BRIDGES POUND
CONSULTING ENGINEERS

ASSESSMENT OF FOUL WATER DRAINAGE FLOW RATES

FOR

PROPOSED EXTENSION TO THE TRAVELODGE HOTEL

AT

STOCKLEY PARK, UXBRIDGE

BRIDGES POUND
CONSULTING ENGINEERS

Assessment of Foul Water Drainage Flow Rates
Proposed Extension to the Travelodge Hotel
Stockley Park, Uxbridge

REVISIONS

REV	PURPOSE	REVISION DETAILS	DATE
0	Initial Issue		November 2024

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1.0 INTRODUCTION

It is proposed to convert an existing two storey building into hotel accommodation to extend the existing Travelodge Hotel at The Arena, Stockley Park. The existing building is part of the Arena complex and was formerly a Wetherspoons pub at ground floor level and provided office accommodation at first floor. The Travelodge Hotel was constructed circa 2020 and is linked to the existing Arena building at first floor level.

The Arena is part of an extensive business park known as Stockley Park that occupies a site area of approximately 60 hectares.

Stockley Park is located in Uxbridge, West London, near Heathrow Airport. The Arena comprises leisure facilities including sports complex, restaurant, bars and retail units.

This document assesses the impact of additional foul water flows from the proposed hotel extension on the existing Stockley Park East gravity foul drainage system.

Reference for this report is taken from a Bridges Pound ltd report issued September 2017 for the original Travelodge Hotel in which foul water flowrates for the Stockley Park East site were assessed, based on information available at that time.

2.0 FLOW RATE ASSESSMENT

The foul water flowrate for the existing Arena site, including the current Travelodge Hotel has been compared to the anticipated foul water flow rater for the Arena site, including the proposed hotel extension.

Using BS EN 12056-2:2000, the flowrate for each building has been assessed using Table 2 – System III as recommended in Building Regulations Approved Document H1, Clause 1.39.

Data provided by George Harwood Ltd (supplied 2017) has been used to calculate the number of DU units for the Nuffield Sports centre and the Golf club. Surveys of the existing Arena buildings have been used to estimate number of DU units for the ground floor retail units, former Wetherspoons and the first-floor office area.

The DU units from each building have been incorporated into a drainage network design to assess the existing foul drainage flowrates. Micro Drainage has been used to analyse the foul water drainage network. These networks have been analysed and included in Appendix A.

Using table 3 in BS EN 12056-2:2000, the frequency of usage (K) for office buildings is 0.5. For hotels and restaurants, the frequency of usage (K) is 0.7.

For the Arena, that includes shops, restaurants, office areas and a fitness centre, a frequency factor of K = 0.7 has been applied. The proposed hotel will have a frequency factor K = 0.7.

Record drawings indicate that the existing foul water drainage pipes to the Arena are 150mm diameter, laid at a 1 in 60 gradient.

For the existing Arena site that includes the current Travelodge Hotel and Golf club, a foul water flow rate of 14.4 l/s has been calculated.

The proposed foul water flow rate for the existing Arena site that includes the current Travelodge Hotel and Golf club plus the proposed hotel extensions, a foul water flow rate of 15.3 l/s has been calculated.

The existing 150mm diameter foul water drainage pipe leaving the Arena site has capacity of 20.0 l/s which is greater than proposed flow rate of 15.3 l/s.

The increase in flow rate to due the hotel extension = 15.3l/s – 14.4 l/s = 0.9 l/s, which equates to a 4% increase, assuming that all buildings will be in full occupation at the same time..

The existing 150mm diameter foul water drainage system to the Arena is suitable for the increased flow rater of 0.9 l/s.

3.0 IMPACT ON EXISTING STOCKLEY PARK EAST FOUL WATER DRAINAGE

The existing foul water drainage system for the Stockley Park East site discharges into a pumping station.

Referring to the Bridges Pound report issued 2017, the peak flow rate for all buildings on the Stockley Park East site, the Arena, Golf Club and existing hotel if occurring at the same time. A flow rate of 21.7l/s was calculated. This flow rate assumes that all buildings, including the hotel, will be in full occupation at the same time.

Record drawings for the pumping station, indicated that the incoming pipe into the pumping station is a 225mm diameter pipe. Assuming a pipe gradient of 1 in 60, a flow capacity of 59 l/s was assumed.

The increase in foul water flowrate from the proposed hotel extension has been calculated to be 0.9 l/s.

By inspection the increase in foul water flow rate of 21.7 + 0.9 l/s = 22.6 l/s can be accommodated by the existing 225mm diameter foul water drainage system.

4.0 SUMMARY OF FLOW RATE ASSESSMENTS

The existing foul water flow rate from Stockley Park East, including all office buildings, the Arena, Golf Club and the existing Travelodge Hotel discharging into the pumping station was calculated to be 21.7l/s. This flowrate assumes that all buildings will be at full occupation at the same time.

The anticipated increase in foul water from the extended hotel has been calculated to be 0.9 l/s. Which will increase the foul water flow in the Stockley Park East drainage system to 22.6l/s. This equates to a 4% increase, when assuming that all buildings on the site will be in full occupation at the same time. This assumption is conservative as it is unlikely that the hotel will be in full occupation at the same time as the office blocks.

Both the existing onsite drainage to the Arena and the Stockley Park East site has sufficient capacity for this increase in flow rate.

Appendix A

Flow Rate Summaries & Estimations

Existing Foul Water Flowrate

Bridges Pound Ltd		Page 1
Bridge House 141 Albany Road Coventry, CV5 6ND	Stockley Park - Arena EXISTING Golf+Arena+Ex Hotel	Micro Drainage
Date 29/11/2024 12:35 File M2439 Ex FWD.MDX	Designed by AG Checked by	
Innovyze	Network 2019.1	

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)	250

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	Auto Design
1.000	7.500	0.125	60.0	0.000	21.2	0.0	1.500	o	150	Pipe/Conduit	
1.001	8.000	0.133	60.2	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
1.002	11.500	0.192	59.9	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
1.003	18.500	0.308	60.1	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
1.004	11.500	0.192	59.9	0.000	404.1	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	35.850	0.000	0.0	21.2	0.0	41	0.83	1.13	20.0	3.2
1.001	35.725	0.000	0.0	21.2	0.0	41	0.83	1.13	20.0	3.2
1.002	35.592	0.000	0.0	21.2	0.0	41	0.83	1.13	20.0	3.2
1.003	35.400	0.000	0.0	21.2	0.0	41	0.83	1.13	20.0	3.2
1.004	35.092	0.000	0.0	425.3	0.0	94	1.23	1.13	20.0	14.4

Foul Drainage Design to BS EN 12056-2:2000

Project Title:
Job No: M2439
Ex Arena and Golf
plus ex Hotel

Calculation of Waste water flows for Drain systems

Discharge Unit Calculation in Accordance with Table 2

Determine Frequency factor from Table 3

Type of Building		K
Dwellling, Guest House, Office (Intermittent Use)		0.5
Hospital, School, Restaurant, Hotel (Frequesnt Use)		0.7
Toilets and/or shower open to public (Congested Use		1
Laboratory Buildings (Special Use)		1.2

Discharge Unit Calculation from Table 2 - **System III**

Utilise K = 0.7

Drain Ref.	WC with 6L Cistern	Urinal + cistern	Wash Basin	Shower	Bath	Kitchen sink	Dish Washer	Total Units
Wetherspoons	9	3	9			2	2	22.2
								0
Subway	1		3	0		1	1	4.1
								0
Costa	1		2			1	1	3.8
								0
Greggs	1	0	2	0		2	1	5.1
								0
Former WHS	1		1			1		3.3
								0
Nuffield Sports	49	8	42	25		7	1	118.4
								0
Golf Club	8	2	8	4		2	1	21.2
								0
Management Centre	4	2	4	0		1	1	10.3
								0
Existing Hotel	82		83	63	18	18	3	236.9
								0
								0
						Total Discharge l/s		425.3
Total Units for Each Appliance Type	156	15	154	92		35	11	
Discharge l/s for each Appliance type	1.7	0.4	0.3	0.4		1.3	0.2	
Total Discharge for each Appliance	265.2	6	46.2	36.8		45.5	2.2	401.9
K = Frequency Factor	0.7							

Proposed Foul Water Flowrate

Bridges Pound Ltd		Page 1
Bridge House 141 Albany Road Coventry, CV5 6ND	Stockley Park - Arena PROPOSED Golf+Arena+Ex Hotel+Extension	Micro Drainage
Date 29/11/2024 12:57 File M2439 Proposed FWD.MDX	Designed by AG Checked by	
Innovyze	Network 2019.1	

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)	250

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	Auto Design
1.000	7.500	0.125	60.0	0.000	21.2	0.0	1.500	o	150	Pipe/Conduit	
1.001	8.000	0.133	60.2	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
1.002	11.500	0.192	59.9	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
1.003	18.500	0.308	60.1	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
1.004	11.500	0.192	59.9	0.000	453.7	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	35.850	0.000	0.0	21.2	0.0	41	0.83	1.13	20.0	3.2
1.001	35.725	0.000	0.0	21.2	0.0	41	0.83	1.13	20.0	3.2
1.002	35.592	0.000	0.0	21.2	0.0	41	0.83	1.13	20.0	3.2
1.003	35.400	0.000	0.0	21.2	0.0	41	0.83	1.13	20.0	3.2
1.004	35.092	0.000	0.0	474.9	0.0	98	1.25	1.13	20.0	15.3

Foul Drainage Design to BS EN 12056-2:2000

Project Title:
Job No: M2439
Ex Arena and Golf
plus ex Hotel

Calculation of Waste water flows for Drain systems

Discharge Unit Calculation in Accordance with Table 2

Determine Frequency factor from Table 3

Type of Building		K
Dwellling, Guest House, Office (Intermittent Use)		0.5
Hospital, School, Restaurant, Hotel (Frequesnt Use)		0.7
Toilets and/or shower open to public (Congested Use		1
Laboratory Buildings (Special Use)		1.2

Discharge Unit Calculation from Table 2 - **System III**

Utilise K = 0.7

Drain Ref.	WC with 6L Cistern	Urinal + cistern	Wash Basin	Shower	Bath	Kitchen sink	Dish Washer	Total Units
Wetherspoons	9	3	9			2	2	**22.2**
								0
Subway	1		3	0		1	1	**4.1**
								0
Costa	1		2			1	1	**3.8**
								0
Greggs	1	0	2	0		2	1	**5.1**
								0
Former WHS	1		1			1		**3.3**
								0
Nuffield Sports	49	8	42	25		7	1	**118.4**
								0
Golf Club	8	2	8	4		2	1	**21.2**
								0
Management Centre	4	2	4	0		1	1	**10.3**
								0
Existing Hotel	82		83	63	18	18	3	**236.9**
								0
Alterations to Hotel 2nd floor	-1		-2			-2	-2	**-5.3**
Proposed 2nd floor	7		7	7				**16.8**
Proposed Hotel Ground Floor	14		16	13		3	2	**38.1**
								0
								0
						Total Discharge l/s		**474.9**
Total Units for Each Appliance Type	**176**	**15**	**175**	**112**		**36**	**11**	
Discharge l/s for each Appliance type	1.7	0.4	0.3	0.4		1.3	0.2	
Total Discharge for each Appliance	299.2	6	52.5	44.8		46.8	2.2	451.5
K = Frequency Factor	0.7							

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Appendix B

Bridges Pound Ltd
Drainage Report
'Assessment of Foul Water Drainage Flow Rates'
Issued September 2017

BRIDGES POUND
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ASSESSMENT OF FOUL WATER DRAINAGE FLOW RATES

FOR

PROPOSED TRAVELODGE

AT

STOCKLEY PARK, UXBRIDGE

BRIDGES POUND
CONSULTING ENGINEERS

Assessment of Foul Water Drainage Flow Rates
Proposed Travelodge
Stockley Park, Uxbridge

REVISIONS

REV	PURPOSE	REVISION DETAILS	DATE
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BRIDGES POUND
CONSULTING ENGINEERS

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APPENDICES

APPENDIX A Flow Rate Summaries & Estimations

APPENDIX B Drainage Network Calculations

1.0 INTRODUCTION

It is proposed to construct a Travelodge Hotel at The Arena, Stockley Park. The Arena is part of an extensive business park known as Stockley Park that occupies a site area of approximately 60 hectares.

Stockley Park is located in Uxbridge, West London, near Heathrow Airport. The Arena comprises leisure facilities including sports complex, restaurant, bars and retail units.

The new three storey hotel will comprise hotel accommodation at first and second floors with under croft parking at ground floor. The majority of the new building will be located over existing car parking areas and partially over-sail the existing building.

This documents assesses the impact of additional foul water flows from the proposed hotel on the existing Stockley Park East gravity foul drainage system.

2.0 EXISTING SITE FOUL DRAINAGE

The existing foul drainage system for Stockley Park East is gravity fed towards a foul pumping station that then takes foul drainage via a rising main to connect into the Thames Water Foul drainage system.

George Harwood Ltd have carried out a survey on each building on the existing Stockley Park East site and the Arena site to assess the number of appliances each building has. Appliances counted include WCs, urinals, wash basis, showers, kitchen sinks and dishwaters.

3.0 FLOW RATE ASSESSMENT

Using BS EN 12056-2:2000, the flowrate for each building has been assessed using Table 2 – System III as recommended in Building Regulations Approved Document H1, Clause 1.39.

Data provided by George Harwood Ltd has been used to calculate the number of DU units for each building. The DU units from each building has been incorporated into a drainage network design to assess existing foul drainage flowrates. Micro Drainage has been used to analyse the foul water drainage network. These networks have been analysed and included in Appendix B.

Using table 3 in BS EN 12056-2:2000, the frequency of usage (K) for office buildings is 0.5. For hotels and restaurants, the frequency of usage (K) is 0.7.

Stockley Park East comprises mostly offices has a frequency factor K = 0.5 has been applied. For the Arena, that includes shops, restaurants and the fitness centre, a frequency factor of K = 0.7 has been applied. The proposed hotel will have a frequency factor K = 0.7.

In order to combine flows of different frequency factors into the Micro Drainage software, the number of DU units for the Arena, Golf Club and Hotel have been increased by a factor of 1.4^2 this will provide an equivalent flow rate to achieve a frequency factor of K = 0.7.

Peak flow rates have been assessed for when all buildings on the Stockley Park East site, the Arena, Golf Club and proposed hotel occur at the same time. A flow rate of 21.7l/s has been calculated.

It is likely that the peak flow rate from the office buildings and proposed hotel will occur at different times. During the evening, it has been assumed that the hotel will be at 100% occupancy when the office buildings on Stockley Park East are at 50% occupancy, a peak flow rate of 18.3l/s has been calculated. For this calculation, it has been assumed that the Arena and Golf Club will also be at 100% occupancy.

During daytime, it has been assumed that the hotel will be at 50% occupancy the office buildings at 100% occupancy, a peak flowrate of 20.5l/s has been assessed. Again the Arena and golf club have been assumed to be at 100% occupancy.

These figures are summarised in Appendix A.

4.0 SUMMARY OF FLOW RATE ASSESSMENTS

The flow rate from all existing buildings on the Stockley Park East site, the Arena site and existing Golf Club has been assessed using the number of appliance for each building provided by George Harwood Ltd.

The existing foul water flow rate from Stockley Park East is 16.6l/s. When this flow rate is combined with flow rates from the existing Arena and Golf Club, a combined flow rate of 19.1l/s has been calculated.

The impact on flow rates from the proposed hotel has been assessed. The flowrate from the existing Stockley Park East site, together with the Arena, Golf Club and proposed Hotel has been calculated to be 21.7l/s, which equates to a 13.6% increase in flow rate on the existing foul water drainage system. This increase assumes that all buildings will be at full occupation at the same time.

The peak flow rate from the Hotel and offices located in the Stockley Park East are likely to be at different times.

During the evening, it has been assumed that the offices located on Stockley Park East will be at 50% occupancy, whilst the Hotel, Arena site and Golf club are at 100% occupancy. A peak flow rate of 18.3l/s has been assessed which is 4% less the existing daytime peak flow rate on the existing foul water drainage system.

During daytime, it has been assumed that the offices on Stockley Park East, existing buildings on the Arena and Golf Club are all at 100% occupancy and the Hotel is at 50% occupancy. The peak flow rate has been calculated to 20.5l/s which is a 7.3% increase on the existing foul water drainage system.

5.0 COMPARISON OF FLOW RATES

George Harwood have provided an "estimation" of foul discharges from the three areas of the office development, Arena and Golf Club and the proposed hotel.

These figures are enclosed in Appendix A.

There is a difference between the figures prepared by George Harwood and those we have determined. This comes from the fact that George Harwood have assumed a DU factor for System I, as per Table 2 of BS EN 10026 and Bridges Pound have used System III as noted in the Building Regulations Approved Document H1. We believe that this is therefore the correct way of assessing the flow rates.

When determining the overall flows to the pumping station it is not appropriate to summate the three separate flows from the areas concerned but to take the summated system flow. This results in a significant reduction in overall design flow.

At the worst case with the hotel flows added the flow into the pumping station will be 21.7 L/s compared to an estimated existing flow of 19.1 l/s, an increase of 2.6 l/s, considerably less than the 10.3 l/s flow if the hotel were taken alone.

6.0 FURTHER CONSIDERATIONS

` One matter not covered above is the flow generated by the sump pumps discharging from the void below the arena itself. These flows are as a result of failure of the waterproofing to the lakes and are discharged into the foul drainage from the arena.

No historic details of the pumps are available at the present but an estimation of the average flow rate is 2.5 l/s or effectively the additional flow from the Hotel site.

Appendix A

Flow Rate Summaries & Estimations

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Project				Job Ref.	
Stockley Park - Uxbridge				M1843	
Section				Sheet no./rev.	
Summary of Flow rates					
AG	Date	Chk'd by	Date	App'd by	Date Aug 2017

Stockley Park – Summary of Flow Rates

Network Flow rates using Micro Drainage

Number of Appliances taken from data provided by George Harwood Ltd

BS EN 12056-2:2000 – Table 2 – System III (as per Approved Document H1 Clause 1.39)

K = 0.5 for offices, K = 0.7 for Hotels and restaurants

Location	Frequency Factor K	Units DU	Flow Rate l/s
Existing Flow Rates			
Existing Arena & Golf Club	K=0.7	183.2	9.5
Existing Stockley Park East	K=0.5	1102.4	16.6
Existing Stockley Park East + Existing Arena & Golf Club	K=0.5	1285.6	17.9
Existing Stockley Park East + Existing Arena & Golf Club (Note DU Units for Arena and Golf Club have been increased by 1.4^2 to achieve an equivalent K factor of 0.7)	K=0.5 for Stockley East + K=0.7 for Arena & Golf Club		**Existing flow from all existing buildings = 19.1l/s**
Proposed Flow Rates			
Existing Stockley Park East + Existing Arena & Golf Club + Proposed Hotel	K=0.5	1502.8	19.4
Existing Stockley Park East + Existing Arena & Golf Club + Proposed Hotel	K=0.7	1502.8	27.1
Existing Stockley Park East + Existing Arena & Golf Club + Proposed Hotel (Note DU Units for Arena, Golf Club and Hotel have been increased by 1.4^2 to achieve an equivalent K factor of 0.7)	K=0.5 for Stockley East + K=0.7 for Arena & Golf Club + K=0.7 for Hotel		**Proposed flow from all existing buildings and new Hotel = 21.7l/s**
Assessment on % Increase in Existing Flow Rates due to Hotel			
% Increase in flow assuming maximum flow from all buildings at the same time	21.7 / 19.1 = 13.6%		13.6% increase if all buildings at max flow
Night Time – Assume Stockley Park East running at 50% and Arena + Golf Club + Hotel all running at 100%	18.3 / 19.1 = -4%		Flow rate = 18.3l/s this is 4% less than the existing daytime flow rate of 19.1l/s
Day Time – Assume Stockley Park East running at 100% and Arena + Golf Club at 100% and Hotel running at 50%	20.5 / 19.1 = 7.3%		Flow rate = 20.5l/s 7.3% increase to existing flow rate of 19.1l/s.

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Estimation of discharges into Foul Detention Tank / Pumping System for Stockley Park East

	WC with 6L Cistern	Urinal + Cistern	Wash Basin	Shower	Kitchen Sink	Dishwasher
Address						
1 Longwalk - Celegene	53	8	59	7	3	2
2 Longwalk - Lucozade, Ribena, Suntory	30	6	26	4	18	4
3 Longwalk - M&S	42	10	46	10	4	5
4 Longwalk - Aberdeen	30	10	26	2	2	2
5 Longwalk - IMG Productions	36	20	36	13	2	8
1 Roundwood - Kuehne & Nagel	16	6	14	4	2	
2 Roundwood - Gilead Science	30	10	26	4	2	
3 & 4 Roundwood - Cargo Logic Management	18	8	18	4	2	
5 Roundwood - MSC Cruise Management	34	12	11	6	14	2
6 Roundwood - Canon	19	5	16	4	9	2
7 Roundwood - Mitsubishi & Fiserve	24	8	27	2	5	2
1 Furzground - Regus	27	8	2	32	3	3
2 Furzground - Apple	23	12	22	1	6	4
3 Furzground - Mixed Tenancy	16	6	14	4	2	
4 Furzground - Sharp	18	3	24	1	9	5
Unit B5	30	10	26	4	2	
Maintenance Base	3	2	3	2	2	1
Total	449	144	396	104	87	40
Discharge (L/S)	2.0	0.8	0.5	0.6	0.8	0.8
Total Discharges L/Sec	898.0	115.2	198.0	62.4	69.6	32.0

∑ DU = Sum of Discharges (L/Sec)	1375.2
K = Frequency Factor (BS EN 12056 - Table 3)	0.5

Total Flow rate (L/S) = K√∑ DU **18.5**

BS EN 12056 Table 3 - Typical Frequency Factors (K)

Usage of Appliance	**K**
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

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Estimation of foul discharges From The Arena

	WC with 6L Cistern	Urinal + Cistern	Wash Basin	Shower	Kitchen Sink	Dishwasher
Address						
Wetherspoons	9	3	9		2	2
Subway	1		2	0	1	1
Costa	1	0	1	0	1	1
Greggs	1	0	2	0	1	1
Nuffield Sports	49	8	42	25	7	1
Golf Club	8	2	8	4	2	1
Management Centre	4	2	4	0	1	1
Total	73	15	68	29	15	8
Discharge (L/S)	2.0	0.8	0.5	0.6	0.8	0.8
Total Discharges L/Sec	146.0	12.0	34.0	17.4	12.0	6.4

∑ DU = Sum of Discharges (L/Sec)	227.8
K = Frequency Factor (BS EN 12056 - Table 3)	0.7

Total Flow rate (L/S) = K $\sqrt{\sum}$ DU **10.6**

BS EN 12056 Table 3 - Typical Frequency Factors (K)

Usage of Appliance	**K**
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

Estimation of foul discharges From the Proposed Travelodge

George Harwood Ltd

	WC with 6L Cistern	Urinal + Cistern	Wash Basin	Shower	Bath	Kitchen Sink	Dishwasher
Address							
First Floor	44		44	35	9	1	0
Second Floor	38		39	28	9	2	2
Total	82	0	83	63	18	3	2
Discharge (L/S)	2.0	0.8	0.5	0.6	0.8	0.8	0.8
Total Discharges L/Sec	164.0	0.0	41.5	37.8	14.4	2.4	1.6

∑ DU = Sum of Discharges (L/Sec)	261.7
K = Frequency Factor (BS EN 12056 - Table 3)	0.7
Total Flow rate (L/S) = K √∑ DU	**11.3**

BS EN 12056 Table 3 - Typical Frequency Factors (K)

Usage of Appliance	**K**
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

Note:
Discharges assessed using Urban Legend Drawings lodged as part of the planning application via the Hilingdon website.
Proposed ground Floor Rev D02
Proposed First Floor Rev D02
Proposed Second Floor Rev D02

Using Table 2 of BS EN 12056 I have assumed System 1 discharges and WC's with 6.0L cisterns

Appendix B

Drainage Network Calculations

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	0.50	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)	250

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	95.000	1.583	60.0	0.000	118.1	0.0	1.500	o	100	Pipe/Conduit
1.001	90.000	1.500	60.0	0.000	87.0	0.0	1.500	o	150	Pipe/Conduit
1.002	90.000	1.500	60.0	0.000	99.4	0.0	1.500	o	150	Pipe/Conduit
1.003	50.000	0.833	60.0	0.000	66.6	0.0	1.500	o	150	Pipe/Conduit
1.004	42.000	0.700	60.0	0.000	59.8	0.0	1.500	o	150	Pipe/Conduit
1.005	55.000	0.917	60.0	0.000	89.4	0.0	1.500	o	150	Pipe/Conduit
2.000	55.000	0.917	60.0	0.000	38.0	0.0	1.500	o	100	Pipe/Conduit
3.000	50.000	0.833	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
2.001	50.000	0.833	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
2.002	63.000	1.050	60.0	0.000	67.0	0.0	1.500	o	150	Pipe/Conduit
2.003	84.000	1.400	60.0	0.000	43.4	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	40.000	0.000	0.0	118.1	0.0	68	0.96	0.86	6.8	5.4
1.001	38.367	0.000	0.0	205.1	0.0	62	1.04	1.13	20.0	7.2
1.002	36.867	0.000	0.0	304.5	0.0	69	1.09	1.13	20.0	8.7
1.003	35.367	0.000	0.0	371.1	0.0	73	1.12	1.13	20.0	9.6
1.004	34.533	0.000	0.0	430.9	0.0	77	1.14	1.13	20.0	10.4
1.005	33.833	0.000	0.0	520.3	0.0	81	1.17	1.13	20.0	11.4
2.000	0.000	0.000	0.0	38.0	0.0	47	0.84	0.86	6.8	3.1
3.000	0.000	0.000	0.0	0.0	0.0	0	0.00	1.13	20.0	0.0
2.001	-0.967	0.000	0.0	38.0	0.0	40	0.82	1.13	20.0	3.1
2.002	-1.800	0.000	0.0	105.0	0.0	52	0.95	1.13	20.0	5.1
2.003	-2.850	0.000	0.0	148.4	0.0	57	0.99	1.13	20.0	6.1

EXISTING STOCKLEY PARK EAST K=0.5

UNITS = 1102.4 DU
FLOW = 16.6 L/S

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
2.004	131.000	2.183	60.0	0.000	86.9	0.0	1.500	o	150	Pipe/Conduit
1.006	68.000	1.133	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
1.007	30.000	0.500	60.0	0.000	67.0	0.0	1.500	o	150	Pipe/Conduit
1.008	62.000	1.033	60.0	0.000	52.8	0.0	1.500	o	150	Pipe/Conduit
1.009	27.000	0.450	60.0	0.000	59.5	0.0	1.500	o	150	Pipe/Conduit
1.010	9.000	0.150	60.0	0.000	38.0	0.0	1.500	o	150	Pipe/Conduit
1.011	30.000	0.500	60.0	0.000	67.0	0.0	1.500	o	150	Pipe/Conduit
1.012	58.000	0.967	60.0	0.000	52.1	0.0	1.500	o	150	Pipe/Conduit
1.013	40.000	0.667	60.0	0.000	10.4	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)
2.004	-4.250	0.000	0.0	235.3	0.0	64	1.06	1.13	20.0	7.7
1.006	-6.433	0.000	0.0	755.6	0.0	91	1.22	1.13	20.0	13.7
1.007	-7.567	0.000	0.0	822.6	0.0	94	1.23	1.13	20.0	14.3
1.008	-8.067	0.000	0.0	875.4	0.0	96	1.24	1.13	20.0	14.8
1.009	-9.100	0.000	0.0	934.9	0.0	98	1.25	1.13	20.0	15.3
1.010	-9.550	0.000	0.0	972.9	0.0	99	1.25	1.13	20.0	15.6
1.011	-9.700	0.000	0.0	1039.9	0.0	102	1.26	1.13	20.0	16.1
1.012	-10.200	0.000	0.0	1092.0	0.0	104	1.27	1.13	20.0	16.5
1.013	-11.166	0.000	0.0	1102.4	0.0	104	1.27	1.13	20.0	16.6

Estimation of Flowrate for Stockley Park East

Number of units taken from George Harwood Data

Foul Drainage Design to BS EN 12056-2:2000

Project Title:
Job No: M1843
Ex Stockley Park

Calculation of Waste water flows for Drain systems

Discharge Unit Calculation in Accordance with Table 2

Determine Frequency factor from Table 3

Type of Building	K
Dwellling, Guest House, Office (Intermittent Use)	0.5
Hospital, School, Restaurant, Hotel (Frequesnt Use)	0.7
Toilets and/or shower open to public (Congested Use	1
Laboratory Buildings (Special Use)	1.2

Discharge Unit Calculation from Table 2 - **System III**

Utilise K = 0.5

Drain Ref.	WC with 6L Cistern	Urinal + cistern	Wash Basin	Shower	Kitchen sink	Dish Washer	Total Units
1 Longwalk - Celegene	53	8	59	7	3	2	**118.1**
2 Longwalk - lucozade, Ribina, Suntory	30	6	26	4	18	4	**87**
3 Longwalk - M&S	42	10	46	10	4	5	**99.4**
4 Longwalk - Aberdeen	30	10	26	2	2	2	**66.6**
5 Longwalk - IMG Productions	36	20	36	13	2	8	**89.4**
1 Roundwood - Kuehne & Nagel	16	6	14	4	2	0	**38**
2 Roundwood - Gilead Science	30	10	26	4	2	0	**67**
3&4 Roundwood - Cargo Logic Management	18	8	18	4	2	0	**43.4**
5 Roundwood - MSC Cruise management	34	12	11	6	14	2	**86.9**
6 Roundwood - Canon	19	5	16	4	9	2	**52.8**
7 Roundwood - Mitsubishi & Fiserve	24	8	27	2	5	2	**59.8**
1 Furzground - Regus	27	8	2	32	3	3	**67**
2 Furzground - Apple	23	12	22	1	6	4	**59.5**
3 Furzground - Mixed Tenancy	16	6	14	4	2	0	**38**
4 Furzground - Sharp	18	3	24	1	9	5	**52.1**
Unit B5	30	10	26	4	2	0	**67**
Maintenance Base	3	2	3	2	2	1	**10.4**
					Total Discharge l/s		**1102.4**
Total Units for Each Appliance Type	**449**	**144**	**396**	**104**	**87**	**40**	
Discharge l/s for each Appliance type	1.7	0.4	0.3	0.4	1.3	0.2	
Total Discharge for each Appliance	763.3	57.6	118.8	41.6	113.1	8	1102.4
K = Frequency Factor	0.5						
Total Flow Rate (L/S) = K $\sqrt{\sum DU}$ =	**16.6**						

Estimation of Flowrate for Stockley Park East

Number of units taken from George Harwood Data

Foul Drainage Design to BS EN 12056-2:2000

Project Title:
Job No: M1843
Ex Stockley Park

Calculation of Waste water flows for Drain systems

Discharge Unit Calculation in Accordance with Table 2

Determine Frequency factor from Table 3

Type of Building	K
Dwellling, Guest House, Office (Intermittent Use)	0.5
Hospital, School, Restaurant, Hotel (Frequesnt Use)	0.7
Toilets and/or shower open to public (Congested Use	1
Laboratory Buildings (Special Use)	1.2

Discharge Unit Calculation from Table 2 - **System I**

Utilise K = 0.5

Drain Ref.	WC with 6L Cistern	Urinal + cistern	Wash Basin	Shower	Kitchen sink	Dish Washer	Total Units
1 Longwalk - Celegene	53	8	59	7	3	2	**150.1**
2 Longwalk - lucozade, Ribina, Suntory	30	6	26	4	18	4	**97.8**
3 Longwalk - M&S	42	10	46	10	4	5	**128.2**
4 Longwalk - Aberdeen	30	10	26	2	2	2	**85.4**
5 Longwalk - IMG Productions	36	20	36	13	2	8	**121.8**
1 Roundwood - Kuehne & Nagel	16	6	14	4	2	0	**47.8**
2 Roundwood - Gilead Science	30	10	26	4	2	0	**85**
3&4 Roundwood - Cargo Logic Management	18	8	18	4	2	0	**55.4**
5 Roundwood - MSC Cruise management	34	12	11	6	14	2	**99.5**
6 Roundwood - Canon	19	5	16	4	9	2	**61.2**
7 Roundwood - Mitsubishi & Fiserve	24	8	27	2	5	2	**74.7**
1 Furzground - Regus	27	8	2	32	3	3	**85.4**
2 Furzground - Apple	23	12	22	1	6	4	**75.2**
3 Furzground - Mixed Tenancy	16	6	14	4	2	0	**47.8**
4 Furzground - Sharp	18	3	24	1	9	5	**62.2**
Unit B5	30	10	26	4	2	0	**85**
Maintenance Base	3	2	3	2	2	1	**12.7**
					Total Discharge l/s		**1375.2**
Total Units for Each Appliance Type	**449**	**144**	**396**	**104**	**87**	**40**	
Discharge l/s for each Appliance type	2	0.8	0.5	0.6	0.8	0.8	
Total Discharge for each Appliance	898	115.2	198	62.4	69.6	32	1375.2
K = Frequency Factor	0.5						
Total Flow Rate (L/S) = K √∑DU =	**18.5**						

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)	250

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	7.500	0.125	60.0	0.000	21.2	0.0	1.500	o	150	Pipe/Conduit
1.001	8.000	0.133	60.2	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
1.002	11.500	0.192	59.9	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
1.003	18.500	0.308	60.1	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
1.004	11.500	0.192	59.9	0.000	162.0	0.0	1.500	o	150	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Units	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	35.850	0.000	0.0	21.2	0.0	41	0.83	1.13	20.0	3.2
1.001	35.725	0.000	0.0	21.2	0.0	41	0.83	1.13	20.0	3.2
1.002	35.592	0.000	0.0	21.2	0.0	41	0.83	1.13	20.0	3.2
1.003	35.400	0.000	0.0	21.2	0.0	41	0.83	1.13	20.0	3.2
1.004	35.092	0.000	0.0	183.2	0.0	73	1.12	1.13	20.0	9.5

Ex ARENA + Ex GOLF

K = 0.7

Estimation of Flowrate for Existing Arena and Golf Club

Number of units taken from George Harwood Data

Foul Drainage Design to BS EN 12056-2:2000

Project Title:
Job No: M1843
Ex Arena and Golf

Calculation of Waste water flows for Drain systems

Discharge Unit Calculation in Accordance with Table 2

Determine Frequency factor from Table 3

Type of Building	K
Dwellling, Guest House, Office (Intermittent Use)	0.5
Hospital, School, Restaurant, Hotel (Frequesnt Use)	0.7
Toilets and/or shower open to public (Congested Use	1
Laboratory Buildings (Special Use)	1.2

Discharge Unit Calculation from Table 2 - **System III**

Utilise K = 0.7

Drain Ref.	WC with 6L Cistern	Urinal + cistern	Wash Basin	Shower	Kitchen sink	Dish Washer	Total Units
Wetherspoons	9	3	9		2	2	**22.2**
							0
Subway	1		2	0	1	1	**3.8**
							0
Costa	1		1		1	1	**3.5**
							0
Greggs	1	0	2	0	1	1	**3.8**
							0
Nuffield Sports	49	8	42	25	7	1	**118.4**
							0
Golf Club	8	2	8	4	2	1	**21.2**
							0
Management Centre	4	2	4	0	1	1	**10.3**
							0
							0
							0
							0
					Total Discharge l/s		**183.2**
Total Units for Each Appliance Type	**73**	**15**	**68**	**29**	**15**	**8**	
Discharge l/s for each Appliance type	1.7	0.4	0.3	0.4	1.3	0.2	
Total Discharge for each Appliance	124.1	6	20.4	11.6	19.5	1.6	183.2
K = Frequency Factor	0.7						
Total Flow Rate (L/S) = K $\sqrt{\sum DU}$ =	**9.5**						

Estimation of Flowrate for Existing Arena and Golf Club

Number of units taken from George Harwood Data

Foul Drainage Design to BS EN 12056-2:2000

Project Title:
Job No: M1843
Ex Arena and Golf

Calculation of Waste water flows for Drain systems

Discharge Unit Calculation in Accordance with Table 2

Determine Frequency factor from Table 3

Type of Building	K
Dwellling, Guest House, Office (Intermittent Use)	0.5
Hospital, School, Restaurant, Hotel (Frequesnt Use)	0.7
Toilets and/or shower open to public (Congested Use	1
Laboratory Buildings (Special Use)	1.2

Discharge Unit Calculation from Table 2 - **System I**

Utilise K = 0.7

Drain Ref.	WC with 6L Cistern	Urinal + cistern	Wash Basin	Shower	Kitchen sink	Dish Washer	Total Units
Wetherspoons	9	3	9		2	2	**28.1**
							0
Subway	1		2	0	1	1	**4.6**
							0
Costa	1		1		1	1	**4.1**
							0
Greggs	1	0	2	0	1	1	**4.6**
							0
Nuffield Sports	49	8	42	25	7	1	**146.8**
							0
Golf Club	8	2	8	4	2	1	**26.4**
							0
Management Centre	4	2	4	0	1	1	**13.2**
							0
							0
							0
							0
					Total Discharge l/s		**227.8**
Total Units for Each Appliance Type	**73**	**15**	**68**	**29**	**15**	**8**	
Discharge l/s for each Appliance type	2	0.8	0.5	0.6	0.8	0.8	
Total Discharge for each Appliance	146	12	34	17.4	12	6.4	227.8
K = Frequency Factor	0.7						
Total Flow Rate (L/S) = K √∑DU =	**10.6**						

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	0.50	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)	250

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	95.000	1.583	60.0	0.000	118.1	0.0	1.500	o	100	Pipe/Conduit
1.001	90.000	1.500	60.0	0.000	87.0	0.0	1.500	o	150	Pipe/Conduit
1.002	90.000	1.500	60.0	0.000	99.4	0.0	1.500	o	150	Pipe/Conduit
1.003	50.000	0.833	60.0	0.000	66.6	0.0	1.500	o	150	Pipe/Conduit
1.004	42.000	0.700	60.0	0.000	59.8	0.0	1.500	o	150	Pipe/Conduit
1.005	55.000	0.917	60.0	0.000	89.4	0.0	1.500	o	150	Pipe/Conduit
2.000	55.000	0.917	60.0	0.000	38.0	0.0	1.500	o	100	Pipe/Conduit
3.000	7.500	0.125	60.0	0.000	21.2	0.0	1.500	o	150	Pipe/Conduit
3.001	8.000	0.133	60.2	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
3.002	11.500	0.192	59.9	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
3.003	18.500	0.308	60.1	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
3.004	11.500	0.192	59.9	0.000	162.0	0.0	1.500	o	150	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Units	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	40.000	0.000	0.0	118.1	0.0	68	0.96	0.86	6.8	5.4
1.001	38.367	0.000	0.0	205.1	0.0	62	1.04	1.13	20.0	7.2
1.002	36.867	0.000	0.0	304.5	0.0	69	1.09	1.13	20.0	8.7
1.003	35.367	0.000	0.0	371.1	0.0	73	1.12	1.13	20.0	9.6
1.004	34.533	0.000	0.0	430.9	0.0	77	1.14	1.13	20.0	10.4
1.005	33.833	0.000	0.0	520.3	0.0	81	1.17	1.13	20.0	11.4
2.000	0.000	0.000	0.0	38.0	0.0	47	0.84	0.86	6.8	3.1
3.000	0.000	0.000	0.0	21.2	0.0	34	0.75	1.13	20.0	2.3
3.001	-0.125	0.000	0.0	21.2	0.0	34	0.75	1.13	20.0	2.3
3.002	-0.258	0.000	0.0	21.2	0.0	34	0.75	1.13	20.0	2.3
3.003	-0.450	0.000	0.0	21.2	0.0	34	0.75	1.13	20.0	2.3
3.004	-0.758	0.000	0.0	183.2	0.0	60	1.02	1.13	20.0	6.8

EXISTING STOCKLEY PARK EAST + EX. ARENA + EX GOLF

K=0.5

UNITS = 1102.4 + 183.2 = 1285.6 DU

FLOW = 17.9 L/S

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
2.001	50.000	0.833	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
2.002	63.000	1.050	60.0	0.000	67.0	0.0	1.500	o	150	Pipe/Conduit
2.003	84.000	1.400	60.0	0.000	43.4	0.0	1.500	o	150	Pipe/Conduit
2.004	131.000	2.183	60.0	0.000	86.9	0.0	1.500	o	150	Pipe/Conduit
1.006	68.000	1.133	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
1.007	30.000	0.500	60.0	0.000	67.0	0.0	1.500	o	150	Pipe/Conduit
1.008	62.000	1.033	60.0	0.000	52.8	0.0	1.500	o	150	Pipe/Conduit
1.009	27.000	0.450	60.0	0.000	59.5	0.0	1.500	o	150	Pipe/Conduit
1.010	9.000	0.150	60.0	0.000	38.0	0.0	1.500	o	150	Pipe/Conduit
1.011	30.000	0.500	60.0	0.000	67.0	0.0	1.500	o	150	Pipe/Conduit
1.012	58.000	0.967	60.0	0.000	52.1	0.0	1.500	o	150	Pipe/Conduit
1.013	40.000	0.667	60.0	0.000	10.4	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)
2.001	-0.967	0.000	0.0	221.2	0.0	63	1.05	1.13	20.0	7.4
2.002	-1.800	0.000	0.0	288.2	0.0	68	1.09	1.13	20.0	8.5
2.003	-2.850	0.000	0.0	331.6	0.0	71	1.11	1.13	20.0	9.1
2.004	-4.250	0.000	0.0	418.5	0.0	76	1.14	1.13	20.0	10.2
1.006	-6.433	0.000	0.0	938.8	0.0	98	1.25	1.13	20.0	15.3
1.007	-7.566	0.000	0.0	1005.8	0.0	101	1.26	1.13	20.0	15.9
1.008	-8.066	0.000	0.0	1058.6	0.0	103	1.26	1.13	20.0	16.3
1.009	-9.099	0.000	0.0	1118.1	0.0	105	1.27	1.13	20.0	16.7
1.010	-9.549	0.000	0.0	1156.1	0.0	106	1.27	1.13	20.0	17.0
1.011	-9.699	0.000	0.0	1223.1	0.0	109	1.28	1.13	20.0	17.5
1.012	-10.199	0.000	0.0	1275.2	0.0	110	1.28	1.13	20.0	17.9
1.013	-11.166	0.000	0.0	1285.6	0.0	111	1.28	1.13	20.0	17.9

Bridges Pound Ltd		Page 1
Bridge House 141 Albany Road Coventry CV5 6ND	Stockley Park	
Date 05/09/2017 12:39 File M1843 Ex Stockley FWD p...	Designed by AG Checked by	
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 K=	0.50	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)	250

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	95.000	1.583	60.0	0.000	118.1	0.0	1.500	o	100	Pipe/Conduit
1.001	90.000	1.500	60.0	0.000	87.0	0.0	1.500	o	150	Pipe/Conduit
1.002	90.000	1.500	60.0	0.000	99.4	0.0	1.500	o	150	Pipe/Conduit
1.003	50.000	0.833	60.0	0.000	66.6	0.0	1.500	o	150	Pipe/Conduit
1.004	42.000	0.700	60.0	0.000	59.8	0.0	1.500	o	150	Pipe/Conduit
1.005	55.000	0.917	60.0	0.000	89.4	0.0	1.500	o	150	Pipe/Conduit
2.000	55.000	0.917	60.0	0.000	38.0	0.0	1.500	o	100	Pipe/Conduit
3.000	7.500	0.833	9.0	0.000	41.6	0.0	1.500	o	150	Pipe/Conduit
3.001	8.000	0.133	60.2	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
3.002	11.500	0.192	59.9	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
3.003	18.500	0.308	60.1	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
3.004	11.500	0.192	59.9	0.000	317.5	0.0	1.500	o	150	Pipe/Conduit

UNITS INCREASE BY 1.4^2 TO ACHIEVE EQUIVALENT FLOW FOR K = 0.7

ARENA + GOLF CLUB.

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	40.000	0.000	0.0	118.1	0.0	68	0.96	0.86	6.8	5.4
1.001	38.367	0.000	0.0	205.1	0.0	62	1.04	1.13	20.0	7.2
1.002	36.867	0.000	0.0	304.5	0.0	69	1.09	1.13	20.0	8.7
1.003	35.367	0.000	0.0	371.1	0.0	73	1.12	1.13	20.0	9.6
1.004	34.533	0.000	0.0	430.9	0.0	77	1.14	1.13	20.0	10.4
1.005	33.833	0.000	0.0	520.3	0.0	81	1.17	1.13	20.0	11.4
2.000	0.000	0.000	0.0	38.0	0.0	47	0.84	0.86	6.8	3.1
3.000	0.000	0.000	0.0	41.6	0.0	26	1.61	2.93	51.8	3.2
3.001	-0.833	0.000	0.0	41.6	0.0	41	0.83	1.13	20.0	3.2
3.002	-0.966	0.000	0.0	41.6	0.0	41	0.83	1.13	20.0	3.2
3.003	-1.158	0.000	0.0	41.6	0.0	41	0.83	1.13	20.0	3.2
3.004	-1.466	0.000	0.0	359.1	0.0	73	1.12	1.13	20.0	9.5

INCREASED FLOWS FOR K = 0.7

EX. STOCKLEY PARK EAST (K = 0.5) + EX. ARENA (K = 0.7) + EX. GOLF (K = 0.7)

FLOW = 19.1 l/s

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
2.001	50.000	0.372	134.3	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
2.002	63.000	1.050	60.0	0.000	67.0	0.0	1.500	o	150	Pipe/Conduit
2.003	84.000	1.400	60.0	0.000	43.4	0.0	1.500	o	150	Pipe/Conduit
2.004	131.000	2.183	60.0	0.000	86.9	0.0	1.500	o	150	Pipe/Conduit
1.006	68.000	1.133	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
1.007	30.000	0.500	60.0	0.000	67.0	0.0	1.500	o	150	Pipe/Conduit
1.008	62.000	1.033	60.0	0.000	52.8	0.0	1.500	o	150	Pipe/Conduit
1.009	27.000	0.450	60.0	0.000	59.5	0.0	1.500	o	150	Pipe/Conduit
1.010	9.000	0.150	60.0	0.000	38.0	0.0	1.500	o	150	Pipe/Conduit
1.011	30.000	0.500	60.0	0.000	67.0	0.0	1.500	o	150	Pipe/Conduit
1.012	58.000	0.967	60.0	0.000	52.1	0.0	1.500	o	150	Pipe/Conduit
1.013	40.000	0.667	60.0	0.000	10.4	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)
2.001	-1.658	0.000	0.0	397.1	0.0	97	0.83	0.76	13.3	10.0
2.002	-2.030	0.000	0.0	464.1	0.0	78	1.15	1.13	20.0	10.8
2.003	-3.080	0.000	0.0	507.5	0.0	80	1.17	1.13	20.0	11.3
2.004	-4.480	0.000	0.0	594.4	0.0	85	1.19	1.13	20.0	12.2
1.006	-6.663	0.000	0.0	1114.7	0.0	105	1.27	1.13	20.0	16.7
1.007	-7.797	0.000	0.0	1181.7	0.0	107	1.27	1.13	20.0	17.2
1.008	-8.297	0.000	0.0	1234.5	0.0	109	1.28	1.13	20.0	17.6
1.009	-9.330	0.000	0.0	1294.0	0.0	111	1.28	1.13	20.0	18.0
1.010	-9.780	0.000	0.0	1332.0	0.0	112	1.28	1.13	20.0	18.2
1.011	-9.930	0.000	0.0	1399.0	0.0	115	1.29	1.13	20.0	18.7
1.012	-10.430	0.000	0.0	1451.1	0.0	117	1.29	1.13	20.0	19.0
1.013	-11.396	0.000	0.0	1461.5	0.0	117	1.29	1.13	20.0	19.1

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)	250

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	95.000	1.583	60.0	0.000	118.1	0.0	1.500	o	150	Pipe/Conduit
1.001	90.000	1.500	60.0	0.000	87.0	0.0	1.500	o	150	Pipe/Conduit
1.002	90.000	1.500	60.0	0.000	99.4	0.0	1.500	o	150	Pipe/Conduit
1.003	50.000	0.833	60.0	0.000	66.6	0.0	1.500	o	150	Pipe/Conduit
1.004	42.000	0.700	60.0	0.000	59.8	0.0	1.500	o	150	Pipe/Conduit
1.005	55.000	0.917	60.0	0.000	89.4	0.0	1.500	o	150	Pipe/Conduit
2.000	55.000	0.917	60.0	0.000	38.0	0.0	1.500	o	100	Pipe/Conduit
3.000	7.500	0.125	60.0	0.000	21.2 x1.4²	0.0	1.500	o	150	Pipe/Conduit
3.001	8.000	0.133	60.2	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
3.002	11.500	0.192	59.9	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
3.003	18.500	0.308	60.1	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
3.004	11.500	0.192	59.9	0.000	162.0 x1.4²	0.0	1.500	o	150	Pipe/Conduit

ARENA + GOLF CLUB.

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	40.000	0.000	0.0	118.1	0.0	64	1.05	1.13	20.0	7.6
1.001	38.417	0.000	0.0	205.1	0.0	75	1.13	1.13	20.0	10.0
1.002	36.917	0.000	0.0	304.5	0.0	85	1.19	1.13	20.0	12.2
1.003	35.417	0.000	0.0	371.1	0.0	90	1.22	1.13	20.0	13.5
1.004	34.583	0.000	0.0	430.9	0.0	95	1.24	1.13	20.0	14.5
1.005	33.883	0.000	0.0	520.3	0.0	101	1.26	1.13	20.0	16.0
2.000	0.000	0.000	0.0	38.0	0.0	58	0.91	0.86	6.8	4.3
3.000	0.000	0.000	0.0	21.2	0.0	41	0.83	1.13	20.0	3.2
3.001	-0.125	0.000	0.0	21.2	0.0	41	0.83	1.13	20.0	3.2
3.002	-0.258	0.000	0.0	21.2	0.0	41	0.83	1.13	20.0	3.2
3.003	-0.450	0.000	0.0	21.2	0.0	41	0.83	1.13	20.0	3.2
3.004	-0.758	0.000	0.0	183.2	0.0	73	1.12	1.13	20.0	9.5

FOR K=0.7 FLOW WA
2.3 L/S
2.3 L/S
2.3 L/S
6.8 L/S

EX. STOCKLEY PARK EAST + EX ARENA + EX GOLF

K = 0.7 – CHECK CALCULATION THAT DU UNITS HAVE BEEN INCREASED CORRECTLY.

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
2.001	50.000	0.833	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
2.002	63.000	1.050	60.0	0.000	67.0	0.0	1.500	o	150	Pipe/Conduit
2.003	84.000	1.400	60.0	0.000	43.4	0.0	1.500	o	150	Pipe/Conduit
2.004	131.000	2.183	60.0	0.000	86.9	0.0	1.500	o	150	Pipe/Conduit
1.006	68.000	1.133	60.0	0.000	0.0	0.0	1.500	o	225	Pipe/Conduit
1.007	30.000	0.500	60.0	0.000	67.0	0.0	1.500	o	225	Pipe/Conduit
1.008	62.000	1.033	60.0	0.000	52.8	0.0	1.500	o	225	Pipe/Conduit
1.009	27.000	0.450	60.0	0.000	59.5	0.0	1.500	o	225	Pipe/Conduit
1.010	9.000	0.150	60.0	0.000	38.0	0.0	1.500	o	225	Pipe/Conduit
1.011	30.000	0.500	60.0	0.000	67.0	0.0	1.500	o	225	Pipe/Conduit
1.012	58.000	0.967	60.0	0.000	52.1	0.0	1.500	o	225	Pipe/Conduit
1.013	40.000	0.667	60.0	0.000	10.4	0.0	1.500	o	225	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)
2.001	-0.967	0.000	0.0	221.2	0.0	77	1.14	1.13	20.0	10.4
2.002	-1.800	0.000	0.0	288.2	0.0	83	1.18	1.13	20.0	11.9
2.003	-2.850	0.000	0.0	331.6	0.0	87	1.20	1.13	20.0	12.7
2.004	-4.250	0.000	0.0	418.5	0.0	94	1.23	1.13	20.0	14.3
1.006	-6.508	0.000	0.0	938.8	0.0	94	1.37	1.48	59.0	21.4
1.007	-7.641	0.000	0.0	1005.8	0.0	96	1.38	1.48	59.0	22.2
1.008	-8.141	0.000	0.0	1058.6	0.0	97	1.39	1.48	59.0	22.8
1.009	-9.174	0.000	0.0	1118.1	0.0	98	1.40	1.48	59.0	23.4
1.010	-9.624	0.000	0.0	1156.1	0.0	99	1.40	1.48	59.0	23.8
1.011	-9.774	0.000	0.0	1223.1	0.0	101	1.42	1.48	59.0	24.5
1.012	-10.274	0.000	0.0	1275.2	0.0	102	1.42	1.48	59.0	25.0
1.013	-11.241	0.000	0.0	1285.6	0.0	103	1.42	1.48	59.0	25.1

Estimation of Flowrate for Proposed Hotel

Number of units taken from George Harwood Data

Foul Drainage Design to BS EN 12056-2:2000

Project Title:
Job No: M1843
Proposed Hotel

Calculation of Waste water flows for Drain systems

Discharge Unit Calculation in Accordance with Table 2

Determine Frequency factor from Table 3

Type of Building		K
Dwellling, Guest House, Office (Intermittent Use)		0.5
Hospital, School, Restaurant, Hotel (Frequesnt Use)		0.7
Toilets and/or shower open to public (Congested Use		1
Laboratory Buildings (Special Use)		1.2

Discharge Unit Calculation from Table 2 - **System III**

Utilise K = 0.7

Drain Ref.	WC with 6L Cistern	Urinal + cistern	Wash Basin	Shower	Bath	Kitchen sink	Dish Washer	Total Units
First Floor	44		44	35	9	1	0	**115**
								0
Second Floor	38		39	28	9	2	2	**102.2**
								0
								0
								0
								0
								0
								0
								0
								0
								0
								0
								0
								0
								0
								0
						Total Discharge l/s		**217.2**
Total Units for Each Appliance Type	**82**	**0**	**83**	**63**	**18**	**3**	**2**	
Discharge l/s for each Appliance type	1.7	0.4	0.3	0.4	1.3	1.3	0.2	
Total Discharge for each Appliance	139.4	0	24.9	25.2	23.4	3.9	0.4	217.2
K = Frequency Factor	0.7							
Total Flow Rate (L/S) = K √∑DU =	**10.3**							

Estimation of Flowrate for Proposed Hotel

Number of units taken from George Harwood Data

Foul Drainage Design to BS EN 12056-2:2000

Project Title:
Job No: M1843
Proposed Hotel

Calculation of Waste water flows for Drain systems

Discharge Unit Calculation in Accordance with Table 2

Determine Frequency factor from Table 3

Type of Building	K
Dwellling, Guest House, Office (Intermittent Use)	0.5
Hospital, School, Restaurant, Hotel (Frequesnt Use)	0.7
Toilets and/or shower open to public (Congested Use	1
Laboratory Buildings (Special Use)	1.2

Discharge Unit Calculation from Table 2 - **System I**

Utilise K = 0.7

Drain Ref.	WC with 6L Cistern	Urinal + cistern	Wash Basin	Shower	Bath	Kitchen sink	Dish Washer	Total Units
First Floor	44		44	35	9	1	0	**139**
								0
Second Floor	38		39	28	9	2	2	**122.7**
								0
								0
								0
								0
								0
								0
								0
								0
								0
								0
								0
								0
								0
								0
						Total Discharge l/s		**261.7**
Total Units for Each Appliance Type	**82**	**0**	**83**	**63**	**18**	**3**	**2**	
Discharge l/s for each Appliance type	2	0.8	0.5	0.6	0.8	0.8	0.8	
Total Discharge for each Appliance	164	0	41.5	37.8	14.4	2.4	1.6	261.7
K = Frequency Factor	0.7							
Total Flow Rate (L/S) = K $\sqrt{\sum DU}$ =	**11.3**							

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	0.50	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)	250

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	95.000	1.583	60.0	0.000	118.1	0.0	1.500	o	100	Pipe/Conduit
1.001	90.000	1.500	60.0	0.000	87.0	0.0	1.500	o	150	Pipe/Conduit
1.002	90.000	1.500	60.0	0.000	99.4	0.0	1.500	o	150	Pipe/Conduit
1.003	50.000	0.833	60.0	0.000	66.6	0.0	1.500	o	150	Pipe/Conduit
1.004	42.000	0.700	60.0	0.000	59.8	0.0	1.500	o	150	Pipe/Conduit
1.005	55.000	0.917	60.0	0.000	89.4	0.0	1.500	o	150	Pipe/Conduit
2.000	55.000	0.917	60.0	0.000	38.0	0.0	1.500	o	100	Pipe/Conduit
3.000	7.500	0.125	60.0	0.000	21.2	0.0	1.500	o	100	Pipe/Conduit
3.001	8.000	0.133	60.2	0.000	115.0	0.0	1.500	o	100	Pipe/Conduit
3.002	11.500	0.192	59.9	0.000	102.2	0.0	1.500	o	150	Pipe/Conduit
3.003	18.500	0.308	60.1	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
3.004	11.500	0.192	59.9	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Units	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	40.000	0.000	0.0	118.1	0.0	68	0.96	0.86	6.8	5.4
1.001	38.367	0.000	0.0	205.1	0.0	62	1.04	1.13	20.0	7.2
1.002	36.867	0.000	0.0	304.5	0.0	69	1.09	1.13	20.0	8.7
1.003	35.367	0.000	0.0	371.1	0.0	73	1.12	1.13	20.0	9.6
1.004	34.533	0.000	0.0	430.9	0.0	77	1.14	1.13	20.0	10.4
1.005	33.833	0.000	0.0	520.3	0.0	81	1.17	1.13	20.0	11.4
2.000	0.000	0.000	0.0	38.0	0.0	47	0.84	0.86	6.8	3.1
3.000	-0.833	0.000	0.0	21.2	0.0	40	0.78	0.86	6.8	2.3
3.001	-0.958	0.000	0.0	136.2	0.0	72	0.97	0.86	6.7	5.8
3.002	-1.141	0.000	0.0	238.4	0.0	65	1.06	1.13	20.0	7.7
3.003	-1.333	0.000	0.0	238.4	0.0	65	1.06	1.13	20.0	7.7
3.004	-1.641	0.000	0.0	238.4	0.0	65	1.06	1.13	20.0	7.7

EX. STOCKLEY PARK EAST + EX. ARENA + EX. GOLF + HOTEL.
(K=0.5) (K=0.5) (K=0.5) (K=0.5)
UNITS = 1502.8 FLOW = 19.4 L/S.

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
3.005	13.500	0.225	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
3.006	25.000	0.417	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
3.007	45.000	0.750	60.0	0.000	162.0	0.0	1.500	o	150	Pipe/Conduit
2.001	55.000	0.917	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
2.002	63.000	1.050	60.0	0.000	67.0	0.0	1.500	o	150	Pipe/Conduit
2.003	84.000	1.400	60.0	0.000	43.4	0.0	1.500	o	150	Pipe/Conduit
2.004	131.000	2.183	60.0	0.000	86.9	0.0	1.500	o	150	Pipe/Conduit
1.006	68.000	1.133	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
1.007	30.000	0.500	60.0	0.000	67.0	0.0	1.500	o	150	Pipe/Conduit
1.008	62.000	1.033	60.0	0.000	52.8	0.0	1.500	o	150	Pipe/Conduit
1.009	27.000	0.450	60.0	0.000	59.5	0.0	1.500	o	150	Pipe/Conduit
1.010	9.000	0.150	60.0	0.000	38.0	0.0	1.500	o	150	Pipe/Conduit
1.011	30.000	0.500	60.0	0.000	67.0	0.0	1.500	o	150	Pipe/Conduit
1.012	58.000	0.967	60.0	0.000	52.1	0.0	1.500	o	150	Pipe/Conduit
1.013	40.000	0.667	60.0	0.000	10.4	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)
3.005	-1.833	0.000	0.0	238.4	0.0	65	1.06	1.13	20.0	7.7
3.006	-2.058	0.000	0.0	238.4	0.0	65	1.06	1.13	20.0	7.7
3.007	-2.475	0.000	0.0	400.4	0.0	75	1.13	1.13	20.0	10.0
2.001	-3.225	0.000	0.0	438.4	0.0	77	1.15	1.13	20.0	10.5
2.002	-4.142	0.000	0.0	505.4	0.0	80	1.17	1.13	20.0	11.2
2.003	-5.192	0.000	0.0	548.8	0.0	82	1.18	1.13	20.0	11.7
2.004	-6.592	0.000	0.0	635.7	0.0	86	1.20	1.13	20.0	12.6
1.006	-8.775	0.000	0.0	1156.0	0.0	106	1.27	1.13	20.0	17.0
1.007	-9.908	0.000	0.0	1223.0	0.0	109	1.28	1.13	20.0	17.5
1.008	-10.408	0.000	0.0	1275.8	0.0	110	1.28	1.13	20.0	17.9
1.009	-11.441	0.000	0.0	1335.3	0.0	113	1.28	1.13	20.0	18.3
1.010	-11.891	0.000	0.0	1373.3	0.0	114	1.29	1.13	20.0	18.5
1.011	-12.041	0.000	0.0	1440.3	0.0	116	1.29	1.13	20.0	19.0
1.012	-12.541	0.000	0.0	1492.4	0.0	118	1.29	1.13	20.0	19.3
1.013	-13.508	0.000	0.0	1502.8	0.0	119	1.29	1.13	20.0	19.4

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)	250

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	95.000	1.583	60.0	0.000	118.1	0.0	1.500	o	150	Pipe/Conduit
1.001	90.000	1.500	60.0	0.000	87.0	0.0	1.500	o	150	Pipe/Conduit
1.002	90.000	1.500	60.0	0.000	99.4	0.0	1.500	o	150	Pipe/Conduit
1.003	50.000	0.833	60.0	0.000	66.6	0.0	1.500	o	150	Pipe/Conduit
1.004	42.000	0.700	60.0	0.000	59.8	0.0	1.500	o	150	Pipe/Conduit
1.005	55.000	0.917	60.0	0.000	89.4	0.0	1.500	o	150	Pipe/Conduit
2.000	55.000	0.917	60.0	0.000	38.0	0.0	1.500	o	100	Pipe/Conduit
3.000	7.500	0.125	60.0	0.000	21.2	0.0	1.500	o	100	Pipe/Conduit
3.001	8.000	0.133	60.2	0.000	115.0	0.0	1.500	o	150	Pipe/Conduit
3.002	11.500	0.192	59.9	0.000	102.2	0.0	1.500	o	150	Pipe/Conduit
3.003	18.500	0.308	60.1	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
3.004	11.500	0.192	59.9	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Units	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	40.000	0.000	0.0	118.1	0.0	64	1.05	1.13	20.0	7.6
1.001	38.417	0.000	0.0	205.1	0.0	75	1.13	1.13	20.0	10.0
1.002	36.917	0.000	0.0	304.5	0.0	85	1.19	1.13	20.0	12.2
1.003	35.417	0.000	0.0	371.1	0.0	90	1.22	1.13	20.0	13.5
1.004	34.583	0.000	0.0	430.9	0.0	95	1.24	1.13	20.0	14.5
1.005	33.883	0.000	0.0	520.3	0.0	101	1.26	1.13	20.0	16.0
2.000	0.000	0.000	0.0	38.0	0.0	58	0.91	0.86	6.8	4.3
3.000	-0.833	0.000	0.0	21.2	0.0	49	0.85	0.86	6.8	3.2
3.001	-1.008	0.000	0.0	136.2	0.0	67	1.07	1.13	20.0	8.2
3.002	-1.141	0.000	0.0	238.4	0.0	79	1.16	1.13	20.0	10.8
3.003	-1.333	0.000	0.0	238.4	0.0	79	1.15	1.13	20.0	10.8
3.004	-1.641	0.000	0.0	238.4	0.0	79	1.16	1.13	20.0	10.8

EXISTING STOCKLEY PARK EAST + EX ARENA + EX GOLF + HOTEL
(K=0.7) (K=0.7) (K=0.7) (K=0.7)

UNITS = 1502.8 DO FLOW = 27.145

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
3.005	13.500	0.225	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
3.006	25.000	0.417	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
3.007	45.000	0.750	60.0	0.000	162.0	0.0	1.500	o	150	Pipe/Conduit
2.001	55.000	0.917	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
2.002	63.000	1.050	60.0	0.000	67.0	0.0	1.500	o	150	Pipe/Conduit
2.003	84.000	1.400	60.0	0.000	43.4	0.0	1.500	o	150	Pipe/Conduit
2.004	131.000	2.183	60.0	0.000	86.9	0.0	1.500	o	150	Pipe/Conduit
1.006	68.000	1.133	60.0	0.000	0.0	0.0	1.500	o	225	Pipe/Conduit
1.007	30.000	0.500	60.0	0.000	67.0	0.0	1.500	o	225	Pipe/Conduit
1.008	62.000	1.033	60.0	0.000	52.8	0.0	1.500	o	225	Pipe/Conduit
1.009	27.000	0.450	60.0	0.000	59.5	0.0	1.500	o	225	Pipe/Conduit
1.010	9.000	0.150	60.0	0.000	38.0	0.0	1.500	o	225	Pipe/Conduit
1.011	30.000	0.500	60.0	0.000	67.0	0.0	1.500	o	225	Pipe/Conduit
1.012	58.000	0.967	60.0	0.000	52.1	0.0	1.500	o	225	Pipe/Conduit
1.013	40.000	0.667	60.0	0.000	10.4	0.0	1.500	o	225	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)
3.005	-1.833	0.000	0.0	238.4	0.0	79	1.15	1.13	20.0	10.8
3.006	-2.058	0.000	0.0	238.4	0.0	79	1.15	1.13	20.0	10.8
3.007	-2.475	0.000	0.0	400.4	0.0	92	1.23	1.13	20.0	14.0
2.001	-3.225	0.000	0.0	438.4	0.0	95	1.24	1.13	20.0	14.7
2.002	-4.142	0.000	0.0	505.4	0.0	100	1.25	1.13	20.0	15.7
2.003	-5.192	0.000	0.0	548.8	0.0	103	1.26	1.13	20.0	16.4
2.004	-6.592	0.000	0.0	635.7	0.0	109	1.28	1.13	20.0	17.6
1.006	-8.850	0.000	0.0	1156.0	0.0	99	1.40	1.48	59.0	23.8
1.007	-9.983	0.000	0.0	1223.0	0.0	101	1.42	1.48	59.0	24.5
1.008	-10.483	0.000	0.0	1275.8	0.0	102	1.42	1.48	59.0	25.0
1.009	-11.516	0.000	0.0	1335.3	0.0	104	1.43	1.48	59.0	25.6
1.010	-11.966	0.000	0.0	1373.3	0.0	105	1.44	1.48	59.0	25.9
1.011	-12.116	0.000	0.0	1440.3	0.0	106	1.44	1.48	59.0	26.6
1.012	-12.616	0.000	0.0	1492.4	0.0	107	1.45	1.48	59.0	27.0
1.013	-13.583	0.000	0.0	1502.8	0.0	107	1.45	1.48	59.0	27.1

Bridges Pound Ltd		Page 1
Bridge House 141 Albany Road Coventry CV5 6ND	Stockley Park	
Date 05/09/2017 13:35 File M1843 Ex Stockley FWD p...	Designed by AG Checked by	
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	0.50	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)	250

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	95.000	1.583	60.0	0.000	118.1	0.0	1.500	o	100	Pipe/Conduit
1.001	90.000	1.500	60.0	0.000	87.0	0.0	1.500	o	150	Pipe/Conduit
1.002	90.000	1.500	60.0	0.000	99.4	0.0	1.500	o	150	Pipe/Conduit
1.003	50.000	0.833	60.0	0.000	66.6	0.0	1.500	o	150	Pipe/Conduit
1.004	42.000	0.700	60.0	0.000	59.8	0.0	1.500	o	150	Pipe/Conduit
1.005	55.000	0.917	60.0	0.000	89.4	0.0	1.500	o	150	Pipe/Conduit
2.000	55.000	0.917	60.0	0.000	38.0	0.0	1.500	o	100	Pipe/Conduit
3.000	7.500	0.125	60.0	0.000	41.6	0.0	1.500	o	100	Pipe/Conduit
3.001	8.000	0.133	60.2	0.000	225.4	0.0	1.500	o	150	Pipe/Conduit
3.002	11.500	0.192	59.9	0.000	200.3	0.0	1.500	o	150	Pipe/Conduit
3.003	18.500	0.308	60.1	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
3.004	11.500	0.192	59.9	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit

UNITS INCREASED BY 1.4² TO ACHIEVE FLOW FOR K=0.7

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	40.000	0.000	0.0	118.1	0.0	68	0.96	0.86	6.8	5.4
1.001	38.367	0.000	0.0	205.1	0.0	62	1.04	1.13	20.0	7.2
1.002	36.867	0.000	0.0	304.5	0.0	69	1.09	1.13	20.0	8.7
1.003	35.367	0.000	0.0	371.1	0.0	73	1.12	1.13	20.0	9.6
1.004	34.533	0.000	0.0	430.9	0.0	77	1.14	1.13	20.0	10.4
1.005	33.833	0.000	0.0	520.3	0.0	81	1.17	1.13	20.0	11.4
2.000	0.000	0.000	0.0	38.0	0.0	47	0.84	0.86	6.8	3.1
3.000	-0.833	0.000	0.0	41.6	0.0	49	0.85	0.86	6.8	3.2
3.001	-1.008	0.000	0.0	267.0	0.0	67	1.07	1.13	20.0	8.2
3.002	-1.141	0.000	0.0	467.3	0.0	79	1.16	1.13	20.0	10.8
3.003	-1.333	0.000	0.0	467.3	0.0	79	1.15	1.13	20.0	10.8
3.004	-1.641	0.000	0.0	467.3	0.0	79	1.16	1.13	20.0	10.8

INCREASED FLOWS FOR K=0.7

EX STOCKLEY PARK EAST (K=0.5) + EX ARENA (K=0.7) + EX GOLF (K=0.7) + HOTEL (K=0.7)

FLOW = 21.7 L/S

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
3.005	13.500	0.225	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
3.006	25.000	0.417	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
3.007	45.000	0.750	60.0	0.000	317.5	0.0	1.500	o	150	Pipe/Conduit
2.001	55.000	0.917	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
2.002	63.000	1.050	60.0	0.000	67.0	0.0	1.500	o	150	Pipe/Conduit
2.003	84.000	1.400	60.0	0.000	43.4	0.0	1.500	o	150	Pipe/Conduit
2.004	131.000	2.183	60.0	0.000	86.9	0.0	1.500	o	150	Pipe/Conduit
1.006	68.000	1.133	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
1.007	30.000	0.500	60.0	0.000	67.0	0.0	1.500	o	225	Pipe/Conduit
1.008	62.000	1.033	60.0	0.000	52.8	0.0	1.500	o	225	Pipe/Conduit
1.009	27.000	0.450	60.0	0.000	59.5	0.0	1.500	o	225	Pipe/Conduit
1.010	9.000	0.150	60.0	0.000	38.0	0.0	1.500	o	225	Pipe/Conduit
1.011	30.000	0.500	60.0	0.000	67.0	0.0	1.500	o	225	Pipe/Conduit
1.012	58.000	0.967	60.0	0.000	52.1	0.0	1.500	o	225	Pipe/Conduit
1.013	40.000	0.667	60.0	0.000	10.4	0.0	1.500	o	225	Pipe/Conduit

UNITS INCREASED BY 1.42

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)
3.005	-1.833	0.000	0.0	467.3	0.0	79	1.15	1.13	20.0	10.8
3.006	-2.058	0.000	0.0	467.3	0.0	79	1.15	1.13	20.0	10.8
3.007	-2.475	0.000	0.0	784.8	0.0	92	1.23	1.13	20.0	14.0
2.001	-3.225	0.000	0.0	822.8	0.0	94	1.23	1.13	20.0	14.3
2.002	-4.142	0.000	0.0	889.8	0.0	97	1.24	1.13	20.0	14.9
2.003	-5.192	0.000	0.0	933.2	0.0	98	1.25	1.13	20.0	15.3
2.004	-6.592	0.000	0.0	1020.1	0.0	101	1.26	1.13	20.0	16.0
1.006	-8.775	0.000	0.0	1540.4	0.0	120	1.29	1.13	20.0	19.6
1.007	-9.983	0.000	0.0	1607.4	0.0	90	1.34	1.48	59.0	20.0
1.008	-10.483	0.000	0.0	1660.2	0.0	91	1.35	1.48	59.0	20.4
1.009	-11.516	0.000	0.0	1719.7	0.0	92	1.35	1.48	59.0	20.7
1.010	-11.966	0.000	0.0	1757.7	0.0	93	1.36	1.48	59.0	21.0
1.011	-12.116	0.000	0.0	1824.7	0.0	94	1.36	1.48	59.0	21.4
1.012	-12.616	0.000	0.0	1876.8	0.0	94	1.37	1.48	59.0	21.7
1.013	-13.583	0.000	0.0	1887.2	0.0	95	1.37	1.48	59.0	21.7

INCREASED FLOW FOR K = 0.7

Bridges Pound Ltd		Page 1
Bridge House 141 Albany Road Coventry CV5 6ND	Stockley Park	
Date 05/09/2017 13:49 File M1843 Ex Stockley FWD p...	Designed by AG Checked by	
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	0.50	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)	250

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	95.000	1.583	60.0	0.000	59.1	0.0	1.500	o	100	Pipe/Conduit
1.001	90.000	1.500	60.0	0.000	43.5	0.0	1.500	o	100	Pipe/Conduit
1.002	90.000	1.500	60.0	0.000	49.7	0.0	1.500	o	100	Pipe/Conduit
1.003	50.000	0.833	60.0	0.000	33.3	0.0	1.500	o	150	Pipe/Conduit
1.004	42.000	0.700	60.0	0.000	29.9	0.0	1.500	o	150	Pipe/Conduit
1.005	55.000	0.917	60.0	0.000	44.7	0.0	1.500	o	150	Pipe/Conduit
2.000	55.000	0.917	60.0	0.000	19.0	0.0	1.500	o	100	Pipe/Conduit
3.000	7.500	0.125	60.0	0.000	41.6	0.0	1.500	o	100	Pipe/Conduit
3.001	8.000	0.133	60.2	0.000	225.4	0.0	1.500	o	150	Pipe/Conduit
3.002	11.500	0.192	59.9	0.000	200.3	0.0	1.500	o	150	Pipe/Conduit
3.003	18.500	0.308	60.1	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
3.004	11.500	0.192	59.9	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit

ALL AT 50% (1.000 – 1.005)

ALL AT 100% (3.000 – 3.004)

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	40.000	0.000	0.0	59.1	0.0	54	0.89	0.86	6.8	3.8
1.001	38.417	0.000	0.0	102.6	0.0	64	0.95	0.86	6.8	5.1
1.002	36.917	0.000	0.0	152.3	0.0	75	0.98	0.86	6.8	6.2
1.003	35.367	0.000	0.0	185.6	0.0	60	1.02	1.13	20.0	6.8
1.004	34.534	0.000	0.0	215.5	0.0	63	1.04	1.13	20.0	7.3
1.005	33.834	0.000	0.0	260.2	0.0	66	1.07	1.13	20.0	8.1
2.000	0.000	0.000	0.0	19.0	0.0	39	0.76	0.86	6.8	2.2
3.000	-0.833	0.000	0.0	41.6	0.0	49	0.85	0.86	6.8	3.2
3.001	-1.008	0.000	0.0	267.0	0.0	67	1.07	1.13	20.0	8.2
3.002	-1.141	0.000	0.0	467.3	0.0	79	1.16	1.13	20.0	10.8
3.003	-1.333	0.000	0.0	467.3	0.0	79	1.15	1.13	20.0	10.8
3.004	-1.641	0.000	0.0	467.3	0.0	79	1.16	1.13	20.0	10.8

NIGHT TIME - ASSUME 50% STOCKLEY PARK EAST
+ 100% HOTEL
+ 100% ARENA + GOLF CLUB.

FLOW = 18.3 L/S

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
3.005	13.500	0.225	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
3.006	25.000	0.417	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
3.007	45.000	0.750	60.0	0.000	317.5	0.0	1.500	o	150	Pipe/Conduit
2.001	55.000	0.917	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
2.002	63.000	1.050	60.0	0.000	33.5	0.0	1.500	o	150	Pipe/Conduit
2.003	84.000	1.400	60.0	0.000	21.7	0.0	1.500	o	150	Pipe/Conduit
2.004	131.000	2.183	60.0	0.000	43.5	0.0	1.500	o	150	Pipe/Conduit
1.006	68.000	1.133	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
1.007	30.000	0.500	60.0	0.000	33.5	0.0	1.500	o	150	Pipe/Conduit
1.008	62.000	1.033	60.0	0.000	26.4	0.0	1.500	o	150	Pipe/Conduit
1.009	27.000	0.450	60.0	0.000	29.8	0.0	1.500	o	150	Pipe/Conduit
1.010	9.000	0.150	60.0	0.000	19.0	0.0	1.500	o	150	Pipe/Conduit
1.011	30.000	0.500	60.0	0.000	33.5	0.0	1.500	o	150	Pipe/Conduit
1.012	58.000	0.967	60.0	0.000	26.1	0.0	1.500	o	150	Pipe/Conduit
1.013	40.000	0.667	60.0	0.000	5.2	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)
3.005	-1.833	0.000	0.0	467.3	0.0	79	1.15	1.13	20.0	10.8
3.006	-2.058	0.000	0.0	467.3	0.0	79	1.15	1.13	20.0	10.8
3.007	-2.475	0.000	0.0	784.8	0.0	92	1.23	1.13	20.0	14.0
2.001	-3.225	0.000	0.0	803.8	0.0	93	1.23	1.13	20.0	14.2
2.002	-4.142	0.000	0.0	837.3	0.0	94	1.23	1.13	20.0	14.5
2.003	-5.192	0.000	0.0	859.0	0.0	95	1.24	1.13	20.0	14.7
2.004	-6.592	0.000	0.0	902.5	0.0	97	1.24	1.13	20.0	15.0
1.006	-8.775	0.000	0.0	1162.7	0.0	106	1.27	1.13	20.0	17.0
1.007	-9.908	0.000	0.0	1196.2	0.0	108	1.27	1.13	20.0	17.3
1.008	-10.408	0.000	0.0	1222.6	0.0	109	1.28	1.13	20.0	17.5
1.009	-11.441	0.000	0.0	1252.4	0.0	110	1.28	1.13	20.0	17.7
1.010	-11.891	0.000	0.0	1271.4	0.0	110	1.28	1.13	20.0	17.8
1.011	-12.041	0.000	0.0	1304.9	0.0	111	1.28	1.13	20.0	18.1
1.012	-12.541	0.000	0.0	1331.0	0.0	112	1.28	1.13	20.0	18.2
1.013	-13.508	0.000	0.0	1336.2	0.0	113	1.28	1.13	20.0	18.3

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	0.50	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)	250

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	95.000	1.583	60.0	0.000	118.1	0.0	1.500	o	100	Pipe/Conduit
1.001	90.000	1.500	60.0	0.000	87.0	0.0	1.500	o	150	Pipe/Conduit
1.002	90.000	1.500	60.0	0.000	99.4	0.0	1.500	o	150	Pipe/Conduit
1.003	50.000	0.833	60.0	0.000	66.6	0.0	1.500	o	150	Pipe/Conduit
1.004	42.000	0.700	60.0	0.000	59.8	0.0	1.500	o	150	Pipe/Conduit
1.005	55.000	0.917	60.0	0.000	89.4	0.0	1.500	o	150	Pipe/Conduit
2.000	55.000	0.917	60.0	0.000	38.0	0.0	1.500	o	100	Pipe/Conduit
3.000	7.500	0.125	60.0	0.000	41.6	0.0	1.500	o	100	Pipe/Conduit
3.001	8.000	0.133	60.2	0.000	112.7	0.0	1.500	o	100	Pipe/Conduit
3.002	11.500	0.192	59.9	0.000	100.2	0.0	1.500	o	150	Pipe/Conduit
3.003	18.500	0.308	60.1	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
3.004	11.500	0.192	59.9	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit

HOTEL AT 50%

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	40.000	0.000	0.0	118.1	0.0	68	0.96	0.86	6.8	5.4
1.001	38.367	0.000	0.0	205.1	0.0	62	1.04	1.13	20.0	7.2
1.002	36.867	0.000	0.0	304.5	0.0	69	1.09	1.13	20.0	8.7
1.003	35.367	0.000	0.0	371.1	0.0	73	1.12	1.13	20.0	9.6
1.004	34.533	0.000	0.0	430.9	0.0	77	1.14	1.13	20.0	10.4
1.005	33.833	0.000	0.0	520.3	0.0	81	1.17	1.13	20.0	11.4
2.000	0.000	0.000	0.0	38.0	0.0	47	0.84	0.86	6.8	3.1
3.000	-0.833	0.000	0.0	41.6	0.0	49	0.85	0.86	6.8	3.2
3.001	-0.958	0.000	0.0	154.3	0.0	75	0.98	0.86	6.7	6.2
3.002	-1.141	0.000	0.0	254.5	0.0	66	1.07	1.13	20.0	8.0
3.003	-1.333	0.000	0.0	254.5	0.0	66	1.07	1.13	20.0	8.0
3.004	-1.641	0.000	0.0	254.5	0.0	66	1.07	1.13	20.0	8.0

DAY TIME - ASSUME 50% HOTEL + 100% STOCKLEY PARK EAS + 100% ARENA + GOLFCLUB

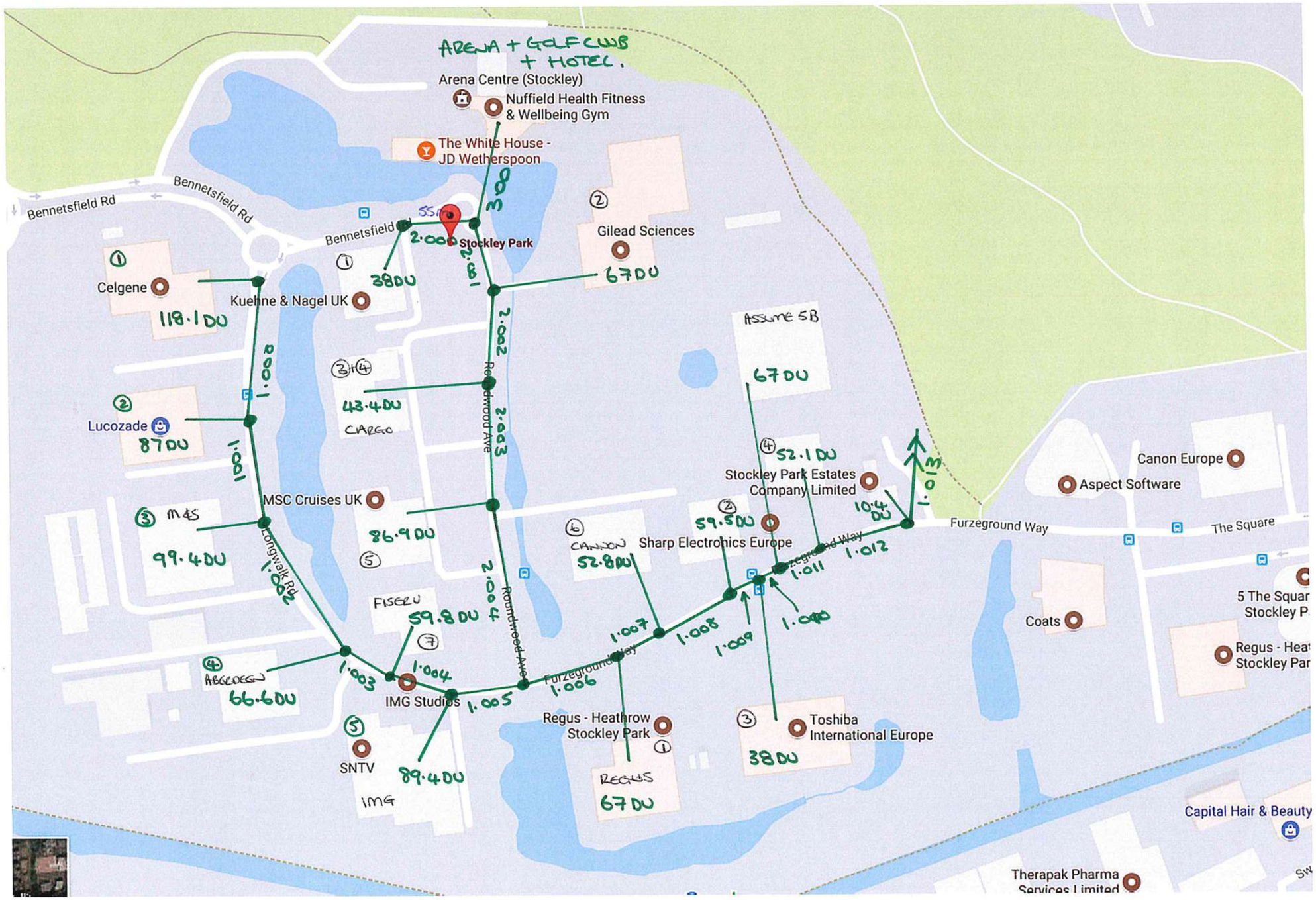
FLOW = 20.5 l/s

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
3.005	13.500	0.225	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
3.006	25.000	0.417	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
3.007	45.000	0.750	60.0	0.000	317.5	0.0	1.500	o	150	Pipe/Conduit
2.001	55.000	0.917	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
2.002	63.000	1.050	60.0	0.000	67.0	0.0	1.500	o	150	Pipe/Conduit
2.003	84.000	1.400	60.0	0.000	43.4	0.0	1.500	o	150	Pipe/Conduit
2.004	131.000	2.183	60.0	0.000	86.9	0.0	1.500	o	150	Pipe/Conduit
1.006	68.000	1.133	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit
1.007	30.000	0.500	60.0	0.000	67.0	0.0	1.500	o	150	Pipe/Conduit
1.008	62.000	1.033	60.0	0.000	52.8	0.0	1.500	o	150	Pipe/Conduit
1.009	27.000	0.450	60.0	0.000	59.5	0.0	1.500	o	150	Pipe/Conduit
1.010	9.000	0.150	60.0	0.000	38.0	0.0	1.500	o	150	Pipe/Conduit
1.011	30.000	0.500	60.0	0.000	67.0	0.0	1.500	o	225	Pipe/Conduit
1.012	58.000	0.967	60.0	0.000	52.1	0.0	1.500	o	225	Pipe/Conduit
1.013	40.000	0.667	60.0	0.000	10.4	0.0	1.500	o	225	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)
3.005	-1.833	0.000	0.0	254.5	0.0	66	1.07	1.13	20.0	8.0
3.006	-2.058	0.000	0.0	254.5	0.0	66	1.07	1.13	20.0	8.0
3.007	-2.475	0.000	0.0	572.0	0.0	84	1.18	1.13	20.0	12.0
2.001	-3.225	0.000	0.0	610.0	0.0	85	1.19	1.13	20.0	12.3
2.002	-4.142	0.000	0.0	677.0	0.0	88	1.21	1.13	20.0	13.0
2.003	-5.192	0.000	0.0	720.4	0.0	90	1.21	1.13	20.0	13.4
2.004	-6.592	0.000	0.0	807.3	0.0	93	1.23	1.13	20.0	14.2
1.006	-8.775	0.000	0.0	1327.6	0.0	112	1.28	1.13	20.0	18.2
1.007	-9.908	0.000	0.0	1394.6	0.0	115	1.29	1.13	20.0	18.7
1.008	-10.408	0.000	0.0	1447.4	0.0	117	1.29	1.13	20.0	19.0
1.009	-11.441	0.000	0.0	1506.9	0.0	119	1.29	1.13	20.0	19.4
1.010	-11.891	0.000	0.0	1544.9	0.0	121	1.29	1.13	20.0	19.7
1.011	-12.116	0.000	0.0	1611.9	0.0	90	1.34	1.48	59.0	20.1
1.012	-12.616	0.000	0.0	1664.0	0.0	91	1.35	1.48	59.0	20.4
1.013	-13.583	0.000	0.0	1674.4	0.0	91	1.35	1.48	59.0	20.5



SITE PLAN OF STOCKLEY PARK.
NOT TO SCALE.

ASSUMED NETWORK LAYOUT

DU UNITS BASED ON DATA PROVIDED BY GEORGE HARWOOD LTD TO BS EN 12056-2:2000 - TABLE 2 - SYSTEM III