GUILDMORE

Planning Condition 5
Submission

27 to 37 High Street
Swanley
Kent
BR8 8AE

Head Office Address:
Guildmore Ltd
Ertosun House
61 Widmore Road
Bromley
Kent BR1 3AA

Date	Author	Revision	Comments
2 November 2021	Charles Lim	01	Planning Submission

Dear sir/madam,

#RE: 19/03543/ FUL 27-37 High Street , Swanley BR8 8AE Condition 5

Please find attach detailed proposal for sustainable surface water drainage scheme for the site based upon the Flood Risk Statement and Surface Water Management (Suds) Report dated November 2019

Our proposal demonstrate that the surface water generated by this development (for all rainfall durations and intensities up to and including the climate change adjusted critical 100 year storm).

Attached documents are as follows:-

1) KPT - Foul drainage calculation 26.07.21
2) KPT – Surface water drainage Calculation 22/9/21
3) C0099-KPT-XX-XX-DR-C-0100-C2 – Drainage Layout
4) C0099-KPT-XX-XX-DR-C-0110 REVC2 - Drainage Details - Sheet 01
5) C0099-KPT-XX-XX-DR-C-0111-C3 – Drainage Detail Sheet 2

Regards,

[redacted]

Charles Lim
On behalf of SB Architect
Charles.lim@sbarchitect.co.uk

27-37 High Street Swanley

Foul water drainage calculations – 26.07.2020

Design methodology & overview:

The hydraulic modelling has been completed using the MicroDrainage Network 2020.1.3 software.

For foul water drainage, peak design flows are based on a total peak discharge rate of 4.9l/s as advised by the MEP engineer (Whitecode consulting on 09.07.21).

The piped networks have been modelled to include all runs from rodding eyes, inspection chambers and manholes. The main runs are 150mm diameter and the manholes vary from 460mm diameter inspection chambers to 900x600mm diameter PCC manholes. Foul water pipes are modelled to achieve the minimum gradients as stated in Building Regulations Part H.

A network overview is shown on the next page.

Network overview:

Foul Water Drainage

FOUL SEWERAGE DESIGN

Design Criteria for Foul - Main

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Persons per House	3.00	Add Flow / Climate Change (%)	0	Min Design Depth for Optimisation (m)	1.200
Industrial Peak Flow Factor	0.00	Domestic (l/s/ha)	0.00	Minimum Backdrop Height (m)	0.200	Min Vel for Auto Design only (m/s)	0.75
Flow Per Person (l/per/day)	222.00	Domestic Peak Flow Factor	6.00	Maximum Backdrop Height (m)	1.500	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F1.000	10.710	0.100	107.1	0.000	0	1.0	1.500	o	150	Pipe/Conduit	
F2.000	10.075	0.200	50.4	0.000	0	1.0	1.500	o	150	Pipe/Conduit	
F1.001	9.133	0.160	57.1	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.002	4.048	0.040	101.2	0.000	0	1.0	1.500	o	150	Pipe/Conduit	
F3.000	13.245	0.145	91.3	0.000	0	1.0	1.500	o	150	Pipe/Conduit	
F1.003	7.742	0.060	129.0	0.000	0	0.9	1.500	o	150	Pipe/Conduit	
F1.004	3.566	0.025	142.6	0.000	0	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.000	68.700	0.000	1.0	0	0.0	26	0.47	0.85	15.0	1.0
F2.000	68.800	0.000	1.0	0	0.0	22	0.62	1.24	21.8	1.0
F1.001	68.600	0.000	2.0	0	0.0	32	0.73	1.16	20.5	2.0
F1.002	68.440	0.000	3.0	0	0.0	45	0.67	0.87	15.4	3.0
F3.000	68.545	0.000	1.0	0	0.0	25	0.50	0.92	16.2	1.0
F1.003	68.400	0.000	4.9	0	0.0	62	0.71	0.77	13.6	4.9
F1.004	68.340	0.000	4.9	0	0.0	64	0.68	0.73	12.9	4.9

Manhole Schedules for Foul - Main

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)
FWRE 03	69.500	0.800	Junction		F1.000	68.700	150				
FWRE 02	69.475	0.675	Junction		F2.000	68.800	150				
FWMH 01	69.450	0.850	Open Manhole	460	F1.001	68.600	150	F1.000	68.600	150	
								F2.000	68.600	150	
FWMH 04	69.500	1.060	Open Manhole	900 x 600	F1.002	68.440	150	F1.001	68.440	150	
FWMH 02	69.500	0.955	Open Manhole	900 x 600	F3.000	68.545	150				
FWMH 05	69.500	1.100	Open Manhole	900 x 600	F1.003	68.400	150	F1.002	68.400	150	
								F3.000	68.400	150	
FWMH 06	69.500	1.160	Open Manhole	460	F1.004	68.340	150	F1.003	68.340	150	
FW	69.500	1.185	Open Manhole	0		OUTFALL		F1.004	68.315	150	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
FWRE 03	551638.766	168514.951			No Entry	
FWRE 02	551642.370	168500.694			No Entry	
FWMH 01	551633.564	168505.590	551633.564	168505.590	Required	
FWMH 04	551629.146	168497.597	551629.146	168497.597	Required	
FWMH 02	551638.461	168487.124	551638.461	168487.124	Required	
FWMH 05	551627.163	168494.068	551627.163	168494.068	Required	
FWMH 06	551624.413	168486.831	551624.413	168486.831	Required	
FW	551620.851	168487.004			No Entry	

27-37 High Street Swanley

Surface water drainage calculations – 22.09.2021

Design methodology & overview:

The hydraulic modelling has been completed using the MicroDrainage Network 2020.1.3 software.

For surface water drainage, peak design flows are based on the drainage catchment areas and FSR rainfall data. The total catchment area for the site = 0.139ha.

The piped networks have been modelled to include all runs from rodding eyes, inspection chambers and manholes. The main runs are 150mm and 225mm diameter and the manholes vary from 460mm diameter inspection chambers to 1200mm diameter PCC manholes. The surface water system is designed to achieve minimum self-cleansing velocities of 1m/s.

The system has been designed to attenuate storm water flows for the 100 year return period storm plus 40% additional allowance for climate change.

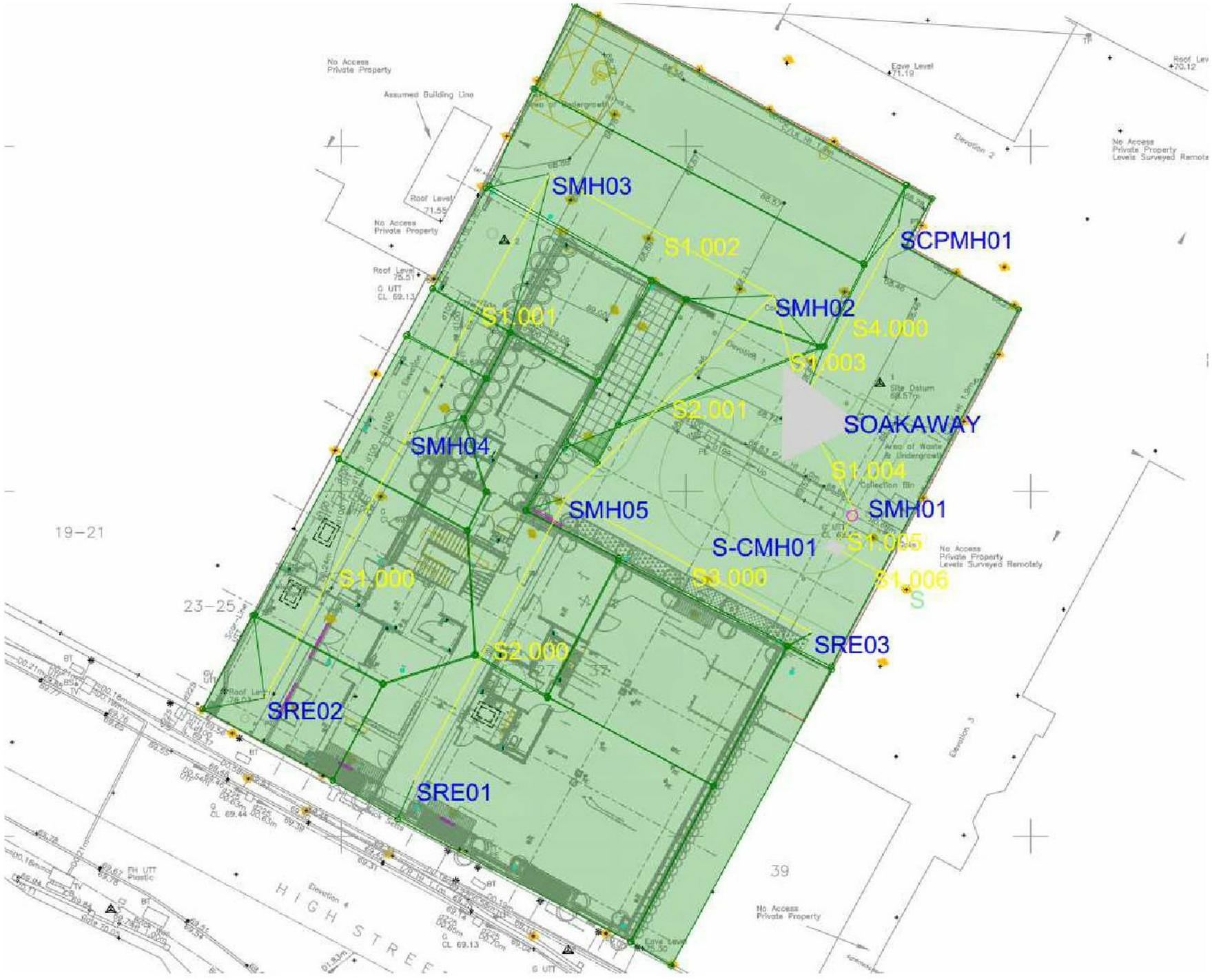
Discharge is via a geo-cellular soakaway tank and there is an overflow restricted by a 50mm orifice plate to assist the tank in draining down. The overflow is required in order to ensure a half drain time of less than 24 hours can be achieved for the soakaway.

The soakaway design is based on best practice which dictates infiltration through the sides of the tank only and a safety factor of 5 has been used.

Three infiltration test results have been received. The worst case rate, 0.0139m/hr has been used for design purposes.

A network overview is shown on the next page.

Network overview



Surface Water Drainage

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)	2	Maximum Time of Concentration (mins)	30	Add Flow / Climate Change (%)	0	Min Vel for Auto Design only (m/s)	1.00
M5-60 (mm)	20.000	Foul Sewage (l/s/ha)	0.000	Minimum Backdrop Height (m)	0.200	Min Slope for Optimisation (1:X)	500
Ratio R	0.427	Volumetric Runoff Coeff.	0.750	Maximum Backdrop Height (m)	1.500		
Maximum Rainfall (mm/hr)	50	PIMP (%)	100	Min Design Depth for Optimisation (m)	1.200		

Designed with Level Soffits

Network Design Table for Storm

- Indicates pipe length does not match coordinates
« - 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
S1.000	17.454	0.450	38.8	0.016	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	17.179	0.370	46.4	0.006	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	14.758	0.140	105.4	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	
S2.000	18.614	0.125	148.9	0.020	5.00	0.0	0.600	o	150	Pipe/Conduit	
S3.000	16.271	0.340	47.9	0.015	5.00	0.0	0.600	o	150	Pipe/Conduit	
S2.001	16.767	0.245	68.4	0.011	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.003	6.501	0.040	162.5	0.006	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)
S1.000	50.00	5.14	68.900	0.016	0.0	0.0	0.0	2.11	83.8	2.2
S1.001	50.00	5.29	68.450	0.021	0.0	0.0	0.0	1.92	76.5	2.9
S1.002	50.00	5.48	68.080	0.030	0.0	0.0	0.0	1.27	50.6	4.1
S2.000	50.00	5.38	68.385	0.020	0.0	0.0	0.0	0.82	14.5	2.6
S3.000	50.00	5.19	68.600	0.015	0.0	0.0	0.0	1.46	25.8	2.1
S2.001	50.00	5.55	68.185	0.046	0.0	0.0	0.0	1.58	62.9	6.2
S1.003	50.00	5.66	67.940	0.082	0.0	0.0	0.0	1.02	40.7	11.0

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
S4.000	11.623	0.150	77.5	0.025	8.00	0.0	0.600	o	150	Pipe/Conduit	
S1.004	2.000#	0.025	80.0	0.033	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.005	5.000#	0.063	80.0	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.006	13.000#	0.163	79.8	0.000	0.00	0.0	0.600	o	100	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)
S4.000	50.00	8.17	68.050	0.025	0.0	0.0	0.0	1.14	20.2	3.4
S1.004	50.00	8.21	67.900	0.139	0.0	0.0	0.0	0.86	6.8«	18.8
S1.005	50.00	8.30	67.875	0.139	0.0	0.0	0.0	0.86	6.8«	18.8
S1.006	50.00	8.56	67.813	0.139	0.0	0.0	0.0	0.86	6.8«	18.8

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)
SRE02	69.500	0.600	Junction		S1.000	68.900	225				
SMH04	69.475	1.025	Open Manhole	450	S1.001	68.450	225	S1.000	68.450	225	
SMH03	69.500	1.420	Open Manhole	450	S1.002	68.080	225	S1.001	68.080	225	
SRE01	69.500	1.115	Junction		S2.000	68.385	150				
SRE03	69.475	0.875	Junction		S3.000	68.600	150				
SMH05	69.475	1.290	Open Manhole	450	S2.001	68.185	225	S2.000	68.260	150	
								S3.000	68.260	150	
SMH02	69.710	1.770	Open Manhole	450	S1.003	67.940	225	S1.002	67.940	225	
								S2.001	67.940	225	
SCPMH01	69.500	1.450	Open Manhole	450	S4.000	68.050	150				
SSOAKAWAY	69.600	1.700	Open Manhole	450	S1.004	67.900	100	S1.003	67.900	225	
								S4.000	67.900	150	
SFlow Control	69.600	1.725	Open Manhole	500	S1.005	67.875	100	S1.004	67.875	100	
S-CMH01	69.610	1.798	Open Manhole	900 x 600	S1.006	67.813	100	S1.005	67.813	100	
S	68.500	0.850	Open Manhole	0		OUTFALL		S1.006	67.650	100	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SRE02	551625.555	168488.006			No Entry	
SMH04	551633.878	168503.348	551633.878	168503.348	Required	
SMH03	551642.098	168518.433	551642.098	168518.433	Required	
SRE01	551634.230	168483.248			No Entry	
SRE03	551657.311	168491.795			No Entry	
SMH05	551643.055	168499.637	551643.055	168499.637	Required	
SMH02	551655.048	168511.355	551655.048	168511.355	Required	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SCPMH01	551662.292	168515.285	551662.292	168515.285	Required	
SSOAKAWAY	551656.736	168505.076	551656.736	168505.076	Required	
SFlow Control	551659.776	168498.807	551659.776	168498.807	Required	
S-CMH01	551658.648	168496.750	551658.648	168496.750	Required	
S	551662.839	168494.439			No Entry	

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.005	0.005	0.005
	User	-	100	0.011	0.011	0.016
1.001	User	-	100	0.006	0.006	0.006
1.002	User	-	100	0.007	0.007	0.007
	User	-	100	0.002	0.002	0.009
2.000	User	-	100	0.020	0.020	0.020
3.000	User	-	100	0.010	0.010	0.010
	User	-	100	0.005	0.005	0.015
2.001	User	-	100	0.011	0.011	0.011
1.003	User	-	100	0.002	0.002	0.002
	User	-	100	0.003	0.003	0.006
4.000	User	-	100	0.011	0.011	0.011
	User	-	100	0.013	0.013	0.025
1.004	User	-	100	0.033	0.033	0.033
1.005	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.139	0.139	0.139

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.006	S	68.500	67.650	0.000	0	0

Simulation Criteria for Storm

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

Number of Input Hydrographs 0 Number of Online Controls 1 Number of Offline Controls 0 Number of Storage Structures 1 Number of Time/Area Diagrams 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Region	England and Wales	Ratio R	0.427	Cv (Summer)	0.750
Return Period (years)	2	M5-60 (mm)	20.000	Profile Type	Summer	Cv (Winter)	0.840

Storm Duration (mins)	30

Online Controls for Storm

Orifice Manhole: SFlow Control, DS/PN: S1.005, Volume (m³): 0.4

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 67.875

Storage Structures for Storm

Cellular Storage Manhole: SSOAKAWAY, DS/PN: S1.004

Invert Level (m) 67.320 Infiltration Coefficient Side (m/hr) 0.01389 Porosity 0.95
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 5.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	86.3	86.3	1.200	86.3	131.9	1.201	0.0	131.9

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Online Controls 1 Number of Offline Controls 0 Number of Storage Structures 1 Number of Time/Area Diagrams 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Region England and Wales M5-60 (mm) 20.000 Ratio R 0.425 Cv (Summer) 0.750 Cv (Winter) 0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SRE02	15 Winter	2	+0%					68.927	-0.198	0.000	0.03			2.9	OK*	
S1.001	SMH04	15 Winter	2	+0%					68.484	-0.191	0.000	0.05			3.7	OK	
S1.002	SMH03	15 Winter	2	+0%					68.131	-0.174	0.000	0.11			5.1	OK	
S2.000	SRE01	15 Winter	2	+0%					68.436	-0.099	0.000	0.24			3.5	OK*	
S3.000	SRE03	15 Winter	2	+0%					68.633	-0.117	0.000	0.11			2.8	OK*	
S2.001	SMH05	15 Winter	2	+0%					68.242	-0.168	0.000	0.14			8.0	OK	
S1.003	SMH02	15 Winter	2	+0%				100/15 Summer	68.049	-0.116	0.000	0.47			14.1	OK	
S4.000	SCPMH01	15 Winter	2	+0%				100/180 Winter	68.095	-0.105	0.000	0.20			3.6	OK	
S1.004	SSOAKAWAY	10080 Winter	2	+0%				100/60 Summer	67.911	-0.089	0.000	0.03			0.1	OK	
S1.005	SFlow Control	10080 Winter	2	+0%				100/60 Summer	67.895	-0.080	0.000	0.02			0.1	OK	
S1.006	S-CMH01	10080 Winter	2	+0%					67.822	-0.091	0.000	0.02			0.1	OK	

Note: surcharge is normal and is a result of water filling up the soakaway due to the fairly low infiltration rate.

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Online Controls 1 Number of Offline Controls 0 Number of Storage Structures 1 Number of Time/Area Diagrams 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Region England and Wales M5-60 (mm) 20.000 Ratio R 0.425 Cv (Summer) 0.750 Cv (Winter) 0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SRE02	15 Winter	30	+0%					68.938	-0.187	0.000	0.07			5.5	OK*	
S1.001	SMH04	15 Winter	30	+0%					68.500	-0.175	0.000	0.11			7.5	OK	
S1.002	SMH03	15 Winter	30	+0%					68.158	-0.147	0.000	0.24			10.7	OK	
S2.000	SRE01	15 Winter	30	+0%					68.458	-0.077	0.000	0.46			6.7	OK*	
S3.000	SRE03	15 Winter	30	+0%					68.646	-0.104	0.000	0.21			5.3	OK*	
S2.001	SMH05	15 Winter	30	+0%					68.268	-0.142	0.000	0.28			15.9	OK	
S1.003	SMH02	15 Winter	30	+0%				100/15 Summer	68.117	-0.048	0.000	0.96			28.6	OK	
S4.000	SCPMH01	15 Winter	30	+0%				100/180 Winter	68.114	-0.086	0.000	0.38			6.9	OK	
S1.004	SSOAKAWAY	960 Winter	30	+0%				100/60 Summer	67.953	-0.047	0.000	0.26			1.2	OK	
S1.005	SFlow Control	960 Winter	30	+0%				100/60 Summer	67.950	-0.025	0.000	0.20			1.2	OK	
S1.006	S-CMH01	960 Winter	30	+0%					67.842	-0.071	0.000	0.18			1.2	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Online Controls 1 Number of Offline Controls 0 Number of Storage Structures 1 Number of Time/Area Diagrams 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Region England and Wales M5-60 (mm) 20.000 Ratio R 0.425 Cv (Summer) 0.750 Cv (Winter) 0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

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

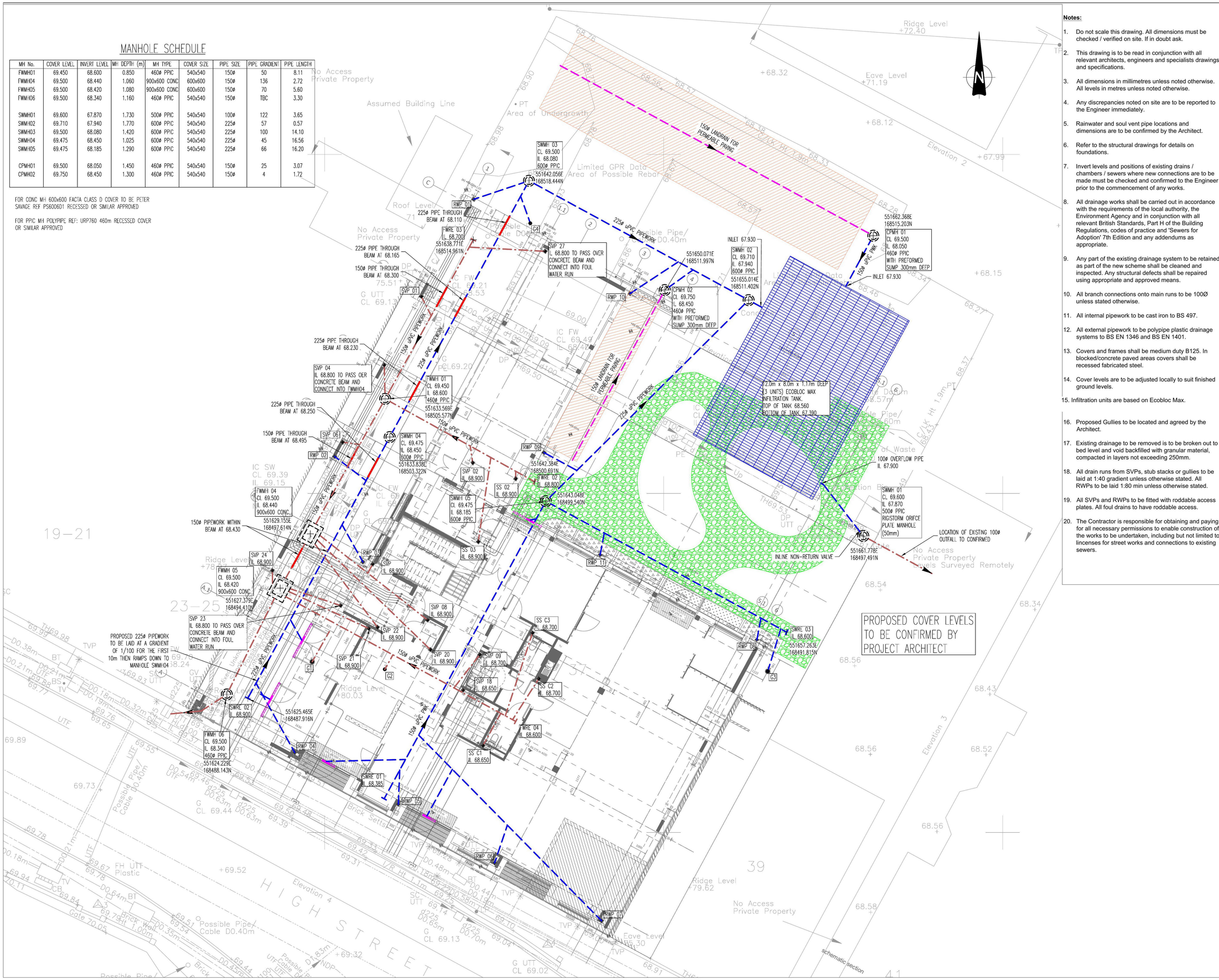
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SRE02	15 Winter	100	+40%					68.952	-0.173	0.000	0.12			10.1	OK*	
S1.001	SMH04	15 Winter	100	+40%					68.519	-0.156	0.000	0.20			13.7	OK	
S1.002	SMH03	15 Winter	100	+40%					68.292	-0.013	0.000	0.43			19.0	OK	
S2.000	SRE01	15 Winter	100	+40%					68.493	-0.042	0.000	0.84			12.1	OK*	
S3.000	SRE03	15 Winter	100	+40%					68.664	-0.086	0.000	0.38			9.7	OK*	
S2.001	SMH05	15 Winter	100	+40%					68.322	-0.088	0.000	0.51			28.8	OK	
S1.003	SMH02	15 Winter	100	+40%				100/15 Summer	68.252	0.087	0.000	1.73			51.7	SURCHARGED	
S4.000	SCPMH01	480 Winter	100	+40%				100/180 Winter	68.230	0.030	0.000	0.09			1.7	SURCHARGED	
S1.004	SSOAKAWAY	480 Winter	100	+40%				100/60 Summer	68.228	0.228	0.000	0.68			3.0	SURCHARGED	
S1.005	SFlow Control	360 Winter	100	+40%				100/60 Summer	68.232	0.257	0.000	0.49			2.9	SURCHARGED	
S1.006	S-CMH01	480 Winter	100	+40%					67.860	-0.053	0.000	0.45			2.9	OK	

MANHOLE SCHEDULE

MH No.	COVER LEVEL	INVERT LEVEL	MH DEPTH (m)	MH TYPE	COVER SIZE	PIPE SIZE	PIPE GRADIENT	PIPE LENGTH
FWMH01	69.450	68.600	0.850	460ø PPIC	540x540	150ø	50	8.11
FWMH04	69.500	68.440	1.060	900x600 CONC	600x600	150ø	136	2.72
FWMH05	69.500	68.420	1.080	900x600 CONC	600x600	150ø	70	5.60
FWMH06	69.500	68.340	1.160	460ø PPIC	540x540	150ø	TBC	3.30
SWMH01	69.600	67.870	1.730	500ø PPIC	540x540	100ø	122	3.65
SWMH02	69.710	67.940	1.770	600ø PPIC	540x540	225ø	57	0.57
SWMH03	69.500	68.080	1.420	600ø PPIC	540x540	225ø	100	14.10
SWMH04	69.475	68.450	1.025	600ø PPIC	540x540	225ø	45	16.56
SWMH05	69.475	68.185	1.290	600ø PPIC	540x540	225ø	66	16.20
CPMH01	69.500	68.050	1.450	460ø PPIC	540x540	150ø	25	3.07
CPMH02	69.750	68.450	1.300	460ø PPIC	540x540	150ø	4	1.72

FOR CONC MH 600x600 FACTA CLASS D COVER TO BE PETER SAVAGE REF PS6006D1 RECESSED OR SIMILAR APPROVED

FOR PPIC MH POLYPIPE REF: URP760 460m RECESSED COVER OR SIMILAR APPROVED



Notes:

1. Do not scale this drawing. All dimensions must be checked / verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the Engineer immediately.
5. Rainwater and soul vent pipe locations and dimensions are to be confirmed by the Architect.
6. Refer to the structural drawings for details on foundations.
7. Invert levels and positions of existing drains / chambers / sewers where new connections are to be made must be checked and confirmed to the Engineer prior to the commencement of any works.
8. All drainage works shall be carried out in accordance with the requirements of the local authority, the Environment Agency and in conjunction with all relevant British Standards, Part H of the Building Regulations, codes of practice and 'Sewers for Adoption' 7th Edition and any addendums as appropriate.
9. Any part of the existing drainage system to be retained as part of the new scheme shall be cleaned and inspected. Any structural defects shall be repaired using appropriate and approved means.
10. All branch connections onto main runs to be 100Ø unless stated otherwise.
11. All internal pipework to be cast iron to BS 497.
12. All external pipework to be polypipe plastic drainage systems to BS EN 1346 and BS EN 1401.
13. Covers and frames shall be medium duty B125. In blocked/concrete paved areas covers shall be recessed fabricated steel.
14. Cover levels are to be adjusted locally to suit finished ground levels.
15. Infiltration units are based on Ecobloc Max.
16. Proposed Gullies to be located and agreed by the Architect.
17. Existing drainage to be removed is to be broken out to bed level and void backfilled with granular material, compacted in layers not exceeding 250mm.
18. All drain runs from SVPs, stub stacks or gullies to be laid at 1:40 gradient unless otherwise stated. All RWPs to be laid 1:80 min unless otherwise stated.
19. All SVPs and RWPs to be fitted with roddable access plates. All foul drains to have roddable access.
20. The Contractor is responsible for obtaining and paying for all necessary permissions to enable construction of the works to be undertaken, including but not limited to lincenses for street works and connections to existing sewers.

NOTES:

LEGEND

- PROPOSED PPIC MANHOLE
- CONCRETE MANHOLE
- SURFACE WATER SEWER
- FOUL WATER SEWER
- LANDRAIN
- ACO RAINDRAIN CHANNEL
- SVP — DRAIN POINT
- RWP — RAINWATER PIPE
- SU — CHANNEL SUMP UNIT
- RG — ROAD GULLY
- MHSW01 — MANHOLE REFERENCE NUMBER
  CL 10.000 — COVER LEVEL
  IL 9.000 — INVERT LEVEL
  900x600 BWK. — MANHOLE SIZE AND CONSTRUCTION
- INFILTRATION TANK
- PERMEABLE PAVING
- RESIN BOUND MATERIAL

Rev	Date	Details of issue/revision	Drw	Rev
C2	27.09.21	ATTENUATION AND OUTFALL DETAILS FINALISED.	RA	LJ
C1	04.08.21	INTERNAL DRAINAGE AMENDED.	RA	LJ
P2	28.07.21	MINOR ADMENDMENTS AND MANHOLE SCHEDULE ADDED.	RA	LJ
P1	23.07.21	ISSUED FOR CONSTRUCTION.	RA	LJ
-	28.06.21	PRELIMINARY ISSUE.	RA	LJ

ISSUES & REVISIONS

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GUILDMORE

PROJECT:

27-37 HIGH STREET SWANLEY

TITLE:

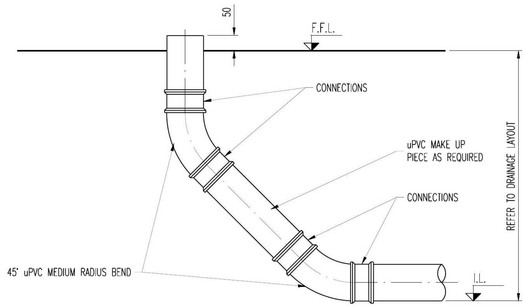
GROUND FLOOR DRAINAGE LAYOUT

Drawn:	RA	Reviewed:	LJ
KPT Ref:	LP1159	Date:	JUN 21
Scale@A1:	1:50		

DRAWING STATUS:

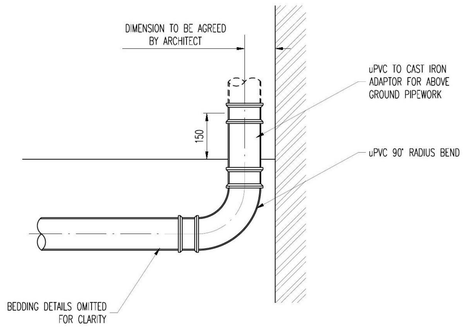
CONSTRUCTION

Project - Origin - Zone - Level - Type - Role - Number	Status	Rev
C0099-KPT-XX-XX-DR-C0100	**S4**	**C2**



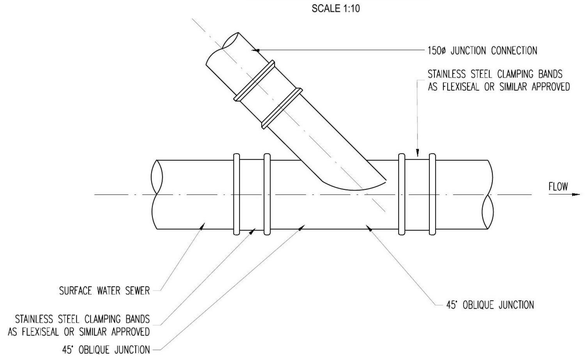
DRAIN POINT

SCALE 1:10



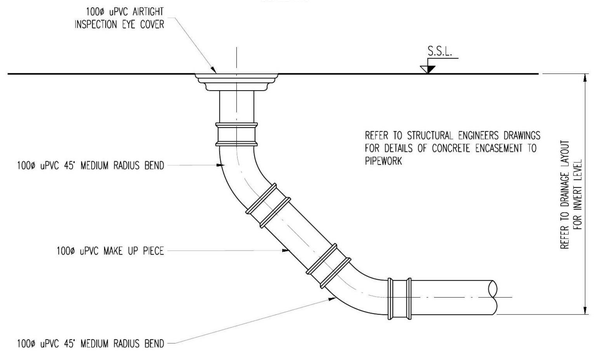
RAINWATER PIPE

SCALE 1:10



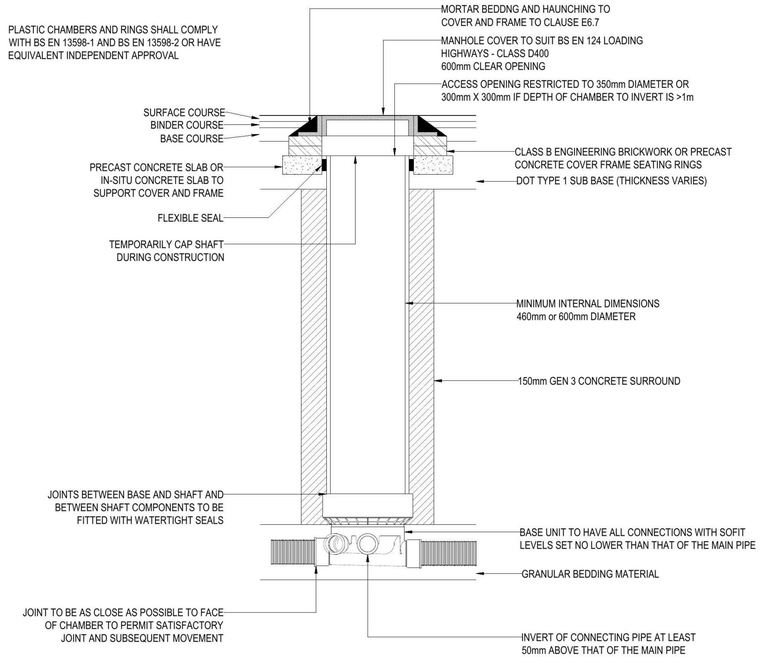
JUNCTION INSERTION CONNECTION

SCALE 1:10



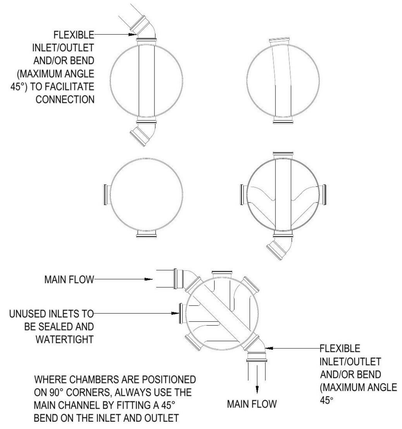
TYPICAL RODDING EYE

SCALE 1:10



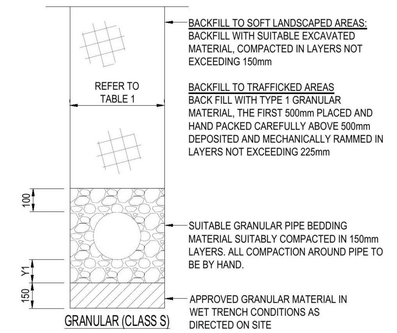
TYPICAL INSPECTION CHAMBER DETAIL (FLEXIBLE MATERIAL DETAIL)

NOT TO SCALE



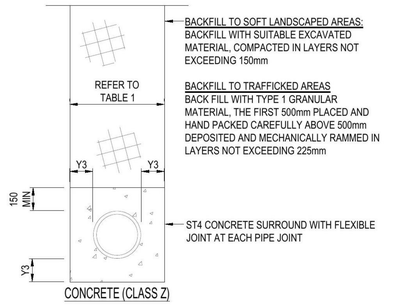
ALTERNATIVE BASE LAYOUTS FOR CHAMBERS

NOT TO SCALE



>1200mm DEPTH TO SOFFIT IN ROADS AND PAVEMENTS

>900mm IN LANDSCAPED AREAS



<1200mm DEPTH TO SOFFIT IN ROADS AND PAVEMENTS

<900mm IN LANDSCAPED AREAS

EXTERNAL PIPE BEDDING DETAILS

SCALE 1:20

PIPE DIA.	GRANULAR BEDDING			CONCRETE BEDDING		
	Y MINIMUM			MIN. TRENCH WIDTH	MAX. TRENCH WIDTH	L (SEE NOTE 6).
	Y1 MIN.	Y2 MIN.	Y3 MIN.			
100	100	200	150	450	750	18
150	100	200	150	500	800	
225	100	200	150	600	900	

TABLE 1: DIMENSIONS FOR BEDDINGS AND TRENCH WIDTHS

NOTES

1. REFER TO DRAWING NUMBERS LP1159-HS-100 FOR DRAINAGE LAYOUT.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
3. ALL LEVELS ARE IN METRES UNLESS OTHERWISE STATED.
4. FOR SETTING OUT OF RAINWATER AND FOUL WATER DRAIN POINTS REFER TO ARCHITECTS AND M&E DRAWINGS.
5. ALL CONCRETE AND CONCRETE PRODUCTS WILL SATISFY SULPHATE CLASSIFICATION 2 OF THE 'BRE DIGEST 363' AND CONSIST OF O.P.C. MINIMUM CEMENT CONTENT 330kg/m³ OR S.R.P.C. MINIMUM CEMENT CONTENT OF 280Kg/m³.
6. FLEXIBLE JOINTS OUTSIDE MANHOLES, STRUCTURES ETC. FOR PIPES UP TO AND INCLUDING 450 DIA. FIRST FLEXIBLE JOINT 150 FROM OUTSIDE FACE OF STRUCTURE. SECOND FLEXIBLE JOINT 600 FROM FROM FIRST JOINT.
7. MANHOLE CONSTRUCTION TO BE WATERTIGHT.
8. WHERE PIPES ENTER A MANHOLE AT AN ANGLE, A SLOW RADIUS BEND IS TO BE USED. THE BEND SHOULD BE BUILT INSIDE THE MANHOLE.
9. HIGH STRENGTH (GRANOLITHIC) CONCRETE TOPPING TO BE BROUGHT UP TO A DENSE SMOOTH FINISH TO ALL BRANCH CONNECTIONS (MIN THICKNESS 20). BENCHING SLOPE TO BE 1:10 TO 1:30.
10. MANHOLE COVERS AND FRAMES TO COMPLY TO B.S. EN124 AND BE CLASS D 400 TYPE UNLESS OTHERWISE SHOWN.
11. ALL PRECAST MANHOLE UNITS ARE TO CONFORM TO B.S. 5911 PT 200.
12. ALL PRECAST CONCRETE SLABS AND RINGS SHALL BE BEDDED OR JOINTED USING A MORTAR, PROPRIETARY BITUMEN RESIN MASTIC SEALANT.
13. LEVELLING OF COVER TO BE ACHIEVED USING ENGINEERING BRICKWORK (4 COURSES MAX. 2 COURSES MIN.)
14. ALL GULLY CONNECTIONS ARE TO BE 150Ø AND TO HAVE CLASS A BED AND SURROUND.
15. WHERE CLASS A BEDDING IS USED FOR PROTECTION TO PIPE WORK, EACH FLEXIBLE JOINT IN THE CONCRETE SURROUND SHALL BE INTERRUPTED OVER ITS FULL CROSS-SECTION WITH A SHAPED COMPRESSIBLE FILLER.
16. WHERE PIPES ARE SURROUNDED IN CONCRETE, PIPE JOINTS ARE TO BE PROTECTED FROM THE INGRESS OF CONCRETE FATS BY WRAPPING THEM IN POLYETHENE SHEET OR BUILDING PAPER.
17. ALL DRAINS ARE TO BE LAID IN A CONSTANT GRADIENT BETWEEN MANHOLE CHAMBERS.
18. STEP IRONS ARE TO BE IN ACCORDANCE WITH B.S. 1247.

Rev	Date	Details of issue/revision	Drw	Rev
C2	05.08.21	DRAWING SHEET CHANGED.	RA	LJ
C1	23.07.21	ISSUED FOR CONSTRUCTION.	RA	LJ
-	28.06.21	PRELIMINARY ISSUE.	RA	LJ

ISSUES & REVISIONS

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GUILDMORE

PROJECT:

27-37 HIGH STREET SWANLEY

TITLE:

DRAINAGE DETAILS SHEET 1

Drawn:	RA	Reviewed:	LJ	
KPT Ref:	LP1159	Date:	JUN 21	Scale@A1: 1:50

DRAWING STATUS:

CONSTRUCTION

Project - Origin - Zone - Level - Type - Role - Number	Status	Rev
C0099-KPT-XX-XX-DR-C-0110	**S4**	**C2**

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1:1 0 10 20 30 40 50 60 70 80 90 100
1:20 0 500 1000 1500 2000
1:1 0 10 20 30 40 50 60 70 80 90 100
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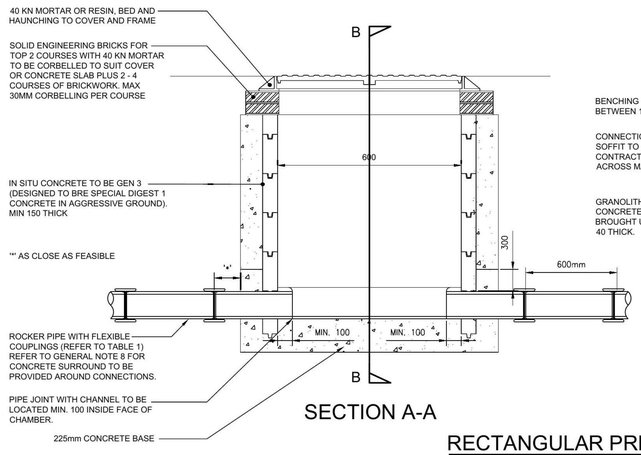
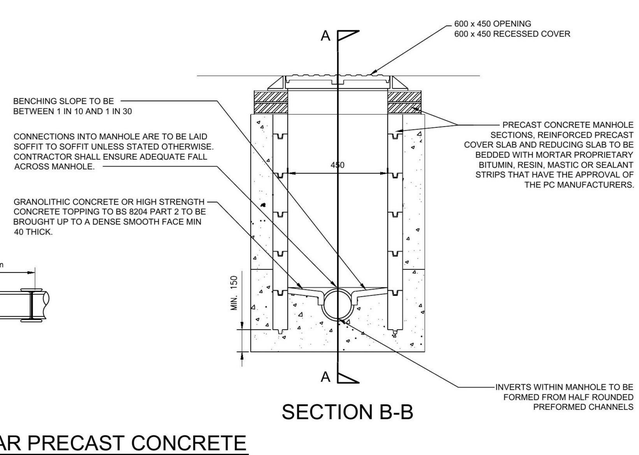
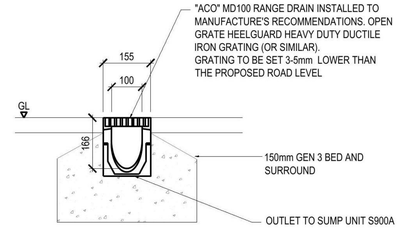


SECTION A-A



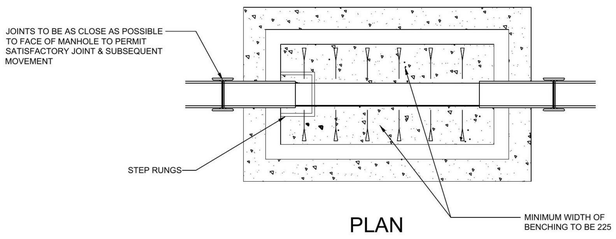
SECTION B-B

RECTANGULAR PRECAST CONCRETE INSPECTION CHAMBER DETAIL

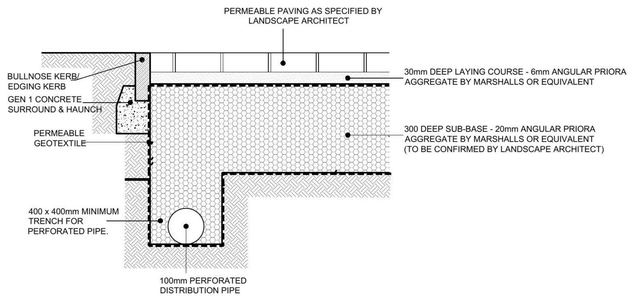


LINEAR DRAIN

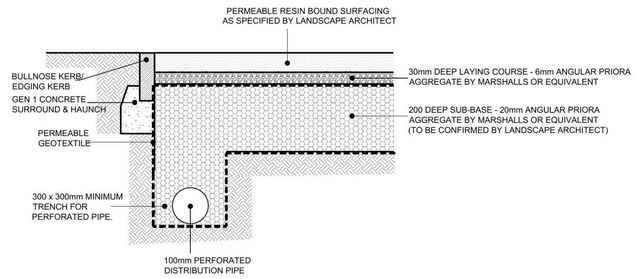
SCALE 1:10



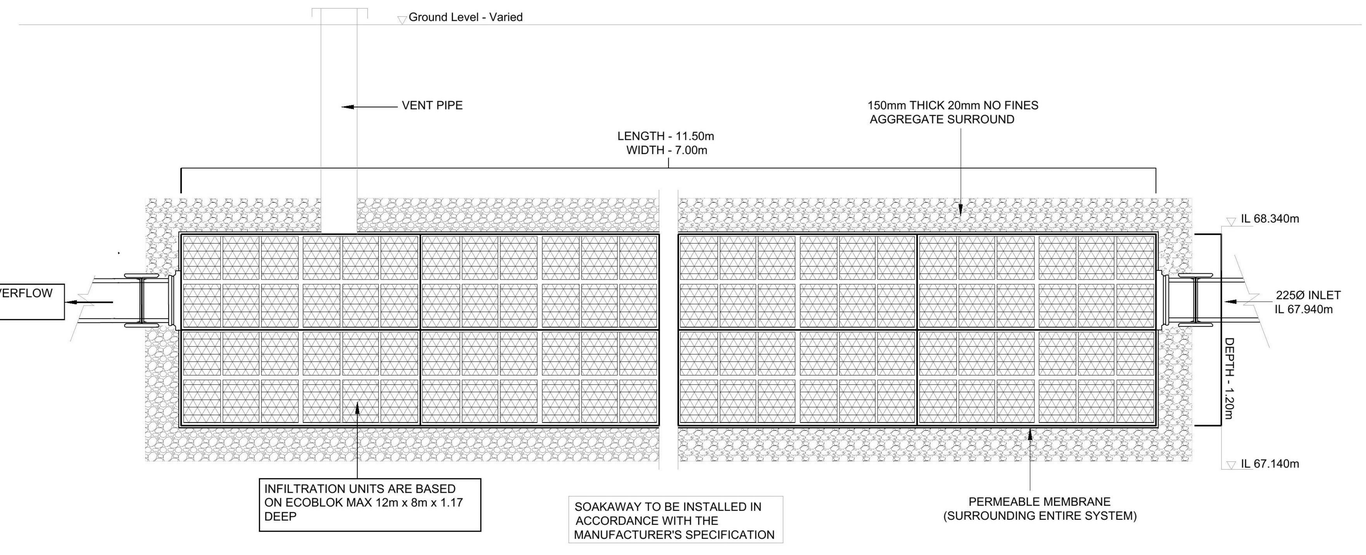
PLAN



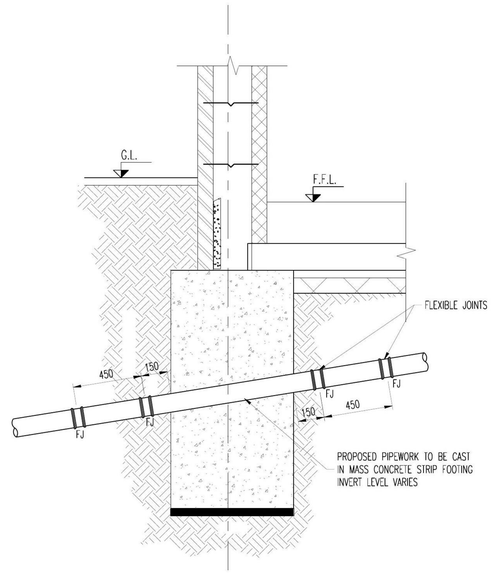
PERMEABLE PAVING DRAINAGE DETAIL PARKING BAYS



RESIN BOUND DRAINAGE DETAIL PEDESTRIAN AREAS



INFILTRATION / ATTENUATION TANK DETAIL



PIPEWORK THROUGH FOUNDATIONS

1:10 0 100 200 300 400 500 600 700 800 900 1000
1:1 0 10 20 30 40 50 60 70 80 90 100
1:20 0 500 1000 1500 2000
1:1 0 10 20 30 40 50 60 70 80 90 100

NOTES:

1. REFER TO DRAWING NUMBERS LP1159-HS-100 FOR DRAINAGE LAYOUT.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
3. ALL LEVELS ARE IN METRES UNLESS OTHERWISE STATED.
4. FOR SETTING OUT OF RAINWATER AND FOUL WATER DRAIN POINTS REFER TO ARCHITECTS AND M&E DRAWINGS.
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14. ALL GULLY CONNECTIONS ARE TO BE 150Ø AND TO HAVE CLASS A BED AND SURROUND.
15. WHERE CLASS A BEDDING IS USED FOR PROTECTION TO PIPE WORK, EACH FLEXIBLE JOINT IN THE CONCRETE SURROUND SHALL BE INTERRUPTED OVER ITS FULL CROSS-SECTION WITH A SHAPED COMPRESSIBLE FILLER.
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17. ALL DRAINS ARE TO BE LAID IN A CONSTANT GRADIENT BETWEEN MANHOLE CHAMBERS.
18. STEP IRONS ARE TO BE IN ACCORDANCE WITH B.S. 1247.

Rev	Date	Details of issue/revision	Drw	Rev
C3	26.09.21	INFILTRATION UNITS SPECIFICATION ADDED	RA	LJ
C2	04.08.21	PIPEWORK THROUGH FOUNDATIONS DETAIL ADDED.	RA	LJ
C1	23.07.21	ISSUED FOR CONSTRUCTION.	RA	LJ
-	28.06.21	PRELIMINARY ISSUE.	RA	LJ

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PROJECT:

27-37 HIGH STREET SWANLEY

TITLE:

DRAINAGE DETAILS SHEET 2

Drawn:	RA	Reviewed:	LJ		
KPT Ref:	LP1159	Date:	JUN 21	Scale@A1:	1:50

DRAWING STATUS:
CONSTRUCTION

Project - Origin - Zone - Level - Type - Role - Number	Status	Rev
C0099-KPT-XX-XX-DR-C0111	**S4**	C3