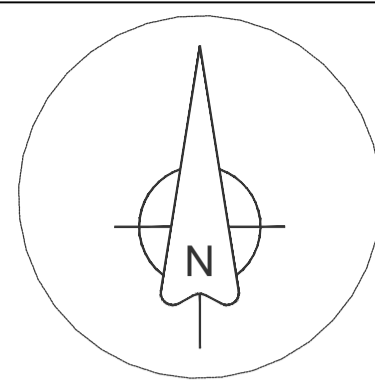


CATCHMENT AREAS SUMMARY			
	PERMEABLE m ²	IMPERMEABLE m ²	REMARKS
CATCHMENT 1	584.0	16,830.0	MINOR CHANGES TO EXISTING AREAS, TO BE DRAINED VIA EXISTING ASSETS
CATCHMENT 2	6098.0	16,857.0	CHANGES IN EXISTING AREAS TO BE DRAINED VIA PROPOSED DRAINAGE

EXISTING AREAS SUMMARY m ²	
ROOF	13,564.0
HARDSTANDING	20,123.5
PERMEABLE	6,682.5
TOTAL SITE	40,369.0



CATCHMENT AREAS SUMMARY			
	PERMEABLE m ²	IMPERMEABLE m ²	REMARKS
CATCHMENT 1	557.0	16,857.0	MINOR CHANGES TO EXISTING AREAS, TO BE DRAINED VIA EXISTING ASSETS
CATCHMENT 2	5,289.0	17,666.0	CHANGES IN EXISTING AREAS TO BE DRAINED VIA PROPOSED DRAINAGE

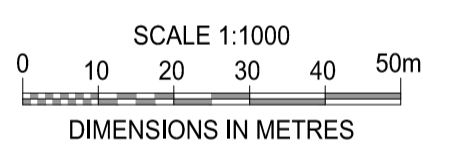
PROPOSED AREAS SUMMARY m ²	
ROOF	11,329.5
HARDSTANDING	23,193.5
PERMEABLE	5,846.0
TOTAL SITE	40,369.0

GENERAL NOTES

- DO NOT SCALE THIS DRAWING. WORK ONLY TO FIGURED DIMENSIONS.
- FOR ALL RELEVANT NOTES, REFER TO STRUCTURAL AND CIVIL ENGINEERING PERFORMANCE SPECIFICATION.
- ANY DISCREPANCIES ARE TO BE REPORTED TO PINNACLE CONSULTING ENGINEERS IMMEDIATELY.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ENGINEERS, ARCHITECTS AND SUB-CONTRACTORS DRAWINGS AND DETAILS.
- THIS DRAWING IS TO BE PRINTED IN COLOUR.
- THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS EXPRESSLY STATED.
- EXISTING SITE AND LEVEL INFORMATION TAKEN FROM SMR ARCHITECTS TOPOGRAPHICAL SURVEY DRAWING 53168/1 DATED 28/02/2019.
- THIS DRAWING USES THE GREAT BRITAIN COORDINATE SYSTEM "OSGB1936.NationalGrid".
- THIS DRAWING HAS BEEN PREPARED USING THE PROPOSED SITE LAYOUT FROM RGP ARCHITECTS, DRAWING NO. 11631-PL108_REV E, DATED 16.04.2025.
- THIS DRAWING HAS BEEN PREPARED USING TOPOGRAPHICAL SURVEY INFORMATION REFERENCED FROM RGP DRAWING 'MEASURED SURVEY EXISTING TOPO', CMS - 205, 07, DATED JUNE 2024.

LEGEND

- SITE BOUNDARY
- CATCHMENT 1
- CATCHMENT 2
- PERMEABLE AREA
- HARDSTANDING AREA
- EXISTING ROOF
- PROPOSED ROOF



P02 UPDATED FOR NEW SITE PLAN DAL AC 25.04.25

P01 ISSUED FOR INFORMATION DAL AC 07.04.25

REV	DESCRIPTION	BY	CHK / APP	DATE

CLIENT
HALLWAY PROPERTIES LIMITED

PROJECT
**LAND AT NORWAY LANE
LITTLEHAMPTON**

DRAWING TITLE
IMPERMEABLE AREAS PLAN



PINNACLE HOUSE,
MAPLE WAY,
BROADLAND GATE,
NORWICH,
NR13 5HB.
WELWYN GARDEN CITY ■ LONDON ■ DUBLIN ■ THE HAGUE ■ FRANKFURT

TELEPHONE: 01603 327 170

DRAWING STATUS INFORMATION					
SCALE @ A1	DATE	DRAWN BY	CHECKED	APPROVED	REV.
1:1000	APR'25	DAL	AC	AC	P02
DRG NO. C240600684-PIN-XX-XX-DR-C-02340					PIN REF. C240600684

Appendix F – Proposed Development Plans

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SITE SPECIFIC HAZARDS
 IN ACCORDANCE WITH THE REQUIREMENTS OF THE CONSERVATION ACT 2016 THE FOLLOWING SIGNIFICANT RESIDUAL HAZARDS HAVE NOT BEEN IDENTIFIED OUT OF THIS PROJECT AND MUST BE TAKEN INTO CONSIDERATION BY CONTRACTORS PLANNING TO UNDERTAKE THE WORKS SHOWN ON THIS DRAWING.

SCALE 1:500
 0m 5 10 15 20 25 30

- LEGEND:**
- OWNERSHIP BOUNDARY
 - PLANNING BOUNDARY (4.0 HECTARES)
 - CAT U TREES. REFER TO FPCR ENVIRONMENT AND DESIGN LTD TREE SURVEY PLAN
 - CAT B TREES. REFER TO FPCR ENVIRONMENT AND DESIGN LTD TREE SURVEY PLAN
 - CAT C TREES. REFER TO FPCR ENVIRONMENT AND DESIGN LTD TREE SURVEY PLAN
 - - - DASHED RED LINE DENOTES EXTENTS OF FORMER BUILDINGS
 - DENOTES BUILDING
 - DENOTES LANDSCAPING
 - DENOTES PAVING
 - DENOTES ASPHALT ROAD
 - DENOTES FOOTPATH IN RESIN BOUND GRAVEL
 - DENOTES FOOTPATH IN TARMAC
 - DENOTES HISTORICAL TRAIL AROUND THE SITE REFER TO DRAWING '1631-H-HISTORY-TRAIL' FOR FURTHER INFORMATION
 - DENOTES ACTIVE EV BAYS
 - ★ DENOTES PASSIVE EV BAYS FOR FUTURE CONNECTIONS
 - DENOTES PERMEABLE SURFACE FOR WHOLE PARKING BAY AREA
 - BENCHES
 - WASTE BINS

NOTES:

THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL CONSULTANT AND SPECIALIST DRAWINGS AND SPECIFICATIONS.

OWNERSHIP BOUNDARY BASED UPON HM LAND REGISTRY TITLE PLAN PROVIDED BY THE CLIENT.

THIS DRAWING IS BASED ON:

- 1) TOPOGRAPHICAL SURVEY INFORMATION PROVIDED BY: CMS LTD DRAWING REF: 'CMS-205-01' DATE: JUNE 2024.
- 2) OS INFORMATION
- 3) TREE SURVEY BY: FPCR ENVIRONMENT AND DESIGN LTD DRAWING REF: '1284-T-01-A' DATE: JUNE 2024.
- 4) FLOOR PLANS SURVEY BY: CMS LTD DRAWING REF: 'CMS-205-01-02/03/04' DATE: JUNE 2024.

PROPOSED LEVELS AND FINISHED FLOOR LEVELS TO BE AGREED WITH DRAINAGE AND STRUCTURAL ENGINEER.

DIMENSIONS GIVEN ON THIS DRAWING ARE APPROXIMATE ONLY AND MUST BE CHECKED ON SITE FOR ALL PURPOSES.

REFER TO LANDSCAPE ARCHITECTS PROPOSALS.

REFER TO HIGHWAYS ENGINEERS PROPOSALS.

SCHEDULE OF ACCOMMODATION:

UNIT A1:	1,722 SQ.M. (18,538 SQ.FT.)
UNIT A2:	2,414 SQ.M. (25,986 SQ.FT.)
UNIT A3:	140 SQ.M. (1,500 SQ.FT.)
UNIT A4:	829 SQ.M. (10,000 SQ.FT.)
UNIT A5:	2,068 SQ.M. (22,240 SQ.FT.)
UNIT A6:	1,020 SQ.M. (10,979 SQ.FT.)
UNIT A7:	1,027 SQ.M. (11,057 SQ.FT.)
UNIT A8:	508 SQ.M. (5,468 SQ.FT.)
UNIT A9:	507 SQ.M. (5,457 SQ.FT.)
TOTAL:	10,333 SQ.M. (111,222 SQ.FT.)

CAR PARKING SCHEDULE

STANDARD BAYS: 331
 ACCESSIBLE BAYS: 12
 PARENT AND CHILD BAYS: 28
 ELECTRIC VEHICLE BAYS: 20

STAFF PARKING: 9

TOTAL BAYS: 420

MOTORCYCLE PARKING: 12

CYCLE PARKING: 70 SPACES

E	16.04.25 UNIT A9 TROLLEY BAY, PARKING NO. & LEGEND UPDATE	EDD
D	14.04.25 GENERAL AMENDMENTS	EDD
C	04.04.25 SITE PLAN UPDATED	EDD
B	26.03.25 SITE PLAN UPDATED	EDD/AM
A	20.03.25 SITE PLAN UPDATED	EDD
REV.	DATE	NOTES

CLIENT / PROJECT:
 HALLWAY PROPERTIES LIMITED
 LAND AT NORWAY LANE
 LITTLEHAMPTON

DRAWING TITLE:
 PROPOSED SITE PLAN

STATUS: **PLANNING**

DATE:	28/02/25	DRAWN:	EDD	SCALE @ A1:	1:500
PROJECT NUMBER:	11631	UNIT / FLOOR CODE:	PL108	TYPE & NUMBER:	E
DRAWING NO.:	11631	UNIT / FLOOR CODE:	PL108	REVISION NUMBER:	E

THE RATCLIFFE GROVES PARTNERSHIP
 MANCHESTER
 19 MANCHESTER ROAD
 BURY LANCASHIRE BL9 6TD
 T: 0161 797 4000 E: manchester@rgp.co.uk
 www.rgp.co.uk

LONDON
 19 BEDFORD ROAD
 LONDON WC1R 4BS
 T: 020 7600 6666 E: london@rgp.co.uk



Appendix G – Infiltration Test Results

Soakaway Infiltration Report

Amazon Littlehampton DBN2

Presented to Gleave Partnership c/o Amazon

Issued: February 2020

Delta-Simons Project Number: 19-0138.08

Issue No.	Status	Issue Date	Comments	Author	Technical Review	Authorised
2	Final	10 th February 2020	Amended to include details of regulatory liaison	[Redacted]	[Redacted]	[Redacted]
				Alex Hunter Graduate	Tom Horner Associate	Paul Bennett Unit Director

1.0 Authorisation and Purpose

Delta-Simons Environmental Consultants Limited (Delta-Simons) has been requested by Gleave Partnership on behalf of Amazon (the “Client”) to undertake continuous groundwater level monitoring within three newly installed boreholes (BH101 to BH103) to identify the variation of winter groundwater levels at the Site. Further works included three BRE365 soakaway tests (SA101 to SA103) to provide information for the suitability and design for soakaways as a drainage solution at Amazon Littlehampton DBN2 (hereafter referred to as the “Site”).

2.0 Limitations

No limitations were encountered during the works.

3.0 Context

Delta-Simons has previously completed the following reports pertaining to the Site:

- ▲ Short Form Geotechnical Report, Amazon DBN2 Refurbishment, Littlehampton, (Ref. 19-0138.04), dated March 2019; and
- ▲ Soakaway Infiltration Report, Amazon DBN2, Littlehampton, (Ref. 19-0138.07), dated May 2019.

A review of the Site’s published geology and hydrogeology is provided below.

4.0 Desktop Information

From BGS mapping, the Site is indicated to be underlain by superficial River Terrace Deposits, followed by bedrock of the New Pit Chalk Formation. Ground conditions encountered during Delta-Simons previous investigation comprised a thin layer of Made Ground, overlying generally cohesive deposits to a maximum (proven) depth of 2.8 m bgl, followed by Chalk bedrock (encountered as clay in the south of the Site).

5.0 Regulatory Liaison

Arun District Council were contacted prior to any works commencing to confirm their satisfaction with the scope of works proposed. Email correspondence is included as Appendix A.

Prior to completion of the soakage testing, Delta-Simons contacted Sarah Burrow of Arun District Council to discuss the timing of the testing, following the completion of the groundwater level monitoring. An agreement was reached to undertake the soakage testing on the basis that groundwater levels had been shown to decrease over the monitoring period (see Section 6.0 below), however, it was agreed to extend the groundwater level monitoring following completion of the soakage testing, to ensure groundwater levels do not increase significantly following completion of the testing.

6.0 Fieldworks and Results

6.1 Groundwater Level Monitoring

Delta-Simons undertook a five-week period of continuous groundwater level monitoring within three newly installed boreholes (BH101 to BH103). The installed boreholes logged groundwater levels at 15-minute intervals to assess the diurnal variance of groundwater levels at the Site.

Table 1: Summary of Continuous Groundwater Level Data

Borehole Location	Highest Recorded Depth to Groundwater (cm bgl)	Date and Time	Lowest Recorded Depth to Groundwater (cm bgl)	Date and Time
BH101	247.885	21/12/2019 21:15	343.836	13/01/2020 03:00
BH102	281.989	21/12/2019 20:45	351.347	13/01/2020 03:15
BH103	208.946	21/12/2019 20:15	238.028	13/01/2020 03:15

The continuous groundwater level data identified an increase in depth to groundwater over the five-week monitoring period. This information was used to determine the design of soakaway infiltration tests at the Site.

The results of groundwater level monitoring can be provided upon request (each dataset is circa 120 pages long).

6.2 Soakaway Infiltration Testing

Soakage testing was undertaken in general accordance with BRE Digest 365: Soakaway Design ^[Ref. 1] on 27th and 28th January 2020.

The soakage testing comprised the excavation of three trial pits (SA101 to SA103) to depths of between 1.1 and 2.0 m bgl. The geology of the trial pit locations was logged. A gravel pack and monitoring pipes were then installed in the trial pits and the remaining voids were backfilled with arisings. The remaining spoil was graded back to original ground level.

The gravel pack in the test locations was then filled with water from a water container and the depth to water from ground level recorded at regular intervals.

The soakage test data was recorded and used to calculate the soil infiltration rate for the locations.

6.2.1 Identified Ground Conditions

Ground conditions encountered in each location comprised the following:

SA101

- ▲ Grass over topsoil comprising of dark brown slightly clayey fine to medium sand to a depth of 0.4 m bgl;
- ▲ River Terrace Deposits comprising of dark brown sandy clay to a depth of 0.75 m bgl; and
- ▲ River Terrace Deposits comprising of light brown clayey fine to medium sand, to a depth of 1.62 m bgl.

SA102

- ▲ Topsoil comprising of dark brown slightly gravelly slightly clayey fine to medium sand. Gravel content comprised of flint, to a depth of 0.2 m bgl;
- ▲ River Terrace Deposits comprising of dark brown slightly sandy clay to a depth of 0.4 m bgl;
- ▲ River Terrace Deposits comprising of bluish brown clay to a depth of 1.5 m bgl; and
- ▲ River Terrace Deposits comprising of light brown clayey medium to coarse sand, to a depth of 2.0 m bgl.

SA103

- ▲ Grass over topsoil comprising of dark brown slightly clayey fine to medium sand to a depth of 0.6 m bgl; and
- ▲ New Pit Chalk Formation comprising of white slightly sandy chalk gravel to a depth of 1.1 m bgl.

7.0 Soakage Tests

Test results are provided in Appendix B and summarised in Table 1 below. The approximate locations of the soakage tests/trial pits are shown on Figure 1.

Table 2: Summary of Testing in General Accordance with BRE 365

Soakaway Test Reference Number	Test Depth Range (m bgl)	Infiltration Rate	Geology
SA101	0.95 – 1.62	6.1×10^{-05}	Sand (River Terrace Deposits)
SA102	1.20 – 2.00	1.7×10^{-05}	Sand (River Terrace Deposits)

It was not possible to obtain an infiltration rate in SA103 due to the high rates at which water drained during the test, therefore, this can be interpreted as a very high permeability classification.

8.0 Conclusions

The infiltration testing has been undertaken to a maximum depth of between 1.62 and 2.0 m bgl within sand of River Terrace Deposits at SA101 and SA102, and chalk at SA103, which is considered to represent the mapped superficial deposits / bedrock geology. Given the nature of the soils encountered, the infiltration tests reached the 25% effective depth over a period of approximately 15 to 55 minutes, in SA101 and SA102, respectively. It was not possible to obtain an infiltration rate for SA103 due to the high rates at which the water drained.

As a result, traditional soakaways are considered to be a suitable method of drainage at the Site, provided they are placed within the granular River Terrace Deposits or within the New Pit Chalk Formation.

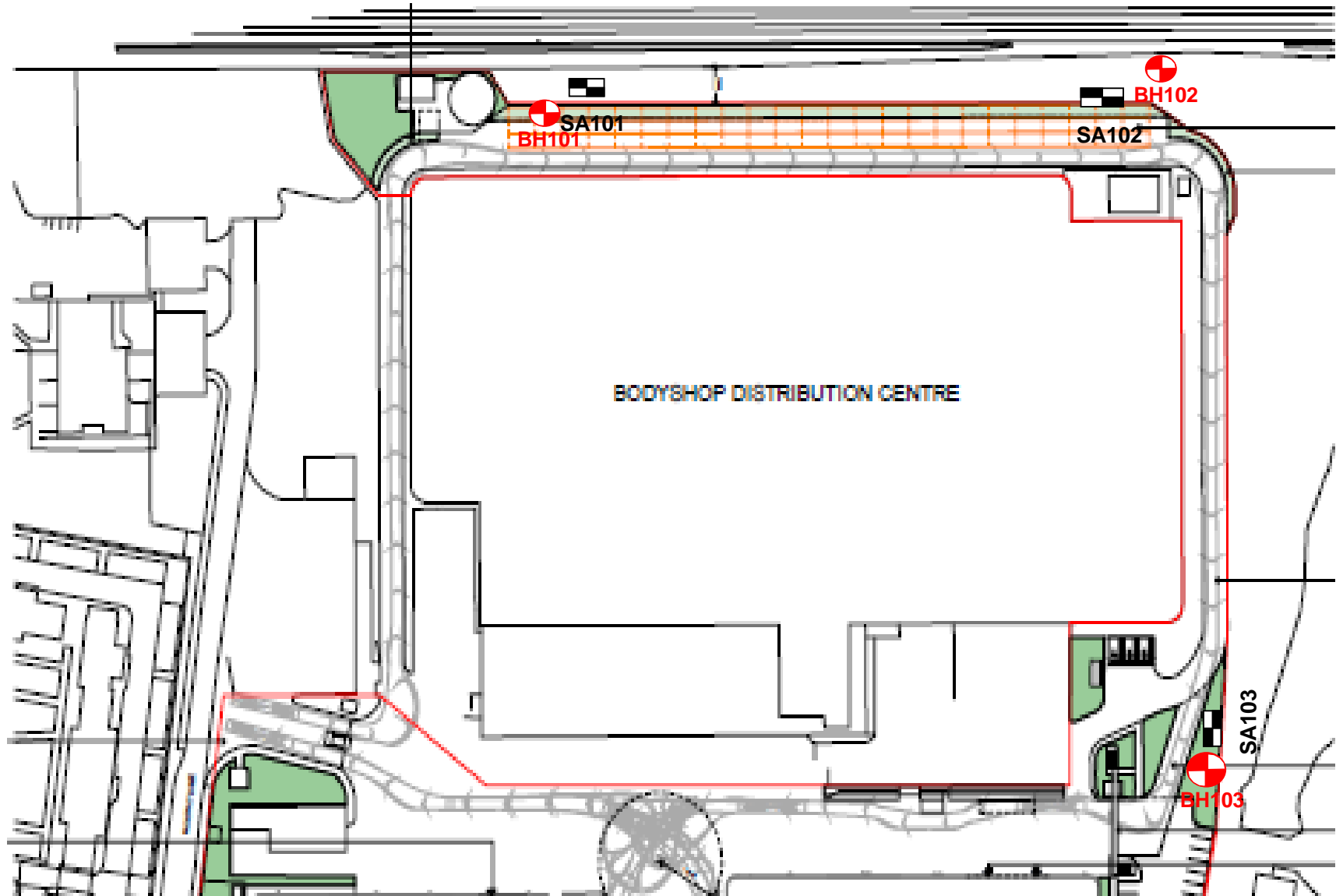
9.0 References

Ref 1: BRE Digest 365: Soakaway Design, BRE 1991.

Enclosed:

- Figure 1 Approximate Intrusive Location Plan
- Appendix A Council Correspondence
- Appendix B Soakaway Test Results

Figure 1 – Approximate Intrusive Location Plan



TITLE:
Approximate Intrusive Location Plan
Littlehampton, Amazon

SCALE:
NTS

DWN/CHKD:
AH

PROJECT NO.:
19-0138.08

DATE:
03-01-20

FIGURE NO.:
1

Appendix A – Council Correspondence

From: [Aarti O'Leary](#)
To: [Tom Horner](#); [Jawsy Jabbar](#); [Ryan Lilley](#)
Subject: Fwd: Application Ref: LU/59/19/PL - Condition 4
Date: 12 November 2019 19:02:47
Attachments: [image001.jpg](#)
[image002.jpg](#)

All

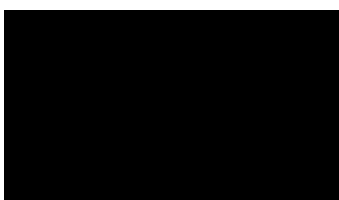
Please see email below.

Kind Regards

Aarti O'Leary
BSc (Hons), MA (Merit), MRTPI
Associate



**Chartered Surveyors & Town
Planners**
6 New Bridge Street
London
EC4V 6AB



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Begin forwarded message:

From: Sarah Burrow <Sarah.Burrow@arun.gov.uk>
Date: 12 November 2019 at 18:05:31 GMT
To: Aarti O'Leary <[REDACTED]>
Cc: Stuart Corbey <Stuart.Corbey@arun.gov.uk>, Paul Cann <Paul.Cann@arun.gov.uk>
Subject: RE: Application Ref: LU/59/19/PL - Condition 4

Dear Aarti,

First of all thank you for getting in touch, it is refreshing to be discussing proposed testing before it is completed. My initial impression is that you're going to be finishing too early. The most important period to cover is when we expect groundwater to peak – normally January-February. Similarly the BRE365 tests will need to be completed above the highest recorded groundwater so it is best that they are completed towards the end of your monitoring.

I would suggest losing a couple of December monitoring weeks and spreading the remainder to cover to the end of February, with fortnightly checking being sufficient.

Kind Regards

Sarah Burrow
Engineering Assistant

From: Aarti O'Leary <[REDACTED]>
Sent: 08 November 2019 16:55
To: Land Drainage <Land.Drainage@arun.gov.uk>
Cc: Stuart Corbey <Stuart.Corbey@arun.gov.uk>
Subject: Application Ref: LU/59/19/PL - Condition 4

Dear Sir/ Madam,

We write with regard to Condition 4 of consent ref: LU/59/19/PL, which states the following:

“Prior to the implementation of proposed surfacing works as shown on plan reference DBN3-SMR-00-ZZ-DR-A-2009-S3-P1, winter groundwater monitoring shall be undertaken to establish the highest annual ground water levels and winter Percolation testing to BRE 364. The monitoring results and any necessary amendment to the proposed drainage strategy to be submitted and agreed by the local planning authority. Until such time as the proposed surfacing works can commence a temporary van staging area comprising temporary roadway aluminium mats to be utilised.”

With a view to preparing an application seeking to discharge the above condition, we wish to discuss the proposed monitoring works and timetable with you.

Firstly, we wish to confirm that the refence in the condition should be to BRE 365 tests, rather than BRE 364.

The attached plan shows the proposed locations of the BRE365 tests. The monitoring wells will be installed in these locations too.

The table below provides the proposed timetable for the monitoring works:

w/c 2/12/19	w/c 9/12	w/c 16/12	w/c 23/12	w/c 30/12	w/c 6/01/20	w/c 13/01
Undertake winter BRE365 testing.	First week of monitoring groundwater levels. Continuous groundwater level data loggers to be installed within monitoring wells.	Second week of monitoring groundwater levels.	Third week of monitoring groundwater levels.	Fourth week of monitoring groundwater levels.	Fifth week of monitoring groundwater levels. End of monitoring period	Provision of report detailing BRE365 soakaway testing results, and details of groundwater levels during monitoring period.
Install groundwater monitoring wells adjacent to BRE365 locations.						

We would be grateful if could advise whether the proposed works and timetable would be acceptable in relation to discharging Condition 4 of consent ref: LU/59/19/PL.

Once we receive your feedback, we would look to apply to formally discharge the condition.

Should you wish to discuss the proposed monitoring works, please do contact me.

Kind Regards

Aarti O'Leary
BSc (Hons), MA (Merit), MRTPI
Associate



Chartered Surveyors & Town Planners
6 New Bridge Street
London
EC4V 6AB



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<http://www.arun.gov.uk>

DX 57406 Littlehampton

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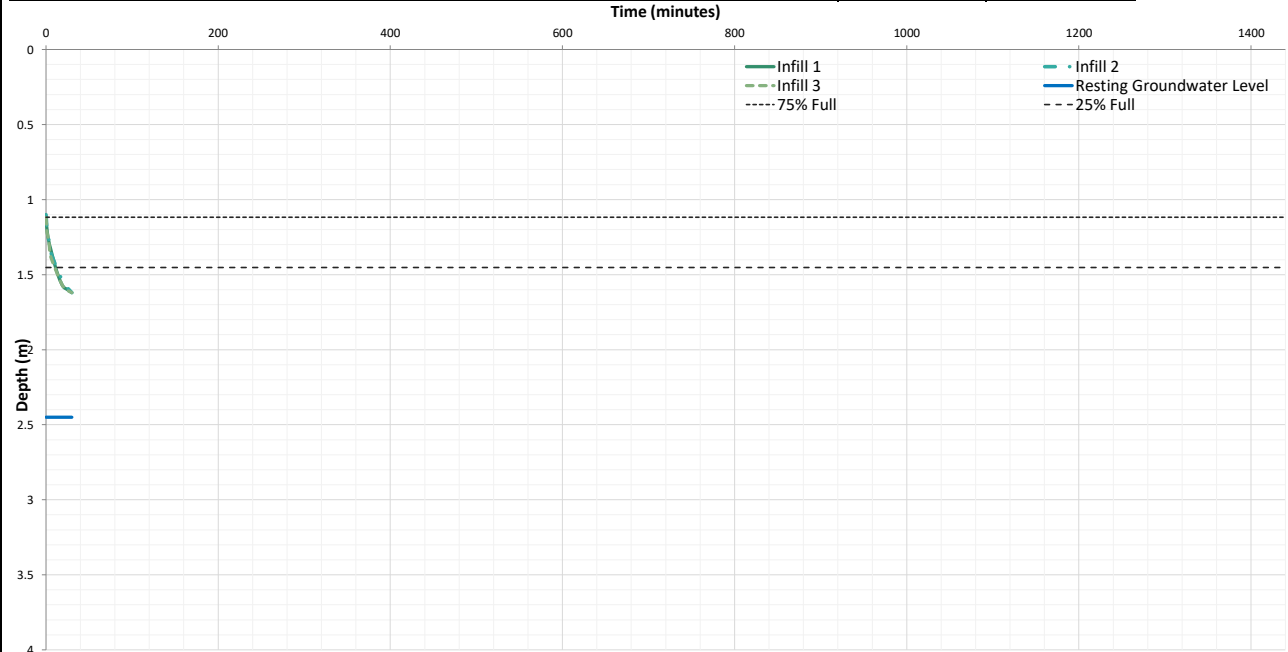
This email has been scanned on behalf of Dalton Warner Davis by MessageLabs.

Appendix B – Soakaway Test Results

	units	Infill 1	Infill 2	Infill 3
Length	m		2.40	
Width	m		0.80	
Depth	m		1.62	
Gravel type			Standard	
Voids ratio			0.35	
Resting groundwater level at time of testing	m		2.45	
Depth of first reading	m	1.12	1.10	1.12
Depth of final reading	m	1.62	1.62	1.62
Did soakage test reach 25% of maximum fill depth?		Yes	Yes	Yes
Did soakage test reach near empty?		Yes	Yes	Yes
Depth at 75% full/effective depth	m	1.25	1.23	1.25
Depth at 25% full/effective depth	m	1.50	1.49	1.50
Time at 75% full/effective depth	mins	2.17	2.00	2.17
Time at 25% full/effective depth	mins	13.61	15.38	13.46
Vp75 - 25 (volume outflowing between 75% and 25% full/effective depth)	m ³	0.17	0.17	0.17
Mean surface area for outflow (50% full/effective depth)	m ²	3.52	3.58	3.52
tp75 (time for the water level to fall from 75% to 25% full/effective depth)	mins	11.44	13.38	11.29
Soil infiltration rate, f =	m/s	0.00006951	0.00006070	0.00007043
or	m/s	7.0E-05	6.1E-05	7.0E-05

Recommended soil infiltration rate	
6.1E-05	m/s

Note:
Where water level reaches nearly empty (5% full), soil infiltration based on 'Full' depth. Where water level did not reach nearly empty (5% full), soil infiltration rate is based on 'Effective' drainage achieved only. Where water level did not fall below 25% of the maximum fill level, this is considered to be a 'Failed' test.



LOG		BACKFILL	
DEPTH (m)		DEPTH (m)	
0.0	Dark brown SAND	0.0	Arisings
0.4	Dark brown sandy CLAY	0.4	
0.8	Brown clayey SAND	0.8	
1.0		1.0	Gravel
1.7		1.7	



TITLE: Soakaway Test Results
 Amazon, Littlehampton
 Gleave Partnership

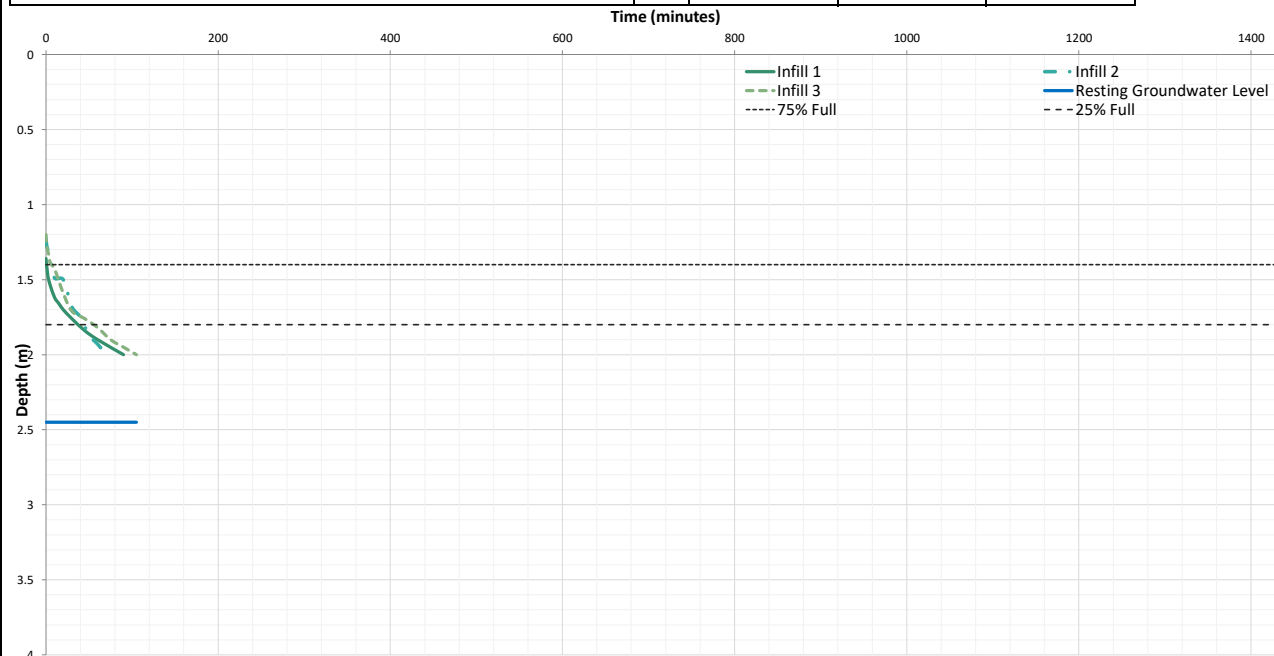
In accordance with BRE Digest 365 (2016)

DRAWN BY: CB	SCALE: Not to Scale	PROJECT NUMBER: 19-0138.08
CHECKED BY: SS	REVISION: 1	SOAKAWAY NUMBER: SA101
DATE: 27/01/2020		

	units	Infill 1	Infill 2	Infill 3
Length	m	2.10		
Width	m	0.56		
Depth	m	2.00		
Gravel type		Standard		
Voids ratio		0.35		
Resting groundwater level at time of testing	m	2.45		
Depth of first reading	m	1.36	1.23	1.20
Depth of final reading	m	2.00	2.00	2.00
Did soakage test reach 25% of maximum fill depth?		Yes	Yes	Yes
Did soakage test reach near empty?		Yes	Yes	Yes
Depth at 75% full/effective depth	m	1.52	1.42	1.40
Depth at 25% full/effective depth	m	1.84	1.81	1.80
Time at 75% full/effective depth	mins	4.00	6.93	6.25
Time at 25% full/effective depth	mins	45.00	44.79	55.00
Vp75 - 25 (volume outflowing between 75% and 25% full/effective depth)	m ³	0.13	0.16	0.16
Mean surface area for outflow (50% full/effective depth)	m ²	2.88	3.22	3.30
tp75 (time for the water level to fall from 75% to 25% full/effective depth)	mins	41.00	37.86	48.75
Soil infiltration rate, f =	m/s	0.00001860	0.00002164	0.00001704
or	m/s	1.9E-05	2.2E-05	1.7E-05

Recommended soil infiltration rate	
1.7E-05	m/s

Note:
Where water level reaches nearly empty (5% full), soil infiltration based on 'Full' depth. Where water level did not reach nearly empty (5% full), soil infiltration rate is based on 'Effective' drainage achieved only. Where water level did not fall below 25% of the maximum fill level, this is considered to be a 'Failed' test.



LOG		BACKFILL	
	DEPTH (m)		DEPTH (m)
Dark brown clayey SAND	0.0	Arisings	0.0
Dark brown slightly sandy CLAY	0.2		
Bluish brown CLAY	0.4		
		Gravel	1.2
Brown clayey SAND	1.5		
	2.0		2.0

	TITLE: Soakaway Test Results Amazon, Littlehampton Gleave Partnership	In accordance with BRE Digest 365 (2016)	DRAWN BY: CB	SCALE: Not to Scale	PROJECT NUMBER: 19-0138.08
			CHECKED BY: SS	REVISION: 1	SOAKAWAY NUMBER: SA102
			DATE: 27/01/2020		

Appendix H – Drainage Calculations

Bessemer Road
 Welwyn Garden City
 Hertfordshire AL7 1HE

Watersmead Business Park
 LittleHampton BN17 6LS



Date 23/04/2025 12:06
 File LITTLEH-VER1.4.MDX

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Network 2019.1

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	1999
Site Location GB 504150 103950 TQ 04150 03950	
C (1km)	-0.026
D1 (1km)	0.387
D2 (1km)	0.278
D3 (1km)	0.404
E (1km)	0.313
F (1km)	2.347
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm at outfall (pipe 1.012)

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	1.151	4-8	0.789	8-12	0.019

Total Area Contributing (ha) = 1.959

Total Pipe Volume (m³) = 111.010

Time Area Diagram at outfall (pipe 6.008)

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.369	4-8	0.506	8-12	0.476	12-16	0.006

Total Area Contributing (ha) = 1.357

Total Pipe Volume (m³) = 170.815

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length	Fall	Slope	I.Area	T.E.	Base	k	HYD	DIA	Section	Type	Auto
	(m)	(m)	(1:X)	(ha)	(mins)	Flow (l/s)	(mm)	SECT	(mm)			Design

Network Results Table

Bessemer Road
 Welwyn Garden City
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Network Design Table for Storm

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	39.080	0.001	39080.0	0.000	5.00	0.0	0.600	Q22	-2	Pipe/Conduit	🔒
1.001	16.250	0.278	58.5	0.026	0.00	0.0	0.600	o	525	Pipe/Conduit	🔒
2.000	38.959	0.233	167.2	0.017	5.00	0.0	0.600	o	225	Pipe/Conduit	🔒
1.002	16.400	0.098	167.3	0.066	0.00	0.0	0.600	o	525	Pipe/Conduit	🔒
3.000	45.193	0.270	167.4	0.000	5.00	0.0	0.600	Q22	-2	Pipe/Conduit	🔒
1.003	9.700	0.058	167.2	0.106	0.00	0.0	0.600	o	525	Pipe/Conduit	🔒
4.000	44.570	0.267	166.9	0.000	5.00	0.0	0.600	Q22	-2	Pipe/Conduit	🔒
1.004	8.248	0.049	168.3	0.063	0.00	0.0	0.600	o	525	Pipe/Conduit	🔒
1.005	32.941	0.302	109.1	0.043	0.00	0.0	0.600	o	525	Pipe/Conduit	🔒
1.006	12.614	0.180	70.1	0.072	0.00	0.0	0.600	o	525	Pipe/Conduit	🔒
5.000	46.710	0.355	131.6	0.079	5.00	0.0	0.600	o	300	Pipe/Conduit	🔒
5.001	65.176	0.130	501.4	0.044	0.00	0.0	0.600	o	300	Pipe/Conduit	🔒
5.002	28.203	0.610	46.2	0.044	0.00	0.0	0.600	o	300	Pipe/Conduit	🔒
1.007	24.135	0.235	102.7	0.045	0.00	0.0	0.600	o	525	Pipe/Conduit	🔒
1.008	5.687	0.080	71.1	0.263	0.00	0.0	0.600	o	525	Pipe/Conduit	🔒
1.009	44.597	0.484	92.1	0.031	0.00	0.0	0.600	o	525	Pipe/Conduit	🔒
1.010	22.549	0.135	167.0	0.565	0.00	0.0	0.600	o	675	Pipe/Conduit	🔒
1.011	33.723	0.202	166.9	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit	🔒
1.012	104.355	0.624	167.2	0.495	0.00	0.0	0.600	o	675	Pipe/Conduit	🔒

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	29.80	16.09	4.944	0.000	0.0	0.0	0.0	0.06	2.3	0.0
1.001	29.69	16.18	3.850	0.026	0.0	0.0	0.0	2.93	635.1	2.1
2.000	50.00	5.64	3.805	0.017	0.0	0.0	0.0	1.01	40.1	2.3
1.002	29.51	16.34	3.572	0.109	0.0	0.0	0.0	1.73	374.2	8.7
3.000	50.00	5.74	4.884	0.000	0.0	0.0	0.0	1.01	40.5	0.0
1.003	29.40	16.43	3.474	0.215	0.0	0.0	0.0	1.73	374.3	17.1
4.000	50.00	5.73	4.740	0.000	0.0	0.0	0.0	1.01	40.5	0.0
1.004	29.32	16.51	3.416	0.278	0.0	0.0	0.0	1.72	373.1	22.1
1.005	29.03	16.77	3.367	0.321	0.0	0.0	0.0	2.14	464.2	25.2
1.006	28.95	16.85	2.990	0.393	0.0	0.0	0.0	2.68	579.8	30.8
5.000	50.00	5.57	3.980	0.079	0.0	0.0	0.0	1.37	96.8	10.7
5.001	49.80	7.13	3.550	0.123	0.0	0.0	0.0	0.70	49.2	16.6
5.002	48.93	7.33	3.420	0.167	0.0	0.0	0.0	2.32	163.9	22.1
1.007	28.75	17.03	2.810	0.604	0.0	0.0	0.0	2.21	478.5	47.1
1.008	28.71	17.06	2.500	0.868	0.0	0.0	0.0	2.66	575.6	67.5
1.009	28.38	17.38	2.420	0.898	0.0	0.0	0.0	2.33	505.3	69.1
1.010	28.19	17.57	1.710	1.464	0.0	0.0	0.0	2.03	724.7	111.8
1.011	27.91	17.85	1.450	1.464	0.0	0.0	0.0	2.03	724.9	111.8
1.012	27.10	18.71	1.340	1.959	0.0	0.0	0.0	2.02	724.3	143.8

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
6.000	54.493	0.410	132.9	0.132	5.00	0.0	0.600	o	300	Pipe/Conduit	
6.001	24.304	0.110	220.9	0.084	0.00	0.0	0.600	o	450	Pipe/Conduit	
7.000	67.728	0.500	135.5	0.081	5.00	0.0	0.600	o	300	Pipe/Conduit	
7.001	55.938	0.120	466.2	0.084	0.00	0.0	0.600	o	450	Pipe/Conduit	
6.002	5.130	0.900	5.7	0.011	0.00	0.0	0.600	o	450	Pipe/Conduit	
8.000	17.613	0.105	167.7	0.040	5.00	0.0	0.600	o	300	Pipe/Conduit	
8.001	13.928	0.084	165.8	0.076	0.00	0.0	0.600	o	450	Pipe/Conduit	
8.002	14.910	0.089	167.5	0.063	0.00	0.0	0.600	o	450	Pipe/Conduit	
8.003	7.330	0.560	13.1	0.049	0.00	0.0	0.600	o	450	Pipe/Conduit	
8.004	7.974	0.090	88.6	0.044	0.00	0.0	0.600	o	450	Pipe/Conduit	
8.005	24.490	0.050	489.8	0.059	0.00	0.0	0.600	o	450	Pipe/Conduit	
6.003	5.366	0.050	107.3	0.028	0.00	0.0	0.600	o	525	Pipe/Conduit	
6.004	55.605	0.300	185.4	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
6.005	29.776	0.000	0.0	0.097	0.00	0.0	0.600	o	525	Pipe/Conduit	
6.006	47.510	0.030	1583.7	0.000	0.00	0.0	0.600	o	800	Pipe/Conduit	
6.007	56.980	0.170	335.2	0.136	0.00	0.0	0.600	o	800	Pipe/Conduit	
6.008	127.863	0.765	167.1	0.374	0.00	0.0	0.600	o	800	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
6.000	50.00	5.67	4.270	0.132	0.0	0.0	0.0	1.36	96.3	17.8
6.001	50.00	5.96	3.860	0.215	0.0	0.0	0.0	1.36	216.9	29.1
7.000	50.00	5.84	4.370	0.081	0.0	0.0	0.0	1.35	95.4	11.0
7.001	50.00	6.83	3.870	0.166	0.0	0.0	0.0	0.94	148.7	22.4
6.002	50.00	6.84	3.750	0.392	0.0	0.0	0.0	8.56	1361.0	53.1
8.000	50.00	5.24	3.850	0.040	0.0	0.0	0.0	1.21	85.6	5.5
8.001	50.00	5.39	3.750	0.116	0.0	0.0	0.0	1.58	250.7	15.7
8.002	50.00	5.55	3.650	0.179	0.0	0.0	0.0	1.57	249.4	24.2
8.003	50.00	5.57	3.550	0.228	0.0	0.0	0.0	5.64	897.4	30.9
8.004	50.00	5.63	2.990	0.271	0.0	0.0	0.0	2.16	343.7	36.7
8.005	50.00	6.08	2.900	0.330	0.0	0.0	0.0	0.91	145.0	44.7
6.003	50.00	6.89	2.850	0.750	0.0	0.0	0.0	2.16	468.0	101.6
6.004	48.44	7.45	2.800	0.750	0.0	0.0	0.0	1.64	355.4	101.6
6.005	40.87	9.75	2.500	0.847	0.0	0.0	0.0	0.22	46.6	101.6
6.006	38.21	10.85	2.180	0.847	0.0	0.0	0.0	0.72	363.3	101.6
6.007	36.94	11.45	2.150	0.983	0.0	0.0	0.0	1.59	796.9	101.6
6.008	35.13	12.39	1.980	1.357	0.0	0.0	0.0	2.25	1131.2	129.1

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
1	5.344	0.400	Junction		1.000	4.944	-2				
1	5.212	1.362	Open Manhole	1200	1.001	3.850	525	1.000	4.943	-2	1093
2	5.230	1.425	Junction		2.000	3.805	225				
2	4.945	1.373	Open Manhole	1500	1.002	3.572	525	1.001	3.572	525	
								2.000	3.572	225	
5	5.284	0.400	Junction		3.000	4.884	-2				
3	4.767	1.293	Open Manhole	1200	1.003	3.474	525	1.002	3.474	525	
								3.000	4.614	-2	1140
7	5.160	0.420	Junction		4.000	4.740	-2				
4	4.747	1.331	Open Manhole	1200	1.004	3.416	525	1.003	3.416	525	
								4.000	4.473	-2	1057
5	4.763	1.396	Open Manhole	1500	1.005	3.367	525	1.004	3.367	525	
6	5.110	2.120	Open Manhole	1500	1.006	2.990	525	1.005	3.065	525	
8	5.330	1.350	Open Manhole	1200	5.000	3.980	300				
9	5.630	2.080	Open Manhole	1200	5.001	3.550	300	5.000	3.625	300	75
10	5.720	2.300	Open Manhole	1200	5.002	3.420	300	5.001	3.420	300	
7	4.960	2.150	Open Manhole	1500	1.007	2.810	525	1.006	2.810	525	
								5.002	2.810	300	
8	4.730	2.230	Open Manhole	1500	1.008	2.500	525	1.007	2.575	525	75
9	4.610	2.190	Open Manhole	1500	1.009	2.420	525	1.008	2.420	525	
10	3.510	1.800	Open Manhole	1500	1.010	1.710	675	1.009	1.936	525	76
11	3.540	2.090	Open Manhole	1500	1.011	1.450	675	1.010	1.575	675	125
12	3.490	2.242	Open Manhole	1500	1.012	1.340	675	1.011	1.248	675	
	3.500	2.784	Open Manhole	0		OUTFALL		1.012	0.716	675	
20	5.880	1.610	Open Manhole	1200	6.000	4.270	300				
21	5.340	1.480	Open Manhole	1350	6.001	3.860	450	6.000	3.860	300	
22	5.960	1.590	Open Manhole	1200	7.000	4.370	300				
23	5.220	1.350	Open Manhole	1350	7.001	3.870	450	7.000	3.870	300	
22	5.140	1.390	Open Manhole	1350	6.002	3.750	450	6.001	3.750	450	
								7.001	3.750	450	
25	5.070	1.220	Open Manhole	1200	8.000	3.850	300				
26	5.070	1.325	Open Manhole	1350	8.001	3.750	450	8.000	3.745	300	
27	5.110	1.460	Open Manhole	1350	8.002	3.650	450	8.001	3.666	450	16
28	5.090	1.540	Open Manhole	1350	8.003	3.550	450	8.002	3.561	450	11
29	5.060	2.070	Open Manhole	1350	8.004	2.990	450	8.003	2.990	450	
30	5.050	2.150	Open Manhole	1350	8.005	2.900	450	8.004	2.900	450	
23	5.180	2.330	Open Manhole	1500	6.003	2.850	525	6.002	2.850	450	
								8.005	2.850	450	
24	5.200	2.400	Open Manhole	1500	6.004	2.800	525	6.003	2.800	525	
25	5.400	2.900	Open Manhole	1500	6.005	2.500	525	6.004	2.500	525	
26	5.360	3.180	Open Manhole	1800	6.006	2.180	800	6.005	2.500	525	45
27	4.690	2.540	Open Manhole	1800	6.007	2.150	800	6.006	2.150	800	
30	4.460	2.480	Open Manhole	1800	6.008	1.980	800	6.007	1.980	800	
	4.000	2.785	Open Manhole	0		OUTFALL		6.008	1.215	800	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
1	503778.979	103439.801			No Entry	
1	503782.841	103478.689	503782.841	103478.689	Required	
2	503794.051	103438.093			No Entry	
2	503798.973	103476.740	503798.973	103476.740	Required	
5	503807.889	103430.183			No Entry	
3	503815.255	103474.772	503815.255	103474.772	Required	
7	503819.933	103429.313			No Entry	
4	503824.885	103473.607	503824.885	103473.607	Required	
5	503833.073	103472.619	503833.073	103472.619	Required	
6	503844.081	103441.571	503844.081	103441.571	Required	
8	503768.269	103470.004	503768.269	103470.004	Required	
9	503762.779	103423.617	503762.779	103423.617	Required	
10	503827.491	103415.851	503827.491	103415.851	Required	
7	503851.185	103431.148	503851.185	103431.148	Required	
8	503873.407	103440.566	503873.407	103440.566	Required	
9	503878.306	103443.455	503878.306	103443.455	Required	
10	503909.154	103475.662	503909.154	103475.662	Required	
11	503928.822	103486.690	503928.822	103486.690	Required	
12	503936.980	103519.411	503936.980	103519.411	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
	503965.147	103619.893			No Entry	
20	503720.936	103426.774	503720.936	103426.774	Required	
21	503699.158	103476.725	503699.158	103476.725	Required	
22	503740.417	103426.134	503740.417	103426.134	Required	
23	503748.590	103493.367	503748.590	103493.367	Required	
22	503693.077	103500.257	503693.077	103500.257	Required	
25	503779.329	103494.328	503779.329	103494.328	Required	
26	503761.874	103496.686	503761.874	103496.686	Required	
27	503748.045	103498.337	503748.045	103498.337	Required	
28	503733.228	103500.003	503733.228	103500.003	Required	
29	503726.025	103501.362	503726.025	103501.362	Required	
30	503718.069	103501.898	503718.069	103501.898	Required	
23	503693.821	103505.333	503693.821	103505.333	Required	
24	503689.006	103507.702	503689.006	103507.702	Required	
25	503702.977	103561.523	503702.977	103561.523	Required	
26	503718.476	103586.946	503718.476	103586.946	Required	
27	503765.668	103581.460	503765.668	103581.460	Required	
30	503822.246	103574.703	503822.246	103574.703	Required	
	503949.214	103559.599			No Entry	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	Q22	-2	1	5.344	4.944	0.175	Junction	
1.001	o	525	1	5.212	3.850	1.137	Open Manhole	1200
2.000	o	225	2	5.230	3.805	1.200	Junction	
1.002	o	525	2	4.945	3.572	1.148	Open Manhole	1500
3.000	Q22	-2	5	5.284	4.884	0.175	Junction	
1.003	o	525	3	4.767	3.474	1.068	Open Manhole	1200
4.000	Q22	-2	7	5.160	4.740	0.195	Junction	
1.004	o	525	4	4.747	3.416	1.106	Open Manhole	1200
1.005	o	525	5	4.763	3.367	1.171	Open Manhole	1500
1.006	o	525	6	5.110	2.990	1.595	Open Manhole	1500
5.000	o	300	8	5.330	3.980	1.050	Open Manhole	1200
5.001	o	300	9	5.630	3.550	1.780	Open Manhole	1200
5.002	o	300	10	5.720	3.420	2.000	Open Manhole	1200
1.007	o	525	7	4.960	2.810	1.625	Open Manhole	1500
1.008	o	525	8	4.730	2.500	1.705	Open Manhole	1500
1.009	o	525	9	4.610	2.420	1.665	Open Manhole	1500
1.010	o	675	10	3.510	1.710	1.125	Open Manhole	1500
1.011	o	675	11	3.540	1.450	1.415	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	39.080	39080.0	1	5.212	4.943	0.044	Open Manhole	1200
1.001	16.250	58.5	2	4.945	3.572	1.148	Open Manhole	1500
2.000	38.959	167.2	2	4.945	3.572	1.148	Open Manhole	1500
1.002	16.400	167.3	3	4.767	3.474	1.068	Open Manhole	1200
3.000	45.193	167.4	3	4.767	4.614	-0.072	Open Manhole	1200
1.003	9.700	167.2	4	4.747	3.416	1.106	Open Manhole	1200
4.000	44.570	166.9	4	4.747	4.473	0.049	Open Manhole	1200
1.004	8.248	168.3	5	4.763	3.367	1.171	Open Manhole	1500
1.005	32.941	109.1	6	5.110	3.065	1.820	Open Manhole	1500
1.006	12.614	70.1	7	4.960	2.810	1.625	Open Manhole	1500
5.000	46.710	131.6	9	5.630	3.625	1.705	Open Manhole	1200
5.001	65.176	501.4	10	5.720	3.420	2.000	Open Manhole	1200
5.002	28.203	46.2	7	4.960	2.810	1.850	Open Manhole	1500
1.007	24.135	102.7	8	4.730	2.575	1.630	Open Manhole	1500
1.008	5.687	71.1	9	4.610	2.420	1.665	Open Manhole	1500
1.009	44.597	92.1	10	3.510	1.936	1.049	Open Manhole	1500
1.010	22.549	167.0	11	3.540	1.575	1.290	Open Manhole	1500
1.011	33.723	166.9	12	3.490	1.248	1.567	Open Manhole	1500

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.012	o	675	12	3.490	1.340	1.475	Open Manhole	1500
6.000	o	300	20	5.880	4.270	1.310	Open Manhole	1200
6.001	o	450	21	5.340	3.860	1.030	Open Manhole	1350
7.000	o	300	22	5.960	4.370	1.440	Open Manhole	1200
7.001	o	450	23	5.220	3.870	1.200	Open Manhole	1350
6.002	o	450	22	5.140	3.750	0.940	Open Manhole	1350
8.000	o	300	25	5.070	3.850	0.920	Open Manhole	1200
8.001	o	450	26	5.070	3.750	0.870	Open Manhole	1350
8.002	o	450	27	5.110	3.650	1.010	Open Manhole	1350
8.003	o	450	28	5.090	3.550	1.090	Open Manhole	1350
8.004	o	450	29	5.060	2.990	1.620	Open Manhole	1350
8.005	o	450	30	5.050	2.900	1.700	Open Manhole	1350
6.003	o	525	23	5.180	2.850	1.805	Open Manhole	1500
6.004	o	525	24	5.200	2.800	1.875	Open Manhole	1500
6.005	o	525	25	5.400	2.500	2.375	Open Manhole	1500
6.006	o	800	26	5.360	2.180	2.380	Open Manhole	1800
6.007	o	800	27	4.690	2.150	1.740	Open Manhole	1800
6.008	o	800	30	4.460	1.980	1.680	Open Manhole	1800

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.012	104.355	167.2		3.500	0.716	2.109	Open Manhole	0
6.000	54.493	132.9	21	5.340	3.860	1.180	Open Manhole	1350
6.001	24.304	220.9	22	5.140	3.750	0.940	Open Manhole	1350
7.000	67.728	135.5	23	5.220	3.870	1.200	Open Manhole	1350
7.001	55.938	466.2	22	5.140	3.750	1.240	Open Manhole	1350
6.002	5.130	5.7	23	5.180	2.850	1.880	Open Manhole	1500
8.000	17.613	167.7	26	5.070	3.745	1.025	Open Manhole	1350
8.001	13.928	165.8	27	5.110	3.666	0.994	Open Manhole	1350
8.002	14.910	167.5	28	5.090	3.561	1.079	Open Manhole	1350
8.003	7.330	13.1	29	5.060	2.990	1.620	Open Manhole	1350
8.004	7.974	88.6	30	5.050	2.900	1.700	Open Manhole	1350
8.005	24.490	489.8	23	5.180	2.850	1.880	Open Manhole	1500
6.003	5.366	107.3	24	5.200	2.800	1.875	Open Manhole	1500
6.004	55.605	185.4	25	5.400	2.500	2.375	Open Manhole	1500
6.005	29.776	0.0	26	5.360	2.500	2.335	Open Manhole	1800
6.006	47.510	1583.7	27	4.690	2.150	1.740	Open Manhole	1800
6.007	56.980	335.2	30	4.460	1.980	1.680	Open Manhole	1800
6.008	127.863	167.1		4.000	1.215	1.985	Open Manhole	0

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.000	0.000	0.000
1.001	User	-	100	0.026	0.026	0.026
2.000	User	-	100	0.017	0.017	0.017
1.002	User	-	100	0.066	0.066	0.066
3.000	-	-	100	0.000	0.000	0.000
1.003	User	-	100	0.106	0.106	0.106
4.000	-	-	100	0.000	0.000	0.000
1.004	User	-	100	0.063	0.063	0.063
1.005	User	-	100	0.043	0.043	0.043
1.006	User	-	100	0.072	0.072	0.072
5.000	User	-	100	0.079	0.079	0.079
5.001	User	-	100	0.044	0.044	0.044
5.002	User	-	100	0.044	0.044	0.044
1.007	User	-	100	0.045	0.045	0.045
1.008	User	-	100	0.263	0.263	0.263
1.009	User	-	100	0.031	0.031	0.031
1.010	User	-	100	0.008	0.008	0.008
	User	-	100	0.025	0.025	0.032
	User	-	100	0.533	0.533	0.565
1.011	-	-	100	0.000	0.000	0.000
1.012	User	-	100	0.091	0.091	0.091
	User	-	100	0.094	0.094	0.185
	User	-	100	0.027	0.027	0.212
	User	-	100	0.044	0.044	0.256
	User	-	100	0.240	0.240	0.495
6.000	User	-	100	0.132	0.132	0.132
6.001	User	-	100	0.084	0.084	0.084
7.000	User	-	100	0.081	0.081	0.081
7.001	User	-	100	0.084	0.084	0.084
6.002	User	-	100	0.011	0.011	0.011
8.000	User	-	100	0.040	0.040	0.040
8.001	User	-	100	0.076	0.076	0.076
8.002	User	-	100	0.063	0.063	0.063
8.003	User	-	100	0.049	0.049	0.049
8.004	User	-	100	0.044	0.044	0.044
8.005	User	-	100	0.059	0.059	0.059
6.003	User	-	100	0.028	0.028	0.028
6.004	-	-	100	0.000	0.000	0.000
6.005	User	-	100	0.032	0.032	0.032
	User	-	100	0.065	0.065	0.097
6.006	-	-	100	0.000	0.000	0.000
6.007	User	-	100	0.136	0.136	0.136
6.008	User	-	100	0.186	0.186	0.186
	User	-	100	0.188	0.188	0.374
				Total	Total	Total
				3.316	3.316	3.316

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.012		3.500	0.716	0.000	0	0

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Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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6.008		4.000	1.215	0.000	0	0
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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs 0 Number of Offline Controls 1 Number of Time/Area Diagrams 0
 Number of Online Controls 0 Number of Storage Structures 8 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH	E (1km)	0.313
Return Period (years)	30	F (1km)	2.347
FEH Rainfall Version	1999	Summer Storms	Yes
Site Location	GB 504150 103950 TQ 04150 03950	Winter Storms	No
C (1km)	-0.026	Cv (Summer)	0.750
D1 (1km)	0.387	Cv (Winter)	0.840
D2 (1km)	0.278	Storm Duration (mins)	30
D3 (1km)	0.404		

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Offline Controls for Storm

Orifice Manhole: 10, DS/PN: 1.010, Loop to PN: None

Diameter (m) 0.500 Discharge Coefficient 0.600 Invert Level (m) 1.710

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Storage Structures for Storm

Porous Car Park Manhole: 7, DS/PN: 1.007

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 5.5
 Membrane Percolation (mm/hr) 1000 Length (m) 30.0
 Max Percolation (l/s) 45.8 Slope (1:X) 0.0
 Safety Factor 2.0 Depression Storage (mm) 5
 Porosity 0.30 Evaporation (mm/day) 3
 Invert Level (m) 4.460 Membrane Depth (mm) 500

Porous Car Park Manhole: 8, DS/PN: 1.008

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 5.0
 Membrane Percolation (mm/hr) 1000 Length (m) 27.5
 Max Percolation (l/s) 38.2 Slope (1:X) 0.0
 Safety Factor 2.0 Depression Storage (mm) 5
 Porosity 0.30 Evaporation (mm/day) 3
 Invert Level (m) 4.230 Membrane Depth (mm) 500

Porous Car Park Manhole: 9, DS/PN: 1.009

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 5.0
 Membrane Percolation (mm/hr) 1000 Length (m) 18.5
 Max Percolation (l/s) 25.7 Slope (1:X) 0.0
 Safety Factor 2.0 Depression Storage (mm) 5
 Porosity 0.30 Evaporation (mm/day) 3
 Invert Level (m) 4.110 Membrane Depth (mm) 500

Cellular Storage Manhole: 10, DS/PN: 1.010

Invert Level (m) 1.710 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)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	20.0	20.0	0.500	20.0	32.0	0.600	0.0	32.0

Porous Car Park Manhole: 12, DS/PN: 1.012

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 5.0
 Membrane Percolation (mm/hr) 1000 Length (m) 35.0
 Max Percolation (l/s) 48.6 Slope (1:X) 0.0
 Safety Factor 2.0 Depression Storage (mm) 5
 Porosity 0.30 Evaporation (mm/day) 3
 Invert Level (m) 2.990 Membrane Depth (mm) 500

Porous Car Park Manhole: 20, DS/PN: 6.000

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 5.0
 Membrane Percolation (mm/hr) 1000 Length (m) 12.5
 Max Percolation (l/s) 17.4 Slope (1:X) 0.0
 Safety Factor 2.0 Depression Storage (mm) 5
 Porosity 0.30 Evaporation (mm/day) 3
 Invert Level (m) 5.380 Membrane Depth (mm) 500

Porous Car Park Manhole: 21, DS/PN: 6.001

Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0
 Membrane Percolation (mm/hr) 1000 Porosity 0.30
 Max Percolation (l/s) 72.9 Invert Level (m) 4.840

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Porous Car Park Manhole: 21, DS/PN: 6.001

Width (m)	5.0	Depression Storage (mm)	5
Length (m)	52.5	Evaporation (mm/day)	3
Slope (1:X)	0.0	Membrane Depth (mm)	500

Porous Car Park Manhole: 22, DS/PN: 6.002

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	32.4
Max Percolation (l/s)	45.0	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	4.640	Membrane Depth (mm)	500

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000
 Number of Input Hydrographs 0 Number of Offline Controls 1 Number of Time/Area Diagrams 0
 Number of Online Controls 0 Number of Storage Structures 8 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D3 (1km) 0.404
 FEH Rainfall Version 1999 E (1km) 0.313
 Site Location GB 504150 103950 TQ 04150 03950 F (1km) 2.347
 C (1km) -0.026 Cv (Summer) 0.750
 D1 (1km) 0.387 Cv (Winter) 0.840
 D2 (1km) 0.278

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 40, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
1.000	1	120 Winter	1	+0%					4.944	-0.225	0.000
1.001	1	15 Winter	1	+0%					3.865	-0.510	0.000
2.000	2	15 Winter	1	+0%					3.836	-0.194	0.000
1.002	2	15 Winter	1	+0%	100/15	Summer			3.641	-0.456	0.000
3.000	5	120 Winter	1	+0%					4.884	-0.225	0.000
1.003	3	15 Winter	1	+0%	100/15	Summer			3.575	-0.424	0.000
4.000	7	120 Winter	1	+0%					4.740	-0.225	0.000
1.004	4	15 Winter	1	+0%	100/15	Summer			3.533	-0.408	0.000
1.005	5	15 Winter	1	+0%	100/15	Summer			3.462	-0.430	0.000
1.006	6	15 Winter	1	+0%	100/15	Summer			3.107	-0.408	0.000
5.000	8	15 Winter	1	+0%	100/15	Summer			4.042	-0.238	0.000
5.001	9	15 Winter	1	+0%	30/15	Summer			3.656	-0.194	0.000
5.002	10	15 Winter	1	+0%	100/15	Summer			3.485	-0.235	0.000
1.007	7	15 Winter	1	+0%	30/15	Winter			2.945	-0.390	0.000
1.008	8	15 Winter	1	+0%	30/15	Summer			2.703	-0.322	0.000
1.009	9	15 Winter	1	+0%	100/15	Summer			2.571	-0.374	0.000
1.010	10	15 Winter	1	+0%	100/15	Summer	1/15 Summer	72	1.908	-0.477	0.000
1.011	11	15 Winter	1	+0%	100/15	Summer			1.634	-0.491	0.000
1.012	12	15 Winter	1	+0%	100/15	Summer			1.537	-0.478	0.000
6.000	20	15 Winter	1	+0%	100/15	Summer			4.350	-0.220	0.000
6.001	21	15 Winter	1	+0%	100/15	Summer			3.964	-0.346	0.000
7.000	22	15 Winter	1	+0%	100/15	Winter			4.433	-0.237	0.000
7.001	23	15 Winter	1	+0%	100/15	Summer			3.973	-0.347	0.000
6.002	22	15 Winter	1	+0%	100/15	Summer			3.828	-0.372	0.000
8.000	25	15 Winter	1	+0%	100/15	Summer			3.898	-0.252	0.000
8.001	26	15 Winter	1	+0%	100/15	Summer			3.827	-0.373	0.000
8.002	27	15 Winter	1	+0%	100/15	Summer			3.746	-0.354	0.000
8.003	28	15 Winter	1	+0%	100/15	Summer			3.616	-0.384	0.000
8.004	29	15 Winter	1	+0%	30/15	Summer			3.108	-0.332	0.000

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe	Status	Level Exceeded
				Flow (l/s)		
1.000	1	0.00		0.0	OK	
1.001	1	0.01		2.4	OK	
2.000	2	0.04		1.8	OK*	
1.002	2	0.04		10.3	OK	
3.000	5	0.00		0.0	OK	
1.003	3	0.08		20.2	OK	
4.000	7	0.00		0.0	OK	
1.004	4	0.11		26.0	OK	
1.005	5	0.08		29.8	OK	
1.006	6	0.11		36.2	OK	
5.000	8	0.09		8.6	OK	
5.001	9	0.25		11.8	OK	
5.002	10	0.10		15.5	OK	
1.007	7	0.15		55.4	OK	
1.008	8	0.31		78.0	OK	
1.009	9	0.18		81.1	OK	
1.010	10	0.19	40.8	87.9	OK	
1.011	11	0.15		88.1	OK	
1.012	12	0.18		122.2	OK	
6.000	20	0.15		14.1	OK	
6.001	21	0.12		21.7	OK	
7.000	22	0.09		8.6	OK	
7.001	23	0.11		15.7	OK	
6.002	22	0.07		37.0	OK	
8.000	25	0.06		4.4	OK	
8.001	26	0.07		11.4	OK	
8.002	27	0.10		17.3	OK	
8.003	28	0.05		21.8	OK	
8.004	29	0.15		25.8	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)
8.005	30 15	Winter	1	+0%	30/15 Summer				3.083	-0.267	0.000
6.003	23 15	Winter	1	+0%	30/15 Summer				3.039	-0.336	0.000
6.004	24 15	Winter	1	+0%	30/15 Summer				2.965	-0.360	0.000
6.005	25 15	Winter	1	+0%	30/15 Summer				2.833	-0.192	0.000
6.006	26 15	Winter	1	+0%	100/15 Winter				2.434	-0.546	0.000
6.007	27 15	Winter	1	+0%					2.326	-0.624	0.000
6.008	30 15	Winter	1	+0%					2.134	-0.646	0.000

PN	US/MH Name	Pipe		Status	Level Exceeded
		Flow / Cap.	Overflow (l/s)		
8.005	30	0.25	30.3	OK	
6.003	23	0.28	69.9	OK	
6.004	24	0.21	68.7	OK	
6.005	25	0.73	71.0	OK	
6.006	26	0.19	68.9	OK	
6.007	27	0.11	73.0	OK	
6.008	30	0.08	85.1	OK	

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 1 Number of Time/Area Diagrams 0
 Number of Online Controls 0 Number of Storage Structures 8 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D3 (1km) 0.404
 FEH Rainfall Version 1999 E (1km) 0.313
 Site Location GB 504150 103950 TQ 04150 03950 F (1km) 2.347
 C (1km) -0.026 Cv (Summer) 0.750
 D1 (1km) 0.387 Cv (Winter) 0.840
 D2 (1km) 0.278

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 40, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
1.000	1	120 Winter	30	+40%					4.944	-0.225	0.000
1.001	1	15 Winter	30	+40%					3.913	-0.462	0.000
2.000	2	15 Winter	30	+40%					3.875	-0.155	0.000
1.002	2	15 Winter	30	+40%	100/15	Summer			3.774	-0.323	0.000
3.000	5	120 Winter	30	+40%					4.884	-0.225	0.000
1.003	3	15 Winter	30	+40%	100/15	Summer			3.744	-0.255	0.000
4.000	7	120 Winter	30	+40%					4.740	-0.225	0.000
1.004	4	15 Winter	30	+40%	100/15	Summer			3.719	-0.222	0.000
1.005	5	15 Winter	30	+40%	100/15	Summer			3.607	-0.285	0.000
1.006	6	15 Winter	30	+40%	100/15	Summer			3.376	-0.139	0.000
5.000	8	15 Winter	30	+40%	100/15	Summer			4.119	-0.161	0.000
5.001	9	15 Winter	30	+40%	30/15	Summer			3.906	0.056	0.000
5.002	10	15 Winter	30	+40%	100/15	Summer			3.568	-0.152	0.000
1.007	7	15 Winter	30	+40%	30/15	Winter			3.335	0.000	0.000
1.008	8	15 Winter	30	+40%	30/15	Summer			3.198	0.173	0.000
1.009	9	15 Winter	30	+40%	100/15	Summer			2.821	-0.124	0.000
1.010	10	15 Winter	30	+40%	100/15	Summer	1/15 Summer	72	2.219	-0.166	0.000
1.011	11	15 Winter	30	+40%	100/15	Summer			1.965	-0.160	0.000
1.012	12	15 Winter	30	+40%	100/15	Summer			1.860	-0.155	0.000
6.000	20	15 Winter	30	+40%	100/15	Summer			4.461	-0.109	0.000
6.001	21	15 Winter	30	+40%	100/15	Summer			4.111	-0.199	0.000
7.000	22	15 Winter	30	+40%	100/15	Winter			4.511	-0.159	0.000
7.001	23	15 Winter	30	+40%	100/15	Summer			4.125	-0.195	0.000
6.002	22	15 Winter	30	+40%	100/15	Summer			3.933	-0.267	0.000
8.000	25	15 Winter	30	+40%	100/15	Summer			3.973	-0.177	0.000
8.001	26	15 Winter	30	+40%	100/15	Summer			3.941	-0.259	0.000
8.002	27	15 Winter	30	+40%	100/15	Summer			3.912	-0.188	0.000
8.003	28	15 Winter	30	+40%	100/15	Summer			3.886	-0.114	0.000
8.004	29	15 Winter	30	+40%	30/15	Summer			3.867	0.427	0.000

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

PN	US/MH Name	Flow / Cap.	Overflow (1/s)	Pipe Flow (1/s)	Status	Level Exceeded
1.000	1	0.00		0.0	OK	
1.001	1	0.03		14.1	OK	
2.000	2	0.20		8.2	OK*	
1.002	2	0.23		56.0	OK	
3.000	5	0.00		0.0	OK	
1.003	3	0.45		111.1	OK	
4.000	7	0.00		0.0	OK	
1.004	4	0.61		143.0	OK	
1.005	5	0.42		164.5	OK	
1.006	6	0.60		194.4	OK	
5.000	8	0.43		38.7	OK	
5.001	9	1.16		54.4	SURCHARGED	
5.002	10	0.48		70.3	OK	
1.007	7	0.77		286.6	SURCHARGED	
1.008	8	1.61		400.4	SURCHARGED	
1.009	9	0.92		410.4	OK	
1.010	10	0.91	213.3	424.5	OK	
1.011	11	0.75		428.3	OK	
1.012	12	0.90		605.4	OK	
6.000	20	0.71		64.3	OK	
6.001	21	0.58		105.5	OK	
7.000	22	0.43		39.5	OK	
7.001	23	0.56		77.1	OK	
6.002	22	0.35		186.4	OK	
8.000	25	0.27		20.0	OK	
8.001	26	0.36		60.1	OK	
8.002	27	0.55		93.2	OK	
8.003	28	0.26		108.8	OK	
8.004	29	0.72		121.8	SURCHARGED	

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PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)
8.005	30 15	Winter	30	+40%	30/15	Summer			3.843	0.493	0.000
6.003	23 15	Winter	30	+40%	30/15	Summer			3.779	0.404	0.000
6.004	24 15	Winter	30	+40%	30/15	Summer			3.584	0.259	0.000
6.005	25 15	Winter	30	+40%	30/15	Summer			3.250	0.225	0.000
6.006	26 15	Winter	30	+40%	100/15	Winter			2.801	-0.179	0.000
6.007	27 15	Winter	30	+40%					2.568	-0.382	0.000
6.008	30 15	Winter	30	+40%					2.329	-0.451	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
8.005	30	1.16		141.2	SURCHARGED	
6.003	23	1.35		335.3	SURCHARGED	
6.004	24	1.04		332.0	SURCHARGED	
6.005	25	3.65		357.4	SURCHARGED	
6.006	26	0.93		344.4	OK	
6.007	27	0.53		360.3	OK	
6.008	30	0.39		408.1	OK	

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 1 Number of Time/Area Diagrams 0
 Number of Online Controls 0 Number of Storage Structures 8 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D3 (1km) 0.404
 FEH Rainfall Version 1999 E (1km) 0.313
 Site Location GB 504150 103950 TQ 04150 03950 F (1km) 2.347
 C (1km) -0.026 Cv (Summer) 0.750
 D1 (1km) 0.387 Cv (Winter) 0.840
 D2 (1km) 0.278

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 40, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
1.000	1	120 Winter	100	+45%					4.944	-0.225	0.000
1.001	1	15 Winter	100	+45%					4.221	-0.154	0.000
2.000	2	15 Winter	100	+45%					4.030	0.000	0.000
1.002	2	15 Winter	100	+45%	100/15	Summer			4.218	0.121	0.000
3.000	5	120 Winter	100	+45%					4.884	-0.225	0.000
1.003	3	15 Winter	100	+45%	100/15	Summer			4.203	0.204	0.000
4.000	7	120 Winter	100	+45%					4.740	-0.225	0.000
1.004	4	15 Winter	100	+45%	100/15	Summer			4.180	0.239	0.000
1.005	5	15 Winter	100	+45%	100/15	Summer			4.154	0.262	0.000
1.006	6	15 Winter	100	+45%	100/15	Summer			4.083	0.568	0.000
5.000	8	15 Winter	100	+45%	100/15	Summer			4.752	0.472	0.000
5.001	9	15 Winter	100	+45%	30/15	Summer			4.633	0.783	0.000
5.002	10	15 Winter	100	+45%	100/15	Summer			4.280	0.560	0.000
1.007	7	15 Winter	100	+45%	30/15	Winter			4.024	0.689	0.000
1.008	8	15 Winter	100	+45%	30/15	Summer			3.811	0.786	0.000
1.009	9	15 Winter	100	+45%	100/15	Summer			3.334	0.389	0.000
1.010	10	15 Winter	100	+45%	100/15	Summer	1/15 Summer	72	2.603	0.218	0.000
1.011	11	15 Winter	100	+45%	100/15	Summer			2.468	0.343	0.000
1.012	12	15 Winter	100	+45%	100/15	Summer			2.350	0.335	0.000
6.000	20	15 Winter	100	+45%	100/15	Summer			4.900	0.330	0.000
6.001	21	15 Winter	100	+45%	100/15	Summer			4.549	0.239	0.000
7.000	22	15 Winter	100	+45%	100/15	Winter			4.707	0.037	0.000
7.001	23	15 Winter	100	+45%	100/15	Summer			4.554	0.234	0.000
6.002	22	15 Winter	100	+45%	100/15	Summer			4.492	0.292	0.000
8.000	25	15 Winter	100	+45%	100/15	Summer			4.640	0.490	0.000
8.001	26	15 Winter	100	+45%	100/15	Summer			4.614	0.414	0.000
8.002	27	15 Winter	100	+45%	100/15	Summer			4.590	0.490	0.000
8.003	28	15 Winter	100	+45%	100/15	Summer			4.550	0.550	0.000
8.004	29	15 Winter	100	+45%	30/15	Summer			4.516	1.076	0.000

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PN	US/MH Name	Flow / Cap.	Overflow (1/s)	Pipe Flow (1/s)	Status	Level Exceeded
1.000	1	0.00		0.0	OK	
1.001	1	0.05		21.6	OK	
2.000	2	0.31		12.3	SURCHARGED*	
1.002	2	0.35		85.8	SURCHARGED	
3.000	5	0.00		0.0	OK	
1.003	3	0.62		151.2	SURCHARGED	
4.000	7	0.00		0.0	OK	
1.004	4	0.83		194.1	SURCHARGED	
1.005	5	0.53		209.8	SURCHARGED	
1.006	6	0.79		257.9	SURCHARGED	
5.000	8	0.61		55.0	SURCHARGED	
5.001	9	1.61		75.6	SURCHARGED	
5.002	10	0.71		104.5	SURCHARGED	
1.007	7	1.01		375.2	SURCHARGED	
1.008	8	2.11		524.2	SURCHARGED	
1.009	9	1.22		542.5	SURCHARGED	
1.010	10	1.11	412.2	519.1	SURCHARGED	
1.011	11	0.93		530.0	SURCHARGED	
1.012	12	1.19		800.6	SURCHARGED	
6.000	20	1.05		95.7	SURCHARGED	
6.001	21	0.84		152.2	SURCHARGED	
7.000	22	0.67		61.2	SURCHARGED	
7.001	23	0.80		108.7	SURCHARGED	
6.002	22	0.45		239.6	SURCHARGED	
8.000	25	0.36		26.7	SURCHARGED	
8.001	26	0.44		74.3	SURCHARGED	
8.002	27	0.68		115.2	SURCHARGED	
8.003	28	0.35		146.4	SURCHARGED	
8.004	29	1.03		174.3	SURCHARGED	

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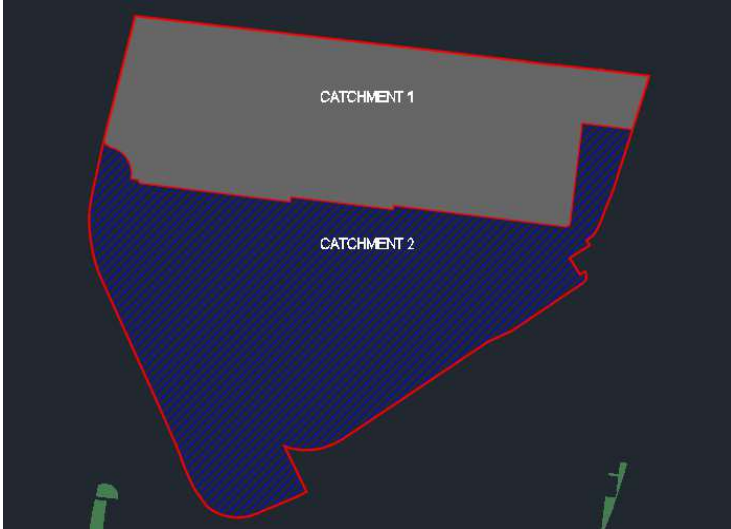
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)
8.005	30 15	Winter	100	+45%	30/15 Summer				4.449	1.099	0.000
6.003	23 15	Winter	100	+45%	30/15 Summer				4.326	0.951	0.000
6.004	24 15	Winter	100	+45%	30/15 Summer				4.003	0.678	0.000
6.005	25 15	Winter	100	+45%	30/15 Summer				3.441	0.416	0.000
6.006	26 15	Winter	100	+45%	100/15 Winter				2.984	0.004	0.000
6.007	27 15	Winter	100	+45%					2.662	-0.288	0.000
6.008	30 15	Winter	100	+45%					2.437	-0.343	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
8.005	30	1.74		210.4	SURCHARGED	
6.003	23	1.77		440.9	SURCHARGED	
6.004	24	1.36		435.0	SURCHARGED	
6.005	25	4.84		473.9	SURCHARGED	
6.006	26	1.24		461.0	SURCHARGED	
6.007	27	0.72		490.9	OK	
6.008	30	0.59		617.4	OK	

Watersmead Business Park, Littlehampton - Site Catchments Map



Existing Area Types	Existing Area
1 ROOF	13564
2 HARD STANDING	20123
3 LANDSCAPE	6682
Total Site Area (sqm)	40369

	Catchment Area m2
Catchment 1	17414
Catchment 2	22955
Total	40369

	Proposed Area	Net Areas	Remarks
ROOF	11329.5	-2234.5	DECREASE
HARD STANDING	23193.5	3070.5	INCREASE
LANDSCAPE	5846	-836	DECREASE
total site	40369		

Remarks
 > Same impermeable areas Pre- and Post-Development for Catchment 1
 > Demolished building areas (Unit 7) changed the runoff coeff. C value from Roof to Hardstanding (at Pre- to Post-Development), a net decrease in general

CALCULATED PRE-DEVELOPMENT RUNOFF RATE (l/s)
 (Q = 2.78 CIA)
 Q = 675 l/s

CALCULATED POST-DEVELOPMENT RUN-OFF RATE (l/s)
 (Q = 2.78 CIA) $C = c_v * C_r$
 Q = 677 l/s

CALCULATED PRE-DEVELOPMENT RUNOFF VOLUME (m3)
 (100-YEAR 6-HOUR)
 Volume = 2,352 m3

CALCULATED POST-DEVELOPMENT RUNOFF VOLUME (m3)
 (100-YEAR 6-HOUR)
 Volume = 2,359 m3

CLIENT / PROJECT

Littlehampton	1 of 1	1	C240600684
TITLE	PREPARED	CHECKED	DATE
C240600684-PIN-XX-XX-CA-C-02100 Foul Water Design Flow Rates	DL	IL	Apr-25

The recommended basis for foul sewer design is 6DWF+10%. The multiplier "6" if used to estimate the conditions at peak flow. An additional 10% is factored into the DWF as a provision for infiltration; this is increased to an allowance of 20% in areas with a high water table.

Development	Flow Rates (l/day)			Number of Units	Provision for Infiltration	High Water Table	Peak Factor	Flow Rates (l/s)	Comments
Offices	750	per	100m ²	60.00	yes	yes	6	3.750	Building 7 to be demolished (accounting for 2 floors)
Warehouse	150	per	100m ²	42.00	yes	yes	6	0.525	Building 5
Warehouse	150	per	100m ²	53.00	yes	yes	6	0.663	Building 6
Shopping Centre	400	per	100m ²	17.19	yes	yes	6	0.573	Unit A1 - home bargains
Shopping Centre	400	per	100m ²	24.06	yes	yes	6	0.802	Unit A2 - M&S
Offices	750	per	100m ²	1.39	yes	yes	6	0.1	Unit A3 - Greggs Assumed as offices as there is no data on seats (ROUND TO 0.1L/S)
Shopping Centre	400	per	100m ²	9.29	yes	yes	6	0.310	Unit A4 - Retail
Shopping Centre	400	per	100m ²	20.62	yes	yes	6	0.687	Unit A5 - Lidl
Shopping Centre	400	per	100m ²	10.13	yes	yes	6	0.338	Unit A6 - TK Max
Shopping Centre	400	per	100m ²	10.22	yes	yes	6	0.341	Unit A7 - Retail
Shopping Centre	400	per	100m ²	5.02	yes	yes	6	0.167	Unit A8 - Retail
Shopping Centre	400	per	100m ²	5.02	yes	yes	6	0.167	Unit A9 - Unit 9

Total existing Building 5+6	1.188	l/s
Total of Building 7 (2 office floors) DEMO	3.750	l/s
Total of proposed Units A1-A9	3.485	l/s
net	-1.453	l/s

NO ADDITIONAL FOUL FLOWS

Appendix I – Proposed Drainage Layout Plan