



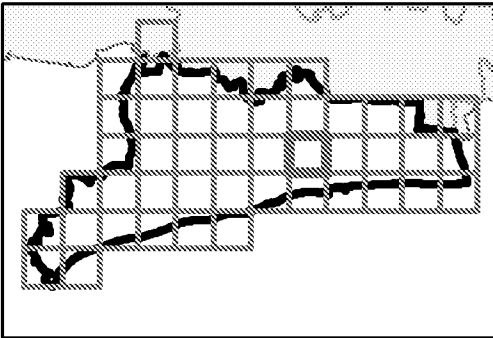
Notes

The Areas Susceptible to Groundwater Flooding (ASiGWF) is a strategic scale map showing groundwater flood areas on a 1km square grid. The data was produced to annotate Indicative Flood Risk Areas for Preliminary Flood Risk Assessment (PFRA) studies and allow the Lead Local Flood Authorities (LLFAs) to determine whether there may be a risk of flooding from groundwater.

This data shows the proportion of each 1km grid square where geological and hydrogeological condition show that groundwater might emerge. It does not show the likelihood of groundwater flooding occurring. It does not take account of the chance of flooding from groundwater rebound. This dataset covers a large area of land, and only isolated locations within the overall susceptible area are actually likely to suffer the consequences of groundwater flooding.

The ASiGWF data should be used only in combination with other information, for example local data or historic data. It should not be used as sole evidence for any specific flood risk management, land use planning or other decisions at any scale. However, the data can help to identify areas for assessment at a local scale where finer resolution datasets exist.

Key Plan



Legend

-  Arun District SFRA boundary
-  < 25%
-  >= 25% <50%
-  >= 50% <75%
-  >= 75%



REF	Date	Comments
A	June 2012	-
B		
C		

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ARUN DISTRICT COUNCIL

LEVEL 1 SFRA: APPENDIX F AREAS SUSCEPTIBLE TO GROUNDWATER

Sheet No. 25 of 48 Index Number: AGC_25

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Notes

The Areas Susceptible to Groundwater Flooding (ASiGWF) is a strategic scale map showing groundwater flood areas on a 1km square grid. The data was produced to annotate Indicative Flood Risk Areas for Preliminary Flood Risk Assessment (PFRA) studies and allow the Lead Local Flood Authorities (LLFAs) to determine whether there may be a risk of flooding from groundwater.

This data shows the proportion of each 1km grid square where geological and hydrogeological condition show that groundwater might emerge. It does not show the likelihood of groundwater flooding occurring. It does not take account of the chance of flooding from groundwater rebound. This dataset covers a large area of land, and only isolated locations within the overall susceptible area are actually likely to suffer the consequences of groundwater flooding.

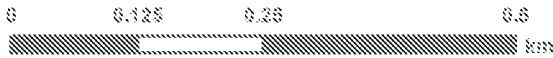
The ASiGWF data should be used only in combination with other information, for example local data or historic data. It should not be used as sole evidence for any specific flood risk management, land use planning or other decisions at any scale. However, the data can help to identify areas for assessment at a local scale where finer resolution datasets exist.

Key Plan



Legend

-  Arun District SFRA boundary
-  < 25%
-  >= 25% < 50%
-  >= 50% < 75%
-  >= 75%



REF	Date	Comments
A	June 2012	-
B		
C		

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ARUN DISTRICT COUNCIL

LEVEL 1 SFRA: APPENDIX F AREAS SUSCEPTIBLE TO GROUNDWATER

Sheet No. 26 of 48 Index Number: AGC_26

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E. Southern Water Records

Appendices

Former Waitrose, Littlehampton

Project Number: WIE14296

Document Reference: WIE14296-100-R-4-1-3-FRA

Connor Henderson

From: [REDACTED]
Sent: 12 March 2018 11:33
To: Connor Henderson
Subject: Southern Water

Follow Up Flag: Follow up
Flag Status: Flagged

Categories: To be Filed



Mr Henderson
connor.henderson@watermangroup.com

Ref:
8001420206

Date:
12 March 2018

Contact:
01273 663696

Dear Mr Henderson

The Environmental Information Regulations 2004 Request for Information

Thank you for your request for information which we received on 8 March 2018. We have dealt with your request under the Environmental Information Regulations 2004. This letter provides the response to your request, which reads as follows:

I am writing in regards to the proposed development at the Former Waitrose site located on Avon Road, Littlehampton, approximate postcode BN17 6AT.

Should you hold any records of flooding at the site, please could you specify the following, if known.

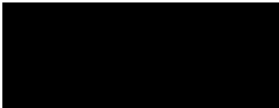
- 3. The date the incident(s) occurred.
- 4. The location and extent of the incident(s).
- 5. The reason behind the flooding (i.e. blockages, extreme storm events, etc.).
- 6. The duration of the event(s).

I have checked our records and I can confirm that our records do not show any history of sewer incidents or flooding at this site.

If you are dissatisfied with the handling of your request, you have the right to ask for an internal review. Internal review requests should be submitted within forty working days of the date of receipt of this response and should be addressed to Robin Churchill, Southern Water Services Ltd, Southern House, Yeoman Road, Worthing, West Sussex BN13 3NX.



Waterman Infrastructure & Environment
Pickfords Wharf
Clink Street
London
SE1 9DG

Your ref WIE14296
Our ref 285860
Date 21 March 2018
Contact 

Attention: Connor Henderson

Dear Customer

Re: New Road and Street Work Act 1991
Provision of public sewer and water main record extract
Location: Former Waitrose, East Street, Littlehampton, BN17 6AT

Thank you for your request for the provision of extracts of our sewer and/or water main records under the New Road and Street Work Act 1991.

Please find enclosed the extracts from Southern Water's records for the above location.

Customers should be aware that there are areas within our region in which there are neither sewers nor water mains. Similarly, whilst the enclosed extract may indicate the approximate location of our apparatus in the area of interest, it should not be relied upon as showing that further infrastructure does not exist and may subsequently be found following site investigation. Actual positions of the disclosed (and any undisclosed) infrastructure should therefore be determined on site, because Southern Water does not accept any responsibility for inaccuracy or omission regarding the enclosed plan. Accordingly it should not be considered to be a definitive document.

Should you require any further assistance regarding this matter, please contact the LandSearch team.

Yours faithfully

LandSearch

Southern Water Southern House Capstone Road Chatham Kent ME5 7QA www.southernwater.co.uk

Southern Water Services Ltd Registered Office: Southern House Yeoman Road Worthing BN13 3NX Registered in England No. 2366670

102381



102093

O.S. REF. TQ0202SE		Drawn by: kumaria	The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. WARNING: 8245, 8246, 8247 are coordinates of boundary features. Coordinates of features are not intended to be used for any purpose other than to identify the location of the feature.
Scale: 1:1250			
Date: 21/03/2018		Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved Licence No. WU 298530.	
Title: 285860_Former Waitrose, East S			

502641

503112

SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape
0101X	4.64	1.46	225	VC	CIRC	7320X	2.71	0.21	150	VC	CIRC												
0102X	4.28		225	VC	CIRC	8101X	3.03	0.62	1100	CP	Egg												
0103X			UNK	UNK	UNK	8102X			450	VC	CIRC												
010DX			225	VC	CIRC	8103X			UNK	UNK	CIRC												
012DX			UNK	UNK	UNK	810DX			450	VC	CIRC												
013DX			UNK	UNK	UNK	811DX			UNK	UNK	UNK												
014DX			UNK	UNK	UNK	814DX			UNK	UNK	CIRC												
0151X	3.56	1.77	375	CP	CIRC	8150X	2.98	1.25	450	UNK	CIRC												
01ADX			UNK	UNK	UNK	8151X	3.35	1.82	450	BAC	CIRC												
01BDX			UNK	UNK	UNK	8201X	5.16	1.88	225	VC	CIRC												
01DDX			225	VC	CIRC	8250X	5.55	4.14	150	VC	CIRC												
0201X	3.26	0.66	OTHER	CP	Egg	8251X	5.39	3.43	150	VC	CIRC												
0202X	5.66	3.81	225	VC	CIRC	8252X	3.81	2.33	225	VC	CIRC												
020DX			UNK	UNK	UNK	8301X	6.7	3.33	225	VC	CIRC												
021DX			UNK	UNK	UNK	8302X	6.28	2.87	225	VC	CIRC												
0301X	3.61	0.73	OTHER	CP	Egg	8303X	6.16	2.77	225	VC	CIRC												
030DX			UNK	CP	Egg	8304X	6.74	5.46	150	VC	CIRC												
031DX			UNK	CP	Egg	8306X			225	VC	CIRC												
6101X			UNK	CP	Egg	830DX			UNK	UNK	UNK												
6102X			300	VC	CIRC	831DX			UNK	UNK	CIRC												
610DX	4.93	1.85	300	VC	CIRC	832DX			225	VC	CIRC												
611BX			300	VC	CIRC	833DX			225	VC	CIRC												
611DX			100	UNK	UNK	834DX	6.41	5.74	150	VC	CIRC												
612DX			225	UNK	UNK	835DX			UNK	UNK	CIRC												
614DX			225	UNK	UNK	836DX			UNK	UNK	UNK												
6150X	4.43		OTHER	BRE	CIRC	83ADX	6.5	5.31	150	VC	CIRC												
615DX			UNK	UNK	UNK	83BDX	6.59	5.54	150	VC	CIRC												
616DX			UNK	UNK	UNK	83CDX	6.32	4.93	150	VC	CIRC												
617DX			UNK	BRE	CIRC	83DDX	6.16	3.62	150	VC	CIRC												
6201X		2.15	300	VC	CIRC	83GDX	6.59	5.17	100	VC	CIRC												
620DX			300	VC	CIRC	9001X	6.59	5.23	1100	BRE	Egg												
6301X	5.6		300	VC	CIRC	9001X	2.39	0.2	1100	VC	Egg												
6303X			UNK	UNK	CIRC	9101X	2.6	0.47	150	CP	Egg												
630BX			UNK	UNK	CIRC	9102X	2.28	0.45	900	CP	Egg												
630DX			225	VC	CIRC	9103X	2.29		150	VC	CIRC												
634DX			UNK	UNK	UNK	9104X			150	VC	CIRC												
63FBX			225	VC	CIRC	9105X	2.49		225	VC	CIRC												
63FBX			UNK	UNK	CIRC	9109X			150	VC	CIRC												
7001X			300	VC	CIRC	910DX			150	VC	CIRC												
7002X			UNK	UNK	CIRC	9110X			150	VC	CIRC												
7003X			UNK	UNK	CIRC	9111X			150	VC	CIRC												
7101X	3.79	0.85	450	VC	CIRC	9112X			150	VC	CIRC												
7102X	4.18	1.11	300	VC	CIRC	9116X			100	VC	CIRC												
7103Y	4.55	1.17	300	VC	CIRC	912DX			900	CP	Egg												
7104X			UNK	UNK	CIRC	9150X	2.65	1.25	450	CP	CIRC												
7105X			UNK	UNK	CIRC	9151X	2.34	0.83	300	VC	CIRC												
7106X			UNK	UNK	CIRC	9152X	2.52	1.15	450	CP	CIRC												
7107X			UNK	UNK	CIRC	915DY			375	VC	CIRC												
710DX			UNK	UNK	CIRC	9201X	3.21		UNK	CP	Egg												
711DX			UNK	UNK	UNK	9202X			150	VC	CIRC												
712DX			225	VC	CIRC	9203X			UNK	UNK	UNK												
714DX			300	VC	CIRC	9204X			UNK	UNK	CIRC												
7150X	3.84	2.18	450	BAC	CIRC	920DX			UNK	UNK	CIRC												
7151X	3.92	2.83	UNK	CP	CIRC	921DX			UNK	UNK	CIRC												
7152X	4.59		375	CP	CIRC	921LX	6.01	3.48	225	VC	CIRC												
715DX			225	CP	CIRC	924DX			UNK	CP	Egg												
7201X	5.34	2.18	375	VC	CIRC	9250X	2.58	0.87	300	VC	CIRC												
7202X	6.87	4.37	225	VC	CIRC	9301X			150	VC	CIRC												
7301X	6.34	3.21	150	VC	CIRC																		
7302X	6.69	3.71	UNK	UNK	CIRC																		
7303X			UNK	UNK	CIRC																		
7304X			UNK	UNK	CIRC																		
730DX			UNK	UNK	CIRC																		
731DX			UNK	UNK	UNK																		

[illegible]

Drawn by: kumaria	
Title: 285860_Former Waitrose, East S	
Date: 21/03/2018	

F. Drainage Layout Drawings

Appendices

Former Waitrose, Littlehampton

Project Number: WIE14296

Document Reference: WIE14296-100-R-4-1-3-FRA



PROPOSED DRAINAGE CATCHMENTS		
	SOFT LANDSCAPING (ha)	DRAINED AREA (ha)
CATCHMENT 1	0.0210	0.2260
CATCHMENT 2	0.0510	0.1870

This drawing should not be scaled. Dimensions to be verified on site.
Any discrepancies should be referred to the Engineer prior to work being put in hand.

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Pickfords Wharf, Clink Street, London SE1 9DG t 020 7928 7888 f 03333 444 501

GENERAL NOTES

- KEY
- SITE BOUNDARY - 0.560ha
 - CATCHMENT 1 - 0.247ha
 - CATCHMENT 2 - 0.238ha
 - DRAINED AREA (SEE TABLE)
 - UNDRAINED SOFT LANDSCAPING (SEE TABLE)
 - EXISTING HIGHWAY - 0.075ha

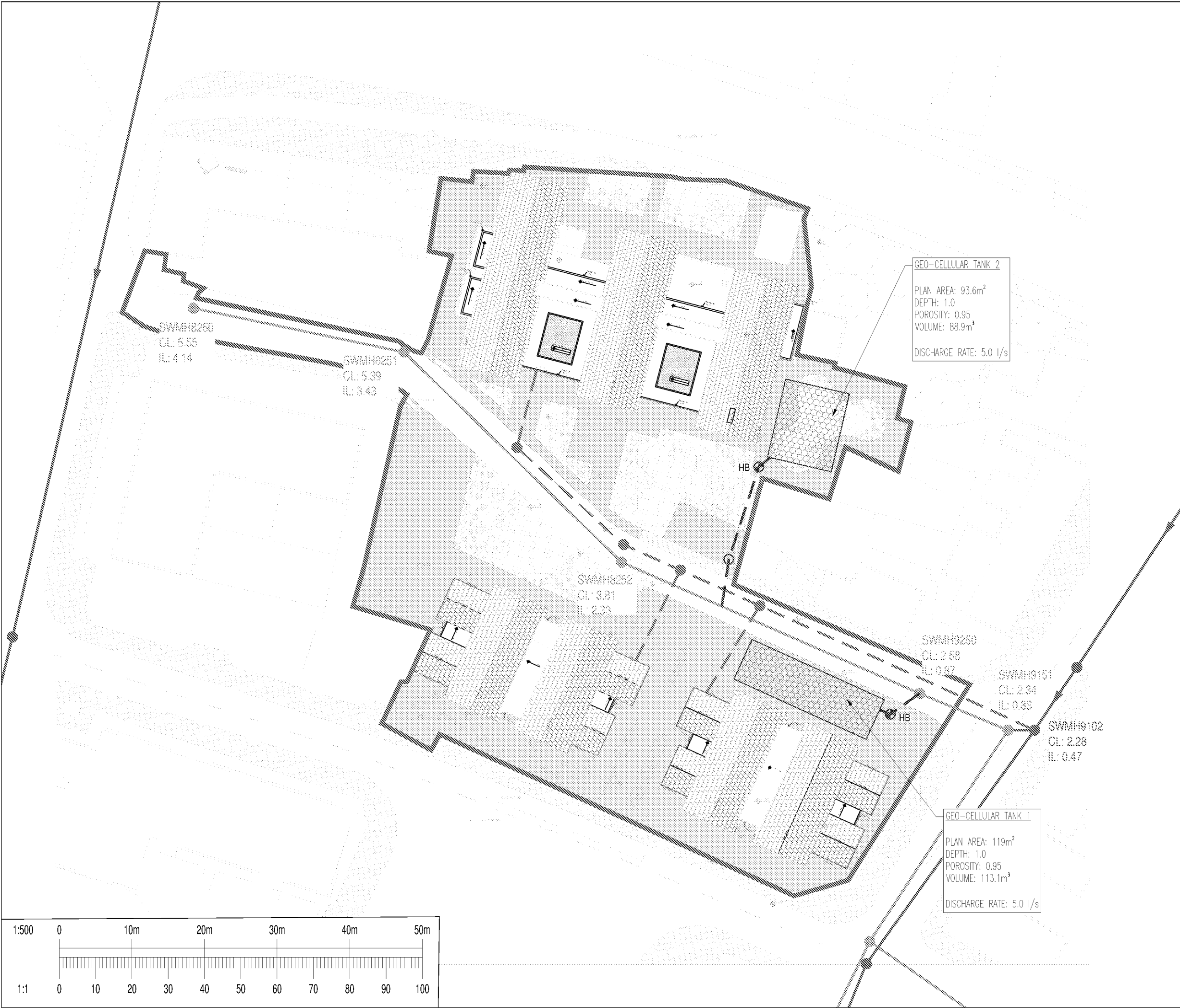
REV	05.08.20	ISSUED	CT
Rev	Date	Description	By

Amendments	
Project	FORMER WAITROSE, LITTLEHAMPTON
Title	PROPOSED DRAINAGE CATCHMENTS
Client	ROPEMAKE PROPERTIES LTD



Pickfords Wharf Clink Street London SE1 9DG
t 020 7928 7888
mail@watermangroup.com www.watermangroup.com

Status			
PRELIMINARY			
Designed By	CT	Checked By	DO
Drawn By	CT	Date	AUGUST 2020
Project - Originator - Volume - Level - Type - Role - Number			Revision
14296-WIE-ZZ-XX-DR-D-92101			P01



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GENERAL NOTES

KEY

- EXISTING PUBLIC SURFACE WATER SEWER
- EXISTING PUBLIC COMBINED SEWER
- PROPOSED SURFACE WATER SEWER
- PROPOSED FOUL SEWER
- PROPOSED HYDRO BRAKE
- PROPOSED ATTENUATION TANK
- PROPOSED PERMEABLE PAVING

NOTES

- 1) DRAINAGE STRATEGY IS SUBJECT TO CHANGE AT THE DETAILED DESIGN STAGE.

REV	Date	Description	By
Rev	Date	Description	By

Amendments

Project
FORMER WAITROSE, LITTLEHAMPTON

Title
PROPOSED DRAINAGE STRATEGY

Client
ROPEMAKE PROPERTIES LTD



Pickfords Wharf Clink Street London SE1 9DG
t 020 7928 7888
mail@watermangroup.com www.watermangroup.com

Status
PRELIMINARY

Designed By	CT	Checked By	DO	Waterman Ref	IProjec
Drawn By	CT	Date	AUGUST 2020	Scales @ A3	Scale

Project	Originator	Volume	Level	Type	Role	Number	Revision
14296-WIE-ZZ-XX-DR-D-92102							P01



G. Calculations

Appendices

Former Waitrose, Littlehampton

Project Number: WIE14296

Document Reference: WIE14296-100-R-4-1-3-FRA

Waterman Group							Page 1																																																																																																																																																																								
Pickfords Wharf Clink Street London, SE1 9DG			Former Waitrose, Littlehampton Catchment 2 - North 1 in 100 yr + 40% CC																																																																																																																																																																												
Date 01/08/2020 File 200802_Catchment 2 Nort...			Designed by C. Thwaites Checked by D. O'Donovan																																																																																																																																																																												
Innovyze			Source Control 2019.1																																																																																																																																																																												
<u>Summary of Results for 100 year Return Period (+40%)</u> Half Drain Time : 156 minutes. <table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Control (l/s)</th><th>Max $\sqrt{\text{Outflow}}$ (l/s)</th><th>Max Volume (mE)</th><th>Status</th></tr><tr><td>15 min Summer</td><td>3.322</td><td>0.542</td><td>0.0</td><td>5.0</td><td>5.0</td><td>48.2</td><td>OK</td></tr><tr><td>30 min Summer</td><td>3.486</td><td>0.706</td><td>0.0</td><td>5.0</td><td>5.0</td><td>62.7</td><td>OK</td></tr><tr><td>60 min Summer</td><td>3.624</td><td>0.844</td><td>0.0</td><td>5.0</td><td>5.0</td><td>75.1</td><td>OK</td></tr><tr><td>120 min Summer</td><td>3.645</td><td>0.865</td><td>0.0</td><td>5.0</td><td>5.0</td><td>76.9</td><td>OK</td></tr><tr><td>180 min Summer</td><td>3.621</td><td>0.841</td><td>0.0</td><td>5.0</td><td>5.0</td><td>74.8</td><td>OK</td></tr><tr><td>240 min Summer</td><td>3.591</td><td>0.811</td><td>0.0</td><td>5.0</td><td>5.0</td><td>72.1</td><td>OK</td></tr><tr><td>360 min Summer</td><td>3.524</td><td>0.744</td><td>0.0</td><td>5.0</td><td>5.0</td><td>66.1</td><td>OK</td></tr><tr><td>480 min Summer</td><td>3.453</td><td>0.673</td><td>0.0</td><td>5.0</td><td>5.0</td><td>59.9</td><td>OK</td></tr><tr><td>600 min Summer</td><td>3.376</td><td>0.596</td><td>0.0</td><td>5.0</td><td>5.0</td><td>53.0</td><td>OK</td></tr><tr><td>720 min Summer</td><td>3.306</td><td>0.526</td><td>0.0</td><td>5.0</td><td>5.0</td><td>46.8</td><td>OK</td></tr><tr><td>960 min Summer</td><td>3.190</td><td>0.410</td><td>0.0</td><td>5.0</td><td>5.0</td><td>36.5</td><td>OK</td></tr><tr><td>1440 min Summer</td><td>3.036</td><td>0.256</td><td>0.0</td><td>5.0</td><td>5.0</td><td>22.8</td><td>OK</td></tr><tr><td>2160 min Summer</td><td>2.928</td><td>0.148</td><td>0.0</td><td>4.6</td><td>4.6</td><td>13.2</td><td>OK</td></tr><tr><td>2880 min Summer</td><td>2.894</td><td>0.114</td><td>0.0</td><td>4.1</td><td>4.1</td><td>10.1</td><td>OK</td></tr><tr><td>4320 min Summer</td><td>2.868</td><td>0.088</td><td>0.0</td><td>3.1</td><td>3.1</td><td>7.8</td><td>OK</td></tr><tr><td>5760 min Summer</td><td>2.856</td><td>0.076</td><td>0.0</td><td>2.5</td><td>2.5</td><td>6.8</td><td>OK</td></tr><tr><td>7200 min Summer</td><td>2.849</td><td>0.069</td><td>0.0</td><td>2.2</td><td>2.2</td><td>6.2</td><td>OK</td></tr><tr><td>8640 min Summer</td><td>2.845</td><td>0.065</td><td>0.0</td><td>2.0</td><td>2.0</td><td>5.7</td><td>OK</td></tr><tr><td>10080 min Summer</td><td>2.841</td><td>0.061</td><td>0.0</td><td>1.8</td><td>1.8</td><td>5.4</td><td>OK</td></tr><tr><td>15 min Winter</td><td>3.392</td><td>0.612</td><td>0.0</td><td>5.0</td><td>5.0</td><td>54.4</td><td>OK</td></tr></table>								Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max $\sqrt{\text{Outflow}}$ (l/s)	Max Volume (mE)	Status	15 min Summer	3.322	0.542	0.0	5.0	5.0	48.2	OK	30 min Summer	3.486	0.706	0.0	5.0	5.0	62.7	OK	60 min Summer	3.624	0.844	0.0	5.0	5.0	75.1	OK	120 min Summer	3.645	0.865	0.0	5.0	5.0	76.9	OK	180 min Summer	3.621	0.841	0.0	5.0	5.0	74.8	OK	240 min Summer	3.591	0.811	0.0	5.0	5.0	72.1	OK	360 min Summer	3.524	0.744	0.0	5.0	5.0	66.1	OK	480 min Summer	3.453	0.673	0.0	5.0	5.0	59.9	OK	600 min Summer	3.376	0.596	0.0	5.0	5.0	53.0	OK	720 min Summer	3.306	0.526	0.0	5.0	5.0	46.8	OK	960 min Summer	3.190	0.410	0.0	5.0	5.0	36.5	OK	1440 min Summer	3.036	0.256	0.0	5.0	5.0	22.8	OK	2160 min Summer	2.928	0.148	0.0	4.6	4.6	13.2	OK	2880 min Summer	2.894	0.114	0.0	4.1	4.1	10.1	OK	4320 min Summer	2.868	0.088	0.0	3.1	3.1	7.8	OK	5760 min Summer	2.856	0.076	0.0	2.5	2.5	6.8	OK	7200 min Summer	2.849	0.069	0.0	2.2	2.2	6.2	OK	8640 min Summer	2.845	0.065	0.0	2.0	2.0	5.7	OK	10080 min Summer	2.841	0.061	0.0	1.8	1.8	5.4	OK	15 min Winter	3.392	0.612	0.0	5.0	5.0	54.4	OK
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max $\sqrt{\text{Outflow}}$ (l/s)	Max Volume (mE)	Status																																																																																																																																																																								
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120 min Summer	3.645	0.865	0.0	5.0	5.0	76.9	OK																																																																																																																																																																								
180 min Summer	3.621	0.841	0.0	5.0	5.0	74.8	OK																																																																																																																																																																								
240 min Summer	3.591	0.811	0.0	5.0	5.0	72.1	OK																																																																																																																																																																								
360 min Summer	3.524	0.744	0.0	5.0	5.0	66.1	OK																																																																																																																																																																								
480 min Summer	3.453	0.673	0.0	5.0	5.0	59.9	OK																																																																																																																																																																								
600 min Summer	3.376	0.596	0.0	5.0	5.0	53.0	OK																																																																																																																																																																								
720 min Summer	3.306	0.526	0.0	5.0	5.0	46.8	OK																																																																																																																																																																								
960 min Summer	3.190	0.410	0.0	5.0	5.0	36.5	OK																																																																																																																																																																								
1440 min Summer	3.036	0.256	0.0	5.0	5.0	22.8	OK																																																																																																																																																																								
2160 min Summer	2.928	0.148	0.0	4.6	4.6	13.2	OK																																																																																																																																																																								
2880 min Summer	2.894	0.114	0.0	4.1	4.1	10.1	OK																																																																																																																																																																								
4320 min Summer	2.868	0.088	0.0	3.1	3.1	7.8	OK																																																																																																																																																																								
5760 min Summer	2.856	0.076	0.0	2.5	2.5	6.8	OK																																																																																																																																																																								
7200 min Summer	2.849	0.069	0.0	2.2	2.2	6.2	OK																																																																																																																																																																								
8640 min Summer	2.845	0.065	0.0	2.0	2.0	5.7	OK																																																																																																																																																																								
10080 min Summer	2.841	0.061	0.0	1.8	1.8	5.4	OK																																																																																																																																																																								
15 min Winter	3.392	0.612	0.0	5.0	5.0	54.4	OK																																																																																																																																																																								
<table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (mE)</th><th>Discharge Volume (mE)</th><th>Time-Peak (mins)</th></tr><tr><td>15 min Summer</td><td>147.715</td><td>0.0</td><td>51.6</td><td>18</td></tr><tr><td>30 min Summer</td><td>98.777</td><td>0.0</td><td>69.1</td><td>33</td></tr><tr><td>60 min Summer</td><td>63.048</td><td>0.0</td><td>88.3</td><td>62</td></tr><tr><td>120 min Summer</td><td>36.974</td><td>0.0</td><td>103.6</td><td>120</td></tr><tr><td>180 min Summer</td><td>26.915</td><td>0.0</td><td>113.2</td><td>148</td></tr><tr><td>240 min Summer</td><td>21.401</td><td>0.0</td><td>120.0</td><td>180</td></tr><tr><td>360 min Summer</td><td>15.370</td><td>0.0</td><td>129.2</td><td>248</td></tr><tr><td>480 min Summer</td><td>12.102</td><td>0.0</td><td>135.7</td><td>318</td></tr><tr><td>600 min Summer</td><td>10.040</td><td>0.0</td><td>140.7</td><td>382</td></tr><tr><td>720 min Summer</td><td>8.614</td><td>0.0</td><td>144.9</td><td>442</td></tr><tr><td>960 min Summer</td><td>6.762</td><td>0.0</td><td>151.6</td><td>566</td></tr><tr><td>1440 min Summer</td><td>4.829</td><td>0.0</td><td>162.4</td><td>794</td></tr><tr><td>2160 min Summer</td><td>3.473</td><td>0.0</td><td>175.3</td><td>1128</td></tr><tr><td>2880 min Summer</td><td>2.766</td><td>0.0</td><td>186.1</td><td>1472</td></tr><tr><td>4320 min Summer</td><td>2.037</td><td>0.0</td><td>205.5</td><td>2200</td></tr><tr><td>5760 min Summer</td><td>1.659</td><td>0.0</td><td>223.3</td><td>2936</td></tr><tr><td>7200 min Summer</td><td>1.428</td><td>0.0</td><td>240.3</td><td>3672</td></tr><tr><td>8640 min Summer</td><td>1.271</td><td>0.0</td><td>256.7</td><td>4368</td></tr><tr><td>10080 min Summer</td><td>1.158</td><td>0.0</td><td>272.6</td><td>5104</td></tr><tr><td>15 min Winter</td><td>147.715</td><td>0.0</td><td>57.8</td><td>18</td></tr></table>								Storm Event	Rain (mm/hr)	Flooded Volume (mE)	Discharge Volume (mE)	Time-Peak (mins)	15 min Summer	147.715	0.0	51.6	18	30 min Summer	98.777	0.0	69.1	33	60 min Summer	63.048	0.0	88.3	62	120 min Summer	36.974	0.0	103.6	120	180 min Summer	26.915	0.0	113.2	148	240 min Summer	21.401	0.0	120.0	180	360 min Summer	15.370	0.0	129.2	248	480 min Summer	12.102	0.0	135.7	318	600 min Summer	10.040	0.0	140.7	382	720 min Summer	8.614	0.0	144.9	442	960 min Summer	6.762	0.0	151.6	566	1440 min Summer	4.829	0.0	162.4	794	2160 min Summer	3.473	0.0	175.3	1128	2880 min Summer	2.766	0.0	186.1	1472	4320 min Summer	2.037	0.0	205.5	2200	5760 min Summer	1.659	0.0	223.3	2936	7200 min Summer	1.428	0.0	240.3	3672	8640 min Summer	1.271	0.0	256.7	4368	10080 min Summer	1.158	0.0	272.6	5104	15 min Winter	147.715	0.0	57.8	18																																																															
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Waterman Group							Page 2
Pickfords Wharf Clink Street London, SE1 9DG			Former Waitrose, Littlehampton Catchment 2 - North 1 in 100 yr + 40% CC				
Date 01/08/2020 File 200802_Catchment 2 Nort...			Designed by C. Thwaites Checked by D. O'Donovan				
Innovyze			Source Control 2019.1				
Summary of Results for 100 year Return Period (+40%)							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max √ Outflow (l/s)	Max Volume (mE)	Status
30 min Winter	3.577	0.797	0.0	5.0	5.0	70.9	OK
60 min Winter	3.738	0.958	0.0	5.0	5.0	85.2	OK
120 min Winter	3.776	0.996	0.0	5.0	5.0	88.6	OK
180 min Winter	3.749	0.969	0.0	5.0	5.0	86.1	OK
240 min Winter	3.710	0.930	0.0	5.0	5.0	82.7	OK
360 min Winter	3.620	0.840	0.0	5.0	5.0	74.7	OK
480 min Winter	3.523	0.743	0.0	5.0	5.0	66.1	OK
600 min Winter	3.419	0.639	0.0	5.0	5.0	56.8	OK
720 min Winter	3.305	0.525	0.0	5.0	5.0	46.7	OK
960 min Winter	3.136	0.356	0.0	5.0	5.0	31.7	OK
1440 min Winter	2.952	0.172	0.0	4.7	4.7	15.3	OK
2160 min Winter	2.886	0.106	0.0	3.8	3.8	9.4	OK
2880 min Winter	2.867	0.087	0.0	3.0	3.0	7.7	OK
4320 min Winter	2.851	0.071	0.0	2.2	2.2	6.3	OK
5760 min Winter	2.842	0.062	0.0	1.8	1.8	5.5	OK
7200 min Winter	2.837	0.057	0.0	1.6	1.6	5.1	OK
8640 min Winter	2.833	0.053	0.0	1.4	1.4	4.7	OK
10080 min Winter	2.831	0.051	0.0	1.3	1.3	4.5	OK
Storm Event	Rain (mm/hr)	Flooded Volume (mE)	Discharge Volume (mE)	Time-Peak (mins)			
30 min Winter	98.777	0.0	77.4	32			
60 min Winter	63.048	0.0	99.0	60			
120 min Winter	36.974	0.0	116.1	116			
180 min Winter	26.915	0.0	126.7	168			
240 min Winter	21.401	0.0	134.4	190			
360 min Winter	15.370	0.0	144.8	268			
480 min Winter	12.102	0.0	152.0	344			
600 min Winter	10.040	0.0	157.6	422			
720 min Winter	8.614	0.0	162.3	478			
960 min Winter	6.762	0.0	169.8	594			
1440 min Winter	4.829	0.0	181.9	796			
2160 min Winter	3.473	0.0	196.3	1120			
2880 min Winter	2.766	0.0	208.5	1468			
4320 min Winter	2.037	0.0	230.2	2156			
5760 min Winter	1.659	0.0	250.1	2936			
7200 min Winter	1.428	0.0	269.1	3672			
8640 min Winter	1.271	0.0	287.5	4400			
10080 min Winter	1.158	0.0	305.4	5136			
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Waterman Group		Page 3
Pickfords Wharf Clink Street London, SE1 9DG	Former Waitrose, Littlehampton Catchment 2 - North 1 in 100 yr + 40% CC	
Date 01/08/2020	Designed by C. Thwaites	
File 200802_Catchment 2 Nort...	Checked by D. O'Donovan	
Innovyze		Source Control 2019.1

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 502926 102231 TQ 02926 02231
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.187

Time (mins)	Area
From	To: (ha)
0	4 0.187

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Pickfords Wharf Clink Street London, SE1 9DG	Former Waitrose, Littlehampton Catchment 2 - North 1 in 100 yr + 40% CC	
Date 01/08/2020 File 200802_Catchment 2 Nort...	Designed by C. Thwaites Checked by D. O'Donovan	
Innovyze Source Control 2019.1		

Model Details

Storage is Online Cover Level (m) 4.280

Cellular Storage Structure

Invert Level (m) 2.780 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	93.6	0.0	1.001	0.0	0.0
1.000	93.6	0.0			

Hydro-Brake÷ Optimum Outflow Control

Unit Reference MD-SHE-0105-5000-1000-5000
Design Head (m) 1.000
Design Flow (l/s) 5.0
Flush-Flow Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 105
Invert Level (m) 2.780
Minimum Outlet Pipe Diameter (mm) 150
Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	5.0
Flush-Flow	0.296	5.0
Kick-Flow	0.637	4.1
Mean Flow over Head Range	-	4.3

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	3.6	1.200	5.4	3.000	8.4	7.000	12.5
0.200	4.8	1.400	5.8	3.500	9.0	7.500	12.9
0.300	5.0	1.600	6.2	4.000	9.6	8.000	13.3
0.400	4.9	1.800	6.6	4.500	10.1	8.500	13.7
0.500	4.7	2.000	6.9	5.000	10.6	9.000	14.1
0.600	4.3	2.200	7.2	5.500	11.1	9.500	14.5
0.800	4.5	2.400	7.5	6.000	11.6		
1.000	5.0	2.600	7.8	6.500	12.1		

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CALCULATIONS

Company: WIE
Sheet No: 1 of 1
By C. Thwaites
Checked: D. O'Donovan

Office: London
Project No: WIE 14296
Date 02.08.20
Date 02.08.20

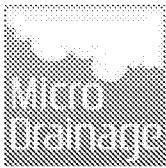
Project Title: Former Waitrose, Littlehampton

Calculations Title: Surface Water Management (M100_60) - Existing Surface Water Runoff

LOCATION	CALCULATIONS	OPTIONS
	Calculations based on: Design and Analysis of urban storm drainage. The Wallingford Procedure, Volume 1 Principles methods and practice.	
	<u>User Input Data</u>	
	Total site area (exlcuding Avon Road) 0.485 ha	
	SAAR (From FEH) 719	
	Rainfall Intensity (Ffrom FEH) 45.03	
	PIMP (% impervious) 100 %	
	Soil Type 0.40	
	Very Low Runoff (well drained sandy, loamy or earthy peat soils) 0.15	
	Low Runoff (Very permeable soils (e.g. gravel, sand) 0.30	
	Moderate (Very fine sands, silts and sedimentary clays) 0.40	
	High Runoff (Clayey or loamy soils) 0.45	
	Very High Runoff (Soils of the wet uplands) 0.50	
Fig. 9.7	UCWI (From Figure 9.7 of Wallingford Method) 73	
Eqn. 13	$Q_p \text{ (peak discharge)} = 2.78 C_v CR i A$	
	Where: Q_p (Peak Discharge) i = rainfall intensity A = Total Area	
From FEH	Average rainfall Intensity (i)	
	M100_60 is: 45.0 mm	
Eqn 7.20	$C_v = PR/100$	
Eqn 7.3	$PR = (0.829 PIMP) + (25.0 SOIL) + (0.078 UCWI) - 20.7$	
	PIMP (Percentage of catchment which is impervious) 100 %	
Page 52	Note: PIMP can not be less than 40% 40 %	
	Thus value of PIMP to be used 100 ≡	
	Soil: 0.40 UCWI: 73	
	PR = 77.89	
	Thus $C_v = 0.78$	
Sec 7.10	CR (Recommended for simulation and design) 340	
	v ix d x 3 0 0 3 m s − 1 → 61.5 l / s or 126.8 l / s / h a	

Waterman Group							Page 1																																																																																																																																																																																																																																																																																	
Pickfords Wharf Clink Street London, SE1 9DG			Former Waitrose, Littlehampton Catchment 1 - South 1 in 100 yr + 40% CC																																																																																																																																																																																																																																																																																					
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<u>Summary of Results for 100 year Return Period (+40%)</u> Half Drain Time : 201 minutes. <table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Control (l/s)</th><th>Max Σ Outflow (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>15 min Summer</td><td>2.022</td><td>0.522</td><td>0.0</td><td>5.0</td><td>5.0</td><td>59.0</td><td>O K</td></tr><tr><td>30 min Summer</td><td>2.183</td><td>0.683</td><td>0.0</td><td>5.0</td><td>5.0</td><td>77.2</td><td>O K</td></tr><tr><td>60 min Summer</td><td>2.328</td><td>0.828</td><td>0.0</td><td>5.0</td><td>5.0</td><td>93.6</td><td>O K</td></tr><tr><td>120 min Summer</td><td>2.371</td><td>0.871</td><td>0.0</td><td>5.0</td><td>5.0</td><td>98.5</td><td>O K</td></tr><tr><td>180 min Summer</td><td>2.358</td><td>0.858</td><td>0.0</td><td>5.0</td><td>5.0</td><td>97.0</td><td>O K</td></tr><tr><td>240 min Summer</td><td>2.335</td><td>0.835</td><td>0.0</td><td>5.0</td><td>5.0</td><td>94.4</td><td>O K</td></tr><tr><td>360 min Summer</td><td>2.280</td><td>0.780</td><td>0.0</td><td>5.0</td><td>5.0</td><td>88.2</td><td>O K</td></tr><tr><td>480 min Summer</td><td>2.223</td><td>0.723</td><td>0.0</td><td>5.0</td><td>5.0</td><td>81.7</td><td>O K</td></tr><tr><td>600 min Summer</td><td>2.166</td><td>0.666</td><td>0.0</td><td>5.0</td><td>5.0</td><td>75.3</td><td>O K</td></tr><tr><td>720 min Summer</td><td>2.104</td><td>0.604</td><td>0.0</td><td>5.0</td><td>5.0</td><td>68.2</td><td>O K</td></tr><tr><td>960 min Summer</td><td>1.995</td><td>0.495</td><td>0.0</td><td>5.0</td><td>5.0</td><td>56.0</td><td>O K</td></tr><tr><td>1440 min Summer</td><td>1.837</td><td>0.337</td><td>0.0</td><td>5.0</td><td>5.0</td><td>38.1</td><td>O K</td></tr><tr><td>2160 min Summer</td><td>1.703</td><td>0.203</td><td>0.0</td><td>4.9</td><td>4.9</td><td>22.9</td><td>O K</td></tr><tr><td>2880 min Summer</td><td>1.640</td><td>0.140</td><td>0.0</td><td>4.5</td><td>4.5</td><td>15.8</td><td>O K</td></tr><tr><td>4320 min Summer</td><td>1.603</td><td>0.103</td><td>0.0</td><td>3.7</td><td>3.7</td><td>11.6</td><td>O K</td></tr><tr><td>5760 min Summer</td><td>1.587</td><td>0.087</td><td>0.0</td><td>3.0</td><td>3.0</td><td>9.8</td><td>O K</td></tr><tr><td>7200 min Summer</td><td>1.578</td><td>0.078</td><td>0.0</td><td>2.6</td><td>2.6</td><td>8.9</td><td>O K</td></tr><tr><td>8640 min Summer</td><td>1.573</td><td>0.073</td><td>0.0</td><td>2.3</td><td>2.3</td><td>8.2</td><td>O K</td></tr><tr><td>10080 min Summer</td><td>1.569</td><td>0.069</td><td>0.0</td><td>2.1</td><td>2.1</td><td>7.7</td><td>O K</td></tr><tr><td>15 min Winter</td><td>2.088</td><td>0.588</td><td>0.0</td><td>5.0</td><td>5.0</td><td>66.5</td><td>O K</td></tr></table> <table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Discharge Volume (m³)</th><th>Time-Peak (mins)</th></tr><tr><td>15 min Summer</td><td>147.715</td><td>0.0</td><td>62.3</td><td>18</td></tr><tr><td>30 min Summer</td><td>98.777</td><td>0.0</td><td>83.4</td><td>33</td></tr><tr><td>60 min Summer</td><td>63.048</td><td>0.0</td><td>106.7</td><td>62</td></tr><tr><td>120 min Summer</td><td>36.974</td><td>0.0</td><td>125.2</td><td>120</td></tr><tr><td>180 min Summer</td><td>26.915</td><td>0.0</td><td>136.7</td><td>164</td></tr><tr><td>240 min Summer</td><td>21.401</td><td>0.0</td><td>144.9</td><td>194</td></tr><tr><td>360 min Summer</td><td>15.370</td><td>0.0</td><td>156.2</td><td>258</td></tr><tr><td>480 min Summer</td><td>12.102</td><td>0.0</td><td>163.9</td><td>328</td></tr><tr><td>600 min Summer</td><td>10.040</td><td>0.0</td><td>170.0</td><td>398</td></tr><tr><td>720 min Summer</td><td>8.614</td><td>0.0</td><td>175.0</td><td>462</td></tr><tr><td>960 min Summer</td><td>6.762</td><td>0.0</td><td>183.2</td><td>586</td></tr><tr><td>1440 min Summer</td><td>4.829</td><td>0.0</td><td>196.2</td><td>822</td></tr><tr><td>2160 min Summer</td><td>3.473</td><td>0.0</td><td>211.8</td><td>1164</td></tr><tr><td>2880 min Summer</td><td>2.766</td><td>0.0</td><td>224.9</td><td>1500</td></tr><tr><td>4320 min Summer</td><td>2.037</td><td>0.0</td><td>248.3</td><td>2204</td></tr><tr><td>5760 min Summer</td><td>1.659</td><td>0.0</td><td>269.8</td><td>2936</td></tr><tr><td>7200 min Summer</td><td>1.428</td><td>0.0</td><td>290.4</td><td>3672</td></tr><tr><td>8640 min Summer</td><td>1.271</td><td>0.0</td><td>310.2</td><td>4344</td></tr><tr><td>10080 min Summer</td><td>1.158</td><td>0.0</td><td>329.4</td><td>5104</td></tr><tr><td>15 min Winter</td><td>147.715</td><td>0.0</td><td>69.8</td><td>18</td></tr></table>								Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status	15 min Summer	2.022	0.522	0.0	5.0	5.0	59.0	O K	30 min Summer	2.183	0.683	0.0	5.0	5.0	77.2	O K	60 min Summer	2.328	0.828	0.0	5.0	5.0	93.6	O K	120 min Summer	2.371	0.871	0.0	5.0	5.0	98.5	O K	180 min Summer	2.358	0.858	0.0	5.0	5.0	97.0	O K	240 min Summer	2.335	0.835	0.0	5.0	5.0	94.4	O K	360 min Summer	2.280	0.780	0.0	5.0	5.0	88.2	O K	480 min Summer	2.223	0.723	0.0	5.0	5.0	81.7	O K	600 min Summer	2.166	0.666	0.0	5.0	5.0	75.3	O K	720 min Summer	2.104	0.604	0.0	5.0	5.0	68.2	O K	960 min Summer	1.995	0.495	0.0	5.0	5.0	56.0	O K	1440 min Summer	1.837	0.337	0.0	5.0	5.0	38.1	O K	2160 min Summer	1.703	0.203	0.0	4.9	4.9	22.9	O K	2880 min Summer	1.640	0.140	0.0	4.5	4.5	15.8	O K	4320 min Summer	1.603	0.103	0.0	3.7	3.7	11.6	O K	5760 min Summer	1.587	0.087	0.0	3.0	3.0	9.8	O K	7200 min Summer	1.578	0.078	0.0	2.6	2.6	8.9	O K	8640 min Summer	1.573	0.073	0.0	2.3	2.3	8.2	O K	10080 min Summer	1.569	0.069	0.0	2.1	2.1	7.7	O K	15 min Winter	2.088	0.588	0.0	5.0	5.0	66.5	O K	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	15 min Summer	147.715	0.0	62.3	18	30 min Summer	98.777	0.0	83.4	33	60 min Summer	63.048	0.0	106.7	62	120 min Summer	36.974	0.0	125.2	120	180 min Summer	26.915	0.0	136.7	164	240 min Summer	21.401	0.0	144.9	194	360 min Summer	15.370	0.0	156.2	258	480 min Summer	12.102	0.0	163.9	328	600 min Summer	10.040	0.0	170.0	398	720 min Summer	8.614	0.0	175.0	462	960 min Summer	6.762	0.0	183.2	586	1440 min Summer	4.829	0.0	196.2	822	2160 min Summer	3.473	0.0	211.8	1164	2880 min Summer	2.766	0.0	224.9	1500	4320 min Summer	2.037	0.0	248.3	2204	5760 min Summer	1.659	0.0	269.8	2936	7200 min Summer	1.428	0.0	290.4	3672	8640 min Summer	1.271	0.0	310.2	4344	10080 min Summer	1.158	0.0	329.4	5104	15 min Winter	147.715	0.0	69.8	18
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status																																																																																																																																																																																																																																																																																	
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Waterman Group							Page 2
Pickfords Wharf Clink Street London, SE1 9DG			Former Waitrose, Littlehampton Catchment 1 - South 1 in 100 yr + 40% CC				
Date 01/08/2020 File 200802_CATCHMENT 1 SOUT...			Designed by C. Thwaites Checked by D. O'Donovan				
Innovyze			Source Control 2019.1				
<u>Summary of Results for 100 year Return Period (+40%)</u>							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	2.270	0.770	0.0	5.0	5.0	87.1	O K
60 min Winter	2.437	0.937	0.0	5.0	5.0	105.9	O K
120 min Winter	2.497	0.997	0.0	5.0	5.0	112.7	O K
180 min Winter	2.491	0.991	0.0	5.0	5.0	112.1	O K
240 min Winter	2.460	0.960	0.0	5.0	5.0	108.5	O K
360 min Winter	2.391	0.891	0.0	5.0	5.0	100.7	O K
480 min Winter	2.314	0.814	0.0	5.0	5.0	92.0	O K
600 min Winter	2.236	0.736	0.0	5.0	5.0	83.2	O K
720 min Winter	2.154	0.654	0.0	5.0	5.0	74.0	O K
960 min Winter	1.982	0.482	0.0	5.0	5.0	54.5	O K
1440 min Winter	1.763	0.263	0.0	5.0	5.0	29.7	O K
2160 min Winter	1.629	0.129	0.0	4.5	4.5	14.5	O K
2880 min Winter	1.602	0.102	0.0	3.6	3.6	11.5	O K
4320 min Winter	1.580	0.080	0.0	2.7	2.7	9.0	O K
5760 min Winter	1.570	0.070	0.0	2.2	2.2	7.9	O K
7200 min Winter	1.564	0.064	0.0	1.9	1.9	7.2	O K
8640 min Winter	1.560	0.060	0.0	1.7	1.7	6.7	O K
10080 min Winter	1.556	0.056	0.0	1.5	1.5	6.4	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
30 min Winter	98.777	0.0	93.4	32			
60 min Winter	63.048	0.0	119.5	62			
120 min Winter	36.974	0.0	140.2	118			
180 min Winter	26.915	0.0	153.1	172			
240 min Winter	21.401	0.0	162.4	220			
360 min Winter	15.370	0.0	174.9	276			
480 min Winter	12.102	0.0	183.6	354			
600 min Winter	10.040	0.0	190.4	430			
720 min Winter	8.614	0.0	196.1	506			
960 min Winter	6.762	0.0	205.2	626			
1440 min Winter	4.829	0.0	219.8	850			
2160 min Winter	3.473	0.0	237.2	1144			
2880 min Winter	2.766	0.0	251.9	1476			
4320 min Winter	2.037	0.0	278.2	2188			
5760 min Winter	1.659	0.0	302.2	2936			
7200 min Winter	1.428	0.0	325.2	3672			
8640 min Winter	1.271	0.0	347.4	4400			
10080 min Winter	1.158	0.0	369.0	5136			
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Waterman Group		Page 4
Pickfords Wharf Clink Street London, SE1 9DG	Former Waitrose, Littlehampton Catchment 1 - South 1 in 100 yr + 40% CC	
Date 01/08/2020 File 200802_CATCHMENT 1 SOUT...	Designed by C. Thwaites Checked by D. O'Donovan	
Innovyze Source Control 2019.1		

Model Details

Storage is Online Cover Level (m) 3.000

Cellular Storage Structure

Invert Level (m) 1.500 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	119.0	0.0	1.001	0.0	0.0
1.000	119.0	0.0			

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0105-5000-1000-5000
Design Head (m) 1.000
Design Flow (l/s) 5.0
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 105
Invert Level (m) 1.500
Minimum Outlet Pipe Diameter (mm) 150
Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	5.0
Flush-Flo™	0.296	5.0
Kick-Flo®	0.637	4.1
Mean Flow over Head Range	-	4.3

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	3.6	1.200	5.4	3.000	8.4	7.000	12.5
0.200	4.8	1.400	5.8	3.500	9.0	7.500	12.9
0.300	5.0	1.600	6.2	4.000	9.6	8.000	13.3
0.400	4.9	1.800	6.6	4.500	10.1	8.500	13.7
0.500	4.7	2.000	6.9	5.000	10.6	9.000	14.1
0.600	4.3	2.200	7.2	5.500	11.1	9.500	14.5
0.800	4.5	2.400	7.5	6.000	11.6		
1.000	5.0	2.600	7.8	6.500	12.1		

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Project Title: Littlehampton
 Calculations Title: Existing Foul Flow Estimate

Sheet No: 1 of 2 Project No: WIE14296
 By: D O'Donovan Date: 05.08.20
 Checked: D O'Donovan Date: 05.08.20

		Dry Weather Flow Rate (per day)	Source	Number of	Factor	Profile (hours)	Peak Flow Rate (litres/second)
Residential					2.12	24	
Existing property =	160 litres/person/day	368.0 litres per unit	Thames Water Guidelines (2016)	0 existing units			0.0
New property =	125 litres/person/day	287.5 litres per unit	Thames Water Guidelines (2016)	0 proposed units			0.0
Occupancy =	2.3 persons						
Hotel		500.0 litres per room	British Water (2013)	0 rooms	3	24	0.0
Student Accommodation		200.0 litres per bed	Thames Water Guidelines (2016)	0 beds	3	24	0.0
Offices		750.0 litres per 100m ²	Jones (1992)	0 m ²	3	10	0.0
Retail		400.0 litres per 100m ²	Jones (1992)	2604.3 m ²	3	12	0.7
Cinema		10.0 litres per seat	Jones (1992)	0 seats*	3	8	0.0
Health Club/Sports Centre		50.0 litres per customer	British Water (2013)	0 customers**	3	16	0.0
Day School		90.0 litres per pupil	British Water (2013)	0 pupils	3	10	0.0
Boarding School		175.0 litres per pupil	British Water (2013)	0 pupils	3	24	0.0
Hospital		625.0 litres per bed	Jones (1992)	0 beds	3	24	0.0
Nursing Home		350.0 litres per bed	British Water (2013)	0 beds	3	24	0.0
Restaurant		30.0 litres per cover	British Water (2013)	0 covers	3	8	0.0
Pub/Club		15.0 litres per customer	Butler and Davies (2004)	0 customers***	3	12	0.0
Warehouse		150.0 litres per 100m ²	Jones (1992)	0 m ²	3	12	0.0
Manufacturing		550.0 litres per 100m ²	Jones (1992)	0 m ²	3	12	0.0
Commercial		300.0 litres per 100m ²	Jones (1992)	0 m ²	3	12	0.0
SUB TOTAL							0.7
Infiltration percentage	10%						0.1
TOTAL							0.8

* Foul flow rate needs to be calculated based on number of seats. An allowance of 4m² has been made for each seat.

Floor area = 0 m² 4 m² per person

** Foul flow rate needs to be calculated based on number of customers. An allowance of 4m² has been made for each customer.

Floor area = 0 m² 4 m² per person

*** Foul flow rate needs to be calculated based on number of customers. An allowance of 4m² has been made for each customer.

Floor area = 0 m² 4 m² per person



Project Title: Littlehampton
Calculations Title: Proposed Foul Flow Estimate

Sheet No: 2 of 2 Project No: WIE14296
 By: D O'Donovan Date: 05.08.20
 Checked: D O'Donovan Date: 05.08.20

	Dry Weather Flow Rate (per day)	Source	Number of	Factor	Profile (hours)	Peak Flow Rate (litres/second)
Residential				2.12	24	
Existing property = 160 litres/person/day	400.0 litres per unit	Thames Water Guidelines (2016)	0 existing units			0.0
New property = 125 litres/person/day	312.5 litres per unit	Thames Water Guidelines (2016)	50 proposed units			0.4
Occupancy = 2.5 persons						
Hotel	500.0 litres per room	British Water (2013)	0 rooms	3	24	0.0
Student Accommodation	200.0 litres per bed	Thames Water Guidelines (2016)	0 beds	3	24	0.0
Offices	750.0 litres per 100m ²	Jones (1992)	0 m ²	3	10	0.0
Retail	400.0 litres per 100m ²	Jones (1992)	144 m ²	3	12	0.0
Cinema	10.0 litres per seat	Jones (1992)	0 seats*	3	8	0.0
Health Club/Sports Centre	50.0 litres per customer	British Water (2013)	0 customers**	3	16	0.0
Day School	90.0 litres per pupil	British Water (2013)	0 pupils	3	10	0.0
Boarding School	175.0 litres per pupil	British Water (2013)	0 pupils	3	24	0.0
Hospital	625.0 litres per bed	Jones (1992)	0 beds	3	24	0.0
Nursing Home	350.0 litres per bed	British Water (2013)	0 beds	3	24	0.0
Restaurant	30.0 litres per cover	British Water (2013)	0 covers	3	8	0.0
Pub/Club	15.0 litres per customer	Butler and Davies (2004)	0 customers***	3	12	0.0
Warehouse	150.0 litres per 100m ²	Jones (1992)	0 m ²	3	12	0.0
Manufacturing	550.0 litres per 100m ²	Jones (1992)	0 m ²	3	12	0.0
Commercial	300.0 litres per 100m ²	Jones (1992)	0 m ²	3	12	0.0
SUB TOTAL						0.4
Infiltration percentage 10%						0.0
TOTAL						0.5

* Foul flow rate needs to be calculated based on number of seats. An allowance of 4m² has been made for each seat.

Floor area = 0 m² 4 m² per person

** Foul flow rate needs to be calculated based on number of customers. An allowance of 4m² has been made for each customer.

Floor area = 0 m² 4 m² per person

*** Foul flow rate needs to be calculated based on number of customers. An allowance of 4m² has been made for each customer.

Floor area = 0 m² 4 m² per person

UK and Ireland Office Locations

