



New Private Dwelling, Land Adjacent to No.86 Camlet Way, Hadley Wood

Surface Water & SUDs Strategy

In Support of Planning Application 22/00627/FUL

10th March 2022

1.0 Introduction

- 1.1 Infrastructure Design Ltd (IDL) has been appointed by Jenna Rachel to prepare a Surface Water & SuDS design for their proposed redevelopment at the aforementioned site

2.0 Flood Risk

- 2.1 By reference to the Long Term Flooding Assessment online tool, this address is defined as being in an area at *Very Low Risk of Flooding*
- 2.2 Appendix A includes the maps showing the effects of flooding from Rivers, Surface Water and Reservoirs. The site is unaffected on all counts.
- 2.3 In the unlikely event of flooding from sewers, resulting flows will be contained with the road network (Camlet Way). The onsite FW and SW drainage is to be pumped which will further protect the new property as these facilities are provided with non-return valves in case of main sewer surcharge.
- 2.4 Overland flow routes in case of exceedance will mimic the existing situation where land continues to fall to the south via the rear gardens to the properties off Pagitts Grove and towards Hadley Common. See Appendix D for drainage layout showing exceedance flow paths.

3.0 Surface Water Drainage / SuDS

- 3.1 An existing 375 dia SW sewer exists in the nearside verge of Camlet Way at a depth to invert of approx. 1.0m. Adjacent to the site, within the Freehold of No 86 Camlet Way, an existing package pump station exists which discharges SW from this dwelling into Camlet Way at a rate of 2 l/sec. It is proposed to form a connection into this existing pump station with the consent of the current owner. Refer to Appendix G which includes a letter from the current owner of No 86, accepting a discharge via their pump station.
- 3.2 The existing undeveloped site presently discharges its surface water, overland to the south.
- 3.3 Given the topography of the site and prevailing clay subsoil conditions, it is necessary to provide a positive means of discharge to the existing surface water sewer network. Infiltration techniques are not suitable.
- 3.4 The FFL to the new dwelling, is to be set at a level some 5m lower than Camlet Way, and therefore requires a pump facility to lift the surface water discharge to its outfall.

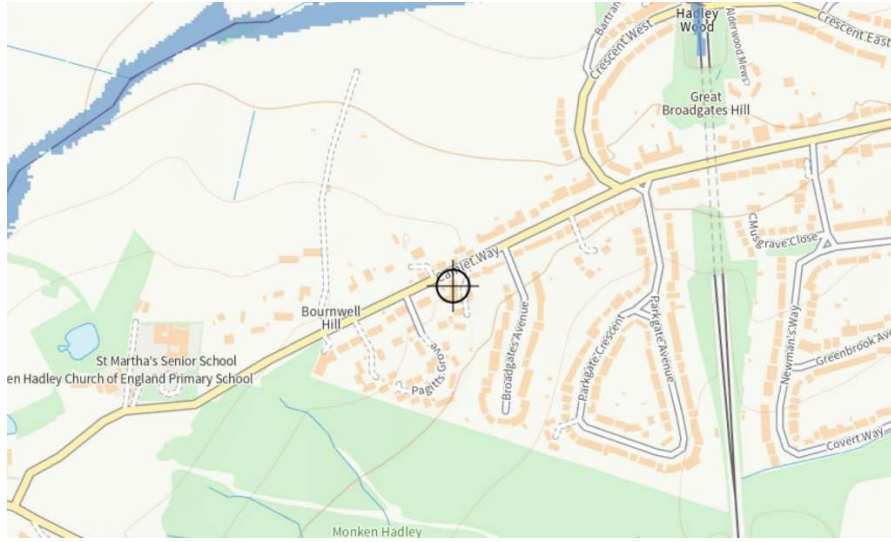
- 3.5 The total impermeable catchment of the new development, proposed to discharge into the adopted sewer system is 290m².
- 3.6 Attenuation in the form of cellular storage is to be provided (12m³) along with 300mm thickness of reduced fines crushed rock subbase to the 130m² of permeable driveway (30% voids ratio providing 11.7m³ of potential stormwater storage).
- 3.7 Source Control measures in the form of raised rain-planters will divert the majority of the roof runoff via specially planted containers that will serve to remove pollutants during the first-flush (approx.. 5mm depth of rainfall). These planters will be designed to divert flow from the downpipe with the containers having a low-flow outfall in to the drain and overflow in case of heavy or prolonged rainfall. Refer to Appendix F for the *Stormwater Planter Construction and Maintenance Guide*.
- 3.8 In acknowledging the obligation to limit runoff to as close as possible to greenfield runoff rates. The adjacent pump station already controls runoff from No 86 to 2 litres/sec. By discharging into this existing pump station, there will be greater increase in flow rate than currently exists for No 86.
- 3.9 The design has been prepared so as to prevent on and offsite flooding for any storm event, up to and including a 1 in 100 year event, plus an allowance for the potential effects of climate change (+ 40%). Similarly, by extension, the site will not flood for any events up to and including the peak 1 in 30 year event.
- 3.10 The site lies wholly outside any recorded source protection zones (SPZ), however, it is acknowledged that any potentially contaminated runoff (for example off roads and private drives) should benefit from a SuDS treatment stage, in order to improve water quality prior to discharge. A newly constructed driveway formed of permeable paving will provide this level of treatment. This will be impermeably lined and a perforated pipe installed in the subbase to provide a final positive outfall.
- 3.11 The SuDS Hierarchy has been duly considered and our explanation as to how we arrived at the proposed strategy is noted under Appendix A.

4.0 Enclosures

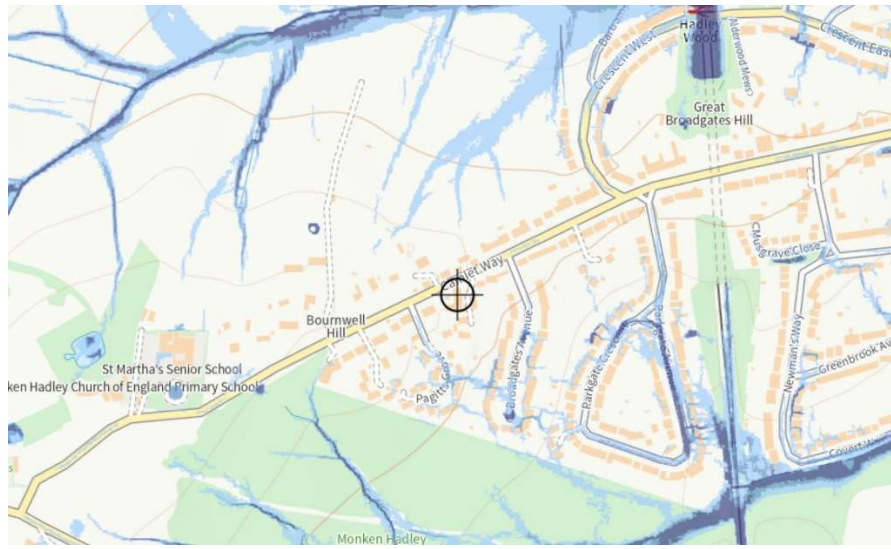
- 4.1 Appendix A includes the Flood Maps for this address.
- 4.2 Appendix B defines the SuDS Hierarchy, and has been duly completed to show which of these measures has been incorporated.
- 4.3 Appendix C provides calculations to demonstrate that there will be no flooding for storm events up to and including the 1 in 100 year + 40% storm event.
- 4.4 Appendix D includes a copy of the Surface Water Drainage Strategy Layout
- 4.5 Appendix E includes a copy of the Thames Water asset search.
- 4.6 Appendix F includes the Management and Maintenance strategy for the site, including a copy of the *Stormwater Planter Construction and Maintenance Guide*.
- 4.7 Appendix G includes a copy of a letter from No 86 Camlet Way, confirming acceptance of flow from the new property into the existing pump station.
- 4.8 Appendix H includes extracts of the soils report which identifies the ground conditions which are not conducive to the use of infiltration techniques.

Appendix A – Flood Risk Maps


Flood Risk From Rivers (Very Low Risk)



Flood Risk From Surface Water (Very Low Risk)




Appendix B - The SUDS Hierarchy

Most Sustainable	SUDS technique	Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit	Included in the scheme?	Comments	
	Living roofs	✓	✓	✓	✓	The new dwelling will have a pitched roof which is unsuitable for this type of SuDS feature, however we have proposed the inclusion of raised rain planters to collect runoff from the majority of the roof areas.	
	Basins and ponds - Constructed wetlands - Balancing ponds - Detention basins - Retention ponds	✓	✓	✓		Above ground features are unsuitable on this site given the steep topography and presence of retained trees and their root protection areas.	
	Filter strips and swales	✓	✓	✓		As above.	
	Infiltration devices -soakaways - infiltration trenches and basins	✓	✓	✓		Given the clay subsoil conditions, infiltration techniques are unsuitable on this site.	
	Permeable surfaces and filter drains - gravelled areas - solid paving blocks porous pavements	✓	✓		✓	Permeable paving is proposed to be used in forming the new driveway. This will also assist in pollution reduction.	
	Tanked systems - over-sized pipes/tanks - storms/cells	✓				✓	Cellular storage is proposed in order to provide the additional attenuation required during prolonged storm events.
	Least Sustainable						

Appendix C – Surface Water Calculations

Inc. Permeable Paving

Infrastructure Design Limited		Page 1
33 The Point Rockingham Road Market Harborough Leicestershire LE16 7QU		
Date 10/03/2022 16:18 File	Designed by philt Checked by	
Micro Drainage		Source Control 2017.1.2

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	0.066	Urban	0.000
SAAR (mm)	700	Region Number	Region 6

Results 1/s


QBAR Rural	0.3
QBAR Urban	0.3
Q100 years	0.9
Q1 year	0.2
Q30 years	0.7
Q100 years	0.9

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 2 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m ³)	Status
15 min Summer	107.269	0.169	0.0	5.8	5.8	0.9	O K
30 min Summer	107.262	0.162	0.0	5.7	5.7	0.8	O K
60 min Summer	107.224	0.124	0.0	4.7	4.7	0.5	O K
120 min Summer	107.193	0.093	0.0	3.3	3.3	0.3	O K
180 min Summer	107.179	0.079	0.0	2.5	2.5	0.2	O K
240 min Summer	107.167	0.067	0.0	2.0	2.0	0.1	O K
360 min Summer	107.156	0.056	0.0	1.5	1.5	0.1	O K
480 min Summer	107.150	0.050	0.0	1.2	1.2	0.1	O K
600 min Summer	107.147	0.047	0.0	1.0	1.0	0.1	O K
720 min Summer	107.143	0.043	0.0	0.9	0.9	0.1	O K
960 min Summer	107.138	0.038	0.0	0.7	0.7	0.0	O K
1440 min Summer	107.132	0.032	0.0	0.5	0.5	0.0	O K
2160 min Summer	107.127	0.027	0.0	0.3	0.3	0.0	O K
2880 min Summer	107.124	0.024	0.0	0.3	0.3	0.0	O K
4320 min Summer	107.120	0.020	0.0	0.2	0.2	0.0	O K
5760 min Summer	107.118	0.018	0.0	0.2	0.2	0.0	O K
7200 min Summer	107.116	0.016	0.0	0.1	0.1	0.0	O K
8640 min Summer	107.115	0.015	0.0	0.1	0.1	0.0	O K
10080 min Summer	107.114	0.014	0.0	0.1	0.1	0.0	O K
15 min Winter	107.278	0.178	0.0	6.0	6.0	0.9	O K


Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
15 min Summer	142.829	0.0	2.8	12
30 min Summer	92.260	0.0	3.8	19
60 min Summer	56.713	0.0	4.9	34
120 min Summer	33.709	0.0	5.9	64
180 min Summer	24.562	0.0	6.5	94
240 min Summer	19.521	0.0	6.9	124
360 min Summer	14.048	0.0	7.5	184
480 min Summer	11.131	0.0	7.9	244
600 min Summer	9.286	0.0	8.2	300
720 min Summer	8.005	0.0	8.5	364
960 min Summer	6.329	0.0	9.0	484
1440 min Summer	4.539	0.0	9.6	726
2160 min Summer	3.251	0.0	10.2	1092
2880 min Summer	2.564	0.0	10.6	1464
4320 min Summer	1.832	0.0	11.0	2176
5760 min Summer	1.442	0.0	11.3	2856
7200 min Summer	1.198	0.0	11.4	3672
8640 min Summer	1.029	0.0	11.5	4264
10080 min Summer	0.904	0.0	11.4	5040
15 min Winter	142.829	0.0	3.2	12

Infrastructure Design Limited		Page 2
33 The Point Rockingham Road Market Harborough Leicestershire LE16 7QU	LA 86 Camlet Way Hadley Wood Permeable Driveway	
Date 10/03/2022 16:59 File Permeable Driveway.SRCX	Designed by IDL Checked by PT	
Micro Drainage		Source Control 2017.1.2

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Control (1/s)	Max Σ Outflow (1/s)	Max Volume (m³)	Status
30 min Winter	107.253	0.153	0.0	5.5	5.5	0.7	O K
60 min Winter	107.207	0.107	0.0	4.2	4.2	0.3	O K
120 min Winter	107.179	0.079	0.0	2.5	2.5	0.2	O K
180 min Winter	107.164	0.064	0.0	1.9	1.9	0.1	O K
240 min Winter	107.156	0.056	0.0	1.5	1.5	0.1	O K
360 min Winter	107.149	0.049	0.0	1.1	1.1	0.1	O K
480 min Winter	107.143	0.043	0.0	0.9	0.9	0.1	O K
600 min Winter	107.139	0.039	0.0	0.7	0.7	0.0	O K
720 min Winter	107.136	0.036	0.0	0.6	0.6	0.0	O K
960 min Winter	107.132	0.032	0.0	0.5	0.5	0.0	O K
1440 min Winter	107.127	0.027	0.0	0.3	0.3	0.0	O K
2160 min Winter	107.123	0.023	0.0	0.2	0.2	0.0	O K
2880 min Winter	107.120	0.020	0.0	0.2	0.2	0.0	O K
4320 min Winter	107.117	0.017	0.0	0.1	0.1	0.0	O K
5760 min Winter	107.115	0.015	0.0	0.1	0.1	0.0	O K
7200 min Winter	107.113	0.013	0.0	0.1	0.1	0.0	O K
8640 min Winter	107.112	0.012	0.0	0.1	0.1	0.0	O K
10080 min Winter	107.111	0.011	0.0	0.1	0.1	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	92.260	0.0	4.4	20
60 min Winter	56.713	0.0	5.5	34
120 min Winter	33.709	0.0	6.7	64
180 min Winter	24.562	0.0	7.3	92
240 min Winter	19.521	0.0	7.8	122
360 min Winter	14.048	0.0	8.5	180
480 min Winter	11.131	0.0	8.9	246
600 min Winter	9.286	0.0	9.3	302
720 min Winter	8.005	0.0	9.6	370
960 min Winter	6.329	0.0	10.1	490
1440 min Winter	4.539	0.0	10.9	718
2160 min Winter	3.251	0.0	11.6	1116
2880 min Winter	2.564	0.0	12.0	1480
4320 min Winter	1.832	0.0	12.6	2144
5760 min Winter	1.442	0.0	12.9	2784
7200 min Winter	1.198	0.0	13.1	3560
8640 min Winter	1.029	0.0	13.2	4368
10080 min Winter	0.904	0.0	13.3	5152

Infrastructure Design Limited		Page 3
33 The Point Rockingham Road Market Harborough Leicestershire LE16 7QU	LA 86 Camlet Way Hadley Wood Permeable Driveway	
Date 10/03/2022 16:59 File Permeable Driveway.SRCX	Designed by IDL Checked by PT	
Micro Drainage		Source Control 2017.1.2


Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.440	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.013

Time (mins)		Area
From:	To:	(ha)
0	4	0.013

Infrastructure Design Limited		Page 4
33 The Point Rockingham Road Market Harborough Leicestershire LE16 7QU	LA 86 Camlet Way Hadley Wood Permeable Driveway	
Date 10/03/2022 16:59 File Permeable Driveway.SRCX	Designed by IDL Checked by PT	
Micro Drainage	Source Control 2017.1.2	

Model Details

Storage is Online Cover Level (m) 107.700

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	26.0
Max Percolation (l/s)	36.1	Slope (1:X)	40.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	107.100	Membrane Depth (m)	0

Pipe Outflow Control

Diameter (m)	0.100	Entry Loss Coefficient	0.500
Slope (1:X)	150.0	Coefficient of Contraction	0.600
Length (m)	10.000	Upstream Invert Level (m)	107.100
Roughness k (mm)	0.600		

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 139 minutes.


Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E (l/s)	Max Outflow (l/s)	Max Volume (m ³)	Status
15 min Summer	105.249	0.579	0.0	2.0		2.0	18.6	O K
30 min Summer	105.362	0.692	0.0	2.0		2.0	23.2	O K
60 min Summer	105.434	0.764	0.0	2.0		2.0	26.1	O K
120 min Summer	105.424	0.754	0.0	2.0		2.0	25.7	O K
180 min Summer	105.387	0.717	0.0	2.0		2.0	24.2	O K
240 min Summer	105.353	0.683	0.0	2.0		2.0	22.8	O K
360 min Summer	105.288	0.618	0.0	2.0		2.0	20.2	O K
480 min Summer	105.228	0.558	0.0	2.0		2.0	17.8	O K
600 min Summer	105.166	0.496	0.0	2.0		2.0	15.5	O K
720 min Summer	105.103	0.433	0.0	2.0		2.0	13.4	O K
960 min Summer	104.981	0.311	0.0	2.0		2.0	9.6	O K
1440 min Summer	104.801	0.131	0.0	2.0		2.0	4.0	O K
2160 min Summer	104.677	0.007	0.0	2.0		2.0	0.2	O K
2880 min Summer	104.670	0.000	0.0	1.7		1.7	0.0	O K
4320 min Summer	104.670	0.000	0.0	1.2		1.2	0.0	O K
5760 min Summer	104.670	0.000	0.0	0.9		0.9	0.0	O K
7200 min Summer	104.670	0.000	0.0	0.8		0.8	0.0	O K
8640 min Summer	104.670	0.000	0.0	0.7		0.7	0.0	O K
10080 min Summer	104.670	0.000	0.0	0.6		0.6	0.0	O K
15 min Winter	105.313	0.643	0.0	2.0		2.0	21.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
15 min Summer	142.829	0.0	21.1	21
30 min Summer	92.260	0.0	27.3	34
60 min Summer	56.713	0.0	33.5	62
120 min Summer	33.709	0.0	40.0	114
180 min Summer	24.562	0.0	43.8	142
240 min Summer	19.521	0.0	46.2	174
360 min Summer	14.048	0.0	49.9	242
480 min Summer	11.131	0.0	52.7	308
600 min Summer	9.286	0.0	55.0	374
720 min Summer	8.005	0.0	57.0	440
960 min Summer	6.329	0.0	59.9	562
1440 min Summer	4.539	0.0	64.6	794
2160 min Summer	3.251	0.0	69.3	1104
2880 min Summer	2.564	0.0	72.9	0
4320 min Summer	1.832	0.0	78.2	0
5760 min Summer	1.442	0.0	82.0	0
7200 min Summer	1.198	0.0	85.2	0
8640 min Summer	1.029	0.0	87.8	0
10080 min Summer	0.904	0.0	90.0	0
15 min Winter	142.829	0.0	23.7	21

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Control (1/s)	Max Σ Outflow (1/s)	Max Volume (m ³)	Status
30 min Winter	105.445	0.775	0.0	2.0	2.0	26.5	O K
60 min Winter	105.538	0.868	0.0	2.0	2.0	30.3	O K
120 min Winter	105.552	0.882	0.0	2.0	2.0	30.8	O K
180 min Winter	105.499	0.829	0.0	2.0	2.0	28.7	O K
240 min Winter	105.454	0.784	0.0	2.0	2.0	26.9	O K
360 min Winter	105.361	0.691	0.0	2.0	2.0	23.1	O K
480 min Winter	105.271	0.601	0.0	2.0	2.0	19.5	O K
600 min Winter	105.181	0.511	0.0	2.0	2.0	16.1	O K
720 min Winter	105.085	0.415	0.0	2.0	2.0	12.8	O K
960 min Winter	104.906	0.236	0.0	2.0	2.0	7.3	O K
1440 min Winter	104.684	0.014	0.0	2.0	2.0	0.4	O K
2160 min Winter	104.670	0.000	0.0	1.5	1.5	0.0	O K
2880 min Winter	104.670	0.000	0.0	1.2	1.2	0.0	O K
4320 min Winter	104.670	0.000	0.0	0.9	0.9	0.0	O K
5760 min Winter	104.670	0.000	0.0	0.7	0.7	0.0	O K
7200 min Winter	104.670	0.000	0.0	0.6	0.6	0.0	O K
8640 min Winter	104.670	0.000	0.0	0.5	0.5	0.0	O K
10080 min Winter	104.670	0.000	0.0	0.4	0.4	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
30 min Winter	92.260	0.0	30.6	34
60 min Winter	56.713	0.0	37.7	62
120 min Winter	33.709	0.0	44.8	118
180 min Winter	24.562	0.0	48.9	164
240 min Winter	19.521	0.0	51.8	188
360 min Winter	14.048	0.0	55.9	264
480 min Winter	11.131	0.0	59.1	336
600 min Winter	9.286	0.0	61.6	404
720 min Winter	8.005	0.0	63.7	470
960 min Winter	6.329	0.0	67.2	590
1440 min Winter	4.539	0.0	72.3	772
2160 min Winter	3.251	0.0	77.7	0
2880 min Winter	2.564	0.0	81.7	0
4320 min Winter	1.832	0.0	87.5	0
5760 min Winter	1.442	0.0	91.9	0
7200 min Winter	1.198	0.0	95.4	0
8640 min Winter	1.029	0.0	98.3	0
10080 min Winter	0.904	0.0	100.8	0

Infrastructure Design Limited		Page 3
33 The Point Rockingham Road Market Harborough Leicestershire LE16 7QU	LA 86 Camlet Way Hadley Wood Attenuation & Pump	
Date 10/03/2022 16:00 File Attenuation and Pump at...	Designed by IDL Checked by PT	
Micro Drainage		Source Control 2017.1.2


Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.440	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.079

Time (mins) Area			Time (mins) Area		
From:	To:	(ha)	From:	To:	(ha)
0	4	0.049	4	8	0.030

Infrastructure Design Limited		Page 4
33 The Point Rockingham Road Market Harborough Leicestershire LE16 7QU	LA 86 Camlet Way Hadley Wood Attenuation & Pump	
Date 10/03/2022 16:00 File Attenuation and Pump at...	Designed by IDL Checked by PT	
Micro Drainage		Source Control 2017.1.2

Model Details

Storage is Online Cover Level (m) 107.300

Cellular Storage Structure

Invert Level (m) 104.670 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

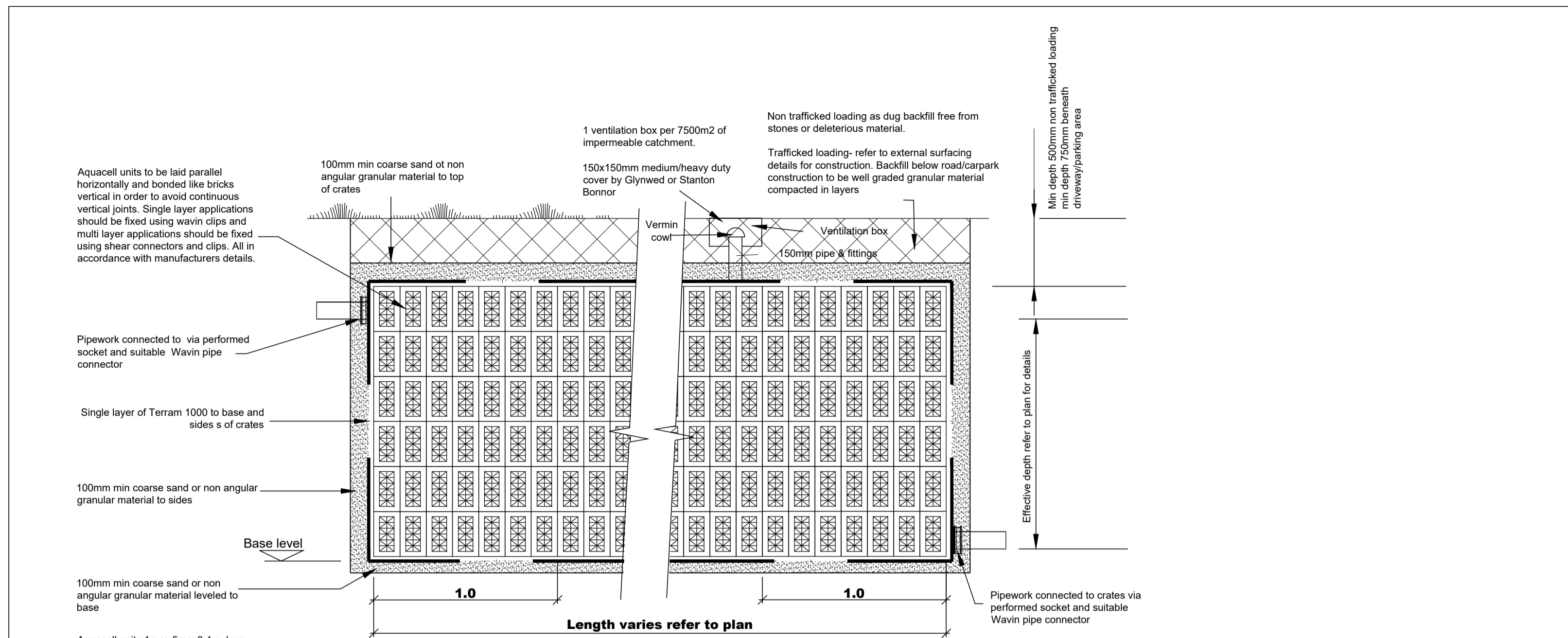
Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	32.5	32.5	2.600	0.0	75.2
0.200	32.5	37.1	2.800	0.0	75.2
0.400	32.5	41.6	3.000	0.0	75.2
0.600	42.5	46.5	3.200	0.0	75.2
0.800	42.5	51.7	3.400	0.0	75.2
1.000	42.5	56.9	3.600	0.0	75.2
1.200	42.5	62.2	3.800	0.0	75.2
1.400	42.5	67.4	4.000	0.0	75.2
1.600	42.5	72.6	4.200	0.0	75.2
1.800	0.0	75.2	4.400	0.0	75.2
2.000	0.0	75.2	4.600	0.0	75.2
2.200	0.0	75.2	4.800	0.0	75.2
2.400	0.0	75.2	5.000	0.0	75.2

Pump Outflow Control

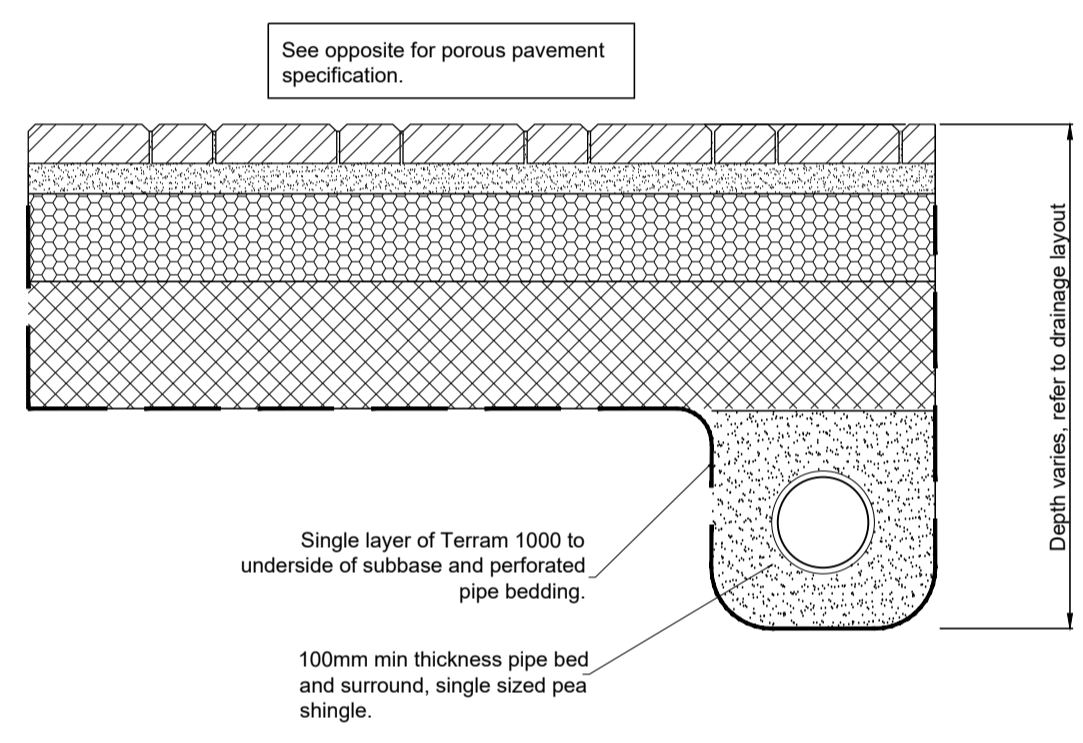
Invert Level (m) 104.000

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.0000	0.900	2.0000	1.700	2.0000	2.500	2.0000
0.200	2.0000	1.000	2.0000	1.800	2.0000	2.600	2.0000
0.300	2.0000	1.100	2.0000	1.900	2.0000	2.700	2.0000
0.400	2.0000	1.200	2.0000	2.000	2.0000	2.800	2.0000
0.500	2.0000	1.300	2.0000	2.100	2.0000	2.900	2.0000
0.600	2.0000	1.400	2.0000	2.200	2.0000	3.000	2.0000
0.700	2.0000	1.500	2.0000	2.300	2.0000		
0.800	2.0000	1.600	2.0000	2.400	2.0000		

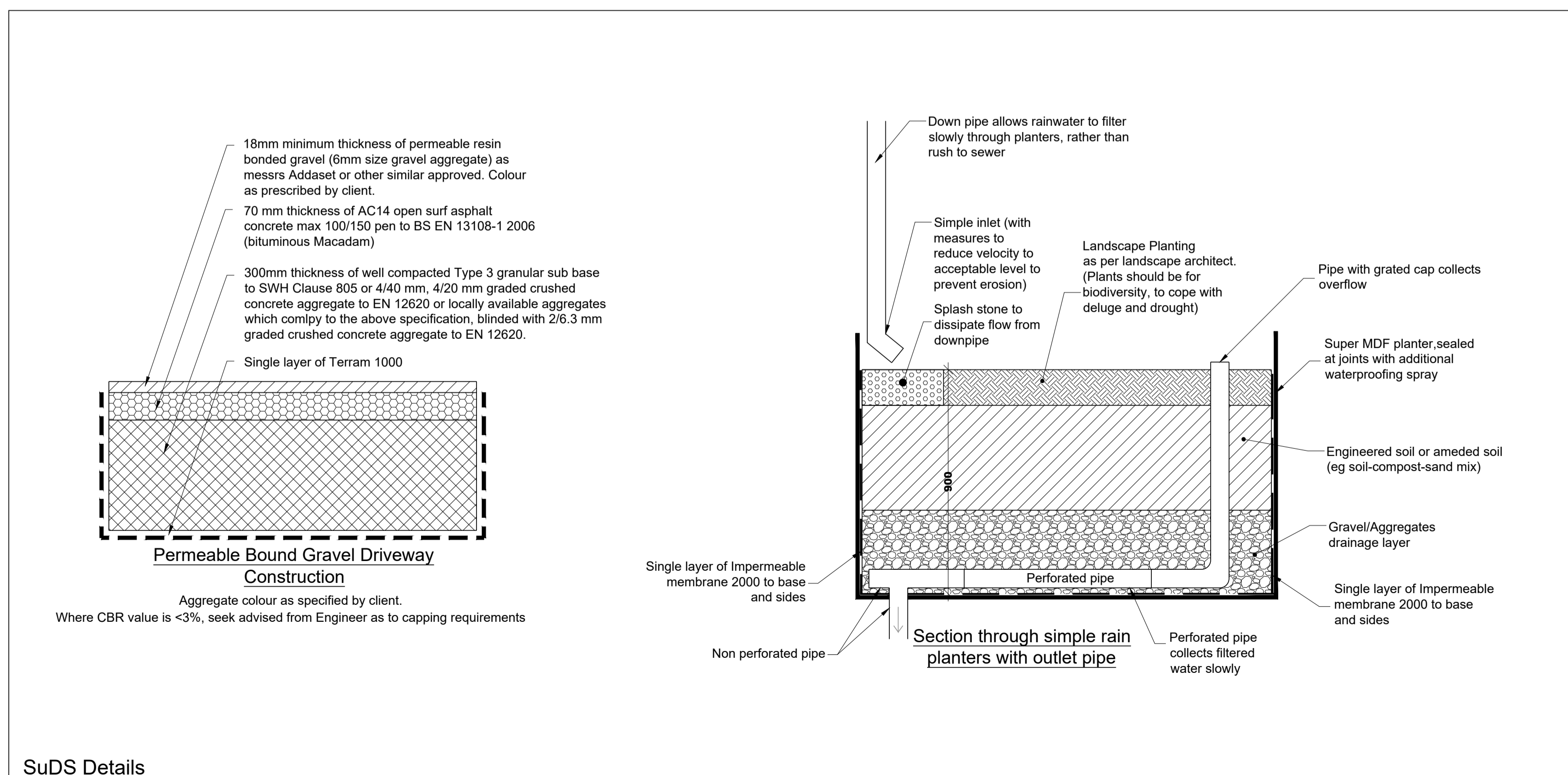
Appendix D – Drainage Strategy Layout



Typical Wavin Attenuation System

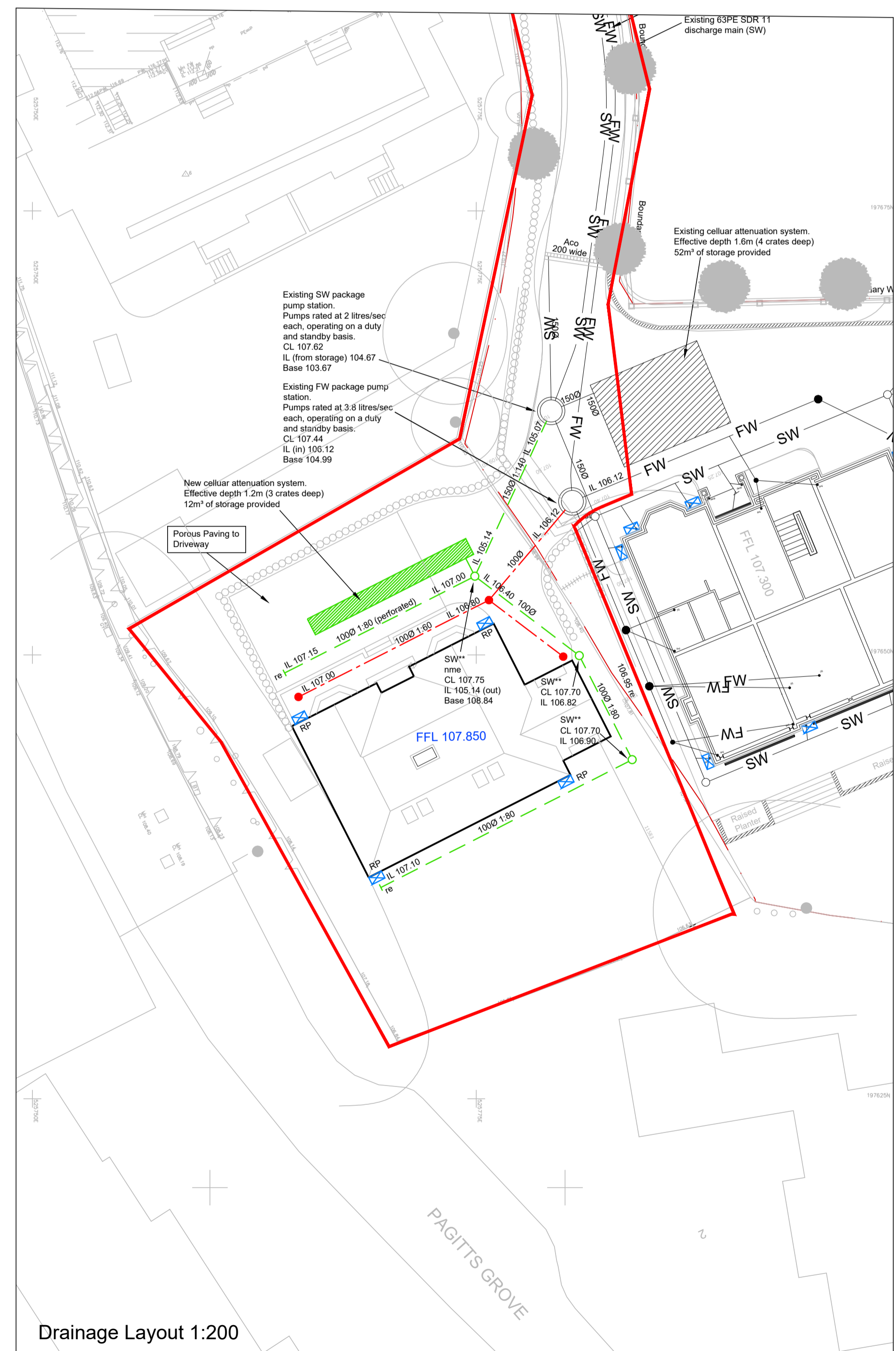


Typical Detail of Perforated Pipe below Subbase of Permeable Parking Area



SuDS Details

- Key**
- FW Existing foul water sewer
 - SW Existing surface water sewer
 - Private foul water drainage as detailed on the private drainage/ construction details.
 - Private SW drainage as detailed on the private drainage/ construction details.
 - Polypropylene universal inspection chambers 3000 deep max, 450 dia, 100 inlet / outlet connections (6 no. max) or 150 inlet/outlet connections (4 no max) as detailed on the private drainage/ construction details.
 - Polypropylene 'non-entry' inspection chambers 3000 deep max, 450 dia (with 300 dia. or square cover) 100 inlet / outlet connections (6 no. max), or 150 inlet/outlet connections (4 no max) as detailed on the private drainage construction details.
 - Polypropylene silt trap as detailed on the private drainage construction details.
 - Rodding eye same dia. as downstream drain
 - Aquacell or similar heavy duty crate-based attenuation system as detailed on the private drainage/ construction details
 - 1.2m x 0.6m 0.9m deep Rain Planters



Drainage Layout 1:200

- Notes**
- 1 This drawing is to be read in conjunction with the private drainage construction details all other relevant contract documents.
 - 2 All private drainage works to be carried out in accordance with the provisions laid down in BS EN 752 & The Building Regulations, Part H.
 - 3 Levels shown in buildings are Finished Floor Level.
 - 4 Drainage under adopted roads to be either- a) Vitrified Clayware to BS EN 252 b) Concrete to BS 5911, Class M. Laterals to be formed of either vitrified clay or "Extra Strength", concrete "Class M".
 - 5 Before commencing any Sewer or drainage works, the Developer's Groundworker must satisfy themselves, the developer and the Local Authority of actual levels and conditions of existing sewers.
 - 6 Buried concrete to satisfy the requirements of BRE Special Digest 1 as predetermined by the site's Geotechnical Report
 - 7 All abandoned, buried obstructions encountered during the construction of Highway & Drainage Works are to be broken out to bed level of drains and sewers, and to the formation of car parks and drives etc., and to sufficient depth to allow for laying service company's mains and services.
 - 8 Depth and Location of existing services to be traced prior to any excavation.
 - 9 All private drainage to be laid to levels shown using flexibly jointed pipes, either uPVC to BS 4660 and BS 5481 or vitrified clayware to BS EN 295.
 - 10 Generally pipes to have granular Bed & Surround in accordance with manufacturers recommendations, ensuring adequate protection with respect to depth and location. Where bedding material is placed at depths susceptible to ground water ingress, it is to be wrapped in a geotextile (Terram 700 or better).
 - 11 Private precast concrete manholes and catchpits to be constructed using conc. box sections or circular rings to BS 5911-200, with 150mm conc. surround, size and construction to comply with Table 12 of Approved Document, Part H.
 - 12 Rodding eyes, etc are to be laid to manufacturers minimum cover and depth to allow adequate fall from adjoining unit.
 - 13 Access panels are to be provided to all rainwater pipes, a max. 600 above finished ground level.
 - 14 All manholes / inspection chambers in hard surfaced areas, to have recessed covers. These are to be orientated such as to minimise cut blocks.
 - 15 All pipework to be 100mmØ unless otherwise stated, 150mm dia from road gullies.
 - 16 All levels in metres (m) unless specified otherwise.
 - 17 All drain runs from SVP's, stub stacks or FW gullies to be laid at min. 1:40 gradient unless otherwise stated.
 - 18 SVP's, stub stacks & RWP's are shown indicative only. Refer to Architectural dimensioned GA's for accurate locations
 - 19 House/Flat drainage to be laid prior to erection of scaffold.
 - 20 All cover and invert levels shown are in metres. All pipe diameters are in millimetres U.N.O.
 - 21 All chambers located in trafficked areas to have concrete surround.
 - 22 **IMPORTANT NOTE:** At depths where groundwater ingress is encountered, consider the use of a sump / pump arrangement. Where excavations are >1m deep, consider the use of full perimeter trench support.
 - 23 **IMPORTANT NOTE:** The new sewer connections are to be successfully made prior to commencing any upstream drainage works.

P1	For Planning	11.03.22
REV	DESCRIPTION	DATE
SCALE: 1:200@A1		
DATE: Mar 2022		
DRAWN: IDL		
TITLE: Drainage Strategy Layout		
PROJECT: LA 86 Camlet Way, Hadley Wood		
Client: Jenna Rachel		
Draw No: IDL/1130/07/01		
Ref. No: 1130-07-01.pdf		
33 The Point, Rockingham Road Market Harborough Leicestershire LE16 7QU Tel 01858 411570 Fax 01858 411571 Email: info@infrades.co.uk URL: www.infrades.co.uk		
 iDL LTD INFRASTRUCTURE DESIGN LIMITED		

Appendix E – Thames Water Asset Search

Asset Location Search



Atkins Telecoms
Stats Enquiries Team The Hub
500Park Avenue
BRISTOL
BS32 4RZ

CHECKED

Search address supplied Site at Camlet Way, BARNET, Hertfordshire
EN4 0NX

Your reference 50351

Our reference ALS/ALS Standard/2016_3448241

Search date 8 November 2016

Notification of Price Changes...

From **1 September 2016** Thames Water Property Searches will be increasing the prices of its Asset Location Searches. This will be the first price rise in three years and is in line with the RPI at 1.84%. The increase follows significant capital investment in improving our systems and infrastructure.

Enquiries received with a higher payment prior to 1 September 2016 will be non-refundable. For further details on the price increase please visit our website at

www.thameswater-propertysearches.co.uk



Asset Location Search



Search address supplied: Site at Camlet Way, BARNET, Hertfordshire, EN4 0NX

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 search provides 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 0845 070 9148, 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



Waste Water Services

Please provide a copy extract from the public sewer map.

The following quartiles have been printed as they fall within Thames' sewerage area:

TQ2597SE
TQ2697SW
TQ2697NW
TQ2597NE

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.

Following examination of our statutory maps, Thames Water has been unable to find

Asset Location Search



any plans of water mains within this area. If you require a connection to the public water supply system, please write to:

New Connections / Diversions
Thames Water
Network Services Business Centre
Brentford
Middlesex
TW8 0EE

Tel: 0845 850 2777
Fax: 0207 713 3858
Email: developer.services@thameswater.co.uk

The following quartiles have not been printed as they are out of Thames' water catchment area. For details of the assets requested please contact the water company indicated below:

TQ2597SE	Affinity Water
TQ2697SW	Affinity Water
TQ2697NW	Affinity Water
TQ2597NE	Affinity Water

Affinity Water Ltd
Tamblin Way
Hatfield
AL10 9EZ

Tel: 0845 7823333

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.

Asset Location Search



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: 0845 850 2777
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: 0845 850 2777
Email: developer.services@thameswater.co.uk



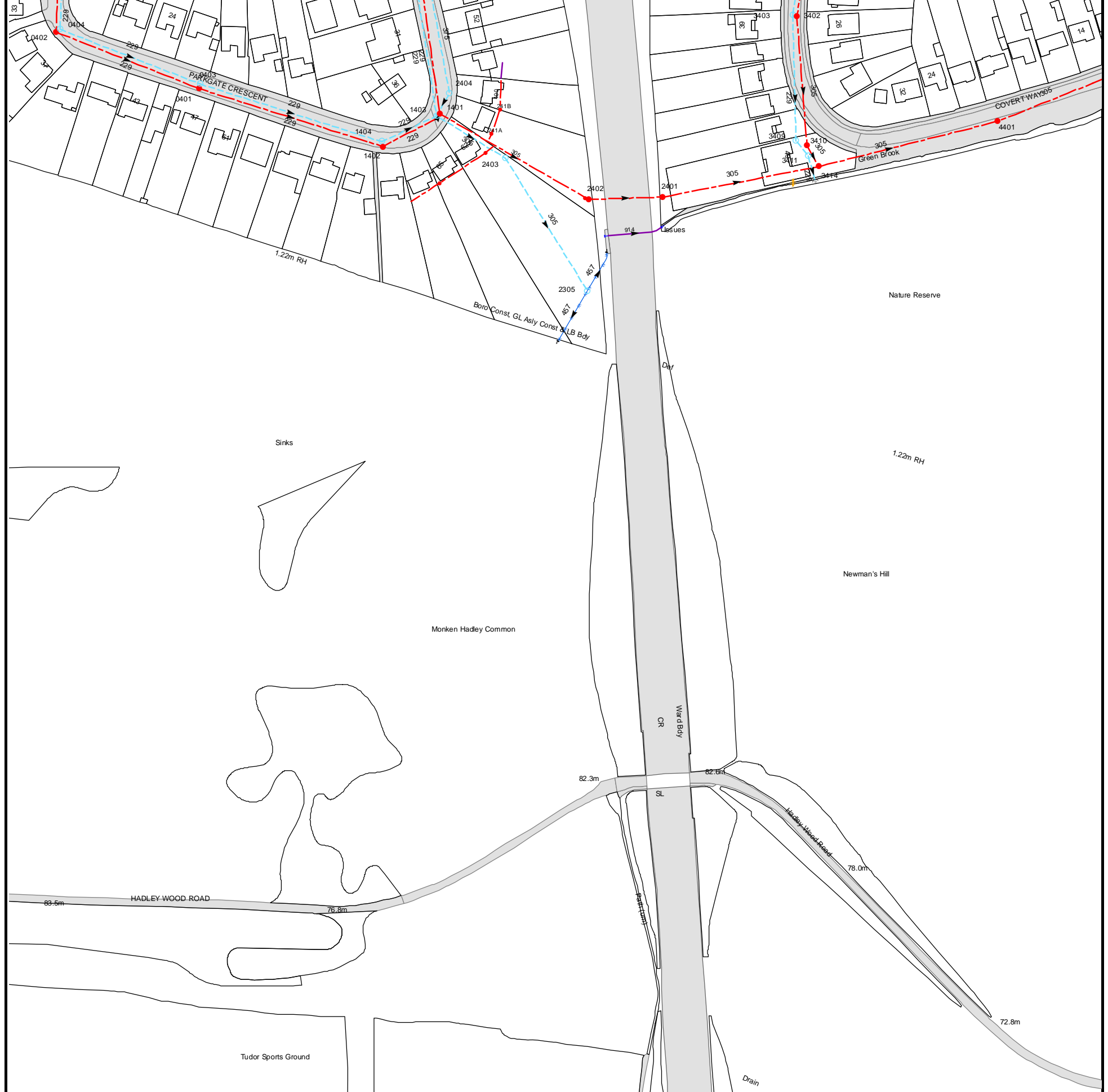
The width of the displayed area is 500m and the centre of the map is located at OS coordinates 525750,197250
 The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. 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
7003	n/a	n/a
7001	102.9	n/a
7004	n/a	n/a
501A	n/a	n/a
6001	106.6	104.55
6002	104.69	102.69
501B	n/a	n/a
5004	.01	n/a
5002	109.94	106.92
5001	112.54	n/a
5003	111.5	109.45

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.



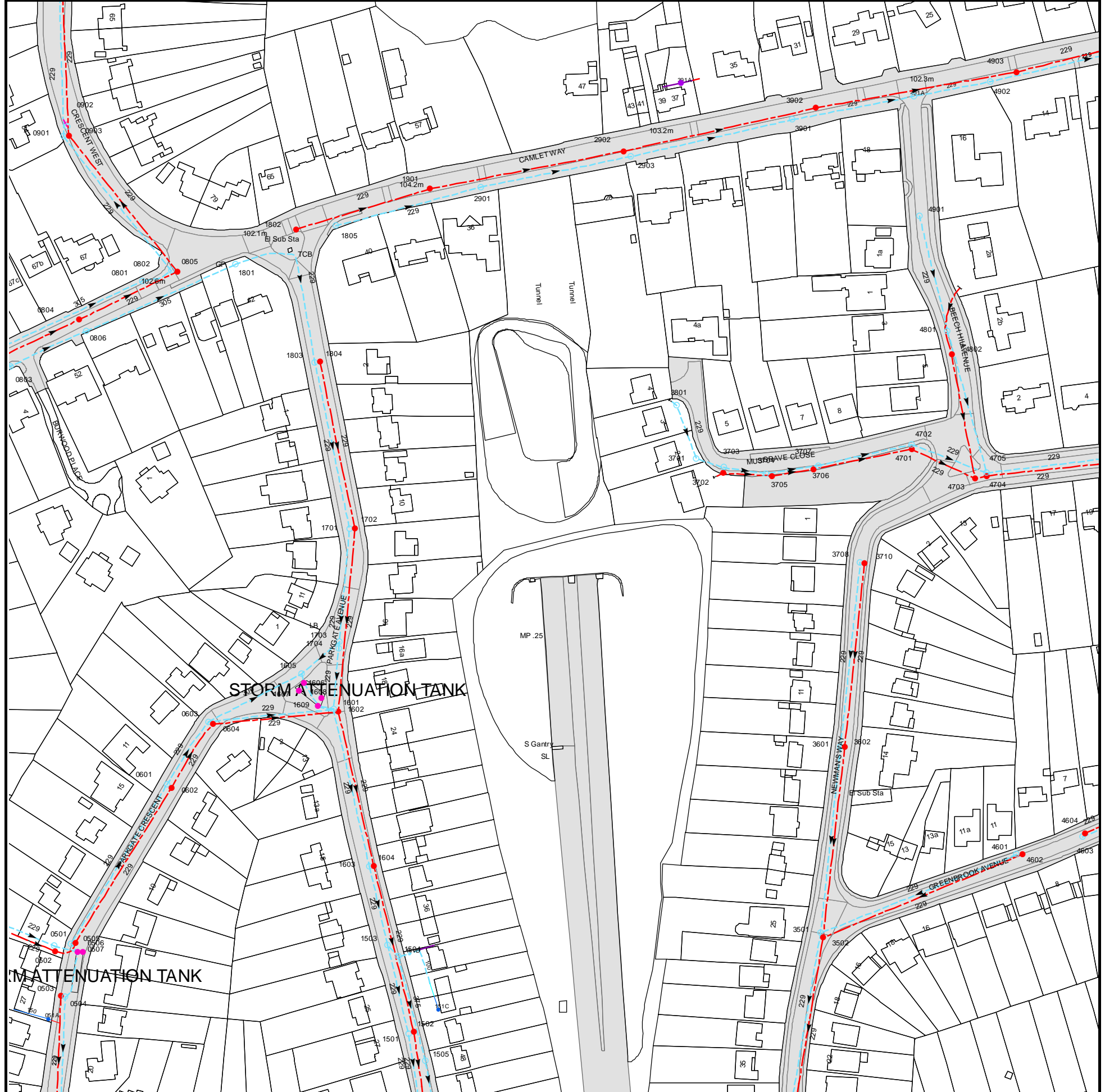
The width of the displayed area is 500m and the centre of the map is located at OS coordinates 526250,197250
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. 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.

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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
0401	84.87	82.71
0403	84.9	83.09
1404	81.98	80.38
1402	81.9	80.02
1403	81.39	78.38
141A	n/a	n/a
1401	81.3	78.08
2404	n/a	n/a
241C	n/a	n/a
241A	n/a	n/a
241B	n/a	n/a
2403	80.03	77.84
0402	87.64	85.13
0404	87.61	85.45
2401	77.39	74.21
3403	78.45	76.62
3409	n/a	n/a
3402	78.43	76.32
3410	n/a	n/a
3411	n/a	n/a
3414	n/a	n/a
4401	75.48	72.54
2305	78.27	77.11
2402	78.98	74.71

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.



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 526250,197750

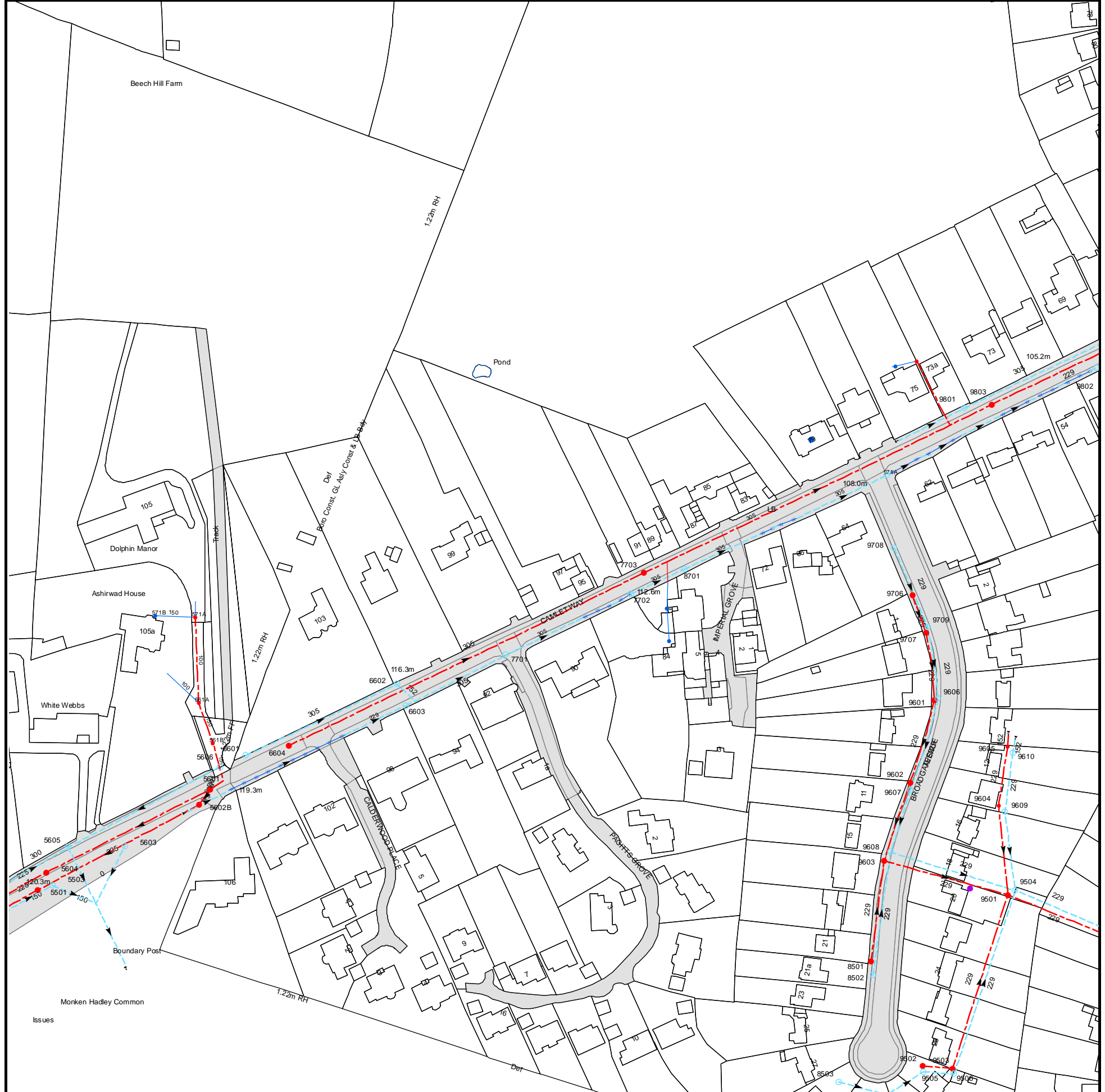
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual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

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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
4802	97.15	95.8
4801	97.89	96.16
4901	101.02	99.19
491A	n/a	n/a
4902	101.33	97.98
4903	101.23	97.8
0803	104.65	103.89
0901	97.59	95.59
0902	96.15	95.84
0903	97.53	95.72
0804	103.52	101.23
0806	103.59	102.85
0801	102.62	100.8
0802	102.21	97.6
0805	102.24	99.85
1801	101.92	100.68
1802	102.28	99.84
1803	95.93	93.57
1804	95.89	93.61
1805	103.13	99.69
1901	104.69	99.46
2901	104.24	99.31
2902	103.34	98.87
2903	103.4	98.91
391A	n/a	n/a
3901	102.51	98.47
3902	102.38	98.39
0508	n/a	n/a
0507	n/a	n/a
0601	86.02	84.25
0602	86.03	83.9
0603	85.7	82.99
0604	85.68	83.14
1603	82.37	80.31
1604	82.34	80
1503	n/a	n/a
1504	n/a	n/a
1501	81.56	79.3
151D	n/a	n/a
1502	81.54	79
1505	n/a	n/a
151C	n/a	n/a
051A	n/a	n/a
0501	88.14	86.95
0502	n/a	n/a
0503	88	85.92
0504	88.05	86.27
0505	87.77	85.33
0506	87.77	84.97
1602	84.7	82.24
1601	84.74	82.58
1609	n/a	n/a
1608	n/a	n/a
1607	n/a	n/a
1606	n/a	n/a
1605	n/a	n/a
1704	n/a	n/a
1703	n/a	n/a
1701	89.5	87.33
1702	89.41	87.26
4601	83.87	80.92
4602	83.93	80.65
4603	84.36	81.23
4604	84.36	80.9
3801	99.13	98.18
3701	98.03	96.52
3702	97.63	96.01
3703	97.68	96.2
3704	97.19	95.7
3705	97.18	95.44
3706	96.55	94.8
3707	96.52	95.09
3501	81.91	79.86
3502	81.8	79.52
3601	87.7	85.18
3602	87.74	85.12
3708	93.48	91.32
3710	93.45	91.31
4701	95.42	92.68
4702	95.44	92.92
4703	93.26	91.7
4704	93.17	89.03
4705	93.2	89.37

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The width of the displayed area is 500m and the centre of the map is located at OS coordinates 525750,197750

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.

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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
981B	n/a	n/a
981A	n/a	n/a
9802	66.34	64.62
8503	94.44	93.12
8501	94.43	93.36
8502	94.49	93.58
9603	95.35	92.88
9608	95.33	93.27
9602	95.52	94.09
9607	95.51	94.37
9502	93.4	91.47
9505	93.26	91.47
9503	92.84	90.78
9506	93.65	91.1
951A	n/a	n/a
9604	94.12	91.07
9609	94.06	91.22
9605	94.89	91.55
9501	90.71	89.39
9610	94.32	91.67
9504	90.75	89.7
9601	96.35	94.57
9606	96.33	94.86
7701	66.74	65.83
871A	n/a	n/a
9707	101.08	99.4
9709	101.24	100.25
871B	n/a	n/a
9706	103.49	102.28
7702	n/a	n/a
7703	112.28	107.98
8701	n/a	n/a
9708	105.99	104.59
971A	n/a	n/a
87AF	n/a	n/a
9801	106.27	103.83
9803	105.84	103.81
5501	119.72	117.42
5604	120.05	117.44
5503	119.07	118.02
5605	n/a	n/a
5603	119.46	118.6
571B	n/a	n/a
571A	n/a	n/a
561A	n/a	n/a
5602B	.01	n/a
5601	119.33	n/a
561B	n/a	n/a
5606	n/a	n/a
6601	119.17	117.88
6604	118.38	115.38
6602	116.75	115.53
6603	116.37	115.48

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 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
-  Gully
-  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 millimetres. 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 Insight on 0845 070 9148.

Appendix F – Management & Maintenance Regime

Stormwater Attenuation (and surface water drainage system generally)

The principle means of surface water disposal from the development is by way of a privately maintained sewer network, discharging into attenuation tanks below the driveway, inclusive of a pump set to limit the flow into the existing offsite sewer system. The attenuation takes the form of a fully lined cellular system of interlocking crates.

The home owner will ensure that the following measures are undertaken to ensure the longevity of the surface water drainage system;

Quarterly

- i) Inspect the performance of the attenuation system by lifting the covers on the upstream chambers (silt traps) to check that the outlet pipes (into the crates) are free of obstruction and visible (ie not submerged). If an inlet pipe is submerged then remedial action may be required.

Remedial advice to be sought from a suitably qualified consulting infrastructure engineer.

Every 6 months

- i) Remove silt build up from **all** catchpits and drainage channels.
- ii) Ensure that at least twice yearly, the pump sets, associated float controls and alarms, etc are serviced by a specialist company, with any recommended remedial or replacement works actioned promptly.

Annually

- i) Select approx. 20% of the development's surface water inspection chambers (situated in accessible areas) and inspect for blockages / silt build up. Remove silt and debris. Rotate on a 5 yearly cycle to cover all such chambers over this period.

Every 2-5 years (depending on outcome of aforementioned inspections)

- i) Commission a CCTV survey and report on condition of the surface water piped drainage system upstream of the crate attenuation to check for structural integrity and hydraulic fluidity. Carry out promptly any remedial work as advised by CCTV company.

Pump Stations

Upon completion of installation and commissioning, the pump supplier will be appointed to undertake a minimum of 2 services per station, each year.

Such regular inspection and maintenance should avoid the need for major refurbishment and reduce the potential for pump failure.

The pump supplier will also provide the emergency call out service in case of pump failure. Typically responses are made within 8 hours.

Permeable Paving

The main access road and parking area is to be constructed in permeable paving in order to;

- a) Delay the surface water runoff volume from these areas into the downstream attenuation system.
- b) Enhance the quality of the rainwater percolating through the construction layers before discharging via a perforated collector pipe into the downstream system.

The home owner will ensure that the following measures are undertaken to ensure the longevity of the pervious pavement;

Quarterly

- i) Inspect the pervious pavement for signs of ponding and ensure there is no migration of soils from adjacent landscaped areas or other deleterious material that may prematurely clog up the jointing stone situated in the gaps between the blocks. Ideally this type of inspection should be undertaken immediately following a heavy rainfall event.
- ii) Commission vacuum sweeping and brushing of the pervious pavement to ensure joints are kept free of silt. Minimum 3 sweeping per year, thus;
 - a) End of Winter (April) – to collect winter debris
 - b) Mid-Summer (July/August) – to collect dust, flower and grass-type deposits.
 - c) After Autumn leaf fall (November)

The company commissioned to carry out this work should ensure that their vacuum equipment is suited to the type of surfacing applied.

Last Resort Remedial Action

- i) Should a portion of the pervious pavement become substantially impervious due to excessive siltation, the following procedure should be followed;
 - a) Plane off existing surfacing
 - b) Break out underlying bitmac base layer and replace with similar compacted depth of course aggregate subbase material to BS EN 13242:2002 Type 4/20.
 - c) Renew laying course.

NB. Material removed from the voids or the layers below the surface may contain heavy metals and hydrocarbons and as such may need to be disposed of as 'controlled waste'. Sediment testing should be carried out before disposal to confirm its classification and appropriate disposal methods.

**Appendix G – Letter of Acceptance from No 86 Camlet Way for flows to
discharge via existing Pump Station**

FAO of the Lead Local Flood Authority, Enfield Council.

11/03/2022

Dear Sirs,

RE: 22/00627/FUL Planning Application at Land Adjacent To 86 Camlet Way Enfield EN4 0NX

Please be advised that should the development of land adjacent to our property obtain planning consent, we hereby confirm that we are satisfied that the foul and surface water drainage discharging from the new dwelling, may pass via our privately owned pump stations.

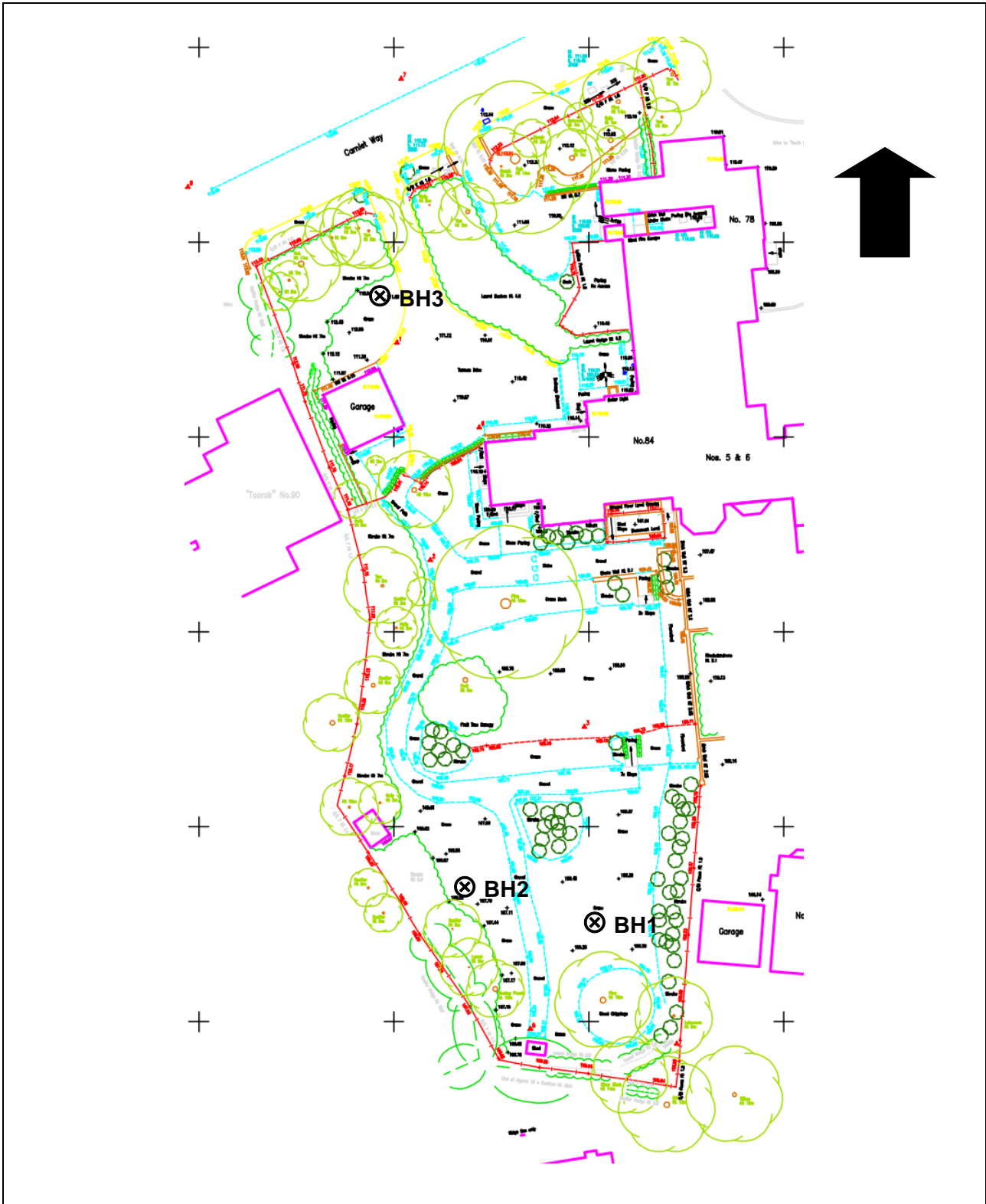
An Agreement will be put in place prior to occupation of the new dwelling, which ensures that the cost of the servicing and maintenance of the exiting pump stations will be shared equally between the 2 connected property freeholders.


Your faithfully,

A handwritten signature in black ink, appearing to be 'Jenna Rachel C', written in a cursive style.

Mrs Jenna Rachel C

Appendix H – Soils Report Extracts




Project Number: 1750	Project: 84 Camlet Way. Hadley Wood	Scale: NTS
Figure 3	Borehole Location Plan	

GEOLOGICAL LOG

Project: 84 Camlet Way Location: Hadley Wood Barnet EN4 0NX Project No: 1750 Client: Fusion Residential Logged By: NPB	Borehole Number: BH1 Start of Drilling: 8th May 2017 Completion of Drilling: 8th May 2017 Drilling Method: Premier Auger rig Ground Level (m AOD): Not surveyed
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Sample/Test			Description	Log	Depth (m)	Thick-ness (m)	S/pipe
Sample / Test	Result	Sample range					
No tests or samples taken			Grass over brown silty sandy slightly gravelly CLAY. Sand is fine, gravel is fine to medium angular to rounded flint and brick (TOPSOIL/MADE GROUND).	[Grid]	0.3	0.3	None
			Firm brown mottled dark grey and yellow CLAY with abundant fine to medium, occasionally coarse brick gravel (MADE GROUND)	[Grid]	1.0 1.1	0.7	
			Firm to stiff brown and mottled pale blue-grey and orange CLAY with some partings of fine pale brown sand (LONDON CLAY FORMATION).	[Dashed]	2.0	>1.0	
			<i>Borehole complete at 2.0m</i>		3.0 4.0 5.0 6.0 7.0		

Remarks: Borehole used for soakaway testing. Backfilled with arisings on completion of soakaway test. Groundwater: None encountered	 <small>GEOPHYSICAL AND GROUNDWATER CONSULTANTS</small>
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GEOLOGICAL LOG

Project: 84 Camlet Way Location: Hadley Wood Barnet EN4 0NX Project No: 1750 Client: Fusion Residential Logged By: NPB	Borehole Number: BH2 Start of Drilling: 8th May 2017 Completion of Drilling: 8th May 2017 Drilling Method: Premier Auger rig Ground Level (m AOD): Not surveyed
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Sample/Test			Description	Log	Depth (m)	Thick-ness (m)	S/pipe
Sample / Test	Result	Sample range					
			Grass over very stiff (dry) brown silty sandy slightly gravelly CLAY. Sand is fine, gravel is fine to coarse sub-angular to rounded flint, occasional brick, rare coal and rare cable sheathing fragment at 0.25m (MADE GROUND)		0.3	0.3	None
			Very stiff (dry) brown mottled yellow CLAY with abundant rootlets (LONDON CLAY FORMATION)	-----			
SPT	6,3,3,5,5 N=16	1.0-1.45	<i>Becoming fissured at 1.0m</i>	-----	1.0		
			<i>Possible shear surface observed at 1.5m and some to abundant medium to coarse sand-sized gypsum crystals and rare medium gravel-sized gypsum.</i>	-----		2.9	
SPT	5,3,3,4,3 N=13	2.0-2.45		-----	2.0		

U100		3.0-3.45		-----	3.0		
				-----	3.2		
			Firm brown and mottled pale blue and yellow CLAY with occasional thin partings of fine pale brown sand. (no obvious visual signs of desiccation or gypsum crystals observed)	-----			
SPT	7,2,2,3,3 N=10	4.0-4.45		-----	4.0		

SPT	7,3,4,4,4 N=15	5.0-5.45	<i>Below 5.0m becoming with sporadic medium to coarse sand-sized gypsum crystals below 5.0m</i>	-----	5.0	5.8	

			<i>Below 6.0m becoming stiff and slightly darker brown below 6.0m</i>	-----	6.0		

SPT	7,4,5,5,6 N=20	6.5-6.95	<i>Below 7.9m becoming greyish brown and wet along fissures, mottled yellow with occasional partings of fine yellow sand.</i>	-----	7.0		

Borehole continues

Remarks: Backfilled with arisings.

Groundwater: None encountered

Keys J - 250 or 500ml Jar, T - Tub, V - Vial or 60ml jar, D - Small Disturbed, B - Large bulk sample, W - Water sample.



GEOLOGICAL LOG

Project: 84 Camlet Way Location: Hadley Wood Barnet EN4 0NX Project No: 1750 Client: Fusion Residential Logged By: NPB	Borehole Number: BH2 Start of Drilling: 8th May 2017 Completion of Drilling: 8th May 2017 Drilling Method: Premier Auger rig Ground Level (m AOD): Not surveyed
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Sample/Test			Description	Log	Depth (m)	Thick-ness (m)	S/pipe
Sample / Test	Result	Sample range					
			<i>Borehole continued from sheet 1</i>	-----	7.0		None
SPT	7,4,4,5,5 N=18	8.0-8.45	<i>Below 7.9m becoming greyish brown and wet along fissures, mottled yellow with occasional partings of fine yellow sand.</i>	-----	8.0	5.8	
			Stiff dark grey-brown fissured CLAY (LONDON CLAY FORMATION)	-----	9.0		
SPT	8,5,5,5,6 N=21	9.5-9.95		-----	10.0		
			<i>At 10.5m becoming with rare medium sub-rounded pyritised gravel</i>	-----	11.0		
SPT	5,4,4,4,6 N=18	11.0-11.45	<i>At 11.0m becoming with a little fine sand.</i>	-----	12.0		
U100		12.5-12.95		-----	13.0	>9.0	
SPT	11,5,7,7,8 N=27	14.0-14.45		-----	14.0		
			<i>Borehole continues</i>	-----			

Remarks: Backfilled with arisings. Groundwater: None encountered	 <small>GREENWATER AND GROUNDWATER CONSULTANTS</small> Page 1 of 3
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Keys J - 250 or 500ml Jar, T - Tub, V - Vial or 60ml jar, D - Small Disturbed, B - Large bulk sample, W - Water sample.

GEOLOGICAL LOG

Project: 84 Camlet Way Location: Hadley Wood Barnet EN4 0NX Project No: 1750 Client: Fusion Residential Logged By: NPB	Borehole Number: BH3 Start of Drilling: 9th May 2017 Completion of Drilling: 9th May 2017 Drilling Method: Premier Auger rig Ground Level (m AOD): Not surveyed
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Sample/Test			Description	Log	Depth (m)	Thick-ness (m)	S/pipe
Sample / Test	Result	Sample range					
SPT	2,2,2,2,3 N=9	1.0-1.45	Grass over stiff (dry) brown silty sandy slightly gravelly CLAY. Sand is fine, gravel is fine to medium sub-angular to rounded flint, brick and occasional coal (TOPSOIL/MADE GROUND)		0.25	0.25	None
			Firm brown and mottled orange-brown and dark grey along roots slightly sandy slightly gravelly CLAY with some rootlets. Gravel is fine to medium sub-angular to rounded flint, brick and rare quarry tile fragment (MADE GROUND)		0.6	0.35	
			Firm brown and mottled orange-brown with some dark grey mottling slightly gravelly CLAY. Gravel is fine to medium sub-angular to rounded flint (Possible MADE GROUND - reworked natural soils)		1.0	0.40	
SPT	5,3,4,5,5 N=17	2.0-2.45	Firm brown CLAY with some orange and dark grey mottling and some medium to coarse sand-sized gypsum crystals (LONDON CLAY FORMATION)	-----	2.0		
			<i>At 1.4m becoming fissured with frequent gypsum up to fine gravel size and a little pale blue-grey mottling</i>	-----			
U100	3.0-3.45	3.0-3.45	<i>At 2.95m to 3.0m pocket of orange silty fine sand</i>	-----	3.0		
			<i>Below 3.1m becoming with scattered fine to coarse sand -sized gypsum crystals</i>	-----			
SPT	4,3,2,3,4 N=12	4.0-4.45	<i>Becoming firm between approximately 3.5m to 4.2m</i>	-----	4.0	7.6	
			<i>Becoming fissured with thin partings of fine orange silt and sand along fissure planes</i>	-----			
SPT	5,3,3,3,5 N=14	5.0-5.45	<i>Below 6.0m becoming stiff and slightly darker brown below 6.0m</i>	-----	5.0		
			<i>Below 7.9m becoming greyish brown and wet along fissures, mottled yellow with occasional partings of fine yellow sand.</i>	-----			
U100	6.5-6.95	6.5-6.95	<i>At 7.0m becoming with some medium gravel-sized gypsum crystals</i>	-----	6.0		

<i>Borehole continues</i>				-----	7.0		

Remarks: Backfilled with arisings. Groundwater: None encountered	 <small>Geotechnical and Environmental Consultants</small>
Keys J - 250 or 500ml Jar, T - Tub, V - Vial or 60ml jar, D - Small Disturbed, B - Large bulk sample, W - Water sample.	Page 1 of 3

