

- 141 ALBANY RD.
- COVENTRY
- CV5 6ND

Project Park Grove Surgery, Barnsley, S70 1XY				Job Ref. Y379	
Section Drainage Calculations				Sheet no./rev. ①	
Calc. by RLN	Date Nov 2017	Chk'd by SMH	Date Nov 2017	App'd by	Date

DRAINAGE CALCULATIONS

FOR

PARK GROVE SURGERY, BARNSELEY, S70 1XY

BRIDGES POUND

CONSULTING ENGINEERS

Coventry London Leeds
02477 719 547 0207 953 7561 0113 274 0721

JOB No Y379..... SHEET No.....②.....

DATE OCTOBER 2017.....

MADE BY RLW..... CHECKED BY

PROJECT PARK GROVE SURGERY, BARNSELEY.....

SURFACE WATER DRAINAGE

EXISTING GREENFIELD AREA = 216 m^2 = 0.22 Ha

∴ ATTENUATE TO 10%.

RUNOFF FOR THIS AREA

⇒ FOR 1 IN 1 YR STORM = 2.9 l/s

(i.e. $216 \text{ m}^2 = 0.022 \text{ Ha}$)

∴ DESIGN ATTENUATION STRUCTURE FOR 1 IN 100 YEAR STORM (+30%)

WITH FLOW RESTRICTED TO 2.9 l/s FOR AN IMPERMEABLE AREA

OF 1575 m^2

- see output, REQUIRES 64 m^3 OF STORAGE

SURFACE WATER NETWORKS

NETWORK 1 : ADJACENT TO CAR PARK

PIPE No	LENGTH (m)	AREA	
1.000	7.0m	141m ²	= 0.014 Ha
1.001	13.0m	52 + 94 = 146 m ²	= 0.015 Ha
1.002	13.0m	38m ²	= 0.004 Ha
2.000	4.5m	117m ²	= 0.012 Ha
1.003	3.0m	0	= 0
		Σ 442 m ²	

NETWORK 2 : SERVING CAR PARK

PIPE No	LENGTH (m)	AREA	
1.000	11.5m	600 m ²	= 0.060 Ha

NETWORK 3 : REAR OF BUILDING

PIPE No	LENGTH (m)	AREA	
1.000	5.0m	94 m ²	= 0.009 Ha
1.001	10.0m	88 + 117 = 205 m ²	= 0.020 Ha
1.002	10.5m	0	= -
1.003	20.0m	117m ²	= 0.012 Ha
1.004	6.0m	117m ²	= 0.012 Ha
1.005	4.5m	0	= -
		Σ 533 m ²	

EXISTING "GREENFIELD" EQUIVALENT RUN-OFF

(5)

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10 Station Road		
Kenilworth		
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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)	1	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.370	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	75	Min Design Depth for Optimisation (m)	0.000
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	225
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.017	4-8	0.005

Total Area Contributing (ha) = 0.022

Total Pipe Volume (m³) = 0.079

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
1.000	10.000	0.167	60.0	0.022	5.00	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)
1.000	49.34	5.17	109.850	0.022	0.0	0.0	0.0	1.00	7.8	2.9

EQUIVALENT
RUNOFF.

NETWORK 1 : ADJACENT TO CAR PARK

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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	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.370	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	75	Min Design Depth for Optimisation (m)	0.000
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	225
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.036	4-8	0.009

Total Area Contributing (ha) = 0.045

Total Pipe Volume (m³) = 0.348

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
1.000	7.000	0.150	46.7	0.014	5.00	0.0	0.600	o	100	Pipe/Conduit
1.001	13.000	0.250	52.0	0.015	0.00	0.0	0.600	o	100	Pipe/Conduit
1.002	13.000	0.300	43.3	0.004	0.00	0.0	0.600	o	100	Pipe/Conduit
2.000	4.500	0.100	45.0	0.012	5.00	0.0	0.600	o	100	Pipe/Conduit
1.003	3.000	0.050	60.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	63.58	5.10	109.850	0.014	0.0	0.0	0.0	1.13	8.9	2.4
1.001	62.55	5.31	109.700	0.029	0.0	0.0	0.0	1.07	8.4	4.9
1.002	61.65	5.49	109.450	0.033	0.0	0.0	0.0	1.17	9.2	5.5
2.000	63.78	5.07	109.700	0.012	0.0	0.0	0.0	1.15	9.0	2.1
1.003	61.47	5.53	107.500	0.045	0.0	0.0	0.0	1.30	23.0	7.5

Network 2 : SERVING CAR PARK



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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	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.370	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	75	Min Design Depth for Optimisation (m)	0.000
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	225
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.046	4-8	0.014

Total Area Contributing (ha) = 0.060

Total Pipe Volume (m³) = 0.203

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
1.000	11.500	0.200	57.5	0.060	5.00	0.0	0.600	o	150	Pipe/Conduit

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	63.37	5.14	108.600	0.060	0.0	0.0	0.0	1.33	23.5	10.3

Network 3 : REAR OF BUILDING

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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	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.370	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	75	Min Design Depth for Optimisation (m)	0.000
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	225
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.044	4-8	0.009

Total Area Contributing (ha) = 0.053

Total Pipe Volume (m³) = 0.440

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
1.000	5.000	0.100	50.0	0.009	5.00	0.0	0.600	o	100	Pipe/Conduit
1.001	10.000	0.200	50.0	0.020	0.00	0.0	0.600	o	100	Pipe/Conduit
1.002	10.500	0.225	46.7	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit
1.003	20.000	0.400	50.0	0.012	0.00	0.0	0.600	o	100	Pipe/Conduit
1.004	6.000	0.125	48.0	0.012	0.00	0.0	0.600	o	100	Pipe/Conduit
1.005	4.500	0.100	45.0	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)
1.000	63.72	5.08	108.350	0.009	0.0	0.0	0.0	1.09	8.6	1.6
1.001	62.94	5.23	108.250	0.029	0.0	0.0	0.0	1.09	8.6	4.9
1.002	62.17	5.38	108.050	0.029	0.0	0.0	0.0	1.13	8.9	4.9
1.003	60.71	5.69	107.825	0.041	0.0	0.0	0.0	1.09	8.6	6.7
1.004	60.30	5.78	107.425	0.053	0.0	0.0	0.0	1.12	8.8	8.7
1.005	60.00	5.84	107.300	0.053	0.0	0.0	0.0	1.15	9.0	8.7

ATTENUATION CALCULATIONS

⑨

Bridges Pound Ltd					Page 1	
Bridge House 141 Albany Road Coventry CV5 6ND						
Date 06/11/2017 12:27						
File Y379 - Park Grove Surge...						
Micro Drainage			Designed by rjnathoo Checked by Source Control 2017.1.2			
Summary of Results for 100 year Return Period (+30%)						
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status	
15 min Summer	107.045	0.595	2.8	32.0	O K	
30 min Summer	107.225	0.775	2.8	41.7	O K	
60 min Summer	107.380	0.930	2.8	50.0	O K	
120 min Summer	107.470	1.020	2.8	54.9	O K	
180 min Summer	107.467	1.017	2.8	54.7	O K	
240 min Summer	107.445	0.995	2.8	53.6	O K	
360 min Summer	107.394	0.944	2.8	50.8	O K	
480 min Summer	107.346	0.896	2.8	48.2	O K	
600 min Summer	107.299	0.849	2.8	45.7	O K	
720 min Summer	107.251	0.801	2.8	43.1	O K	
960 min Summer	107.155	0.705	2.8	37.9	O K	
1440 min Summer	106.939	0.489	2.8	26.3	O K	
2160 min Summer	106.728	0.278	2.8	15.0	O K	
2880 min Summer	106.611	0.161	2.7	8.7	O K	
4320 min Summer	106.512	0.062	2.3	3.3	O K	
5760 min Summer	106.485	0.035	1.9	1.9	O K	
7200 min Summer	106.472	0.022	1.6	1.2	O K	
8640 min Summer	106.464	0.014	1.4	0.7	O K	
10080 min Summer	106.458	0.008	1.2	0.4	O K	
15 min Winter	107.124	0.674	2.8	36.3	O K	
30 min Winter	107.329	0.879	2.8	47.3	O K	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)		
15 min Summer	118.004	0.0	34.9	21		
30 min Summer	78.586	0.0	46.5	35		
60 min Summer	49.937	0.0	59.1	64		
120 min Summer	30.668	0.0	72.6	122		
180 min Summer	22.741	0.0	80.8	166		
240 min Summer	18.275	0.0	86.6	196		
360 min Summer	13.361	0.0	95.0	262		
480 min Summer	10.702	0.0	101.4	330		
600 min Summer	9.002	0.0	106.7	400		
720 min Summer	7.812	0.0	111.0	470		
960 min Summer	6.240	0.0	118.2	610		
1440 min Summer	4.539	0.0	129.1	852		
2160 min Summer	3.295	0.0	140.6	1192		
2880 min Summer	2.622	0.0	149.1	1528		
4320 min Summer	1.898	0.0	161.9	2208		
5760 min Summer	1.507	0.0	171.4	2936		
7200 min Summer	1.259	0.0	179.0	3672		
8640 min Summer	1.087	0.0	185.4	4376		
10080 min Summer	0.960	0.0	191.0	5136		
15 min Winter	118.004	0.0	39.1	21		
30 min Winter	78.586	0.0	52.1	35		
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Bridge House 141 Albany Road Coventry CV5 6ND					
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Micro Drainage			Source Control 2017.1.2		
Summary of Results for 100 year Return Period (+30%)					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	107.511	1.061	2.8	57.1	O K
120 min Winter	107.629	1.179	2.9	63.4	O K
180 min Winter	107.640	1.190	2.9	64.0	O K
240 min Winter	107.610	1.160	2.9	62.4	O K
360 min Winter	107.545	1.095	2.8	58.9	O K
480 min Winter	107.476	1.026	2.8	55.2	O K
600 min Winter	107.405	0.955	2.8	51.4	O K
720 min Winter	107.334	0.884	2.8	47.6	O K
960 min Winter	107.188	0.738	2.8	39.7	O K
1440 min Winter	106.860	0.410	2.8	22.1	O K
2160 min Winter	106.610	0.160	2.7	8.6	O K
2880 min Winter	106.517	0.067	2.4	3.6	O K
4320 min Winter	106.478	0.028	1.8	1.5	O K
5760 min Winter	106.464	0.014	1.4	0.7	O K
7200 min Winter	106.456	0.006	1.2	0.3	O K
8640 min Winter	106.451	0.001	1.0	0.1	O K
10080 min Winter	106.450	0.000	0.9	0.0	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Winter	49.937	0.0	66.3	62	
120 min Winter	30.668	0.0	81.4	118	
180 min Winter	22.741	0.0	90.6	174	
240 min Winter	18.275	0.0	96.9	222	
360 min Winter	13.361	0.0	106.4	278	
480 min Winter	10.702	0.0	113.6	356	
600 min Winter	9.002	0.0	119.4	434	
720 min Winter	7.812	0.0	124.4	510	
960 min Winter	6.240	0.0	132.5	660	
1440 min Winter	4.539	0.0	144.6	894	
2160 min Winter	3.295	0.0	157.4	1208	
2880 min Winter	2.622	0.0	167.0	1524	
4320 min Winter	1.898	0.0	181.3	2204	
5760 min Winter	1.507	0.0	191.9	2936	
7200 min Winter	1.259	0.0	200.5	3616	
8640 min Winter	1.087	0.0	207.7	4304	
10080 min Winter	0.960	0.0	214.0	0	
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Micro Drainage		Source Control 2017.1.2
<u>Rainfall Details</u>		
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)	19.000	Shortest Storm (mins) 15
Ratio R	0.370	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +30
<u>Time Area Diagram</u>		
Total Area (ha) 0.158		
Time (mins)	Area	Time (mins) Area
From: To: (ha)		From: To: (ha)
0 4 0.106		4 8 0.052
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Model Details

Storage is Online Cover Level (m) 107.650

Tank or Pond Structure

Invert Level (m) 106.450

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	53.8	0.700	53.8	1.400	53.8	2.100	53.8
0.100	53.8	0.800	53.8	1.500	53.8	2.200	53.8
0.200	53.8	0.900	53.8	1.600	53.8	2.300	53.8
0.300	53.8	1.000	53.8	1.700	53.8	2.400	53.8
0.400	53.8	1.100	53.8	1.800	53.8	2.500	53.8
0.500	53.8	1.200	53.8	1.900	53.8		
0.600	53.8	1.300	53.8	2.000	53.8		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0078-2900-1195-2900
Design Head (m)	1.195
Design Flow (l/s)	2.9
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	78
Invert Level (m)	106.400
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.195	2.9
Flush-Flo™	0.341	2.8
Kick-Flo®	0.696	2.3
Mean Flow over Head Range	-	2.5

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.3	1.200	2.9	3.000	4.4	7.000	6.6
0.200	2.8	1.400	3.1	3.500	4.7	7.500	6.8
0.300	2.9	1.600	3.3	4.000	5.0	8.000	7.0
0.400	2.8	1.800	3.5	4.500	5.3	8.500	7.2
0.500	2.7	2.000	3.7	5.000	5.6	9.000	7.4
0.600	2.5	2.200	3.8	5.500	5.9	9.500	7.6
0.800	2.4	2.400	4.0	6.000	6.1		
1.000	2.7	2.600	4.1	6.500	6.3		

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BRIDGES POUND

CONSULTING ENGINEERS

Coventry London Leeds
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JOB No Y379 SHEET No..... (13)
DATE OCTOBER 2017
MADE BY RUN CHECKED BY
PROJECT PARK GROVE SURGERY, BARNSELEY

FOUL WATER DRAINAGE

Table 3 — Typical frequency factors (*K*)

Usage of appliances	<i>K</i>
Intermittent use, e.g. in dwelling, guesthouse, office	0,5
Frequent use, e.g. in hospital, school, restaurant, hotel	0,7
Congested use, e.g. in toilets and/or showers open to public	1,0
Special use, e.g. laboratory	1,2

6.3.3 Total flowrate (Q_{tot})

Q_{tot} is the design flowrate in a part or in the whole drainage system where sanitary appliances, appliances with continuous flow and/or waste water pumps are connected to the system.

Continuous flows and pump discharge rates shall be added to the waste water flowrate without any reduction.

where:

$$Q_{tot} = Q_{ww} + Q_c + Q_p$$

Q_{tot} = Total flowrate (l/s)

Q_{ww} = Waste water flowrate (l/s)

Q_c = Continuous flowrate (l/s)

Q_p = Pumped water flowrate (l/s)

6.3.4 Calculation rules

The pipe capacity (Q_{max}) shall be at least the larger of:

- the calculated waste water flowrate (Q_{ww}) or total flowrate (Q_{tot}); or
- the flowrate of the appliance with the largest discharge unit (see Table 2).

For convenience some values of Q_{ww} or Q_{tot} calculated for different frequency factors (*K*) and sums of discharge units (DU) are tabulated in annex B.

6.4 Layout of branches

6.4.1 Unventilated discharge branches

Sizes and limitations upon the use of unventilated discharge branches are given in Tables 4 and 5. Where the limitations cannot be met, discharge branches shall be ventilated, unless national and local regulations and practice allow the use of larger pipe sizes or air admittance valves. Limitations given in Table 5 are simplifications. For further information see national and local regulations and practice.

Table 2 — Discharge units (DU) *

Appliance	System I	System II	System III	System IV
	DU l/s	DU l/s	DU l/s	DU l/s
Wash basin, bidet	0,5	0,3	0,3	0,3
Shower without plug	0,6	0,4	0,4	0,4
Shower with plug	0,8	0,5	1,3	0,5
Single urinal with cistern	0,8	0,5	0,4	0,5
Urinal with flushing valve	0,5	0,3	-	0,3
Slab urinal	0,2*	0,2*	0,2*	0,2*
Bath	0,8	0,6	1,3	0,5
Kitchen sink	0,8	0,6	1,3	0,5
Dishwasher (household)	0,8	0,6	0,2	0,5
Washing machine up to 6 kg	0,8	0,6	0,6	0,5
Washing machine up to 12 kg	1,5	1,2	1,2	1,0
WC with 4,0 l cistern	**	1,8	**	**
WC with 6,0 l cistern	2,0	1,8	1,2 to 1,7***	2,0
WC with 7,5 l cistern	2,0	1,8	1,4 to 1,8***	2,0
WC with 9,0 l cistern	2,5	2,0	1,6 to 2,0***	2,5
Floor gully DN 50	0,8	0,9	-	0,6
Floor gully DN 70	1,5	0,9	-	1,0
Floor gully DN 100	2,0	1,2	-	1,3
* Per person. ** Not permitted. *** Depending upon type (valid for WC's with siphon flush cistern only). - Not used or no data.				

6.2.3 Discharge from non-domestic sanitary appliances

Discharges from non-domestic sanitary appliances (e.g. commercial kitchen) should be determined individually.

6.3 Calculation of flowrate

6.3.1 Waste water flowrate (Q_{ww})

Q_{ww} is the expected flowrate of waste water in a part or in the whole drainage system where only domestic sanitary appliances (see Table 2) are connected to the system.

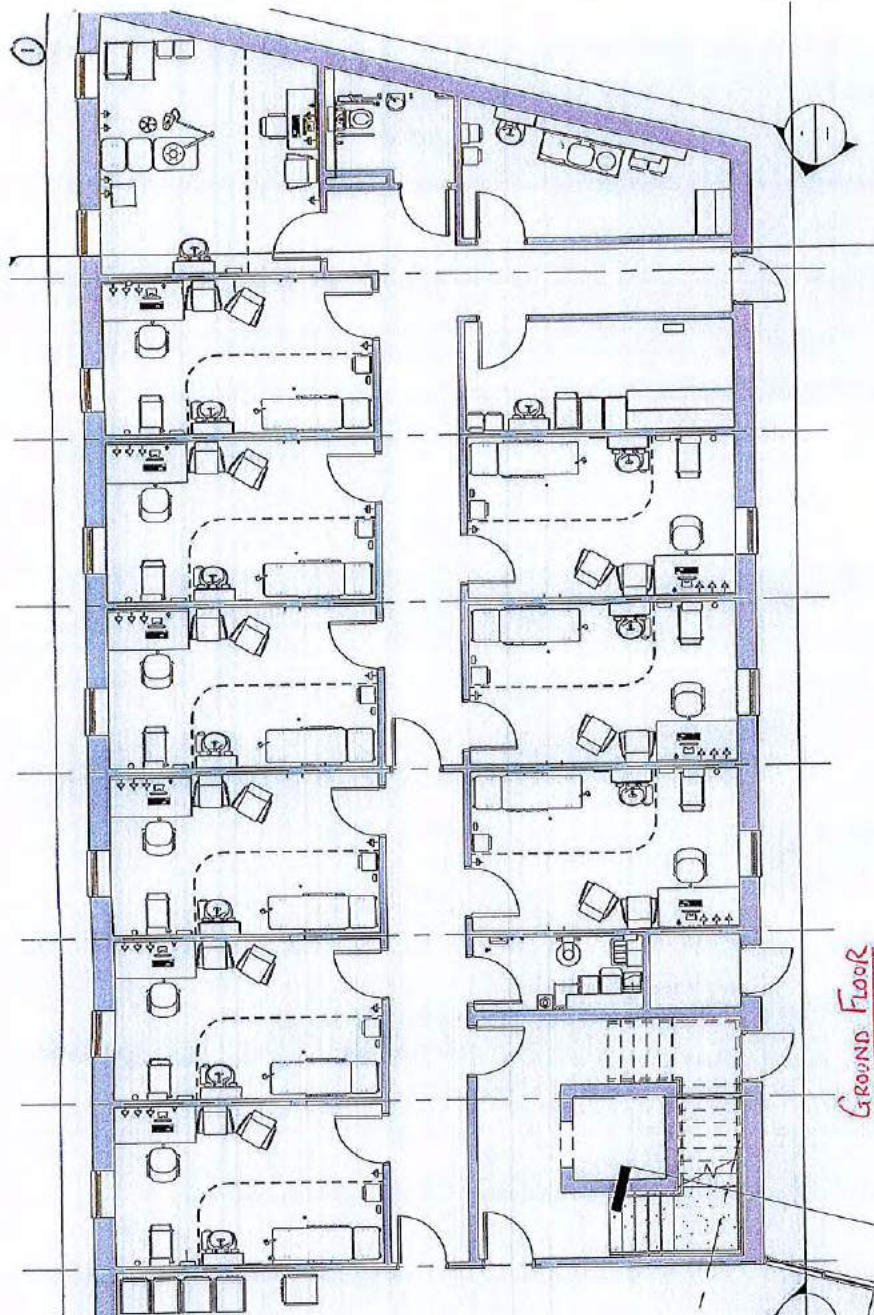
$$Q_{ww} = K \sqrt{\sum DU}$$

where:

Q_{ww} = Waste water flowrate (l/s)
 K = Frequency factor
 $\sum DU$ = Sum of discharge units

6.3.2 Frequency factor (K)

Typical frequency factors associated with different usage of appliances are given in Table 3.



GROUND FLOOR

- 18 HANDWASH BASINS
- 5 W.C.
- 1 SINK
- 1 DISHWASHER (ALLOWANCE)
- 1 WASHING MACHINE (ALLOWANCE)

= 18 x 0.30
 = 5 x 2.00
 = 1 x 1.30
 = 1 x 0.20
 = 1 x 1.20
 TOTAL

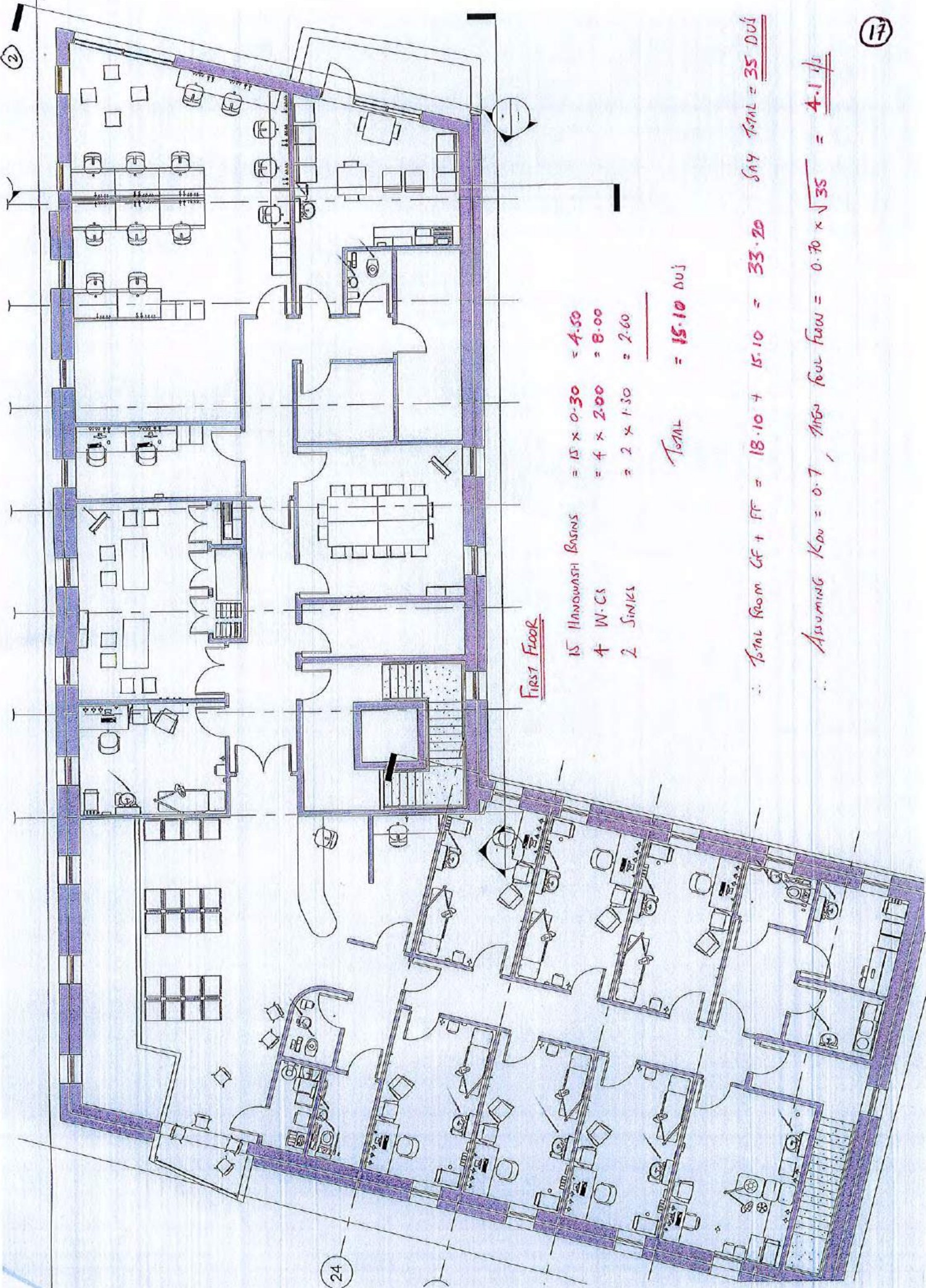
= 5.40
 = 10.00
 = 1.30
 = 0.20
 = 1.20
 = 18.10 Dvi

FULL WATER DRAINAGE

24

25

26



First Floor

15 Handwash Basins = $15 \times 0.30 = 4.50$
 4 W.Cs = $4 \times 2.00 = 8.00$
 2 Sinks = $2 \times 1.30 = 2.60$
Total = 15.10 DUJ

$\therefore$ Total Room CF + FF = $18.10 + 15.10 = 33.20$ Say Total = 35 DUJ

$\therefore$ Assuming $K_{av} = 0.7$, Area for Flow = $0.70 \times \sqrt{35} = 4.115$

Bridges Pound Ltd		Page 1
Bridge House 141 Albany Road Coventry CV5 6ND		
Date 14/11/2017 15:04	Designed by rjnathoo	
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Micro Drainage		Network 2017.1.2

FOUL SEWERAGE DESIGN

Design Criteria for Foul - Unit

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	0
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.000
Calculation Method	EN 752	Maximum Backdrop Height (m)	0.000
Frequency Factor	0.70	Min Design Depth for Optimisation (m)	0.000
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.75
Domestic Peak Flow Factor	0.00	Min Slope for Optimisation (1:X)	150

Designed with Level Soffits

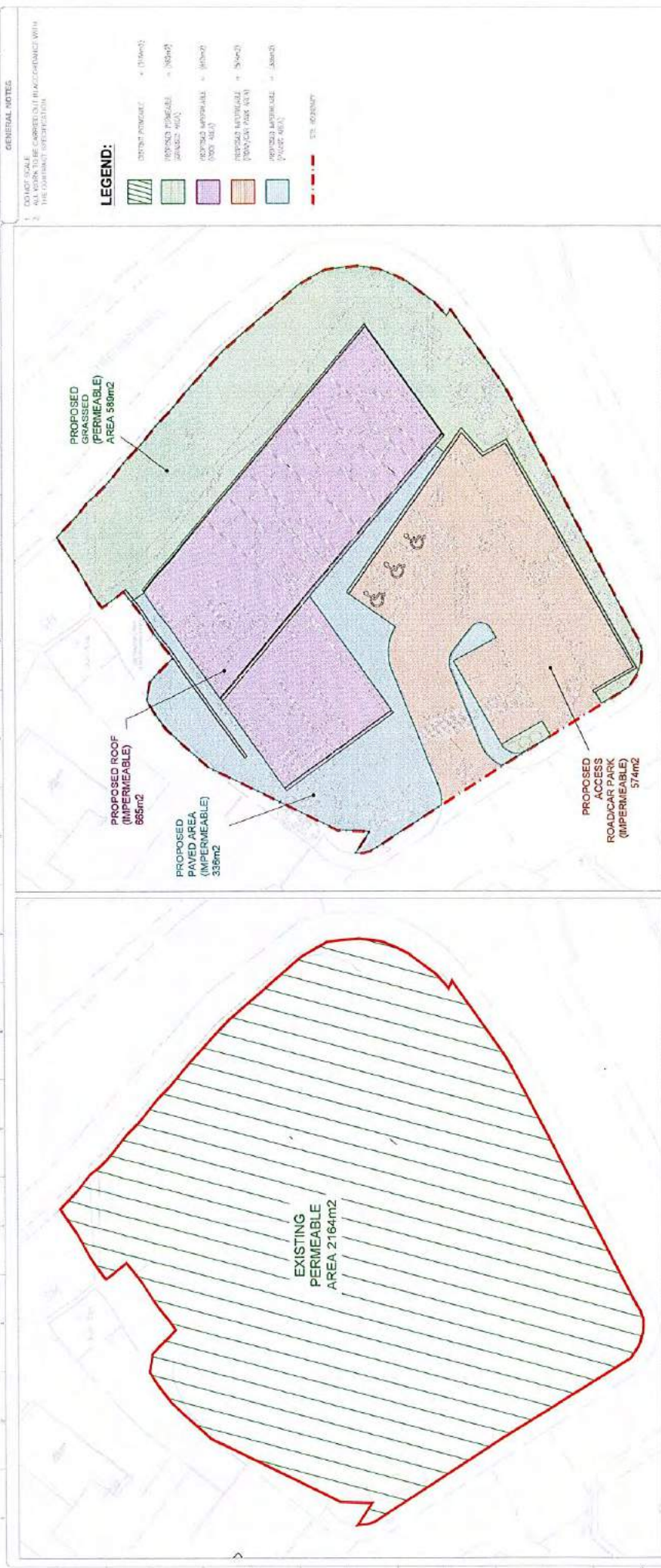
Network Design Table for Foul - Unit

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Units	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type
1.000	8.500	0.120	70.8	0.000	0.9	0.0	1.500	o	100	Pipe/Conduit
1.001	7.900	0.120	65.8	0.000	2.2	0.0	1.500	o	100	Pipe/Conduit
1.002	4.100	0.075	54.7	0.000	0.9	0.0	1.500	o	100	Pipe/Conduit
1.003	3.000	0.050	60.0	0.000	7.0	0.0	1.500	o	100	Pipe/Conduit
1.004	6.200	0.100	62.0	0.000	4.4	0.0	1.500	o	100	Pipe/Conduit
1.005	18.000	0.350	51.4	0.000	0.0	0.0	1.500	o	100	Pipe/Conduit
1.006	10.600	0.475	22.3	0.000	2.7	0.0	1.500	o	150	Pipe/Conduit
1.007	9.300	0.425	21.9	0.000	1.4	0.0	1.500	o	150	Pipe/Conduit
2.000	14.200	0.230	61.7	0.000	1.4	0.0	1.500	o	100	Pipe/Conduit
2.001	10.400	0.150	69.3	0.000	4.3	0.0	1.500	o	100	Pipe/Conduit
2.002	10.000	0.200	50.0	0.000	0.9	0.0	1.500	o	100	Pipe/Conduit
2.003	6.900	0.120	57.5	0.000	0.9	0.0	1.500	o	100	Pipe/Conduit
2.004	5.000	0.075	66.7	0.000	3.1	0.0	1.500	o	150	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Units	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	109.940	0.000	0.0	0.9	0.0	22	0.51	0.79	6.2	0.7
1.001	109.820	0.000	0.0	3.1	0.0	30	0.63	0.82	6.4	1.2
1.002	109.700	0.000	0.0	4.0	0.0	30	0.70	0.90	7.1	1.4
1.003	109.625	0.000	0.0	11.0	0.0	41	0.78	0.86	6.8	2.3
1.004	108.900	0.000	0.0	15.4	0.0	45	0.80	0.85	6.6	2.7
1.005	108.800	0.000	0.0	15.4	0.0	43	0.86	0.93	7.3	2.7
1.006	108.400	0.000	0.0	18.1	0.0	31	1.15	1.86	32.9	3.0
1.007	107.925	0.000	0.0	19.5	0.0	31	1.17	1.88	33.2	3.1
2.000	109.600	0.000	0.0	1.4	0.0	24	0.57	0.85	6.7	0.8
2.001	109.370	0.000	0.0	5.7	0.0	35	0.67	0.80	6.3	1.7
2.002	109.220	0.000	0.0	6.6	0.0	34	0.77	0.94	7.4	1.8
2.003	109.020	0.000	0.0	7.5	0.0	36	0.75	0.88	6.9	1.9
2.004	108.850	0.000	0.0	10.6	0.0	35	0.72	1.07	19.0	2.3

Bridges Pound Ltd										Page 2	
Bridge House 141 Albany Road Coventry CV5 6ND											
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Designed by rjnathoo						Checked by					
Micro Drainage						Network 2017.1.2					
<u>Network Design Table for Foul - Unit</u>											
PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Units	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section	Type
2.005	8.300	0.125	66.4	0.000	1.4	0.0	1.500	o	150	Pipe/Conduit	
2.006	8.000	0.150	53.3	0.000	3.5	0.0	1.500	o	150	Pipe/Conduit	
1.008	14.200	0.250	56.8	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
<u>Network Results Table</u>											
PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Units	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	
2.005	108.775	0.000	0.0	12.0	0.0	36	0.73	1.08	19.0	2.4	
2.006	107.650	0.000	0.0	15.5	0.0	37	0.82	1.20	21.2	2.8	
1.008	106.500	0.000	0.0	35.0	0.0	46	0.91	1.16	20.6	4.1	
©1982-2017 XP Solutions											



IMPERMEABLE/PERMEABLE AREAS (PROPOSED)
 SCALE 1:500

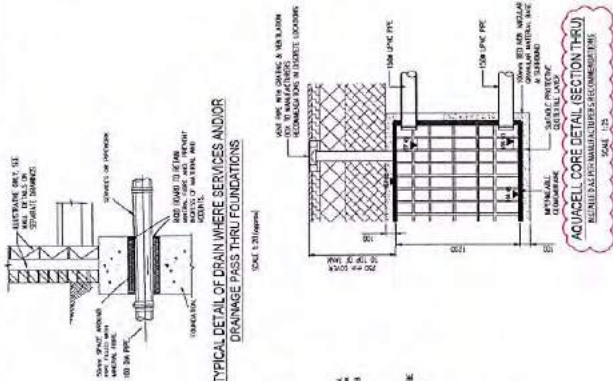
TOTAL PROPOSED IMPERMEABLE AREA = 1598 m²
 TOTAL PROPOSED PERMEABLE AREA = 580 m²
 TOTAL PROPOSED AREA = 2178 m²

IMPERMEABLE/PERMEABLE AREAS (EXISTING)
 SCALE 1:500

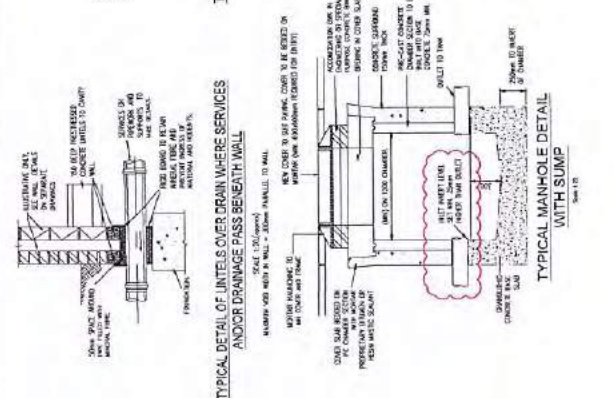
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Project	PARK GROVE BURELIGH
Site	PARK GROVE BURELIGH
Drawing No.	Y37800002
Revision	0
Author	BRIDGES POUND CONSULTING ENGINEERS
Check	BRIDGES POUND CONSULTING ENGINEERS
Drawn	BRIDGES POUND CONSULTING ENGINEERS
Date	20/01/2020

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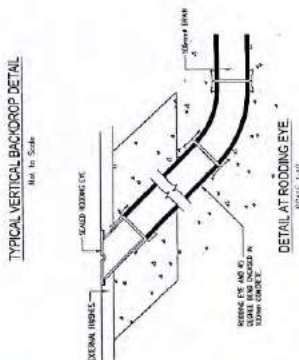
TYPICAL DETAIL OF DRAIN WHERE SERVICES AND/OR DRAINAGE PASS THRU FOUNDATIONS



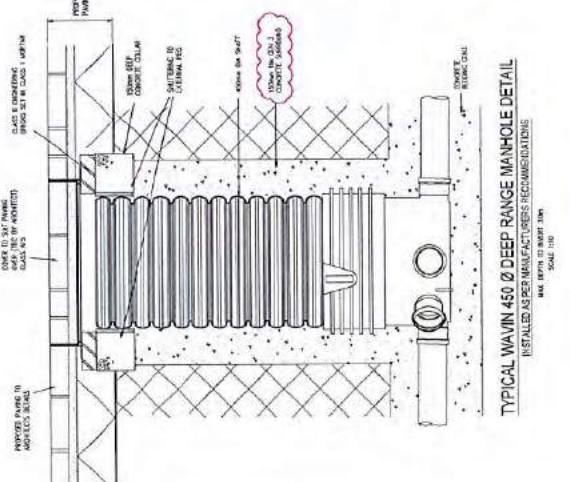
TYPICAL DETAIL OF UNTELS OVER DRAIN WHERE SERVICES AND/OR DRAINAGE PASS BENEATH WALL



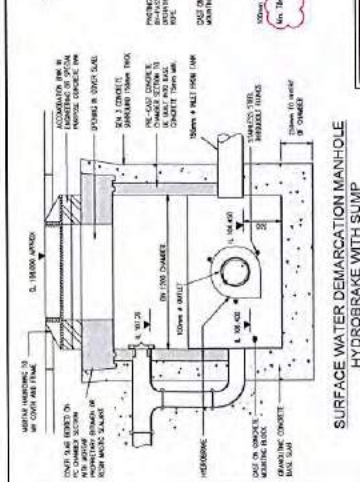
TYPICAL VERTICAL BACKROP DETAIL



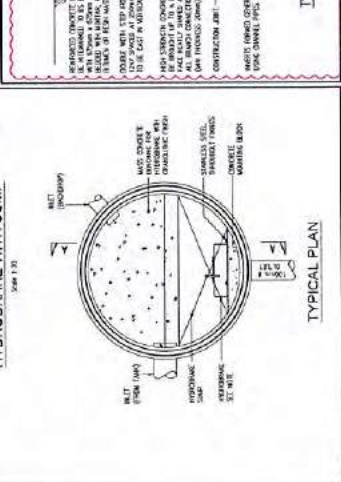
TYPICAL WAVIN 450 Ø DEEP RANGE MANHOLE DETAIL



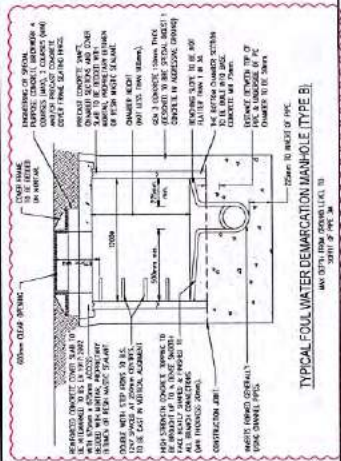
SURFACE WATER DEMARCATION MANHOLE
HYDROBRAKE WITH SUMP



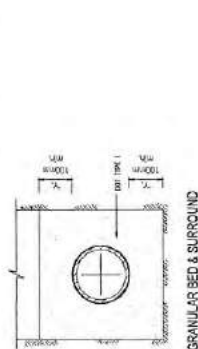
TYPICAL PLAN



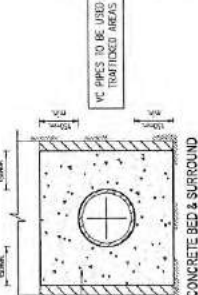
TYPICAL FOUL WATER DEMARCATION MANHOLE (TYPE B)



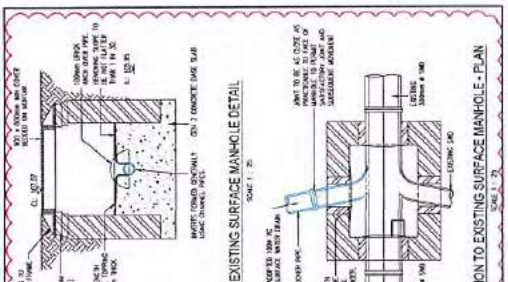
GRANULAR BED & SURROUND



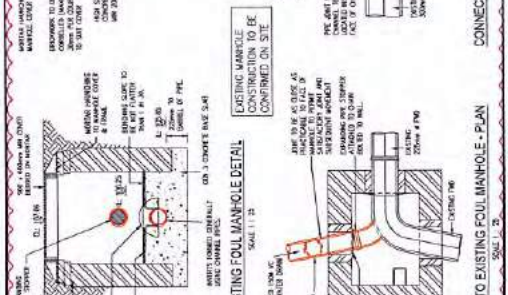
CONCRETE BED & SURROUND



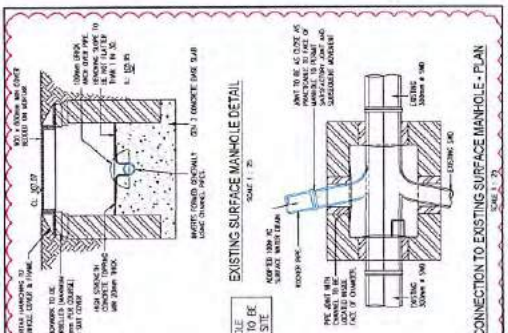
EXISTING SURFACE MANHOLE DETAIL



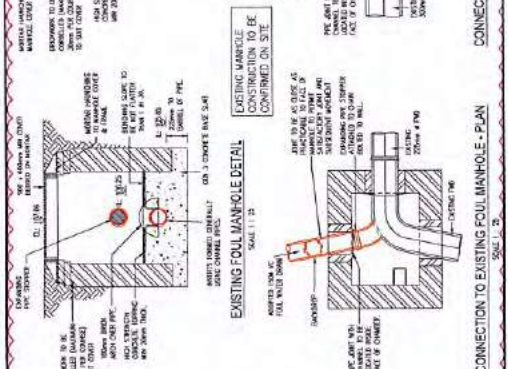
TING FOUL MANHOLE DETAIL.



CONNECTION TO EXISTING SURFACE MANHOLE - PLAN



CONNECTION TO EXISTING FOUL MANHOLE - PLAN

[illegible]

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30 Western Bridge Road
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 Leicestershire LE19 1QF
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 Fax: 0202 9632 7511

PARK GROVE BURLEIGH

1000

PARK GROVE SURGERY
BARNSELEY

DRAINAGE

DETAILS

Draining Date:	Draining Hrs.	Days
File: OCT 2896		

1	Y379/00/06	1
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