A1: 1:200

Status: PRELIMINARY

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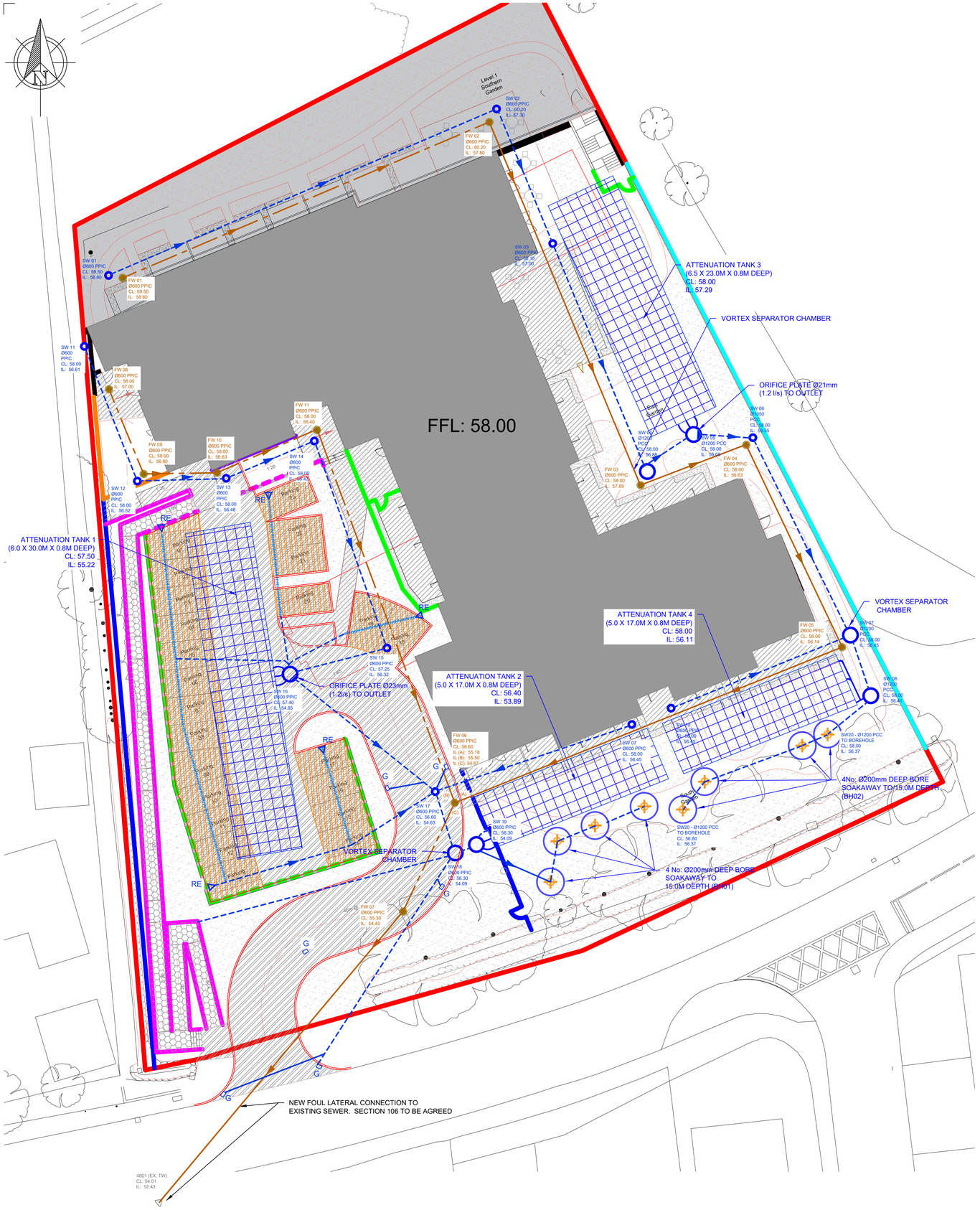
www.clancy.co.uk
Birmingham 0121 200 2800 . Glasgow 0141 222 7321 . Liverpool 0151 227 5300 . London 020 3207 0970 . Manchester 0161 613 6000 . Newcastle 0191 221 2702 . Norwich 01603 305190 . Prestwich 01204 475375 . Reading 0118 947 7886

Originator	Job Number	Discipline	Building/Zone
CCL	8/2607	C	HEX
Type	**Level**	**Drawing No.**	**Revision**
GA	DRN	4402	P1

Appendix F – Drainage Layout and Calculation



HEALTH SAFETY AND ENVIRONMENTAL RISKS BOX

CONSTRUCTION RISKS	MAINTENANCE RISKS	DEMOLITION/ ADAPTATION RISKS
1. DUE TO THE STEEP GRADIENT OF THE SITE CONSIDERATION TO SAFETY MUST BE GIVEN TO EACH CONSTRUCTION TASK . **2.** REFER TO EXISTING SERVICES DRAWING AND TO ARCHITECTS SERVICES DRAWINGS FOR DETAILS & LOCATION OF EXTG AND PROPOSED DRAINAGE & SERVICES. **3.** DRAINAGE CONNECTION REQUIRES DEEP EXCAVATION TEMP WORKS REQUIRED. **4.** EXISTING DRAINS TO EITHER BE REMOVED OR GRUBBED UP. **5.** CONSTRUCTING NEW CONNECTIONS DRAINAGE, POTENTIAL FOR HAZARDOUS GASES. PERMIT TO ENTER EXISTING MANHOLES SHOULD BE OBTAINED FROM THAMES WATER BEFORE UNDERTAKING THE WORK, RELEVANT P.P.E SHOULD BE WORN AT ALL TIMES. IF ANY ASBESTOS CEMENT PIPES ARE FOUND, THEN SAFE SYSTEM OF WORK NEED TO BE PUT IN PLACE WITH ATTENTION DRAWN TO THE CONTROL ASBESTOS AT WORK (AMENDMENT) REGULATIONS 1992. **6.** HIGHWAY WORKS REQUIRED	**1.** ATTENUATION TANKS, GULLIES, CHANNELS AND CHAMBERS REQUIRE THE STANDARD PERIODIC INSPECTION REGIME AND CLEANING ROUTINE TO ENSURE CONTINUED PERFORMANCE. **2.** CONFINED SPACE ENTRY. **3.** ALL MAINTENANCE MUST COMPLY WITH THAMES WATER AUTHORITY'S REGULATIONS.	**1.** APPARATUS LOCATED IN LANDSCAPED AREAS HAS NOT BEEN DESIGNED TO SUPPORT HEAVY VEHICLE LOADING. 2. THE SURFACE WATER DRAINAGE APPARATUS HAS BEEN DESIGNED TO ACCOMMODATE THE DESIGNED CATCHMENT AREA. NO ADDITIONAL AREAS OF HARDSTANDING CAN BE CONNECTION INTO THE SYSTEM WITHOUT RISK OF LOCALIZED FLOODING ON SITE. 3. HAZARDOUS WASTE MATERIALS

IN ADDITION TO THE HAZARDS & RISKS NORMALLY ASSOCIATED WITH THE TYPE OF WORK DETAILED ON THIS DRAWING, TAKE NOTE OF THE ABOVE. IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR, WORKING WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

DRAINAGE STRATEGY

THE FOLLOWING TEXT DESCRIBES THE SURFACE WATER DRAINAGE DISPOSAL STRATEGY FOR THIS DEVELOPMENT.

THE SITE IS CLASSIFIED AS BROWNFIELD (BEING PREVIOUSLY USED FOR RESIDENTIAL PURPOSES.) KEY POINTS FOR THE STRATEGY ARE AS FOLLOWS:

- THE FIRST CHOICE FOR SURFACE WATER IS ATTENUATION WITH DIRECT INFILTRATION, HOWEVER SITE INVESTIGATIONS IDENTIFIED THAT SHALLOW INFILTRATION WAS NOT FEASIBLE DUE TO POOR INFILTRATION RATES ACHIEVED.
- THERE ARE NO WATERCOURSES WITHIN CLOSE PROXIMITY OF THE SITE. NEITHER IS THERE A SURFACE WATER SEWER.
- FURTHER DEEP BORE INVESTIGATION FOUND GOOD INFILTRATION RATES AS INDICATED BELOW. DRILLING CONTINUED TO 30.0M AND NO GROUND WATER WAS ENCOUNTERED;

Location	Depth (m)	Run	Permeability k (m/s)
BH01	10	1	$1.74X10^{-4}$
	15	1	$5.73X10^{-4}$
		2	$2.61X10^{-4}$
	20	1	$4.31X10^{-4}$
		2	$3.76X10^{-4}$
BH02	10	1	$2.46X10^{-4}$
		2	$4.12X10^{-4}$
	15	1	$1.37X10^{-4}$
		2	$4.03X10^{-4}$
	20	1	$2.29X10^{-4}$
		2	$4.58X10^{-4}$

- FOR THIS DESIGN, DISCHARGE HAS BEEN USED IN TWO LOCATIONS (BH1 & BH2) WITH THE HIGHLIGHTED VALUES (ABOVE) USED FOR THE CALCULATIONS.
- THE PROPOSED DEVELOPMENT HAS AN IMPERMEABLE AREA OF APPROXIMATELY 2653m2 (0.265ha) AND HAS A LEVEL DIFFERENCE, FALLING FROM NORTH TO SOUTH BY APPROXIMATELY 6.5M.
- THE SURFACE WATER FLOW HAS BEEN DESIGNED TO CAPTURE AND ATTENUATE RUNOFF IN 4No. CRATED TANKS WITH FLOW RESTRICTED TO 1.2L/S FROM THE UPPER LEVEL TANKS.
- DUE TO THE SITE TOPOGRAPHY AND PROPOSED LAYOUT THERE IS NO SPACE FOR ANY OTHER SUDS FEATURES SUCH AS SWALES AND PONDS ETC.
- FOUL WATER FLOW ASSUMED TO BE UNRESTRICTED INTO THE PUBLIC SEWER WHICH THE NEAREST POINT IS FOUND IN THE JUNCTION OF MABLE ROAD JUST OFF THE SOUTH-WESTERN CORNER OF THE PROPOSED SITE.
- THE SURFACE WATER DESIGN CATERS FOR ALL STORM EVENTS UP TO AND INCLUDING THE 1 IN 100 YEAR EVENT PLUS 40% CLIMATE CHANGE.

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEER'S AND ARCHITECT'S DRAWINGS, DETAILS & SPECIFICATIONS.
2. THE EXTERNAL WORKS DESIGN IS BASED UPON HARRIS IRWIN ARCHITECTS PLAN 3081-HIA-01-00-DR-A-0102 REV P2 DATED 30.07.21
3. TOPOGRAPHICAL SURVEY DRAWING 4022-PD28 DATED JAN '17 BY bhdARCHITECTS HAS ALSO BEEN USED IN THE DESIGN.
4. REFER TO THE ARCHITECT FOR SETTING OUT OF ALL BUILDINGS & INTERNAL DOWN PIPES & RWP'S
5. REFER TO SERVICE ENGINEERS DRAWINGS FOR FINAL SETTING OUT OF RWP AND SVP'S (BASED ON GUTTER SYSTEM).
6. REFER TO SERVICE ENGINEERS DRAWINGS FOR ABOVE GROUND PLUMBING ROUTES FROM APPLIANCES TO STUB STACKS ETC.
7. ALL EXISTING DRAINAGE THAT IS TO BE ABANDONED TO BE 'PLUGGED' IN WITH MASS CONCRETE (150mm MIN) OR REMOVED ENTIRELY.
8. ANY EXISTING SERVICES TO BE LOCATED AND CLEARLY MARKED PRIOR TO EXCAVATIONS BY CONTRACTOR.
9. ALL LEVELS ARE TO BE CONFIRMED BY THE CONTRACTOR ON SITE PRIOR TO CONSTRUCTION.
10. IT IS ASSUMED THAT ALL SINK AND TOILET DRAINAGE POINTS WILL HAVE RODDING ACCESS AT THE APPLIANCE BASE.
11. CONTRACTOR TO AVOID UNDERMINING ANY EXISTING FOOTPATHS/ BUILDINGS DURING WORKS BY ALLOWING ADEQUATE PROTECTION ADJACENT TO THESE AREAS.
12. ALL RAINWATER DOWN PIPES TO HAVE RODDABLE ACCESS AT THE BASE OF THE VERTICAL SECTION.
13. ALL BELOW GROUND DRAINAGE PIPES WITH LESS THAN 900mm COVER TO SOFFIT LEVEL IN TRAFFICKED AREAS I.E. CAR PARK AND SERVICE YARD AREA TO HAVE CLASS Z BEDDING SURROUND. REFER TO THE MANHOLE SCHEDULE AND DETAIL SHEETS FOR FURTHER DETAILS.
14. ALL BELOW GROUND DRAINAGE WITHIN THE SITE BOUNDARY HAS BEEN DESIGNED TO BSEN 752:2008 AND BUILDING REGULATIONS - PART H:2015. THE OFF SITE DRAINAGE TO THE PUBLIC SEWER ARE DESIGNED TO SEWERS FOR ADOPTION 7th EDITION.

LEGEND:

SW	NEW SURFACE WATER SEWER PIPE AND MANHOLE PIPE (225Ø UNO)
	PERMEABLE UNDERDRAINED PAVING TO PARKING BAYS
	PERFORATED PIPE 100Ø UNO
	PERMEABLE UNDERDRAINED PAVING TO PARKING BAYS
RE	RODDING EYE
G	ROAD GULLY
	BOREHOLE SOAKAWAY TO 15.0M DEPTH
FW	NEW FOUL WATER SEWER PIPE AND MANHOLE PIPE (100Ø UNO @ 1:40)
4801 (EX. TW) CL: 54.01 IL: 52.43	EXISTING FOUL PUBLIC SEWER - PROPOSED CONNECTING LOCATION SUBJECT TO SECTION 106 AGREEMENT WITH THAMES WATER

PRELIMINARY DRAWING

THIS DRAWING IS FOR PRELIMINARY INFORMATION PURPOSES ONLY AND MUST NOT BE READ AS A CONSTRUCTION ISSUE. IT INDICATES DESIGN INTENT ONLY AND IS SUBJECT TO AMENDMENT DURING FINAL DESIGN DEVELOPMENT

SCALE 1:200m

0m 2m 4m 6m 8m 10m 12m 14m 16m 18m 20m

Rev	Date	Description	By	Check	App.
P4	14.01.22	ARCHITECTURAL LAYOUT AMENDED	RH	GS	GS
P3	22/12/21	PLANNING ISSUE	RH	GS	GS
P2	16/12/21	PLANNING ISSUE	RH	GS	GS
P1	08.09.21	PRELIMINARY ISSUE	CN	RH	GS

Client: BARCHESTER HEALTHCARE LTD

Project: 57 TOP DARTFORD ROAD
HEXTABLE, KENT
BR8 7SG

Office: NORWICH 01603 305190

Discipline: CIVIL ENGINEERING

Title: DRAINAGE STRATEGY
GENERAL ARRANGEMENT

Scale @ A1: 1:200

Status: PRELIMINARY

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Originator	Job Number	Discipline	Building/Zone
CCL	8/2607	C	HEX
Type	**Level**	**Drawing No.**	**Revision**
GA	DRN	4400	P4

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.411	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.800	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm at outfall (pipe 1.012)

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.052	4-8	0.042

Total Area Contributing (ha) = 0.094

Total Pipe Volume (m³) = 5.745

Time Area Diagram at outfall (pipe 3.015)

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.111	4-8	0.060

Total Area Contributing (ha) = 0.171

Total Pipe Volume (m³) = 6.795

Network Design Table for Storm

« - Indicates pipe capacity < flow

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	40.137	0.221	181.9	0.016	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	12.586	0.210	60.0	0.013	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	23.155	0.116	199.9	0.016	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	6.622	0.035	186.8	0.019	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)
1.000	50.00	5.69	58.600	0.016	0.0	0.0	0.0	0.97	38.4	2.2
1.001	50.00	5.82	57.300	0.029	0.0	0.0	0.0	1.69	67.3	4.0
1.002	50.00	6.24	57.000	0.046	0.0	0.0	0.0	0.92	36.6	6.2
1.003	50.00	6.35	56.884	0.064	0.0	0.1	0.0	0.95	37.9	8.7

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.004	5.686	0.016	350.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.005	22.095	0.110	200.0	0.013	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	18.773	0.101	185.0	0.008	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.006	5.583	0.031	180.0	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.007	2.365	0.006	395.3	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.008	4.156	0.004	943.3	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.009	3.975	0.004	957.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.010	2.930	0.002	1412.1	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.011	1.931	0.001	1860.8	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.012	1.931	0.001	1860.8	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.000	15.189	0.084	180.0	0.003	5.00	0.0	0.600	o	225	Pipe/Conduit	
3.001	8.151	0.041	200.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.002	8.582	0.048	180.0	0.012	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.003	20.271	0.113	180.0	0.023	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.004	9.889	0.099	100.0	0.026	0.00	0.0	0.600	o	225	Pipe/Conduit	
4.000	12.555	0.121	103.8	0.008	5.00	0.0	0.600	o	150	Pipe/Conduit	
4.001	1.725	0.005	350.0	0.028	0.00	0.0	0.600	o	225	Pipe/Conduit	
5.000	13.691	0.064	212.4	0.008	5.00	0.0	0.600	o	150	Pipe/Conduit	
3.005	2.524	0.047	53.3	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.006	16.415	0.047	346.7	0.000	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)
1.004	50.00	6.49	56.274	0.064	0.0	0.1	0.0	0.69	27.6	8.7
1.005	50.00	6.89	56.258	0.077	0.0	0.1	0.0	0.92	36.6	10.5
2.000	50.00	5.43	56.548	0.008	0.0	0.0	0.0	0.74	13.0	1.1
1.006	50.00	6.98	56.148	0.094	0.0	0.1	0.0	0.97	38.6	12.8
1.007	50.00	7.04	56.117	0.094	0.0	0.1	0.0	0.65	25.9	12.8
1.008	50.00	7.21	56.111	0.094	0.0	0.1	0.0	0.42	16.6	12.8
1.009	50.00	7.37	56.107	0.094	0.0	0.1	0.0	0.41	16.5	12.8
1.010	50.00	7.51	56.103	0.094	0.0	0.1	0.0	0.34	13.5	12.8
1.011	50.00	7.60	56.026	0.094	0.0	0.1	0.0	0.36	25.1	12.8
1.012	50.00	7.69	56.025	0.094	0.0	0.1	0.0	0.36	25.1	12.8
3.000	50.00	5.26	56.608	0.003	0.0	0.0	0.0	0.97	38.6	0.4
3.001	50.00	5.41	56.524	0.003	0.0	0.0	0.0	0.92	36.6	0.4
3.002	50.00	5.56	56.483	0.015	0.0	0.0	0.0	0.97	38.6	2.0
3.003	50.00	5.90	56.435	0.037	0.0	0.0	0.0	0.97	38.6	5.1
3.004	50.00	6.03	55.322	0.064	0.0	0.1	0.0	1.31	52.0	8.7
4.000	50.00	5.21	55.369	0.008	0.0	0.0	0.0	0.99	17.4	1.1
4.001	50.00	5.25	55.223	0.036	0.0	0.0	0.0	0.69	27.6	5.0
5.000	50.00	5.33	55.361	0.008	0.0	0.0	0.0	0.69	12.1	1.1
3.005	50.00	6.05	54.818	0.108	0.0	0.1	0.0	1.80	71.4	14.7
3.006	50.00	6.45	54.771	0.108	0.0	0.1	0.0	0.70	27.7	14.7

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
6.000	20.372	0.204	100.0	0.000	5.00	0.0	0.600	o	100	Pipe/Conduit	
3.007	4.096	0.075	54.5	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
7.000	7.319	0.184	39.8	0.014	5.00	0.0	0.600	o	150	Pipe/Conduit	
3.008	5.014	0.025	200.8	0.005	0.00	0.0	0.600	o	225	Pipe/Conduit	
8.000	9.671	0.049	198.6	0.010	5.00	0.0	0.600	o	150	Pipe/Conduit	
9.000	12.016	0.067	180.0	0.011	5.00	0.0	0.600	o	150	Pipe/Conduit	
8.001	14.268	0.079	180.0	0.008	0.00	0.0	0.600	o	225	Pipe/Conduit	
8.002	2.854	0.015	185.0	0.015	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.009	1.448	0.007	200.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.010	2.597	0.005	499.1	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.011	1.960	0.006	350.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.012	3.734	0.005	717.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.013	2.854	0.003	1097.1	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.014	2.810	0.001	2159.8	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
3.015	2.810	0.001	2159.8	0.000	0.00	0.0	0.600	o	375	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)
6.000	50.00	5.44	54.957	0.000	0.0	0.0	0.0	0.77	6.0	0.0
3.007	50.00	6.48	54.628	0.108	0.0	0.1	0.0	1.78	70.6	14.7
7.000	50.00	5.08	54.882	0.014	0.0	0.0	0.0	1.60	28.3	1.9
3.008	50.00	6.57	54.098	0.127	0.0	0.1	0.0	0.92	36.5	17.4
8.000	50.00	5.23	54.216	0.010	0.0	0.0	0.0	0.71	12.5	1.4
9.000	50.00	5.27	54.234	0.011	0.0	0.0	0.0	0.75	13.2	1.5
8.001	50.00	5.51	54.167	0.029	0.0	0.0	0.0	0.97	38.6	4.0
8.002	50.00	5.56	54.088	0.044	0.0	0.0	0.0	0.96	38.1	6.0
3.009	50.00	6.60	54.073	0.171	0.0	0.1	0.0	0.92	36.6	23.4
3.010	50.00	6.68	53.891	0.171	0.0	0.1	0.0	0.58	23.0«	23.4
3.011	50.00	6.72	53.886	0.171	0.0	0.1	0.0	0.69	27.6	23.4
3.012	50.00	6.83	53.880	0.171	0.0	0.1	0.0	0.58	41.0	23.4
3.013	50.00	6.93	53.875	0.171	0.0	0.1	0.0	0.47	33.0	23.4
3.014	50.00	7.06	53.797	0.171	0.0	0.1	0.0	0.38	42.1	23.4
3.015	50.00	7.18	53.796	0.171	0.0	0.1	0.0	0.38	42.1	23.4

Manhole Schedules for Storm

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	59.500	0.900	Open Manhole	600	1.000	58.600	225				
2	60.200	2.900	Open Manhole	600	1.001	57.300	225	1.000	58.379	225	1079
3	58.000	1.000	Open Manhole	1200	1.002	57.000	225	1.001	57.090	225	90
4	58.000	1.116	Open Manhole	1050	1.003	56.884	225	1.002	56.884	225	
ATT.TNK. 3	58.100	1.826	Open Manhole	1200	1.004	56.274	225	1.003	56.849	225	575
6	58.000	1.742	Open Manhole	1050	1.005	56.258	225	1.004	56.258	225	
10	58.000	1.452	Open Manhole	600	2.000	56.548	150				
7	58.000	1.852	Open Manhole	1200	1.006	56.148	225	1.005	56.148	225	
								2.000	56.447	150	224
ATT. TNK. 4	58.000	1.883	Open Manhole	1800	1.007	56.117	225	1.006	56.117	225	
10A	57.975	1.864	Open Manhole	1200	1.008	56.111	225	1.007	56.111	225	
10A_BH_13	57.950	1.843	Open Manhole	1200 x 800	1.009	56.107	225	1.008	56.107	225	
10B_BH_12	57.925	1.822	Open Manhole	1200 x 800	1.010	56.103	225	1.009	56.103	225	
10C_BH_11	57.913	1.887	Open Manhole	1200 x 800	1.011	56.026	300	1.010	56.101	225	
10D_BH_10	57.356	1.331	Open Manhole	1200 x 800	1.012	56.025	300	1.011	56.025	300	
	56.800	0.776	Open Manhole	0		OUTFALL		1.012	56.024	300	
11	58.500	1.892	Open Manhole	600	3.000	56.608	225				
12	58.000	1.476	Open Manhole	600	3.001	56.524	225	3.000	56.524	225	
13	58.000	1.517	Open Manhole	600	3.002	56.483	225	3.001	56.483	225	
14	58.000	1.565	Open Manhole	600	3.003	56.435	225	3.002	56.435	225	
15	57.250	1.928	Open Manhole	1050	3.004	55.322	225	3.003	56.322	225	1000
22_RE	56.250	0.881	Open Manhole	1200	4.000	55.369	150				
ATT. TNK 1	57.500	2.277	Open Manhole	1800	4.001	55.223	225	4.000	55.248	150	
24_RE	57.500	2.139	Open Manhole	1050	5.000	55.361	150				
16	57.400	2.582	Open Manhole	1200	3.005	54.818	225	3.004	55.223	225	405
								4.001	55.218	225	400
								5.000	55.297	150	404
24	57.000	2.229	Open Manhole	1200	3.006	54.771	225	3.005	54.771	225	
19	58.000	3.043	Open Manhole	1200	6.000	54.957	100				
17	56.600	1.972	Open Manhole	1200	3.007	54.628	225	3.006	54.723	225	95
								6.000	54.753	100	
23_RE	56.200	1.318	Open Manhole	1200	7.000	54.882	150				
18	56.200	2.102	Open Manhole	1050	3.008	54.098	225	3.007	54.553	225	455
								7.000	54.698	150	525
21_G1	54.600	0.384	Open Manhole	600	8.000	54.216	150				
23	55.000	0.766	Open Manhole	600	9.000	54.234	150				
22_G2	55.350	1.183	Open Manhole	600	8.001	54.167	225	8.000	54.167	150	
								9.000	54.167	150	
23_G3	56.100	2.012	Open Manhole	600	8.002	54.088	225	8.001	54.088	225	
19	56.300	2.227	Open Manhole	1200	3.009	54.073	225	3.008	54.073	225	
								8.002	54.073	225	
ATT. TNK. 2	56.400	2.509	Open Manhole	1800	3.010	53.891	225	3.009	54.066	225	175
33A	56.500	2.614	Open Manhole	1200	3.011	53.886	225	3.010	53.886	225	
33B_BH_03	56.600	2.720	Open Manhole	1200 x 800	3.012	53.880	300	3.011	53.880	225	

Manhole Schedules for Storm

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)
33C_BH_02	56.700	2.825	Open Manhole	1200 x 800	3.013	53.875	300	3.012	53.875	300	
33D_BH_01.5	56.750	2.953	Open Manhole	1200 x 800	3.014	53.797	375	3.013	53.872	300	
33_BH_01	56.800	3.004	Open Manhole	1200 x 800	3.015	53.796	375	3.014	53.796	375	
	56.850	3.055	Open Manhole	0		OUTFALL		3.015	53.795	375	

MH Name		Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
	1	552476.593	170884.207	552476.593	170884.207	Required	
	2	552513.446	170900.107	552513.446	170900.107	Required	
	3	552518.093	170888.411	552518.093	170888.411	Required	
	4	552526.745	170866.933	552526.745	170866.933	Required	
ATT.TNK.	3	552531.688	170871.340	552531.688	170871.340	Required	
	6	552537.372	170871.194	552537.372	170871.194	Required	
	10	552528.981	170846.800	552528.981	170846.800	Required	
	7	552547.183	170851.397	552547.183	170851.397	Required	
ATT. TNK.	4	552548.888	170846.081	552548.888	170846.081	Required	
	10A	552546.523	170846.093	552546.523	170846.093	Required	
	10A_BH_13	552542.451	170845.263	552542.451	170845.263	Required	
	10B_BH_12	552538.779	170843.740	552538.779	170843.740	Required	
	10C_BH_11	552536.083	170842.593	552536.083	170842.593	Required	
	10D_BH_10	552534.177	170842.283	552534.177	170842.283	Required	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
	552532.272	170841.973			No Entry	
11	552476.177	170880.466	552476.177	170880.466	Required	
12	552481.717	170866.324	552481.717	170866.324	Required	
13	552489.847	170866.906	552489.847	170866.906	Required	
14	552497.831	170870.054	552497.831	170870.054	Required	
15	552504.451	170850.895	552504.451	170850.895	Required	
22_RE	552482.162	170843.425	552482.162	170843.425	Required	
ATT. TNK 1	552492.887	170849.953	552492.887	170849.953	Required	
24_RE	552495.062	170863.594	552495.062	170863.594	Required	
16	552494.611	170849.911	552494.611	170849.911	Required	
24	552496.570	170848.319	552496.570	170848.319	Required	
19	552527.734	170845.826	552527.734	170845.826	Required	
17	552509.065	170837.672	552509.065	170837.672	Required	
23_RE	552503.049	170833.912	552503.049	170833.912	Required	
18	552510.367	170833.788	552510.367	170833.788	Required	
21_G1	552496.662	170813.736	552496.662	170813.736	Required	
23	552487.548	170815.767	552487.548	170815.767	Required	
22_G2	552496.825	170823.406	552496.825	170823.406	Required	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
23_G3	552509.617	170829.725	552509.617	170829.725	Required	
19	552512.426	170829.217	552512.426	170829.217	Required	
ATT. TNK. 2	552513.780	170829.730	552513.780	170829.730	Required	
33A	552514.528	170832.217	552514.528	170832.217	Required	
33B_BH_03	552515.205	170834.057	552515.205	170834.057	Required	
33C_BH_02	552518.654	170835.488	552518.654	170835.488	Required	
33D_BH_01.5	552521.309	170836.535	552521.309	170836.535	Required	
33_BH_01	552523.761	170837.908	552523.761	170837.908	Required	
	552526.212	170839.281			No Entry	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	225	1	59.500	58.600	0.675	Open Manhole	600
1.001	o	225	2	60.200	57.300	2.675	Open Manhole	600
1.002	o	225	3	58.000	57.000	0.775	Open Manhole	1200
1.003	o	225	4	58.000	56.884	0.891	Open Manhole	1050
1.004	o	225	ATT.TNK. 3	58.100	56.274	1.601	Open Manhole	1200
1.005	o	225	6	58.000	56.258	1.517	Open Manhole	1050
2.000	o	150	10	58.000	56.548	1.302	Open Manhole	600
1.006	o	225	7	58.000	56.148	1.627	Open Manhole	1200
1.007	o	225	ATT. TNK. 4	58.000	56.117	1.658	Open Manhole	1800
1.008	o	225	10A	57.975	56.111	1.639	Open Manhole	1200
1.009	o	225	10A_BH_13	57.950	56.107	1.618	Open Manhole	1200 x 800
1.010	o	225	10B_BH_12	57.925	56.103	1.597	Open Manhole	1200 x 800
1.011	o	300	10C_BH_11	57.913	56.026	1.587	Open Manhole	1200 x 800
1.012	o	300	10D_BH_10	57.356	56.025	1.031	Open Manhole	1200 x 800
3.000	o	225	11	58.500	56.608	1.667	Open Manhole	600
3.001	o	225	12	58.000	56.524	1.251	Open Manhole	600
3.002	o	225	13	58.000	56.483	1.292	Open Manhole	600
3.003	o	225	14	58.000	56.435	1.340	Open Manhole	600
3.004	o	225	15	57.250	55.322	1.703	Open Manhole	1050
4.000	o	150	22_RE	56.250	55.369	0.731	Open Manhole	1200
4.001	o	225	ATT. TNK 1	57.500	55.223	2.052	Open Manhole	1800

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	40.137	181.9	2	60.200	58.379	1.596	Open Manhole	600
1.001	12.586	60.0	3	58.000	57.090	0.685	Open Manhole	1200
1.002	23.155	199.9	4	58.000	56.884	0.891	Open Manhole	1050
1.003	6.622	186.8	ATT.TNK. 3	58.100	56.849	1.026	Open Manhole	1200
1.004	5.686	350.0	6	58.000	56.258	1.517	Open Manhole	1050
1.005	22.095	200.0	7	58.000	56.148	1.627	Open Manhole	1200
2.000	18.773	185.0	7	58.000	56.447	1.403	Open Manhole	1200
1.006	5.583	180.0	ATT. TNK. 4	58.000	56.117	1.658	Open Manhole	1800
1.007	2.365	395.3	10A	57.975	56.111	1.639	Open Manhole	1200
1.008	4.156	943.3	10A_BH_13	57.950	56.107	1.618	Open Manhole	1200 x 800
1.009	3.975	957.8	10B_BH_12	57.925	56.103	1.597	Open Manhole	1200 x 800
1.010	2.930	1412.1	10C_BH_11	57.913	56.101	1.587	Open Manhole	1200 x 800
1.011	1.931	1860.8	10D_BH_10	57.356	56.025	1.031	Open Manhole	1200 x 800
1.012	1.931	1860.8		56.800	56.024	0.476	Open Manhole	0
3.000	15.189	180.0	12	58.000	56.524	1.251	Open Manhole	600
3.001	8.151	200.0	13	58.000	56.483	1.292	Open Manhole	600
3.002	8.582	180.0	14	58.000	56.435	1.340	Open Manhole	600
3.003	20.271	180.0	15	57.250	56.322	0.703	Open Manhole	1050
3.004	9.889	100.0	16	57.400	55.223	1.952	Open Manhole	1200
4.000	12.555	103.8	ATT. TNK 1	57.500	55.248	2.102	Open Manhole	1800
4.001	1.725	350.0	16	57.400	55.218	1.957	Open Manhole	1200

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
5.000	o	150	24_RE	57.500	55.361	1.989	Open Manhole	1050
3.005	o	225	16	57.400	54.818	2.357	Open Manhole	1200
3.006	o	225	24	57.000	54.771	2.004	Open Manhole	1200
6.000	o	100	19	58.000	54.957	2.943	Open Manhole	1200
3.007	o	225	17	56.600	54.628	1.747	Open Manhole	1200
7.000	o	150	23_RE	56.200	54.882	1.168	Open Manhole	1200
3.008	o	225	18	56.200	54.098	1.877	Open Manhole	1050
8.000	o	150	21_G1	54.600	54.216	0.234	Open Manhole	600
9.000	o	150	23	55.000	54.234	0.616	Open Manhole	600
8.001	o	225	22_G2	55.350	54.167	0.958	Open Manhole	600
8.002	o	225	23_G3	56.100	54.088	1.787	Open Manhole	600
3.009	o	225	19	56.300	54.073	2.002	Open Manhole	1200
3.010	o	225	ATT. TNK. 2	56.400	53.891	2.284	Open Manhole	1800
3.011	o	225	33A	56.500	53.886	2.389	Open Manhole	1200
3.012	o	300	33B_BH_03	56.600	53.880	2.420	Open Manhole	1200 x 800

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
5.000	13.691	212.4	16	57.400	55.297	1.953	Open Manhole	1200
3.005	2.524	53.3	24	57.000	54.771	2.004	Open Manhole	1200
3.006	16.415	346.7	17	56.600	54.723	1.652	Open Manhole	1200
6.000	20.372	100.0	17	56.600	54.753	1.747	Open Manhole	1200
3.007	4.096	54.5	18	56.200	54.553	1.422	Open Manhole	1050
7.000	7.319	39.8	18	56.200	54.698	1.352	Open Manhole	1050
3.008	5.014	200.8	19	56.300	54.073	2.002	Open Manhole	1200
8.000	9.671	198.6	22_G2	55.350	54.167	1.033	Open Manhole	600
9.000	12.016	180.0	22_G2	55.350	54.167	1.033	Open Manhole	600
8.001	14.268	180.0	23_G3	56.100	54.088	1.787	Open Manhole	600
8.002	2.854	185.0	19	56.300	54.073	2.002	Open Manhole	1200
3.009	1.448	200.0	ATT. TNK. 2	56.400	54.066	2.109	Open Manhole	1800
3.010	2.597	499.1	33A	56.500	53.886	2.389	Open Manhole	1200
3.011	1.960	350.0	33B_BH_03	56.600	53.880	2.495	Open Manhole	1200 x 800
3.012	3.734	717.6	33C_BH_02	56.700	53.875	2.525	Open Manhole	1200 x 800

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
3.013	o	300	33C_BH_02	56.700	53.875	2.525	Open Manhole	1200 x 800
3.014	o	375	33D_BH_01.5	56.750	53.797	2.578	Open Manhole	1200 x 800
3.015	o	375	33_BH_01	56.800	53.796	2.629	Open Manhole	1200 x 800

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
3.013	2.854	1097.1	33D_BH_01.5	56.750	53.872	2.578	Open Manhole	1200 x 800
3.014	2.810	2159.8	33_BH_01	56.800	53.796	2.629	Open Manhole	1200 x 800
3.015	2.810	2159.8		56.850	53.795	2.680	Open Manhole	0

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.016	0.016	0.016
1.001	User	-	100	0.013	0.013	0.013
1.002	User	-	100	0.013	0.013	0.013
	User	-	100	0.003	0.003	0.016
1.003	User	-	100	0.019	0.019	0.019
1.004	-	-	100	0.000	0.000	0.000
1.005	User	-	100	0.013	0.013	0.013
2.000	User	-	100	0.008	0.008	0.008
1.006	User	-	100	0.009	0.009	0.009
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
1.010	-	-	100	0.000	0.000	0.000
1.011	-	-	100	0.000	0.000	0.000
1.012	-	-	100	0.000	0.000	0.000
3.000	User	-	100	0.003	0.003	0.003
3.001	-	-	100	0.000	0.000	0.000
3.002	User	-	100	0.008	0.008	0.008
	User	-	100	0.003	0.003	0.012
3.003	User	-	100	0.012	0.012	0.012
	User	-	100	0.011	0.011	0.023
3.004	User	-	100	0.003	0.003	0.003
	User	-	100	0.016	0.016	0.019
	User	-	100	0.008	0.008	0.026
4.000	User	-	100	0.008	0.008	0.008
4.001	User	-	100	0.028	0.028	0.028
5.000	User	-	100	0.008	0.008	0.008
3.005	-	-	100	0.000	0.000	0.000
3.006	-	-	100	0.000	0.000	0.000
6.000	-	-	100	0.000	0.000	0.000
3.007	-	-	100	0.000	0.000	0.000
7.000	User	-	100	0.014	0.014	0.014
3.008	User	-	100	0.005	0.005	0.005
8.000	User	-	100	0.010	0.010	0.010
9.000	User	-	100	0.011	0.011	0.011
8.001	User	-	100	0.008	0.008	0.008
8.002	User	-	100	0.015	0.015	0.015
3.009	-	-	100	0.000	0.000	0.000
3.010	-	-	100	0.000	0.000	0.000
3.011	-	-	100	0.000	0.000	0.000
3.012	-	-	100	0.000	0.000	0.000
3.013	-	-	100	0.000	0.000	0.000
3.014	-	-	100	0.000	0.000	0.000
3.015	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.265	0.265	0.265

Network Classifications for Storm

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
1.000	1	225	0.675	1.596	Unclassified	600	0	0.675	Unclassified
1.001	2	225	0.685	2.675	Unclassified	600	0	2.675	Unclassified
1.002	3	225	0.775	0.891	Unclassified	1200	0	0.775	Unclassified
1.003	4	225	0.891	1.026	Unclassified	1050	0	0.891	Unclassified
1.004	ATT.TNK. 3	225	1.517	1.601	Unclassified	1200	0	1.601	Unclassified
1.005	6	225	1.517	1.627	Unclassified	1050	0	1.517	Unclassified
2.000	10	150	1.302	1.403	Unclassified	600	0	1.302	Unclassified
1.006	7	225	1.627	1.658	Unclassified	1200	0	1.627	Unclassified
1.007	ATT. TNK. 4	225	1.639	1.658	Unclassified	1800	0	1.658	Unclassified
1.008	10A	225	1.618	1.639	Unclassified	1200	0	1.639	Unclassified
1.009	10A_BH_13	225	1.597	1.618	Unclassified	1200	800	1.618	Unclassified
1.010	10B_BH_12	225	1.587	1.597	Unclassified	1200	800	1.597	Unclassified
1.011	10C_BH_11	300	1.031	1.587	Unclassified	1200	800	1.587	Unclassified
1.012	10D_BH_10	300	0.476	1.031	Unclassified	1200	800	1.031	Unclassified
3.000	11	225	1.251	1.667	Unclassified	600	0	1.667	Unclassified
3.001	12	225	1.251	1.292	Unclassified	600	0	1.251	Unclassified
3.002	13	225	1.292	1.340	Unclassified	600	0	1.292	Unclassified
3.003	14	225	0.703	1.340	Unclassified	600	0	1.340	Unclassified
3.004	15	225	1.703	1.952	Unclassified	1050	0	1.703	Unclassified
4.000	22_RE	150	0.731	2.102	Unclassified	1200	0	0.731	Unclassified
4.001	ATT. TNK 1	225	1.957	2.052	Unclassified	1800	0	2.052	Unclassified
5.000	24_RE	150	1.953	1.989	Unclassified	1050	0	1.989	Unclassified
3.005	16	225	2.004	2.357	Unclassified	1200	0	2.357	Unclassified
3.006	24	225	1.652	2.004	Unclassified	1200	0	2.004	Unclassified
6.000	19	100	1.747	2.943	Unclassified	1200	0	2.943	Unclassified
3.007	17	225	1.422	1.747	Unclassified	1200	0	1.747	Unclassified
7.000	23_RE	150	1.168	1.352	Unclassified	1200	0	1.168	Unclassified
3.008	18	225	1.877	2.002	Unclassified	1050	0	1.877	Unclassified
8.000	21_G1	150	0.234	1.033	Unclassified	600	0	0.234	Unclassified
9.000	23	150	0.616	1.033	Unclassified	600	0	0.616	Unclassified
8.001	22_G2	225	0.958	1.787	Unclassified	600	0	0.958	Unclassified
8.002	23_G3	225	1.787	2.002	Unclassified	600	0	1.787	Unclassified
3.009	19	225	2.002	2.109	Unclassified	1200	0	2.002	Unclassified
3.010	ATT. TNK. 2	225	2.284	2.389	Unclassified	1800	0	2.284	Unclassified
3.011	33A	225	2.389	2.495	Unclassified	1200	0	2.389	Unclassified
3.012	33B_BH_03	300	2.420	2.525	Unclassified	1200	800	2.420	Unclassified
3.013	33C_BH_02	300	2.525	2.578	Unclassified	1200	800	2.525	Unclassified
3.014	33D_BH_01.5	375	2.578	2.629	Unclassified	1200	800	2.578	Unclassified
3.015	33_BH_01	375	2.629	2.680	Unclassified	1200	800	2.629	Unclassified

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.012		56.800	56.024	0.000	0	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
3.015		56.850	53.795	0.000	0	0

Simulation Criteria for Storm

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

Number of Input Hydrographs 0	Number of Offline Controls 0	Number of Time/Area Diagrams 0
Number of Online Controls 4	Number of Storage Structures 15	Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.405		

Online Controls for Storm

Orifice Manhole: 6, DS/PN: 1.005, Volume (m³): 1.7

Diameter (m) 0.013 Discharge Coefficient 0.600 Invert Level (m) 56.258

Orifice Manhole: 10A, DS/PN: 1.008, Volume (m³): 2.1

Diameter (m) 0.031 Discharge Coefficient 0.600 Invert Level (m) 56.111

Orifice Manhole: 24, DS/PN: 3.006, Volume (m³): 2.6

Diameter (m) 0.009 Discharge Coefficient 0.600 Invert Level (m) 54.771

Orifice Manhole: 33A, DS/PN: 3.011, Volume (m³): 3.0

Diameter (m) 0.026 Discharge Coefficient 0.600 Invert Level (m) 53.886

Storage Structures for Storm

Cellular Storage Manhole: ATT.TNK. 3, DS/PN: 1.004

Invert Level (m) 56.274 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	84.0	0.0	0.800	84.0	0.0	0.801	0.0	0.0

Cellular Storage Manhole: ATT. TNK. 4, DS/PN: 1.007

Invert Level (m) 56.117 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	84.0	0.0	0.800	84.0	0.0	0.801	0.0	0.0

Deep Bore Soakaway Manhole: 10A_BH_13, DS/PN: 1.009

Chamber Invert Level (m) 41.405 Borehole Depth (m) 15.000
Chamber Diameter/Length (m) 1.200 Infiltration Coefficient Base (m/hr) 0.93600
Chamber Width (m) 0.800 Safety Factor 2.0
Borehole Diameter (m) 0.200

Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)
0.000	0.00000	5.000	0.00000	10.000	0.50000	15.000	0.93600

Deep Bore Soakaway Manhole: 10B_BH_12, DS/PN: 1.010

Chamber Invert Level (m) 40.799 Borehole Depth (m) 15.000
Chamber Diameter/Length (m) 1.200 Infiltration Coefficient Base (m/hr) 0.93600
Chamber Width (m) 0.800 Safety Factor 2.0
Borehole Diameter (m) 0.200

Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)
0.000	0.00000	5.000	0.00000	10.000	0.50000	15.000	0.93600

Deep Bore Soakaway Manhole: 10C_BH_11, DS/PN: 1.011

Chamber Invert Level (m) 41.101 Borehole Depth (m) 15.000
Chamber Diameter/Length (m) 1.200 Infiltration Coefficient Base (m/hr) 0.93600
Chamber Width (m) 0.800 Safety Factor 2.0
Borehole Diameter (m) 0.200

Deep Bore Soakaway Manhole: 10C_BH_11, DS/PN: 1.011

Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)
0.000	0.00000	5.000	0.00000	10.000	0.50000	15.000	0.93600

Deep Bore Soakaway Manhole: 10D_BH_10, DS/PN: 1.012

Chamber Invert Level (m)	41.025	Borehole Depth (m)	15.000
Chamber Diameter/Length (m)	1.200	Infiltration Coefficient Base (m/hr)	0.93600
Chamber Width (m)	0.800	Safety Factor	2.0
Borehole Diameter (m)	0.200		

Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)
0.000	0.00000	5.000	0.00000	10.000	0.50000	15.000	0.93600

Porous Car Park Manhole: 15, DS/PN: 3.004

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	6.0
Max Percolation (l/s)	8.3	Slope (1:X)	50.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	56.100	Membrane Depth (mm)	0

Cellular Storage Manhole: ATT. TNK 1, DS/PN: 4.001

Invert Level (m)	55.218	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	175.0	0.0	0.800	175.0	0.0	0.801	0.0	0.0

Porous Car Park Manhole: 24_RE, DS/PN: 5.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.5
Max Percolation (l/s)	7.6	Slope (1:X)	350.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	55.361	Membrane Depth (mm)	0

Porous Car Park Manhole: 23_RE, DS/PN: 7.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.8
Max Percolation (l/s)	15.0	Slope (1:X)	50.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	55.800	Membrane Depth (mm)	0

Cellular Storage Manhole: ATT. TNK. 2, DS/PN: 3.010

Invert Level (m) 53.891 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	84.0	0.0	0.400	84.0	0.0	0.401	0.0	0.0

Deep Bore Soakaway Manhole: 33B_BH_03, DS/PN: 3.012

Chamber Invert Level (m) 38.806 Borehole Depth (m) 15.000
Chamber Diameter/Length (m) 1.200 Infiltration Coefficient Base (m/hr) 0.93600
Chamber Width (m) 0.800 Safety Factor 2.0
Borehole Diameter (m) 0.300

Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)
0.000	0.00000	5.000	0.00000	10.000	0.50000	15.000	0.93600

Deep Bore Soakaway Manhole: 33C_BH_02, DS/PN: 3.013

Chamber Invert Level (m) 38.552 Borehole Depth (m) 15.000
Chamber Diameter/Length (m) 1.200 Infiltration Coefficient Base (m/hr) 0.93600
Chamber Width (m) 0.800 Safety Factor 2.0
Borehole Diameter (m) 0.200

Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)
0.000	0.00000	5.000	0.00000	10.000	0.50000	15.000	0.93600

Deep Bore Soakaway Manhole: 33D_BH_01.5, DS/PN: 3.014

Chamber Invert Level (m) 38.872 Borehole Depth (m) 15.000
Chamber Diameter/Length (m) 1.200 Infiltration Coefficient Base (m/hr) 0.93600
Chamber Width (m) 0.800 Safety Factor 2.0
Borehole Diameter (m) 0.200

Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)
0.000	0.00000	5.000	0.00000	10.000	0.50000	15.000	0.93600

Deep Bore Soakaway Manhole: 33_BH_01, DS/PN: 3.015

Chamber Invert Level (m) 38.796 Borehole Depth (m) 15.000
Chamber Diameter/Length (m) 1.200 Infiltration Coefficient Base (m/hr) 0.93600
Chamber Width (m) 0.800 Safety Factor 2.0
Borehole Diameter (m) 0.200

Deep Bore Soakaway Manhole: 33_BH_01, DS/PN: 3.015

Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)
0.000	0.00000	5.000	0.00000	10.000	0.50000	15.000	0.93600

Manhole Headloss for Storm

PN	US/MH Name	US/MH Headloss
1.000	1	0.500
1.001	2	0.500
1.002	3	0.500
1.003	4	0.500
1.004	ATT.TNK. 3	0.500
1.005	6	0.500
2.000	10	0.500
1.006	7	0.500
1.007	ATT. TNK. 4	0.500
1.008	10A	0.500
1.009	10A_BH_13	0.500
1.010	10B_BH_12	0.500
1.011	10C_BH_11	0.500
1.012	10D_BH_10	0.500
3.000	11	0.500
3.001	12	0.500
3.002	13	0.500
3.003	14	0.500
3.004	15	0.500
4.000	22_RE	0.500
4.001	ATT. TNK 1	0.500
5.000	24_RE	0.500
3.005	16	0.500
3.006	24	0.500
6.000	19	0.500
3.007	17	0.500
7.000	23_RE	0.500
3.008	18	0.500
8.000	21_G1	0.500
9.000	23	0.500
8.001	22_G2	0.500
8.002	23_G3	0.500
3.009	19	0.500
3.010	ATT. TNK. 2	0.500
3.011	33A	0.500
3.012	33B_BH_03	0.500
3.013	33C_BH_02	0.500
3.014	33D_BH_01.5	0.500
3.015	33_BH_01	0.500

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 4 Number of Storage Structures 15 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 20.000	Cv (Summer) 0.750
Region England and Wales		Ratio R 0.411	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	1	15 Winter	100	+40%					58.681	-0.144
1.001	2	15 Winter	100	+40%					57.389	-0.136
1.002	3	15 Winter	100	+40%	100/15 Summer				57.231	0.006
1.003	4	15 Winter	100	+40%	100/15 Summer				57.145	0.036
1.004	ATT.TNK. 3	1440 Winter	100	+40%	30/60 Winter				57.019	0.520
1.005	6	1440 Winter	100	+40%	30/60 Summer				57.020	0.537
2.000	10	15 Winter	100	+40%					56.615	-0.083
1.006	7	15 Winter	100	+40%					56.245	-0.128
1.007	ATT. TNK. 4	480 Winter	100	+40%					56.230	-0.112
1.008	10A	480 Winter	100	+40%					56.232	-0.104
1.009	10A_BH_13	60 Winter	100	+40%					56.121	-0.211
1.010	10B_BH_12	480 Winter	100	+40%					56.107	-0.221
1.011	10C_BH_11	480 Winter	100	+40%					52.555	-3.771
1.012	10D_BH_10	15 Summer	1	+0%					41.025	-15.300
3.000	11	15 Winter	100	+40%					56.643	-0.190
3.001	12	15 Winter	100	+40%					56.592	-0.157
3.002	13	15 Winter	100	+40%					56.589	-0.119
3.003	14	15 Winter	100	+40%					56.575	-0.085
3.004	15	1440 Winter	100	+40%	100/15 Summer				55.813	0.266
4.000	22_RE	1440 Winter	100	+40%	100/120 Winter				55.759	0.240
4.001	ATT. TNK 1	1440 Winter	100	+40%	30/360 Winter				55.759	0.311
5.000	24_RE	1440 Winter	100	+40%	30/1440 Winter				55.759	0.248
3.005	16	1440 Winter	100	+40%	1/15 Summer				55.820	0.777
3.006	24	1440 Winter	100	+40%	1/15 Summer				55.862	0.866
6.000	19	15 Summer	1	+0%					54.957	-0.100
3.007	17	1440 Winter	100	+40%					54.633	-0.220
7.000	23_RE	15 Winter	100	+40%					54.945	-0.087
3.008	18	480 Winter	100	+40%	100/15 Summer				54.597	0.274
8.000	21_G1	480 Winter	100	+40%	100/15 Summer				54.597	0.231
9.000	23	480 Winter	100	+40%	100/15 Summer				54.598	0.214

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

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.000	0.28			10.2	OK	
1.001	2	0.000	0.32			18.5	OK	
1.002	3	0.000	0.85			28.4	SURCHARGED	
1.003	4	0.000	1.35			39.7	SURCHARGED	
1.004	ATT.TNK. 3	0.000	0.01			0.3	SURCHARGED	
1.005	6	0.000	0.01			0.3	SURCHARGED	
2.000	10	0.000	0.40			4.9	OK	
1.006	7	0.000	0.38			11.0	OK	
1.007	ATT. TNK. 4	0.000	0.02			0.6	OK	
1.008	10A	0.000	0.02			0.5	OK	
1.009	10A_BH_13	0.000	0.01			0.2	OK	
1.010	10B_BH_12	0.000	0.00			0.1	OK	
1.011	10C_BH_11	0.000	0.00			0.0	OK	
1.012	10D_BH_10	0.000	0.00			0.0	OK	
3.000	11	0.000	0.06			2.0	OK	
3.001	12	0.000	0.07			2.2	OK	
3.002	13	0.000	0.31			9.6	OK	
3.003	14	0.000	0.70			24.4	OK	
3.004	15	0.000	0.05			2.3	SURCHARGED	
4.000	22_RE	0.000	0.01			0.2	SURCHARGED	
4.001	ATT. TNK 1	0.000	0.12			3.6	SURCHARGED	
5.000	24_RE	0.000	0.07			0.8	SURCHARGED	
3.005	16	0.000	0.09			2.8	SURCHARGED	
3.006	24	0.000	0.01			0.2	SURCHARGED	
6.000	19	0.000	0.00			0.0	OK	
3.007	17	0.000	0.00			0.2	OK	
7.000	23_RE	0.000	0.36		6	8.8	OK	
3.008	18	0.000	0.05			1.4	SURCHARGED	
8.000	21_G1	0.000	0.06			0.7	FLOOD RISK	
9.000	23	0.000	0.06			0.8	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
8.001	22_G2	480 Winter	100	+40%	100/15 Summer				54.597	0.205
8.002	23_G3	480 Winter	100	+40%	100/15 Summer				54.597	0.284
3.009	19	480 Winter	100	+40%	100/15 Summer				54.597	0.299
3.010	ATT. TNK. 2	480 Winter	100	+40%	30/240 Winter				54.596	0.480
3.011	33A	480 Winter	100	+40%	30/120 Winter				54.596	0.485
3.012	33B_BH_03	480 Winter	100	+40%					53.899	-0.281
3.013	33C_BH_02	480 Winter	100	+40%					53.886	-0.289
3.014	33D_BH_01.5	480 Winter	100	+40%					53.804	-0.369
3.015	33_BH_01	480 Winter	100	+40%					53.046	-1.124

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
8.001	22_G2	0.000	0.06			2.0	SURCHARGED	
8.002	23_G3	0.000	0.11			3.0	SURCHARGED	
3.009	19	0.000	0.15			4.4	SURCHARGED	
3.010	ATT. TNK. 2	0.000	0.04			1.2	SURCHARGED	
3.011	33A	0.000	0.03			1.0	SURCHARGED	
3.012	33B_BH_03	0.000	0.01			0.7	OK	
3.013	33C_BH_02	0.000	0.01			0.4	OK	
3.014	33D_BH_01.5	0.000	0.00			0.2	OK	
3.015	33_BH_01	0.000	0.00		447	0.0	OK	

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	Calcs for Top Dartford Road			Start page no./Revision 1	
	Calcs by RH	Calcs date 21/12/2021	Checked by	Checked date	Approved by	Approved date

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	London
Storm duration	D = **5** min
Return period	Period = **1** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.440**
5-year return period rainfall of 60 minutes duration	M5_60min = **20.0** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **0** %
Factor Z1 (Wallingford procedure)	Z1 = **0.39**
Rainfall for 5min storm with 5 year return period	$M5\_5min_i = Z1 \times M5\_60min$ = **7.7** mm
Factor Z2 (Wallingford procedure)	Z2 = **0.61**
Rainfall for 5min storm with 1 year return period	$M1\_5min = Z2 \times M5\_5min_i$ = **4.8** mm
Design rainfall intensity	I_{max} = M1_5min / D = **57.0** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **5080** m^2
Percentage of area that is impermeable	p = **46** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **37.0** l/s

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Project				Job no.	
Hextable				8/2607	
Calcs for				Start page no./Revision	
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RH	21/12/2021				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	London
Storm duration	D = **5** min
Return period	Period = **30** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.440**
5-year return period rainfall of 60 minutes duration	M5_60min = **20.0** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **0** %
Factor Z1 (Wallingford procedure)	Z1 = **0.39**
Rainfall for 5min storm with 5 year return period	$M5\_5min_i = Z1 \times M5\_60min$ = **7.7** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.46**
Rainfall for 5min storm with 30 year return period	$M30\_5min = Z2 \times M5\_5min_i$ = **11.3** mm
Design rainfall intensity	I_{max} = M30_5min / D = **135.6** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **5080** m^2
Percentage of area that is impermeable	p = **46** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **88.0** l/s

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Project				Job no.	
Hextable				8/2607	
Calcs for				Start page no./Revision	
Top Dartford Road				1	
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RH	21/12/2021				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	London
Storm duration	D = **5** min
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.440**
5-year return period rainfall of 60 minutes duration	M5_60min = **20.0** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **0** %
Factor Z1 (Wallingford procedure)	Z1 = **0.39**
Rainfall for 5min storm with 5 year return period	$M5\_5min_i = Z1 \times M5\_60min$ = **7.7** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.86**
Rainfall for 5min storm with 100 year return period	$M100\_5min = Z2 \times M5\_5min_i$ = **14.3** mm
Design rainfall intensity	I_{max} = M100_5min / D = **172.2** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **5080** m^2
Percentage of area that is impermeable	p = **46** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **111.8** l/s

Clancy Consulting Ltd 19 Upper King Street, Norwich,	Project Hextable			Job no. 8/2607	
	Calcs for Top Dartford Road			Start page no./Revision 1	
	Calcs by RH	Calcs date 21/12/2021	Checked by	Checked date	Approved by	Approved date

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	London
Storm duration	D = **5** min
Return period	Period = **1** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.440**
5-year return period rainfall of 60 minutes duration	M5_60min = **20.0** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **0** %
Factor Z1 (Wallingford procedure)	Z1 = **0.39**
Rainfall for 5min storm with 5 year return period	$M5\_5min_i = Z1 \times M5\_60min$ = **7.7** mm
Factor Z2 (Wallingford procedure)	Z2 = **0.61**
Rainfall for 5min storm with 1 year return period	$M1\_5min = Z2 \times M5\_5min_i$ = **4.8** mm
Design rainfall intensity	I_{max} = M1_5min / D = **57.0** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **5080** m^2
Percentage of area that is impermeable	p = **52** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **41.8** l/s

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Project				Job no.	
Hextable				8/2607	
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RH	21/12/2021				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	London
Storm duration	D = **5** min
Return period	Period = **30** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.440**
5-year return period rainfall of 60 minutes duration	M5_60min = **20.0** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **0** %
Factor Z1 (Wallingford procedure)	Z1 = **0.39**
Rainfall for 5min storm with 5 year return period	$M5\_5min_i = Z1 \times M5\_60min$ = **7.7** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.46**
Rainfall for 5min storm with 30 year return period	$M30\_5min = Z2 \times M5\_5min_i$ = **11.3** mm
Design rainfall intensity	I_{max} = M30_5min / D = **135.6** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **5080** m^2
Percentage of area that is impermeable	p = **52** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **99.5** l/s

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Project				Job no.	
Hextable				8/2607	
Calcs for				Start page no./Revision	
Top Dartford Road				1	
Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
RH	21/12/2021				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	London
Storm duration	D = **5** min
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.440**
5-year return period rainfall of 60 minutes duration	M5_60min = **20.0** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **0** %
Factor Z1 (Wallingford procedure)	Z1 = **0.39**
Rainfall for 5min storm with 5 year return period	$M5\_5min_i = Z1 \times M5\_60min$ = **7.7** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.86**
Rainfall for 5min storm with 100 year return period	$M100\_5min = Z2 \times M5\_5min_i$ = **14.3** mm
Design rainfall intensity	I_{max} = M100_5min / D = **172.2** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **5080** m^2
Percentage of area that is impermeable	p = **52** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **126.4** l/s

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	London
Storm duration	D = **5** min
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.440**
5-year return period rainfall of 60 minutes duration	M5_60min = **20.0** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **40** %
Factor Z1 (Wallingford procedure)	Z1 = **0.39**
Rainfall for 5min storm with 5 year return period	$M5\_5min_i = Z1 \times M5\_60min \times (1 + p_{climate})$ = **10.8** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.92**
Rainfall for 5min storm with 100 year return period	$M100\_5min = Z2 \times M5\_5min_i$ = **20.8** mm
Design rainfall intensity	I_{max} = M100_5min / D = **249.9** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **5080** m^2
Percentage of area that is impermeable	p = **52** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **183.3** l/s

Appendix G – Kent County council; LLFA Proforma

Appendix C. Drainage Strategy Summary

1. Site details	
Site/development name	57 Top Dartford Rd, Hextable
Address including post code	57 Top Dartford Rd, Hextable, Swanley, Seven Oaks, Kent BR8 7SD
Grid reference	E 552510 N 170851
LPA reference	
Type of application	Outline ☐ Full ☒ Discharge of Conditions ☐ Other ☐
Site condition	Greenfield ☐ Brownfield ☒

2. Existing drainage			Document/Plan where information is stated:
Total site area (ha)	5080m^2 (0.508 Hectares)		
Impermeable area (ha)	1380m^2 (1.38 Hectares)		
Final discharge location	Infiltration ☒ Watercourse ☐ Sewer ☐ Tidal reach/sea ☐		
Greenfield discharge rate (l/s) for existing site area	QBAR (l/s)	0.81	Brownfield rates as existing =; 1:1yr = 37 l/s 1:30yr = 88 l/s 1:100yr = 112 l/s
	1 in 1 year (l/s)	0.69	
	1 in 30 year (l/s)	1.85	
	1 in 100 year (l/s)	3.02	

3. Proposed drainage areas			Document/Plan where information is stated:
Impermeable area (ha)	Roof	0.1483	Refer to drawing: CCL-C-HEX-GA-DRN -4400 & 4402
	Highway/road	.087	
	Other paved areas	.0301	
	Total	0.2654	
Permeable area (ha)	Open space	0.2426	
	Other permeable areas	N/A	
	Total	0.2426	
Final discharge location	Infiltration ☐ Infiltration rate 0.000261 m/s Watercourse ☐ N/A Sewer ☐ N/A Tidal reach/sea ☐ N/A		Refer to drawing: CCL-C-HEX-GA-DRN -4400
Climate change allowance included in design	20% ☐ 30% ☐ 40% ☒		

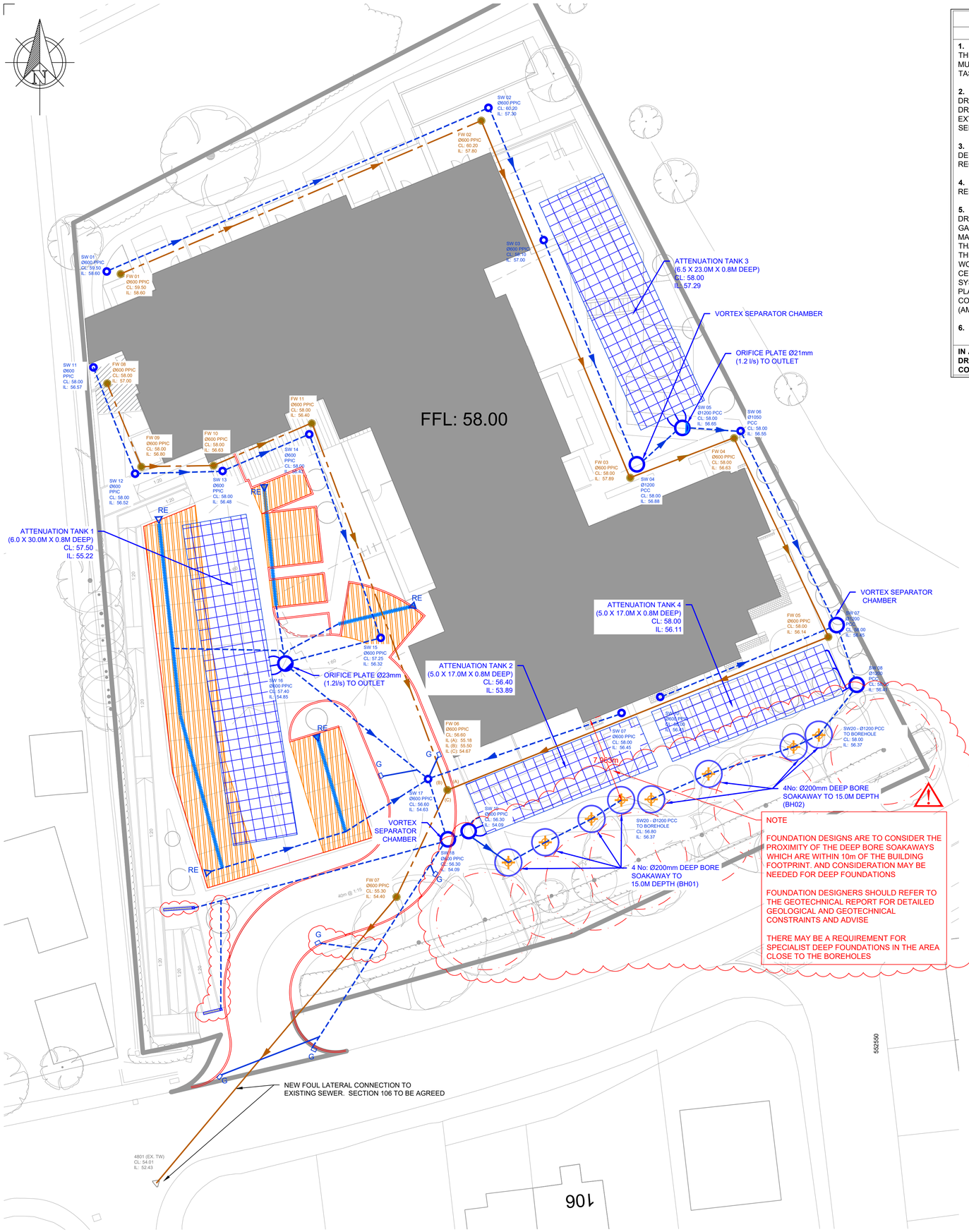
4. Post-Development Discharge rates, without mitigation			**Document/Plan where information is stated:**
Developed discharge rates (l/s)	1 in 1 year	41.8	
	1 in 30 year	99.5	
	1 in 100 year	183.3	
	1 in 100 year + CC	126.4	
5. Post-Development Discharge rates, with mitigation			**Document/Plan where information is stated:**
Describe development drainage strategy in general terms: Drainage proposed is to capture, attenuate in tanks each side of building at high & low levels, restrict flow before final discharge to multiple deep bore soakaways. Majority of SW runoff will be of low contamination sources ie. roof, therefore treatment is proposed via tanked permeable pavement and proprietary features like vortex separators.			
(a) No control required, all flows infiltrating ☒			
(b) Controlled developed discharge rates (l/s)	1 in 1 year		Refer to drawing: CCL-C-HEX-GA-DRN -4400
	1 in 30 year		
	1 in 100 year		
	1 in 100 year + CC		
6. Discharge Volumes			**Document/Plan where information is stated:**
	Existing volume (m^3)	Proposed volume (m^3)	
1 in 1 year			
1 in 30 year			
1 in 100 year			
1 in 100 year + CC			

All information presented above should be contained within the attached Flood Risk Assessment, Drainage Strategy or Statement and be substantiated through plans and appropriate calculations.

Form completed by	Richard Hendry
Qualifications	Senior engineer - Eng.Tech.MIHE
Company	Clancy Consulting
Telephone	01603 305 190
Email	Richard.Hendry@clancy.co.uk
On behalf of (client's details)	Barchester Healthcare
Date	22/12/2021

Appendix D. Drainage Asset Record Sheet for Verification Report

IDENTIFICATION	Type of Structure or Feature	
	Location Name	
	Drawing Identifier	
MANAGEMENT/ OWNERSHIP	Owners Name / Company	
	Address of owner	
	Owners Contact Number	
	Maintained By	
	Adoption proposed	☐ YES ☐ NO
	Name of Adopting Authority	
	Estimated Date of Adoption	
ASSET DETAILS	National Grid Reference (NGR)	
	Cover Level	
	Invert Level	
	Max volume	
	Height	
	Diameter/Width	
	Length	
	Depth	
	Designed Flow Rate	
	Any Additional Uses	



HEALTH SAFETY AND ENVIRONMENTAL RISKS BOX

CONSTRUCTION RISKS	MAINTENANCE RISKS	DEMOLITION/ ADAPTATION RISKS
1. DUE TO THE STEEP GRADIENT OF THE SITE CONSIDERATION TO SAFETY MUST BE GIVEN TO EACH CONSTRUCTION TASK . **2.** REFER TO EXISTING SERVICES DRAWING AND TO ARCHITECTS SERVICES DRAWINGS FOR DETAILS & LOCATION OF EXTG AND PROPOSED DRAINAGE & SERVICES. **3.** DRAINAGE CONNECTION REQUIRES DEEP EXCAVATION TEMP WORKS REQUIRED. **4.** EXISTING DRAINS TO EITHER BE REMOVED OR GRUBBED UP. **5.** CONSTRUCTING NEW CONNECTIONS DRAINAGE, POTENTIAL FOR HAZARDOUS GASES. PERMIT TO ENTER EXISTING MANHOLES SHOULD BE OBTAINED FROM THAMES WATER BEFORE UNDERTAKING THE WORK, RELEVANT P.P.E SHOULD BE WORN AT ALL TIMES. IF ANY ASBESTOS CEMENT PIPES ARE FOUND, THEN SAFE SYSTEM OF WORK NEED TO BE PUT IN PLACE WITH ATTENTION DRAWN TO THE CONTROL ASBESTOS AT WORK (AMENDMENT) REGULATIONS 1992. **6.** HIGHWAY WORKS REQUIRED	**1.** ATTENUATION TANKS, GULLIES, CHANNELS AND CHAMBERS REQUIRE THE STANDARD PERIODIC INSPECTION REGIME AND CLEANING ROUTINE TO ENSURE CONTINUED PERFORMANCE. **2.** CONFINED SPACE ENTRY. **3.** ALL MAINTENANCE MUST COMPLY WITH THAMES WATER AUTHORITY'S REGULATIONS.	**1.** APPARATUS LOCATED IN LANDSCAPED AREAS HAS NOT BEEN DESIGNED TO SUPPORT HEAVY VEHICLE LOADING. 2. THE SURFACE WATER DRAINAGE APPARATUS HAS BEEN DESIGNED TO ACCOMMODATE THE DESIGNED CATCHMENT AREA. NO ADDITIONAL AREAS OF HARDSTANDING CAN BE CONNECTION INTO THE SYSTEM WITHOUT RISK OF LOCALIZED FLOODING ON SITE. 3. HAZARDOUS WASTE MATERIALS

IN ADDITION TO THE HAZARDS & RISKS NORMALLY ASSOCIATED WITH THE TYPE OF WORK DETAILED ON THIS DRAWING, TAKE NOTE OF THE ABOVE. IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR, WORKING WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

DRAINAGE STRATEGY

THE FOLLOWING TEXT DESCRIBES THE SURFACE WATER DRAINAGE DISPOSAL STRATEGY FOR THIS DEVELOPMENT.

THE SITE IS CLASSIFIED AS BROWNFIELD (BEING PREVIOUSLY USED FOR RESIDENTIAL PURPOSES.) KEY POINTS FOR THE STRATEGY ARE AS FOLLOWS:

- THE FIRST CHOICE FOR SURFACE WATER IS ATTENUATION WITH DIRECT INFILTRATION, HOWEVER SITE INVESTIGATIONS IDENTIFIED THAT SHALLOW INFILTRATION WAS NOT FEASIBLE DUE TO POOR INFILTRATION RATES ACHIEVED.
- THERE ARE NO WATERCOURSES WITHIN CLOSE PROXIMITY OF THE SITE. NEITHER IS THERE A SURFACE WATER SEWER.
- FURTHER DEEP BORE INVESTIGATION FOUND GOOD INFILTRATION RATES AS INDICATED BELOW. DRILLING CONTINUED TO 30.0M AND NO GROUND WATER WAS ENCOUNTERED;

Location	Depth (m)	Run	Permeability k (m/s)
BH01	10	1	$1.74X10^{-4}$
	15	1	$5.73X10^{-4}$
		2	$2.61X10^{-4}$
	20	1	$4.31X10^{-4}$
		2	$3.76X10^{-4}$
BH02	10	1	$2.46X10^{-4}$
		2	$4.12X10^{-4}$
	15	1	$1.37X10^{-4}$
		2	$4.03X10^{-4}$
	20	1	$2.29X10^{-4}$
		2	$4.58X10^{-4}$

- FOR THIS DESIGN, DISCHARGE HAS BEEN USED IN TWO LOCATIONS (BH1 & BH2) WITH THE HIGHLIGHTED VALUES (ABOVE) USED FOR THE CALCULATIONS.
- THE PROPOSED DEVELOPMENT HAS AN IMPERMEABLE AREA OF APPROXIMATELY 2653m2 (0.265ha) AND HAS A LEVEL DIFFERENCE, FALLING FROM NORTH TO SOUTH BY APPROXIMATELY 6.5M.
- THE SURFACE WATER FLOW HAS BEEN DESIGNED TO CAPTURE AND ATTENUATE RUNOFF IN 4No. CRATED TANKS WITH FLOW RESTRICTED TO 1.2L/S FROM THE UPPER LEVEL TANKS.
- DUE TO THE SITE TOPOGRAPHY AND PROPOSED LAYOUT THERE IS NO SPACE FOR ANY OTHER SUDS FEATURES SUCH AS SWALES AND PONDS ETC.
- FOUL WATER FLOW ASSUMED TO BE UNRESTRICTED INTO THE PUBLIC SEWER WHICH THE NEAREST POINT IS FOUND IN THE JUNCTION OF MABLE ROAD JUST OFF THE SOUTH-WESTERN CORNER OF THE PROPOSED SITE.
- THE SURFACE WATER DESIGN CATERS FOR ALL STORM EVENTS UP TO AND INCLUDING THE 1 IN 100 YEAR EVENT PLUS 40% CLIMATE CHANGE.

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEER'S AND ARCHITECT'S DRAWINGS, DETAILS & SPECIFICATIONS.
2. THE EXTERNAL WORKS DESIGN IS BASED UPON HARRIS IRWIN ARCHITECTS PLAN 3081-HIA-01-00-DR-A-0102 REV P2 DATED 30.07.21
3. TOPOGRAPHICAL SURVEY DRAWING 4022-PD28 DATED JAN '17 BY bhdARCHITECTS HAS ALSO BEEN USED IN THE DESIGN.
4. REFER TO THE ARCHITECT FOR SETTING OUT OF ALL BUILDINGS & INTERNAL DOWN PIPES & RWP'S
5. REFER TO SERVICE ENGINEERS DRAWINGS FOR FINAL SETTING OUT OF RWP AND SVP'S (BASED ON GUTTER SYSTEM).
6. REFER TO SERVICE ENGINEERS DRAWINGS FOR ABOVE GROUND PLUMBING ROUTES FROM APPLIANCES TO STUB STACKS ETC.
7. ALL EXISTING DRAINAGE THAT IS TO BE ABANDONED TO BE 'PLUGGED' IN WITH MASS CONCRETE (150mm MIN) OR REMOVED ENTIRELY.
8. ANY EXISTING SERVICES TO BE LOCATED AND CLEARLY MARKED PRIOR TO EXCAVATIONS BY CONTRACTOR.
9. ALL LEVELS ARE TO BE CONFIRMED BY THE CONTRACTOR ON SITE PRIOR TO CONSTRUCTION.
10. IT IS ASSUMED THAT ALL SINK AND TOILET DRAINAGE POINTS WILL HAVE RODDING ACCESS AT THE APPLIANCE BASE.
11. CONTRACTOR TO AVOID UNDERMINING ANY EXISTING FOOTPATHS/ BUILDINGS DURING WORKS BY ALLOWING ADEQUATE PROTECTION ADJACENT TO THESE AREAS.
12. ALL RAINWATER DOWN PIPES TO HAVE RODDABLE ACCESS AT THE BASE OF THE VERTICAL SECTION.
13. ALL BELOW GROUND DRAINAGE PIPES WITH LESS THAN 900mm COVER TO SOFFIT LEVEL IN TRAFFICKED AREAS I.E. CAR PARK AND SERVICE YARD AREA TO HAVE CLASS Z BEDDING SURROUND. REFER TO THE MANHOLE SCHEDULE AND DETAIL SHEETS FOR FURTHER DETAILS.
14. ALL BELOW GROUND DRAINAGE WITHIN THE SITE BOUNDARY HAS BEEN DESIGNED TO BSEN 752:2008 AND BUILDING REGULATIONS - PART H:2015. THE OFF SITE DRAINAGE TO THE PUBLIC SEWER ARE DESIGNED TO SEWERS FOR ADOPTION 7th EDITION.

LEGEND:

SW	NEW SURFACE WATER SEWER PIPE AND MANHOLE PIPE (225Ø UNO)
	ATTENUATION TANK
	PERFORATED PIPE 100Ø UNO
	PERMEABLE UNDERDRAINED PAVING TO PARKING BAYS
RE	RODDING EYE
G	ROAD GULLY
	BOREHOLE SOAKAWAY TO 15.0M DEPTH
FW	NEW FOUL WATER SEWER PIPE AND MANHOLE PIPE (100Ø UNO @ 1:40)
4801 (EX. TW) CL: 54.01 IL: 52.43	EXISTING FOUL PUBLIC SEWER - PROPOSED CONNECTING LOCATION SUBJECT TO SECTION 106 AGREEMENT WITH THAMES WATER
	ROOT PROTECTION ZONES
	GATIC CAST SLOT 28 F900 150 LINEAR SW DRAINAGE CHANNEL & ACCESS CHAMBER

Rev	Date	Description	By	Check	App.
P5	19.01.23	ARCHITECTURAL LAYOUT AMENDED	CN	GS	GS
P4	14.01.22	ARCHITECTURAL LAYOUT AMENDED	RH	GS	GS
P3	22/12/21	PLANNING ISSUE	RH	GS	GS
P2	16/12/21	PLANNING ISSUE	RH	GS	GS
P1	08.09.21	PRELIMINARY ISSUE	CN	RH	GS

Client: BARCHESTER HEALTHCARE LTD

Project: 57 TOP DARTFORD ROAD HEXTABLE, KENT BR8 7SG

Office: NORWICH 01603 305190

Discipline: CIVIL ENGINEERING

Title: DRAINAGE STRATEGY GENERAL ARRANGEMENT

Scale @ A1: 1:200

Status: PRELIMINARY

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Originator	Job Number	Discipline	Building/Zone
CCL	8/2607	C	HEX
Type	**Level**	**Drawing No.**	**Revision**
GA	DRN	4400	P5

PRELIMINARY DRAWING
THIS DRAWING IS FOR PRELIMINARY INFORMATION PURPOSES ONLY AND MUST NOT BE READ AS A CONSTRUCTION ISSUE. IT INDICATES DESIGN INTENT ONLY AND IS SUBJECT TO AMENDMENT DURING FINAL DESIGN DEVELOPMENT

SCALE 1:200m
0m 2m 4m 6m 8m 10m 12m 14m 16m 18m 20m