



DRAINAGE DESIGN CALCULATIONS

POUND PLACE, ANGMERING

SAVISTA DESIGN AND BUILD

OCTOBER 2019

1612-ISS-XX-XX-RP-C-0001

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DRAINAGE DESIGN CALCULATIONS

1612-ISS-XX-XX-RP-C-0001

REPORT ISSUE

Revision	Date	Notes
P01	31/10/2019	First Issue

PREPARED BY

Paul Lavery October 2019

REVIEWED BY

Tom Wilson October 2019

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1 SUMMARY SHEET

Design Codes	Sewers for Adoption (latest Edition) Document 'H'
Intended Use of Structure	Care home
FRA or DSR	Drainage Design Strategy Report by Arc Engineers Ref – 18 031 Key pages extracted Refer to Arc Engineers drainage plan for soakaway locations and tables for infiltration rates
Surface Water Modelling	Site modelled using Microdrainage 1yr – no surcharging of sewers – criteria met (only pipes connecting to attenuation cells surcharge) 30yr – sewers surcharge but no flooding - criteria met 100yr + CC – flooding in controlled areas and non-excessive depths – criteria met (no flooding) MicroDrainage print outs for the 4 networks draining to separate soakaways provided (ref SE1612-ISS-XX-XX-CA-C-0051 to 0054)
Foul Water Flows	Flow rates for main runs calculated using unit discharge method. Refer to calculation sheet ref SE1612-ISS-XX-XX-CA-C-0002 for flow calculations. MicroDrainage printout ref SE1612-ISS-XX-XX-CA-C-0050.
Any Other Relevant Information (e.g. fire requirements)	

2 APPROVED STRATEGY

The Drainage Design Strategy Report (DDSR) set out the general strategy for the site to which this design has followed.

The surface water is to infiltrate onsite based on soakaway testing carried out to the local LLFA criteria.

Foul water is to drain to the network being adopted by Southern Water to the east.

Extracts of the DDSR can be found in Appendix A.

3 DESIGN STATEMENT

The care home is to consist of standard domestic showers, sinks, toilet facilities and a canteen kitchen. Foul flows are to gravitate to the west as requested by Southern Water via gravity if possible.

Surface water flows are to infiltrate onsite using rates provided in the DDSR that carried out soakaway testing to the local LLFA criteria. Cellular storage crates are to infiltrate to the side only.

All drainage is to be designed to Sewers For Adoption standards and Document 'H' where applicable.

4 DESIGN PROCEEDURE

Microdrainage has modelled the surface water using the infiltration rates as per the DDSR with a dummy manhole downstream of the soakaway with a weir set to ground level. The results show that all storm water was held and infiltrated by the soakaway as there was no downstream discharge.

1yr Storm event – Pipes do not surcharge except the pipes connecting to the cellular storage but not excessively
30yr event – The proposed networks do not flood

100yr event + 40% CC– The proposed networks do not flood

Microdrainage has modelled the foul water network using base flows to represent the combined flows calculated using the unit discharge method. Southern Water has commented to the Client that they prefer the site to drain to their network to the west. A formal capacity check is being prepared for submission to formally approve the specific manhole.

MicroDrainage calculations can be found in Appendix B.

APPENDIX A



DRAINAGE DESIGN STRATEGY REPORT

PROJECT

POUND PLACE CARE HOME, ROUNDSTONE LANE, ANGMERING for ARUN DISTRICT COUNCIL

PROJECT NUMBER

18 031

CLIENT

HALLMARK CAREHOMES LTD

REPORT DATE

April 2018 – Second Issue



3 CADMAN COURT
LEEDS
LS27 0RX

DOCUMENT CONTROL

PROJECT NAME	POUND PLACE CARE HOME, ROUNDSTONE LANE
PROJECT NUMBER	18 031
CLIENT	HALLMARK CAREHOMES LTD

REVISION	DATE	WRITTEN BY	REVIEWED BY
Initial issue	MAR 18	MP	MR
Second issue	APR 18	MP	MR

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Appendix A	Site Layout Plan
Appendix B	Extracts of Ground Investigation / Soakaway test results
Appendix C	EA Map of Flood Risk Zone
Appendix D	Correspondence with Arun District Council
Appendix E	Sewer Records & Contact
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Appendix G	Foul Water Drainage Calculations
Appendix H	Proposed Plan of Site Drainage
Appendix I	Surface Water Key Plan of Catchment Areas Drainage Calculations

1.0 INTRODUCTION

- 1.1.** Arc Engineers Ltd have been commissioned by Hallmark Carehomes Ltd to provide drainage design for both foul and surface water disposal for the new care home project at on Roundstone Lane, to be referred hereafter as 'the Site'.
- 1.2.** The site is currently occupied by a single house with associated paved areas for parking and garden space. This will be demolished and replaced with a new care home facility. A site layout plan is included in Appendix A.
- 1.3.** This report sets out the investigations undertaken to determine the most appropriate and suitable means of disposing of surface and foul water for the site. The report aims to follow the guidance set out in the following documents.
 - National Planning Policy Framework 2012 (NPPF)
 - National Planning Policy Guidance
 - The SuDS Manual 2015 (CIRIA C753)
 - Approved document H of the Building Regulations
 - Local Authority Strategic Flood Risk Assessment (SFRA)
- 1.4.** The following data was reviewed as part of this assessment.
 - Online Flood mapping
 - British Geological Survey (BGS) on-line maps
 - Ground investigation report – Soakaway results
 - Utility drainage records for the local area.
 - Discussion with local District Council Senior Engineer
 - Discussion with drainage utility provider, Southern Water
- 1.5.** It should be noted that this report sets out the proposed strategy for the actual design of the drainage for the Site. It is not intended to be a Flood Risk Assessment. In this instance ARC Engineers Ltd have been appointed to design the drainage design works for Pound Place. This has been based on information received from the architect, soakaway tests and advice from the district council.

2. SITE APPRAISAL

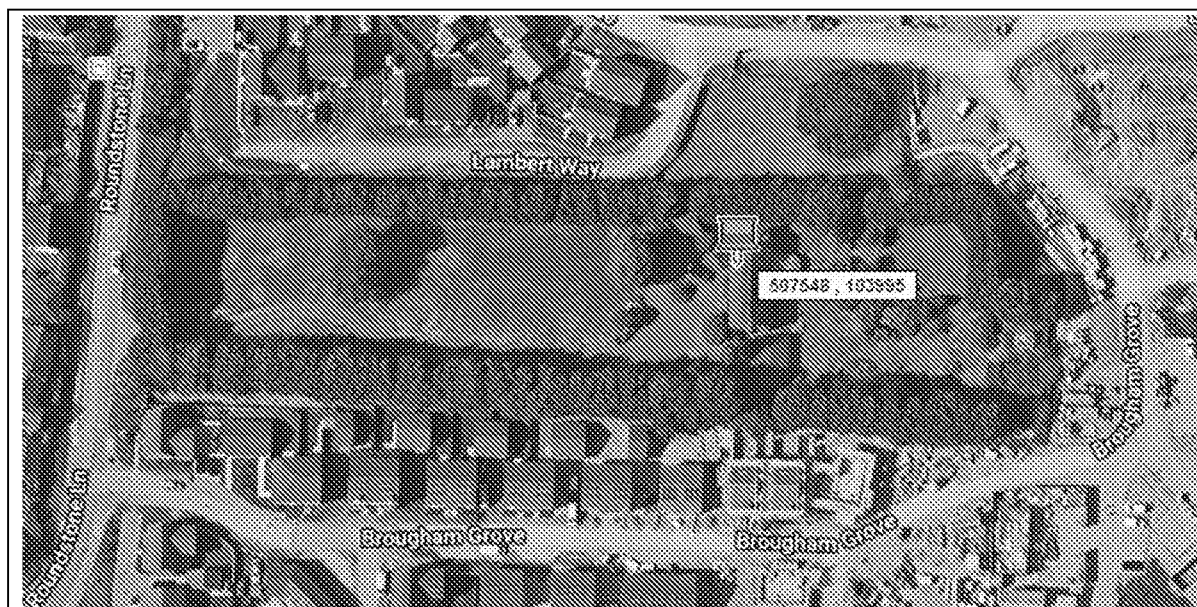
2.1. SITE SETTING

Site Name:	Pound Place, Roundstone Lane, Angmering, Littlehampton, BN16 4AX
Purpose of Development:	New Care Home for Arun District Council
Existing / Former Land Use:	House, garden and hardscaping.
OS NGR:	507548,103995
County:	West Sussex
Local Planning Authority:	Arun District Council
Internal Drainage Board:	N/A



Location Plan

Image produced from the Ordnance Survey map service.



AERIAL PHOTO OF CURRENT / FORMER USE

Image produced from grid-reference-finder

2.2. TOPOGRAPHY

A topographical survey was carried out by archidata on the 16th February 2018. Their drawing indicates that the site slopes from North to South and also slopes down East to West towards Roundstone Lane.

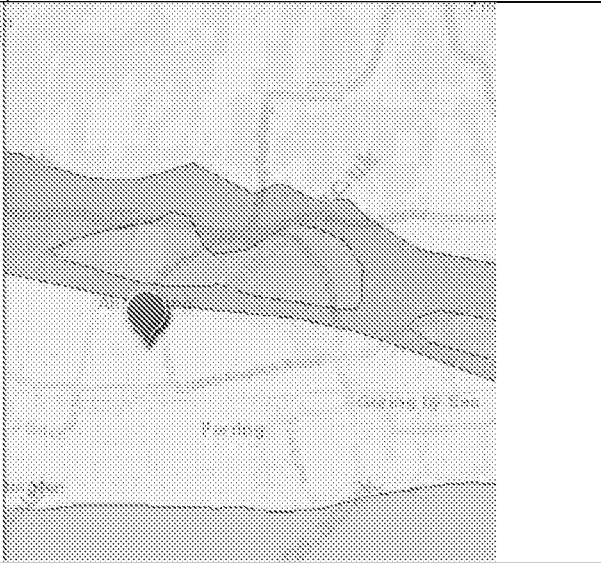
The proposed roof and hardscaped areas will both positively drain into permeable paving, SuDS features and soakaways.

2.3. GEOLOGY

2.3.1. REVIEW OF GROUND INVESTIGATION

Ashdown site investigations have provided soakaway tests which reveal that the ground consists of clay with little to no gravel to a depth of 2m. From the trial pits from 2m to 3m, the ground is very gravelly clay/ very clayey gravel. The tests show that the groundwater level is below 3m as the ground was dry up to 3m.

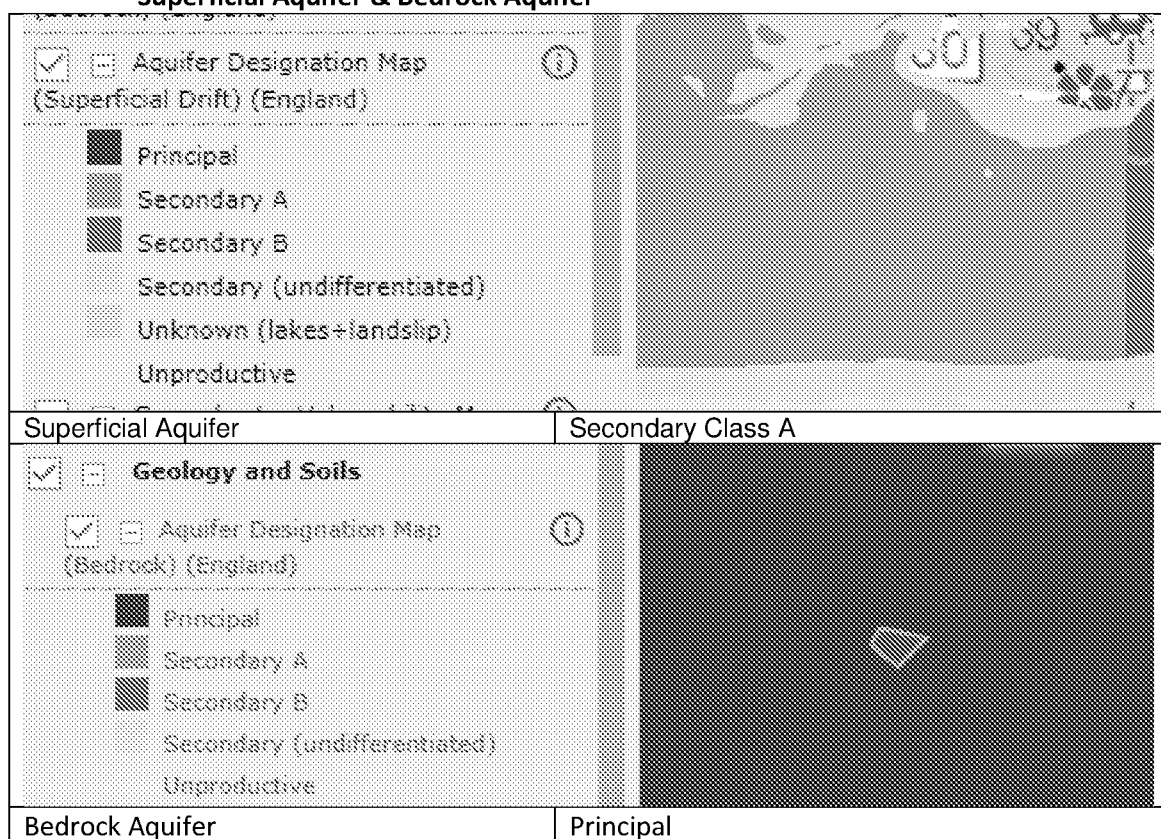
2.3.2. REVIEW OF BGS RECORDS

Map Key (close this window to activate map) ✕ 1:625 000 scale geology Superficial deposits ☐ ALLUVIUM - CLAY, SILT AND SAND ☐ BRICEARTH - SILT ☐ BLOWN SAND - SAND AND GRAVEL ☐ RAISED MARINE DEPOSITS - SAND AND GRAVEL ☐ RIVER TERRACE DEPOSITS (UNDIFFERENTIATED) - SAND AND GRAVEL ☐ SAND AND GRAVEL OF UNCERTAIN AGE AND ORIGIN - SAND AND GRAVEL ☐ CLAY-WITH-FLINTS FORMATION - DIAMICTON	
Superficial Deposits	Sand and gravel
Map Key (close this window to activate map) ✕ 1:625 000 scale geology Bedrock geology ☐ THAMES GROUP - CLAY, SILT, SAND AND GRAVEL ☐ LAMBETH GROUP - CLAY, SILT, SAND AND GRAVEL ☐ GREY CHALK SUBGROUP - CHALK ☐ WHITE CHALK SUBGROUP - CHALK ☐ GAULT FORMATION AND UPPER GREENSAND FORMATION (UNDIFFERENTIATED) - MUDSTONE, SANDSTONE AND LIMESTONE ☐ LOWER GREENSAND GROUP - SANDSTONE AND MUDSTONE	
Bedrock	Chalk

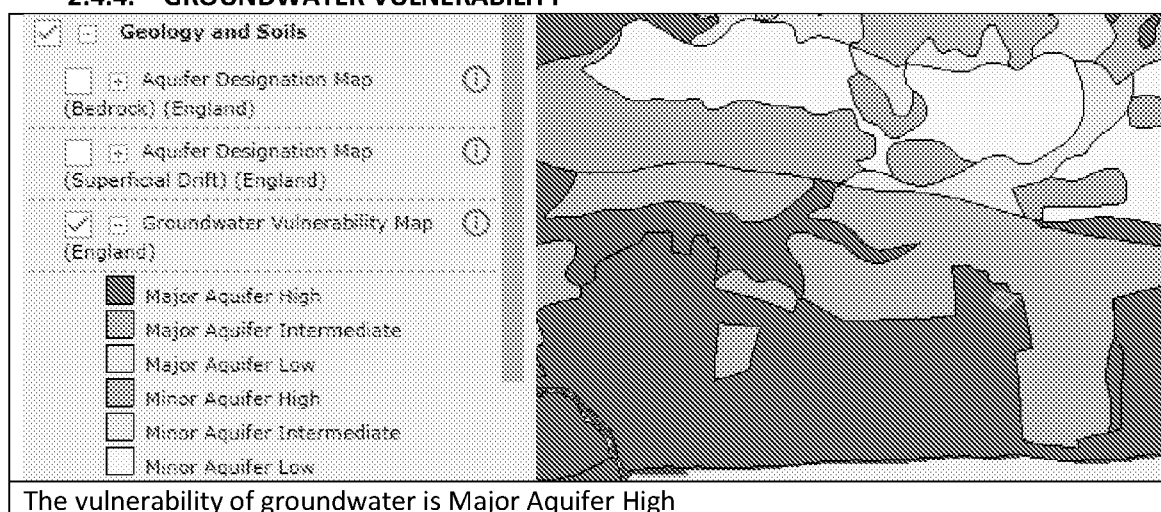
Arun District Council specified that the soakaway tests were to be carried out in winter conditions. Therefore, three soakaway trial pits and five boreholes were tested in winter conditions. These tests showed that the ground is suitable for soakaways to a depth of 3m, the results can be found in the appendices.

There are no surface water features on site. Nevertheless, it should be noted that Groundsure have written in their Floodview report (reference 17274084) that the site or any area within 50m of the study site are susceptible to pluvial (surface water) flooding.

There are no watercourses in the close vicinity to the site.



2.4.4. GROUNDWATER VULNERABILITY



2.4.5. SOURCE PROTECTION ZONE

The site is not within a Source Protection Zone.

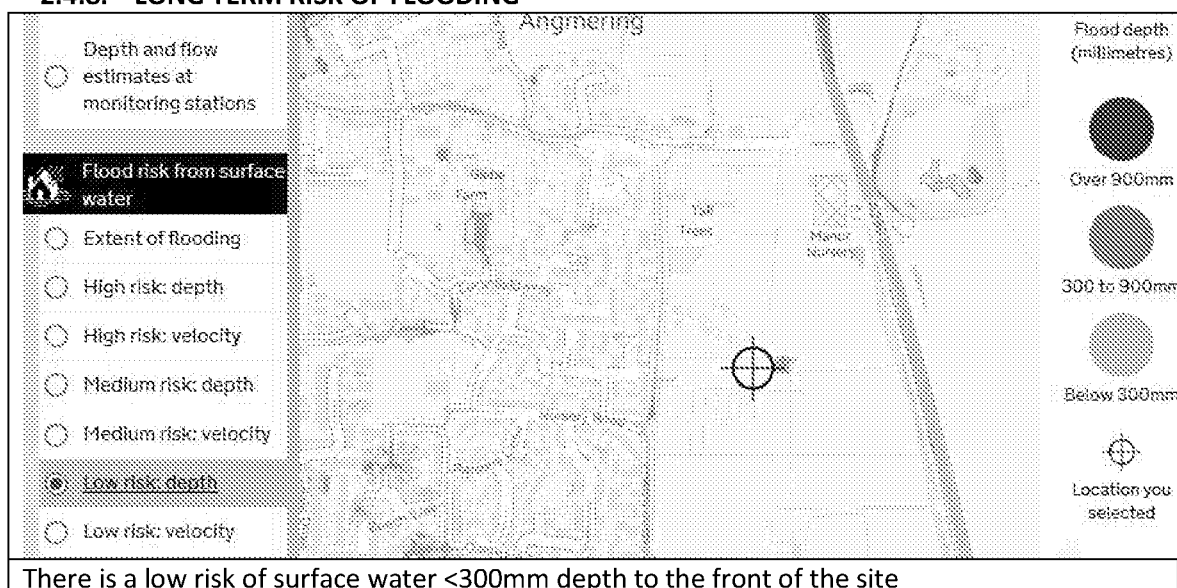
2.4.6. INFILTRATION TESTING

Tests have been carried out according to Arun District Council's suggestion of percolation tests during the winter to see if a soakaway will be suitable for the site. The borehole tests showed that when some 25 litres of water was introduced into the boreholes (up to three times), the water drained away immediately. The results from the trial pits also indicated that the water had been absorbed before the depth of 3m. From these tests, the results show that soakaways will be feasible. (See appendix for soakaway test results)

2.4.7. FLOOD ZONE RISK

The Environment Agency (EA) Flood Map indicates the development site to be located within Flood Zone 1; an area where flooding from rivers and the sea is very unlikely. There is less than 0.1% (1 in 1000) chance of flooding occurring each year. See Appendix D.

2.4.8. LONG TERM RISK OF FLOODING



3. WATER UTILITY RECORDS AND CORRESPONDANCE

- 3.1.** There are no sewer records for the immediate site area. Drawings have been obtained for the sewer to the west of the site area, but these are considered too far away from the immediate site. Southern Water has been contacted to obtain more information about the drainage of the site and immediate surrounding area in Appendix E (on 02/03/18 – by MP). The Senior Engineer at Arun District Council advised that it should be noted that there were no public foul sewers in Roundstone Lane.
- 3.2.** Foul water utility records were found on the council website for the neighbouring development to the north of the site. This showed a foul sewer to run to the east of the site. It is therefore tentatively proposed that the foul drainage will connect to manhole F06 to the east of the site. This connection is to be confirmed by Southern Water. ARC have also communicated with the developers of this neighbouring site to see if more information can be obtained for the existing foul cover and invert levels (Appendix E).

4. CORRESPONDANCE WITH LOCAL AUTHORITY / SFRA

An enquiry was made to Arun District Council on March 2nd 2018 by Arc Engineers to indicate preferred surface water drainage strategies. A response was received from the Senior Drainage and Coastal Engineer of Arun District Council on the 5th March 2018, outlining acceptable means of surface water drainage. The recommendation of utilising soakaways was preferred with other SuDS features such as permeable paving. Also, guidance notes for the methodology of winter percolation tests were distributed by Arun District Council which have been circulated with the Senior Drainage and Coastal Engineer's comments. This outlined that standpipes would not be required for the test and that the percolation test should be carried out to BRE365. A copy of this correspondence is provided in Appendix F.

5. FOUL WATER DRAINAGE STRATEGY

- 5.1.** A gravity only foul drainage connection will be possible from the site, with the internal SVP's directed below ground to shallow inspection chambers around the perimeter of the building. Calculations for foul water flows are provided in Appendix G.
- 5.2.** The proposed site is surrounded by a housing estate that is still being developed. It is understood that the housing development has a new drainage network that runs around the site. The foul drainage will likely connect to the east of the site to manhole F06 at a rate of 6.71 l/s, which is part of the neighbouring development. Refer to Appendix H for the proposed site drainage layout.

6. SURFACE WATER DRAINAGE STRATEGY

- 6.1.** The surface water will be designed to flow into soakaways around the site. The soakaway tests were carried out in winter conditions as specified by Arun District Council (Soakaway test results can be found in the appendices.) There will also be permeable paving for the road and parking bays.

- 6.2.** Arun District Council require that the drainage be designed for 1 in 10 and 1 in 100-year storm events. An allowance of 40% climate change has been applied and as the infiltration rate has been specified to drain 50% of its total volume, a 50% betterment has been included.
- 6.3.** The soakaway tests showed that the ground is suitable for soakaways. Therefore, soakaways will be used for the surface water drainage from the roof, so there will be no discharge into existing sewers. The carpark has an area of 1176m², in the design it has been assumed that the carpark area will be permeable paving.
- 6.4.** The hardstanding roof areas have been divided to indicate where the rainwater will go into each pipe, with a total area of 2318 m². A plan of the divided areas is shown in the appendix.
- 6.5.** The drainage design relies on soakaways; where each network indicated runs into a soakaway. There are 5 soakaways in total. Using the soakaway test results, the percolation rate has been applied to the side of soakaways, the rate for the base has been set as 0m/hr as specified in the requirements by Arun District council.

7. CONCLUSION

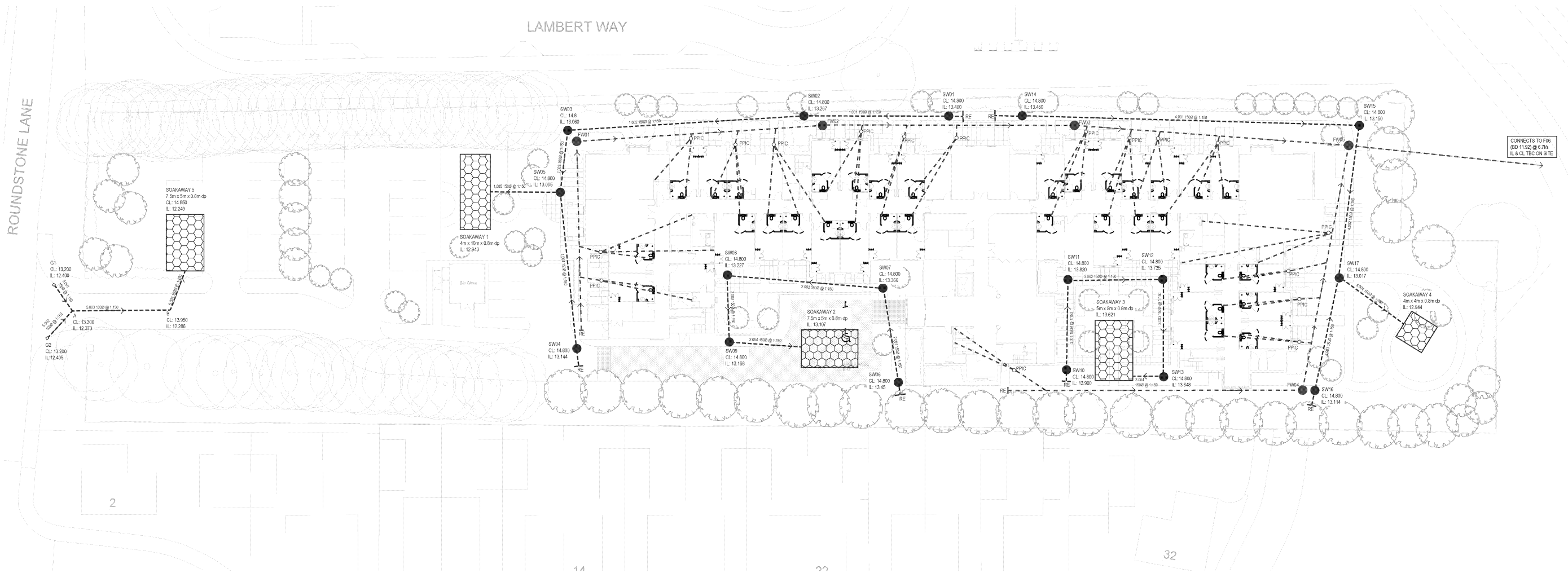
- 7.1.** Environment Agency mapping shows that the site is located within Flood Zone 1; with a low risk of flooding. However, from the FRA there is a high risk of groundwater flooding showing Major Aquifer High. As the soakaway results show that the water table is below 3m and has good soil properties of very gravelly clay/ very clayey gravel from 2m to 3m, where the soakaways are located, it is thought that it is unlikely to incur groundwater flooding.
- 7.2.** The site is located in Angmering and is in the remit of Southern Water and Arun District Council. Arun district council have specified that there should be a climate change applied of 40%. They have also specified that the soakaways should drain 50% of its total volume in 24 hours for both 1 in10 and 1 in 100 year storm events.
- 7.3.** The surface water runoff will flow into various soakaways around the site. With an allowance of 40% climate change, and the design has been based on soakaway tests carried out in winter conditions as requested by Arun District Council. The drainage design can be found in the appendices.
- 7.4.** Permeable paving will be used for the carpark and road. As there are no watercourses in close proximity to the site, and the previous land use was a singular house, it is thought that there will be little contamination.
- 7.5.** A gravity only foul discharge has been designed to connect to the existing sewer system found in the housing development that surrounds the site. It is suggested that the foul drainage connect to manhole F06 to the east of the site, at a rate of 6.71 l/s.
- 7.6.** Calculations and corresponding drawings for both the surface water and foul drainage can be found in the appendices in sections G - J.

ARUN DISTRICT COUNCIL A/561/89DOC

DO NOT SCALE

- KEY:
- 150mm 1:100 FOLL WATER PIPE
 - 225mm 1:100 SURFACE WATER PIPE
 - FW09 BACKGROP MANHOLE
 - INDICATIVE LINE OF EXISTING FAN SEWER
 - INDICATIVE LINE OF EXISTING SW SEWER
 - ACD DRAINAGE CHANNEL (Built in situ)
 - SW01 SURFACE WATER MANHOLE
 - FW02 FOLL WATER MANHOLE
 - PPIC POLYPROPYLENE INSPECTION CHAMBER
 - CONNECTION TO EXISTING FAN SEWER
 - EXISTING SW MANHOLE
 - ROAD GULLY
 - RODDING EYE
 - G GULLY
 - FW FOLL WATER GULLY
 - BG BACK INLET GULLY
 - RWP RAINWATER PIPE
 - SVP SOL VENT PIPE

- General**
- These notes are intended to augment drawings and specifications. Where conflict of requirements exists the order of precedence shall be as shown in the specifications. Check the architect's position and points.
 - This drawing is to be read in conjunction with all other relevant Engineers and Architects drawings.
 - Drawings not to be scaled.
All dimensions to be checked on site by the contractor. Any discrepancies to be notified to the Engineer and further instructions obtained before work is commenced.
 - The structure is designed to be self supporting and stable after the building is fully completed. It is the contractor's sole responsibility to determine the erection procedure and sequence and ensure that the building and its components are safe during erection. This includes the addition of whatever temporary bracing, gus or tie-downs which may be necessary, such material remaining the property of the contractor upon completion.
 - All work to comply to current building regulations and to be in accordance with the relevant British Standards and appropriate Codes of Practice.



A	REVISIONED BY: A/16/19/DOC	DATE: 19/03/2018
REV	INITIALS	DATE
REV	DETAIL	DATE

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CLIENT: **hallmark**
CARE HOMES

PROJECT: PROPOSED CARE HOME
POUND PLACE
ROUNDSTONE ROAD
ANGMERING

TITLE: DRAINAGE PLAN

DRAWING STATUS: INFORMATION ONLY

DRAWN:	DATE:	CHECKED:	DATE:
AC	MARCH 2018	MP	MARCH 2018

SCALE @ A3: 1:200

DRAWING NO: 18 031 S500

REV: A

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APPENDIX B

Foul Water Flow Rate Based on Appliances - Existing/Proposed Site		Design/Date	Checked/Date	Ref:	Rev	Suitability
Stage		PL / 25-10-19		SE1612-ISS-XX-XX-CA-C-0002	P01	
4 - Tender						

Formula for calculating Foul Water Flow rate:

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

Q_{ww} = Foul water (waste water) flow in l/s

K = frequency factor

$\sum DU$ = Sum of discharge units (l/s)

Values and calculation taken from BS EN 12056-2:2000, Part 2
Sanitary Pipework, Layout and Calculation

Frequency Factor

Usage of Appliances		k
Intermittent	i.e. dwelling, guesthouse, office	0.5
Frequent	i.e. hospital, school, restaurant, hotel	0.7
Congested	i.e. toilets/showers open to public	1
Special	i.e. laboratory	1.2

Discharge Unit	DU
Bath	0.8
Dishwasher (household)	0.8
Floor gully DN50	0.8
Floor gully DN70	1.5
Floor gully DN100	2.0
Kitchen sink	0.8
Shower with plug	0.8
Shower without plug	0.6
Slab urinal	0.2
Urinal with flushing valve	0.5
Urinal with cistern	0.8
Wash basin, bidet	0.5
Washing machine (0-6kg)	0.8
Washing machine (6-12kg)	1.5
WC with 6l cistern	2.0
WC with 7.5l cistern	2.0
WC with 9l cistern	2.5
None	

Location	Discharge Unit	Rate	No. of Units	Total DU
Main run along north side of the building and west side as well	Bath	0.8	68	54.4
	Shower without plug	0.6	68	40.8
	Wash basin, bidet	0.5	68	34
Main run along north side of the building and west side as well	Dishwasher (household)	0.8	6	4.8
	Kitchen sink	0.8	7	5.6
	None	0		0
Net discharge from Units ($\sum DU$ in l/s) =				139.6

Calculate foul flow rate with a frequency of usage being: Intermittent

$$(Q_{ww}) = K \sqrt{\sum DU} = 0.5 \times (139.6)^{0.5} = 5.908 \text{ l/s}$$

Location	Discharge Unit	Rate	No. of Units	Total DU
Secondary run along south side, stacks at the start of the run	Bath	0.8	7	5.6
	Shower without plug	0.6	7	4.2
	Wash basin, bidet	0.5	7	3.5
Net discharge from Units ($\sum DU$ in l/s) =				13.3

Calculate foul flow rate with a frequency of usage being: Intermittent

$$(Q_{ww}) = K \sqrt{\sum DU} = 0.5 \times (13.3)^{0.5} = 1.823 \text{ l/s}$$

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20 Ironmonger Lane London EC2V 8EP	Project No: SE1612 Ref: Pound Place, Angmering Proposed FW	
Date 31/10/2019 15:56 File SE1612 Drainage Design P02.MDX	Designed by PaulLavery Checked by	
Innovyze	Network 2018.1.1	

FOUL SEWERAGE DESIGN

Network Design Table for Foul

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F1.000	2.708	0.032	84.6	0.000	0	5.0	1.500	o	150	Pipe/Conduit	
F2.000	2.257	0.032	70.5	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.001	6.308	0.079	79.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F3.000	2.250	0.131	17.2	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.002	4.624	0.039	118.6	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F4.000	2.250	0.230	9.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.003	3.911	0.033	118.5	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F5.000	2.250	0.203	11.1	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.004	6.898	0.057	121.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F6.000	2.250	0.260	8.7	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.005	9.344	0.078	119.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F7.000	2.250	0.088	25.6	0.000	0	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.000	13.950	0.000	5.0	0	0.0	56	0.83	0.95	16.8	5.0
F2.000	13.950	0.000	0.0	0	0.0	0	0.00	1.04	18.4	0.0
F1.001	13.918	0.000	5.0	0	0.0	55	0.85	0.98	17.3	5.0
F3.000	13.970	0.000	0.0	0	0.0	0	0.00	2.12	37.5	0.0
F1.002	13.839	0.000	5.0	0	0.0	61	0.73	0.80	14.2	5.0
F4.000	13.970	0.000	0.0	0	0.0	0	0.00	2.81	49.7	0.0
F1.003	13.800	0.000	5.0	0	0.0	61	0.73	0.80	14.2	5.0
F5.000	13.970	0.000	0.0	0	0.0	0	0.00	2.64	46.7	0.0
F1.004	13.767	0.000	5.0	0	0.0	62	0.73	0.80	14.1	5.0
F6.000	13.970	0.000	0.0	0	0.0	0	0.00	2.99	52.8	0.0
F1.005	13.710	0.000	5.0	0	0.0	62	0.73	0.80	14.1	5.0
F7.000	13.720	0.000	0.0	0	0.0	0	0.00	1.74	30.7	0.0

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20 Ironmonger Lane London EC2V 8EP	Project No: SE1612 Ref: Pound Place, Angmering Proposed FW	
Date 31/10/2019 15:56 File SE1612 Drainage Design P02.MDX	Designed by PaulLavery Checked by	
Innovyze	Network 2018.1.1	

FOUL SEWERAGE DESIGN

Network Design Table for Foul

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F1.006	7.114	0.059	120.6	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F8.000	2.250	0.147	15.3	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.007	8.094	0.067	120.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F9.000	2.250	0.214	10.5	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.008	4.035	0.034	118.7	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F10.000	2.492	0.248	10.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.009	7.541	0.063	119.7	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F11.000	3.073	0.121	25.4	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.010	7.454	0.062	120.2	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F12.000	2.475	0.183	13.5	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.011	5.127	0.043	119.2	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F13.000	2.250	0.226	10.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.006	13.632	0.000	5.0	0	0.0	62	0.73	0.80	14.1	5.0
F8.000	13.720	0.000	0.0	0	0.0	0	0.00	2.25	39.7	0.0
F1.007	13.573	0.000	5.0	0	0.0	62	0.73	0.80	14.1	5.0
F9.000	13.720	0.000	0.0	0	0.0	0	0.00	2.71	47.9	0.0
F1.008	13.506	0.000	5.0	0	0.0	62	0.73	0.80	14.2	5.0
F10.000	13.720	0.000	0.0	0	0.0	0	0.00	2.77	49.0	0.0
F1.009	13.472	0.000	5.0	0	0.0	62	0.73	0.80	14.1	5.0
F11.000	13.530	0.000	0.0	0	0.0	0	0.00	1.74	30.8	0.0
F1.010	13.409	0.000	5.0	0	0.0	62	0.73	0.80	14.1	5.0
F12.000	13.530	0.000	0.0	0	0.0	0	0.00	2.39	42.2	0.0
F1.011	13.347	0.000	5.0	0	0.0	62	0.73	0.80	14.2	5.0
F13.000	13.530	0.000	0.0	0	0.0	0	0.00	2.79	49.3	0.0

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FOUL SEWERAGE DESIGN

Network Design Table for Foul

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F1.012	2.722	0.023	118.3	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.013	14.265	0.143	99.8	0.000	0	0.7	1.500	o	150	Pipe/Conduit	
F1.014	13.793	0.138	99.9	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F14.000	3.579	0.100	35.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.015	6.193	0.408	15.2	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F15.000	9.243	0.101	91.5	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F16.000	12.787	0.150	85.2	0.000	0	2.0	1.500	o	150	Pipe/Conduit	
F16.001	8.862	0.130	68.2	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F16.002	7.829	0.079	99.1	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F17.000	4.113	0.359	11.5	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F16.003	23.350	0.234	99.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F18.000	2.980	0.123	24.2	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F16.004	14.368	0.144	99.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F19.000	6.876	0.267	25.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.012	13.304	0.000	5.0	0	0.0	61	0.73	0.80	14.2	5.0
F1.013	13.281	0.000	5.7	0	0.0	63	0.81	0.88	15.5	5.7
F1.014	13.138	0.000	5.7	0	0.0	63	0.81	0.88	15.5	5.7
F14.000	13.970	0.000	0.0	0	0.0	0	0.00	1.47	25.9	0.0
F1.015	13.000	0.000	5.7	0	0.0	38	1.59	2.26	39.8	5.7
F15.000	13.970	0.000	0.0	0	0.0	0	0.00	0.92	16.2	0.0
F16.000	13.970	0.000	2.0	0	0.0	35	0.64	0.95	16.8	2.0
F16.001	13.820	0.000	2.0	0	0.0	33	0.69	1.06	18.8	2.0
F16.002	13.690	0.000	2.0	0	0.0	36	0.60	0.88	15.5	2.0
F17.000	13.970	0.000	0.0	0	0.0	0	0.00	2.60	45.9	0.0
F16.003	13.611	0.000	2.0	0	0.0	37	0.60	0.88	15.5	2.0
F18.000	13.500	0.000	0.0	0	0.0	0	0.00	1.78	31.5	0.0
F16.004	13.377	0.000	2.0	0	0.0	37	0.60	0.88	15.5	2.0
F19.000	13.500	0.000	0.0	0	0.0	0	0.00	1.73	30.6	0.0

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FOUL SEWERAGE DESIGN

Network Design Table for Foul

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F16.005	21.681	0.217	100.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F20.000	15.555	0.954	16.3	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F16.006	20.420	0.204	100.1	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F16.007	15.177	0.219	69.3	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.016	7.915	0.100	79.2	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.017	14.025	0.140	100.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.018	22.052	0.432	51.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F21.000	6.100	0.584	10.4	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.019	14.971	0.294	50.9	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.020	34.021	0.340	100.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F16.005	13.233	0.000	2.0	0	0.0	37	0.60	0.88	2.0
F20.000	13.970	0.000	0.0	0	0.0	0	0.00	2.18	0.0
F16.006	13.016	0.000	2.0	0	0.0	37	0.60	0.88	2.0
F16.007	12.812	0.000	2.0	0	0.0	33	0.68	1.05	2.0
F1.016	12.592	0.000	7.7	0	0.0	70	0.95	0.99	7.7
F1.017	12.492	0.000	7.7	0	0.0	75	0.87	0.88	7.7
F1.018	12.352	0.000	7.7	0	0.0	62	1.12	1.23	7.7
F21.000	12.520	0.000	0.0	0	0.0	0	0.00	2.72	0.0
F1.019	11.920	0.000	7.7	0	0.0	62	1.12	1.23	7.7
F1.020	11.626	0.000	7.7	0	0.0	75	0.87	0.88	7.7

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Manhole Schedules for Foul											
MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
F1.01	15.220	1.270	Open Manhole	450	F1.000	13.950	150				
F1.10	14.750	0.800	Open Manhole	450	F2.000	13.950	150				
FNODE1	15.155	1.237	Junction		F1.001	13.918	150	F1.000	13.918	150	
								F2.000	13.918	150	
F1.11	14.750	0.780	Open Manhole	450	F3.000	13.970	150				
FNODE2	15.123	1.284	Junction		F1.002	13.839	150	F1.001	13.839	150	
								F3.000	13.839	150	
F1.12	14.750	0.780	Open Manhole	450	F4.000	13.970	150				
FNODE3	15.090	1.350	Junction		F1.003	13.800	150	F1.002	13.800	150	
								F4.000	13.740	150	
F1.13	14.750	0.780	Open Manhole	450	F5.000	13.970	150				
FNODE4	15.025	1.258	Junction		F1.004	13.767	150	F1.003	13.767	150	
								F5.000	13.767	150	
F1.14	14.750	0.780	Open Manhole	450	F6.000	13.970	150				
FNODE5	14.993	1.283	Junction		F1.005	13.710	150	F1.004	13.710	150	
								F6.000	13.710	150	
F1.15	14.750	1.030	Open Manhole	450	F7.000	13.720	150				
FNODE6	14.960	1.328	Junction		F1.006	13.632	150	F1.005	13.632	150	
								F7.000	13.632	150	
F1.16	14.750	1.030	Open Manhole	450	F8.000	13.720	150				
F1.02	14.928	1.355	Open Manhole	450	F1.007	13.573	150	F1.006	13.573	150	
								F8.000	13.573	150	
F1.17	14.750	1.030	Open Manhole	450	F9.000	13.720	150				
FNODE7	14.895	1.389	Junction		F1.008	13.506	150	F1.007	13.506	150	
								F9.000	13.506	150	
F1.18	14.750	1.030	Open Manhole	450	F10.000	13.720	150				
FNODE8	14.830	1.358	Junction		F1.009	13.472	150	F1.008	13.472	150	
								F10.000	13.472	150	
F1.19	14.750	1.220	Open Manhole	450	F11.000	13.530	150				
FNODE9	14.765	1.356	Junction		F1.010	13.409	150	F1.009	13.409	150	
								F11.000	13.409	150	
F1.20	14.750	1.220	Open Manhole	450	F12.000	13.530	150				
FNODE10	14.749	1.402	Junction		F1.011	13.347	150	F1.010	13.347	150	
								F12.000	13.347	150	
F1.21	14.750	1.220	Open Manhole	450	F13.000	13.530	150				
FNODE11	14.733	1.429	Junction		F1.012	13.304	150	F1.011	13.304	150	
								F13.000	13.304	150	
F1.03	14.700	1.419	Open Manhole	450	F1.013	13.281	150	F1.012	13.281	150	
F1.04	14.650	1.512	Open Manhole	450	F1.014	13.138	150	F1.013	13.138	150	
F1.22	14.800	0.830	Open Manhole	450	F14.000	13.970	150				
F1.05	14.740	1.740	Open Manhole	450	F1.015	13.000	150	F1.014	13.000	150	
								F14.000	13.870	150	
F1.23	14.800	0.830	Open Manhole	450	F15.000	13.970	150				
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Manhole Schedules for Foul											
MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdr (mm)
F1.24	14.770	0.800	Open Manhole	450	F16.000	13.970	150				
F1.25	14.750	0.930	Open Manhole	450	F16.001	13.820	150	F16.000	13.820	150	
F1.26	14.740	1.050	Open Manhole	450	F16.002	13.690	150	F16.001	13.690	150	
F1.29	14.750	0.780	Open Manhole	450	F17.000	13.970	150				
FNODE12	14.740	1.129	Junction		F16.003	13.611	150	F16.002	13.611	150	
								F17.000	13.611	150	
F1.30	14.750	1.250	Open Manhole	450	F18.000	13.500	150				
FNODE13	14.740	1.363	Junction		F16.004	13.377	150	F16.003	13.377	150	
								F18.000	13.377	150	
F1.31	14.750	1.250	Open Manhole	450	F19.000	13.500	150				
F1.27	14.530	1.297	Open Manhole	450	F16.005	13.233	150	F16.004	13.233	150	
								F19.000	13.233	150	
F1.32	14.800	0.830	Open Manhole	450	F20.000	13.970	150				
FNODE14	14.530	1.514	Junction		F16.006	13.016	150	F16.005	13.016	150	
								F20.000	13.016	150	
F1.28	14.665	1.853	Open Manhole	450	F16.007	12.812	150	F16.006	12.812	150	
F1.06	14.800	2.208	Open Manhole	450	F1.016	12.592	150	F1.015	12.592	150	
								F15.000	13.869	150	
								F16.007	12.593	150	
F1.07	14.720	2.228	Open Manhole	450	F1.017	12.492	150	F1.016	12.492	150	
F1.08	14.350	1.998	Open Manhole	1200	F1.018	12.352	150	F1.017	12.352	150	
F1.33	14.800	2.280	Open Manhole	1200	F21.000	12.520	150				
FNODE15	13.600	1.680	Open Manhole	1200	F1.019	11.920	150	F1.018	11.920	150	
								F21.000	11.936	150	
F1.09	13.000	1.374	Open Manhole	1200	F1.020	11.626	150	F1.019	11.626	150	
FSOUTHERN WATER	13.050	1.764	Open Manhole	0		OUTFALL		F1.020	11.286	150	
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STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for SW1 - MAIN WEST

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	5.337	0.044	120.0	0.009	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	9.804	0.082	120.0	0.006	0.00	0.0	0.600	o	150	Pipe/Conduit	
S2.000	1.644	0.106	15.5	0.020	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.002	27.182	0.227	119.7	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.003	9.032	0.102	88.5	0.005	0.00	0.0	0.600	o	150	Pipe/Conduit	
S3.000	4.508	0.100	45.1	0.008	5.00	0.0	0.600	o	150	Pipe/Conduit	
S4.000	8.160	0.100	81.6	0.000	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.004	14.474	0.105	137.8	0.007	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.005	5.099	0.000	0.0	0.012	0.00	0.0	0.600	o	225	Pipe/Conduit	
S5.000	4.875	0.050	97.5	0.010	5.00	0.0	0.600	o	150	Pipe/Conduit	
S5.001	9.321	0.600	15.5	0.005	0.00	0.0	0.600	o	150	Pipe/Conduit	
S6.000	5.786	0.100	57.9	0.011	5.00	0.0	0.600	o	150	Pipe/Conduit	
S6.001	11.211	0.570	19.7	0.006	0.00	0.0	0.600	o	150	Pipe/Conduit	
S7.000	16.027	0.650	24.7	0.003	5.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.10	13.250	0.009	0.0	0.0	0.0	0.92	16.2	1.3
S1.001	50.00	5.28	13.206	0.015	0.0	0.0	0.0	0.92	16.2	2.0
S2.000	50.00	5.01	13.230	0.020	0.0	0.0	0.0	2.57	45.4	2.6
S1.002	50.00	5.77	13.124	0.035	0.0	0.0	0.0	0.92	16.2	4.7
S1.003	50.00	5.91	12.897	0.039	0.0	0.0	0.0	1.07	18.9	5.3
S3.000	50.00	5.05	13.970	0.008	0.0	0.0	0.0	1.50	26.6	1.0
S4.000	50.00	5.12	13.970	0.000	0.0	0.0	0.0	1.11	19.7	0.0
S1.004	50.00	6.19	12.795	0.054	0.0	0.0	0.0	0.85	15.1	7.2
S1.005	50.00	6.89	12.690	0.065	0.0	0.0	0.0	0.12	4.9«	8.8
S5.000	50.00	5.08	13.970	0.010	0.0	0.0	0.0	1.02	18.0	1.3
S5.001	50.00	5.14	13.920	0.015	0.0	0.0	0.0	2.57	45.4	2.0
S6.000	50.00	5.07	13.990	0.011	0.0	0.0	0.0	1.32	23.4	1.4
S6.001	50.00	5.15	13.890	0.017	0.0	0.0	0.0	2.28	40.3	2.3
S7.000	50.00	5.13	13.970	0.003	0.0	0.0	0.0	2.04	36.0	0.5

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STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for SW1 - MAIN WEST

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
S5.002	14.368	0.144	100.0	0.022	0.00	0.0	0.600	o	150	Pipe/Conduit	
S8.000	4.511	0.794	5.7	0.008	5.00	0.0	0.600	o	150	Pipe/Conduit	
S5.003	13.564	0.136	99.7	0.014	0.00	0.0	0.600	o	150	Pipe/Conduit	
S9.000	9.815	0.100	98.2	0.000	5.00	0.0	0.600	o	150	Pipe/Conduit	
S9.001	5.220	0.100	52.2	0.005	0.00	0.0	0.600	o	150	Pipe/Conduit	
S5.004	7.226	0.072	100.0	0.011	0.00	0.0	0.600	o	225	Pipe/Conduit	
S5.005	9.711	0.097	100.1	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S5.006	10.254	0.103	100.0	0.018	0.00	0.0	0.600	o	225	Pipe/Conduit	
S5.007	6.398	0.078	82.0	0.021	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.006	0.777	0.000	0.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S5.002	50.00	5.39	13.320	0.057	0.0	0.0	0.0	1.00	17.8	7.8
S8.000	50.00	5.02	13.970	0.008	0.0	0.0	0.0	4.26	75.2	1.1
S5.003	50.00	5.62	13.176	0.080	0.0	0.0	0.0	1.01	17.8	10.8
S9.000	50.00	5.16	13.450	0.000	0.0	0.0	0.0	1.01	17.9	0.0
S9.001	50.00	5.22	13.350	0.005	0.0	0.0	0.0	1.40	24.7	0.7
S5.004	50.00	5.71	12.965	0.096	0.0	0.0	0.0	1.31	52.0	13.0
S5.005	50.00	5.83	12.893	0.096	0.0	0.0	0.0	1.31	52.0	13.0
S5.006	50.00	5.96	12.796	0.115	0.0	0.0	0.0	1.31	52.0	15.5
S5.007	50.00	6.04	12.693	0.136	0.0	0.0	0.0	1.44	57.5	18.4
S1.006	50.00	6.99	12.615	0.201	0.0	0.0	0.0	0.12	4.9«	27.2

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Innovyze					Network 2018.1.1						
Manhole Schedules for SW1 - MAIN WEST											
MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S1.01	14.650	1.400	Open Manhole	450	S1.000	13.250	150				
S1.02	14.650	1.444	Open Manhole	450	S1.001	13.206	150	S1.000	13.206	150	
S1.06	14.650	1.420	Open Manhole	450	S2.000	13.230	150				
SNODE1	14.650	1.526	Junction		S1.002	13.124	150	S1.001	13.124	150	
								S2.000	13.124	150	
S1.03	14.750	1.853	Open Manhole	450	S1.003	12.897	150	S1.002	12.897	150	
S1.07	14.750	0.780	Open Manhole	450	S3.000	13.970	150				
SRE1	14.750	0.780	Junction		S4.000	13.970	150				
S1.04	14.830	2.035	Open Manhole	1200	S1.004	12.795	150	S1.003	12.795	150	
								S3.000	13.870	150	1075
								S4.000	13.870	150	1075
S1.05	14.750	2.060	Open Manhole	1200	S1.005	12.690	225	S1.004	12.690	150	
S1.08	14.750	0.780	Open Manhole	450	S5.000	13.970	150				
S1.09	14.700	0.780	Open Manhole	450	S5.001	13.920	150	S5.000	13.920	150	
S1.10	14.750	0.760	Open Manhole	450	S6.000	13.990	150				
S1.12	14.675	0.785	Open Manhole	450	S6.001	13.890	150	S6.000	13.890	150	
S1.13	14.750	0.780	Open Manhole	450	S7.000	13.970	150				
S1.10	14.650	1.330	Open Manhole	1200	S5.002	13.320	150	S5.001	13.320	150	
								S6.001	13.320	150	
								S7.000	13.320	150	
S1.14	14.750	0.780	Open Manhole	450	S8.000	13.970	150				
SNODE2	14.650	1.474	Junction		S5.003	13.176	150	S5.002	13.176	150	
								S8.000	13.176	150	
SRE2	14.750	1.300	Junction		S9.000	13.450	150				
S1.15	14.750	1.400	Open Manhole	450	S9.001	13.350	150	S9.000	13.350	150	
S1.11	14.650	1.685	Open Manhole	1200	S5.004	12.965	225	S5.003	13.040	150	
								S9.001	13.250	150	210
SNODE3	14.500	1.607	Junction		S5.005	12.893	225	S5.004	12.893	225	
S1.12	14.600	1.804	Open Manhole	1200	S5.006	12.796	225	S5.005	12.796	225	
S1.13	14.700	2.007	Open Manhole	1200	S5.007	12.693	225	S5.006	12.693	225	
SCS1	14.750	2.135	Open Manhole	300	S1.006	12.615	225	S1.005	12.690	225	75
								S5.007	12.615	225	
S	21.000	8.385	Open Manhole	0		OUTFALL		S1.006	12.615	225	
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Storage Structures for SW1 - MAIN WEST

Cellular Storage Manhole: SCS1, DS/PN: S1.006

Invert Level (m) 12.615 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.85791

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	49.0	49.0	1.600	49.0	93.8	1.601	0.0	93.8

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW1 - MAIN WEST

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

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

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

Water Surcharged										
US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth	
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	(m)	(m)
S1.000	S1.01	15 Winter	1	+0%	30/60 Winter				13.282	-0.118
S1.001	S1.02	15 Winter	1	+0%	30/60 Winter				13.243	-0.113
S2.000	S1.06	15 Winter	1	+0%	30/60 Winter				13.266	-0.114
S1.002	SNODE1	15 Winter	1	+0%					13.179	-0.095
S1.003	S1.03	360 Winter	1	+0%	30/15 Summer				13.038	-0.008
S3.000	S1.07	15 Winter	1	+0%	100/120 Winter				13.992	-0.128
S4.000	SRE1	60 Winter	1	+0%					13.970	-0.150
S1.004	S1.04	360 Winter	1	+0%	1/60 Winter				13.037	0.093
S1.005	S1.05	360 Winter	1	+0%	1/30 Winter				13.036	0.121
S5.000	S1.08	15 Winter	1	+0%	100/15 Summer				14.001	-0.119
S5.001	S1.09	15 Winter	1	+0%	100/15 Summer				13.941	-0.129
S6.000	S1.10	15 Winter	1	+0%	100/15 Summer				14.017	-0.123
S6.001	S1.12	15 Winter	1	+0%	100/15 Summer				13.914	-0.126
S7.000	S1.13	15 Winter	1	+0%	100/15 Summer				13.980	-0.140
S5.002	S1.10	15 Winter	1	+0%	30/15 Summer				13.391	-0.079
S8.000	S1.14	15 Winter	1	+0%	100/120 Winter				13.984	-0.136
S5.003	SNODE2	15 Winter	1	+0%					13.258	-0.068
S9.000	SRE2	60 Winter	1	+0%					13.450	-0.150
S9.001	S1.15	15 Winter	1	+0%	30/120 Winter				13.367	-0.133
S5.004	S1.11	15 Winter	1	+0%	30/30 Summer				13.052	-0.138
S5.005	SNODE3	360 Winter	1	+0%					13.038	-0.079
S5.006	S1.12	360 Winter	1	+0%	1/240 Winter				13.038	0.017
S5.007	S1.13	360 Winter	1	+0%	1/60 Summer				13.036	0.118
S1.006	SCS1	360 Winter	1	+0%	1/15 Winter				13.036	0.196

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW1 - MAIN WEST

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
S1.000	S1.01	0.000	0.10	1.3		OK	
S1.001	S1.02	0.000	0.14	2.0		OK	
S2.000	S1.06	0.000	0.13	2.7		OK	
S1.002	SNODE1	0.000	0.29	4.7		OK*	
S1.003	S1.03	0.000	0.05	0.8		OK	
S3.000	S1.07	0.000	0.05	1.1		OK	
S4.000	SRE1	0.000	0.00	0.0		OK*	
S1.004	S1.04	0.000	0.08	1.0		SURCHARGED	
S1.005	S1.05	0.000	0.05	1.2		SURCHARGED	
S5.000	S1.08	0.000	0.09	1.3		OK	
S5.001	S1.09	0.000	0.05	1.9		OK	
S6.000	S1.10	0.000	0.08	1.5		OK	
S6.001	S1.12	0.000	0.06	2.2		OK	
S7.000	S1.13	0.000	0.01	0.5		OK	
S5.002	S1.10	0.000	0.44	7.3		OK	
S8.000	S1.14	0.000	0.02	1.1		OK	
S5.003	SNODE2	0.000	0.57	10.1		OK*	
S9.000	SRE2	0.000	0.00	0.0		OK*	
S9.001	S1.15	0.000	0.03	0.6		OK	
S5.004	S1.11	0.000	0.32	12.0		OK	
S5.005	SNODE3	0.000	0.05	2.0		OK*	
S5.006	S1.12	0.000	0.05	2.3		SURCHARGED	
S5.007	S1.13	0.000	0.07	2.6		SURCHARGED	
S1.006	SCS1	0.000	0.00	0.0		SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW1 - MAIN WEST

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

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

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

Water Surcharged										
US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	(m)	Depth (m)
S1.000	S1.01	240	Winter	30	+0%	30/60	Winter		13.529	0.129
S1.001	S1.02	240	Winter	30	+0%	30/60	Winter		13.528	0.173
S2.000	S1.06	240	Winter	30	+0%	30/60	Winter		13.528	0.148
S1.002	SNODE1	360	Winter	30	+0%				13.274	0.000
S1.003	S1.03	240	Winter	30	+0%	30/15	Summer		13.525	0.478
S3.000	S1.07	15	Winter	30	+0%	100/120	Winter		14.006	-0.114
S4.000	SRE1	60	Winter	30	+0%				13.970	-0.150
S1.004	S1.04	240	Winter	30	+0%	1/60	Winter		13.523	0.578
S1.005	S1.05	240	Winter	30	+0%	1/30	Winter		13.519	0.604
S5.000	S1.08	15	Winter	30	+0%	100/15	Summer		14.019	-0.101
S5.001	S1.09	15	Winter	30	+0%	100/15	Summer		13.956	-0.114
S6.000	S1.10	15	Winter	30	+0%	100/15	Summer		14.034	-0.106
S6.001	S1.12	15	Winter	30	+0%	100/15	Summer		13.930	-0.110
S7.000	S1.13	15	Winter	30	+0%	100/15	Summer		13.988	-0.132
S5.002	S1.10	15	Winter	30	+0%	30/15	Summer		13.637	0.167
S8.000	S1.14	15	Winter	30	+0%	100/120	Winter		13.991	-0.129
S5.003	SNODE2	30	Winter	30	+0%				13.326	0.000
S9.000	SRE2	240	Winter	30	+0%				13.526	-0.074
S9.001	S1.15	240	Winter	30	+0%	30/120	Winter		13.526	0.026
S5.004	S1.11	240	Winter	30	+0%	30/30	Summer		13.526	0.336
S5.005	SNODE3	60	Winter	30	+0%				13.118	0.000
S5.006	S1.12	240	Winter	30	+0%	1/240	Winter		13.523	0.502
S5.007	S1.13	240	Winter	30	+0%	1/60	Summer		13.520	0.602
S1.006	SCS1	240	Winter	30	+0%	1/15	Winter		13.519	0.679

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW1 - MAIN WEST

PN	US/MH Name	Flooded		Pipe	Status	Level Exceeded
		Volume (m³)	Flow / Overflow Cap. (l/s)	Flow (l/s)		
S1.000	S1.01	0.000	0.05	0.6	SURCHARGED	
S1.001	S1.02	0.000	0.07	1.0	SURCHARGED	
S2.000	S1.06	0.000	0.06	1.3	SURCHARGED	
S1.002	SNODE1	0.000	0.09	1.5	SURCHARGED*	
S1.003	S1.03	0.000	0.12	2.0	SURCHARGED	
S3.000	S1.07	0.000	0.13	2.6	OK	
S4.000	SRE1	0.000	0.00	0.0	OK*	
S1.004	S1.04	0.000	0.20	2.7	SURCHARGED	
S1.005	S1.05	0.000	0.14	3.2	SURCHARGED	
S5.000	S1.08	0.000	0.23	3.3	OK	
S5.001	S1.09	0.000	0.13	5.2	OK	
S6.000	S1.10	0.000	0.19	3.6	OK	
S6.001	S1.12	0.000	0.16	5.8	OK	
S7.000	S1.13	0.000	0.04	1.2	OK	
S5.002	S1.10	0.000	1.11	18.2	SURCHARGED	
S8.000	S1.14	0.000	0.05	2.7	OK	
S5.003	SNODE2	0.000	1.15	20.5	SURCHARGED*	
S9.000	SRE2	0.000	0.00	0.0	OK*	
S9.001	S1.15	0.000	0.02	0.3	SURCHARGED	
S5.004	S1.11	0.000	0.15	5.7	SURCHARGED	
S5.005	SNODE3	0.000	0.34	14.7	SURCHARGED*	
S5.006	S1.12	0.000	0.15	6.4	SURCHARGED	
S5.007	S1.13	0.000	0.19	7.5	SURCHARGED	
S1.006	SCS1	0.000	0.00	0.0	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW1 - MAIN WEST

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

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

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

PN	US/MH		Return Period	Climate Change	First (X)		First (Y)	First (Z)	Overflow	Overflow Act.	Water Level	Surcharged Depth
	Name	Storm			Surcharge	Flood					(m)	(m)
S1.000	S1.01	240	Winter	100	+40%	30/60	Winter				14.254	0.854
S1.001	S1.02	240	Winter	100	+40%	30/60	Winter				14.253	0.897
S2.000	S1.06	240	Winter	100	+40%	30/60	Winter				14.253	0.873
S1.002	SNODE1	60	Winter	100	+40%						13.274	0.000
S1.003	S1.03	240	Winter	100	+40%	30/15	Summer				14.243	1.196
S3.000	S1.07	240	Winter	100	+40%	100/120	Winter				14.243	0.123
S4.000	SRE1	360	Winter	100	+40%						14.120	0.000
S1.004	S1.04	240	Winter	100	+40%	1/60	Winter				14.240	1.295
S1.005	S1.05	240	Winter	100	+40%	1/30	Winter				14.223	1.308
S5.000	S1.08	15	Winter	100	+40%	100/15	Summer				14.475	0.355
S5.001	S1.09	15	Winter	100	+40%	100/15	Summer				14.466	0.396
S6.000	S1.10	15	Winter	100	+40%	100/15	Summer				14.482	0.342
S6.001	S1.12	15	Winter	100	+40%	100/15	Summer				14.471	0.431
S7.000	S1.13	15	Winter	100	+40%	100/15	Summer				14.450	0.330
S5.002	S1.10	15	Winter	100	+40%	30/15	Summer				14.443	0.973
S8.000	S1.14	240	Winter	100	+40%	100/120	Winter				14.263	0.143
S5.003	SNODE2	60	Winter	100	+40%						13.326	0.000
S9.000	SRE2	60	Winter	100	+40%						13.600	0.000
S9.001	S1.15	240	Winter	100	+40%	30/120	Winter				14.248	0.748
S5.004	S1.11	240	Winter	100	+40%	30/30	Summer				14.252	1.062
S5.005	SNODE3	60	Winter	100	+40%						13.118	0.000
S5.006	S1.12	240	Winter	100	+40%	1/240	Winter				14.240	1.220
S5.007	S1.13	240	Winter	100	+40%	1/60	Summer				14.226	1.308
S1.006	SCS1	240	Winter	100	+40%	1/15	Winter				14.215	1.375

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW1 - MAIN WEST

PN	US/MH Name	Flooded		Pipe	Status	Level Exceeded
		Volume (m³)	Flow / Overflow Cap. (l/s)	Flow (l/s)		
S1.000	S1.01	0.000	0.08	1.0	SURCHARGED	
S1.001	S1.02	0.000	0.11	1.6	SURCHARGED	
S2.000	S1.06	0.000	0.11	2.1	SURCHARGED	
S1.002	SNODE1	0.000	0.55	8.9	SURCHARGED*	
S1.003	S1.03	0.000	0.23	3.9	SURCHARGED	
S3.000	S1.07	0.000	0.05	0.9	SURCHARGED	
S4.000	SRE1	0.000	0.00	0.1	SURCHARGED*	
S1.004	S1.04	0.000	0.37	5.2	SURCHARGED	
S1.005	S1.05	0.000	0.26	6.1	SURCHARGED	
S5.000	S1.08	0.000	0.37	5.2	FLOOD RISK	
S5.001	S1.09	0.000	0.19	7.5	FLOOD RISK	
S6.000	S1.10	0.000	0.30	5.8	FLOOD RISK	
S6.001	S1.12	0.000	0.22	8.0	FLOOD RISK	
S7.000	S1.13	0.000	0.05	1.7	FLOOD RISK	
S5.002	S1.10	0.000	1.55	25.3	FLOOD RISK	
S8.000	S1.14	0.000	0.02	0.9	SURCHARGED	
S5.003	SNODE2	0.000	1.21	21.6	SURCHARGED*	
S9.000	SRE2	0.000	0.00	0.1	SURCHARGED*	
S9.001	S1.15	0.000	0.03	0.6	SURCHARGED	
S5.004	S1.11	0.000	0.24	9.3	SURCHARGED	
S5.005	SNODE3	0.000	0.52	22.7	SURCHARGED*	
S5.006	S1.12	0.000	0.24	10.6	SURCHARGED	
S5.007	S1.13	0.000	0.32	12.7	SURCHARGED	
S1.006	SCS1	0.000	0.00	0.0	SURCHARGED	

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STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for SW2 - MAIN EAST N

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	19.724	0.164	120.3	0.011	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	17.566	0.146	120.3	0.007	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.002	11.673	0.100	116.7	0.009	0.00	0.0	0.600	o	150	Pipe/Conduit	
S2.000	6.557	0.112	58.5	0.004	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.003	1.261	0.000	0.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.004	1.121	0.019	59.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.36	13.700	0.011	0.0	0.0	0.0	0.92	16.2	1.5
S1.001	50.00	5.68	13.536	0.018	0.0	0.0	0.0	0.91	16.2	2.5
S1.002	50.00	5.89	13.390	0.028	0.0	0.0	0.0	0.93	16.4	3.7
S2.000	50.00	5.08	13.970	0.004	0.0	0.0	0.0	1.32	23.3	0.6
S1.003	50.00	6.12	13.290	0.032	0.0	0.0	0.0	0.09	1.6«	4.3
S1.004	50.00	6.13	13.290	0.032	0.0	0.0	0.0	1.31	23.2	4.3

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Manhole Schedules for SW2 - MAIN EAST N

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S2.01	14.750	1.050	Open Manhole	450	S1.000	13.700	150				
SNODE1	14.750	1.214	Junction		S1.001	13.536	150	S1.000	13.536	150	
S2.02	14.750	1.360	Open Manhole	450	S1.002	13.390	150	S1.001	13.390	150	
S2.04	14.750	0.780	Open Manhole	450	S2.000	13.970	150				
S2.03	14.650	1.360	Open Manhole	1200	S1.003	13.290	150	S1.002	13.290	150	568
								S2.000	13.858	150	
SCS2	14.650	1.360	Open Manhole	1200	S1.004	13.290	150	S1.003	13.290	150	
S	14.650	1.379	Open Manhole	0		OUTFALL		S1.004	13.271	150	

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Storage Structures for SW2 - MAIN EAST N

Cellular Storage Manhole: SCS2, DS/PN: S1.004

Invert Level (m) 13.290 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 15.00000 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	2.0	2.0	0.800	2.0	6.8	0.801	0.0	6.8

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW2 - MAIN EAST N

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

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

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

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)
S1.000	S2.01	15 Winter	1	+0%	100/15 Summer				13.732	-0.118
S1.001	SNODE1	15 Winter	1	+0%					13.574	-0.112
S1.002	S2.02	15 Winter	1	+0%	30/15 Summer				13.439	-0.101
S2.000	S2.04	15 Winter	1	+0%	100/15 Winter				13.987	-0.133
S1.003	S2.03	15 Winter	1	+0%	30/15 Summer				13.353	-0.087
S1.004	SCS2	15 Winter	1	+0%	30/15 Summer				13.338	-0.102

		Flooded		Pipe		Level	
PN	US/MH Name	Volume (m ³)	Flow / Cap.	Flow (l/s)	Overflow (l/s)	Status	Exceeded
S1.000	S2.01	0.000	0.10		1.5	OK	
S1.001	SNODE1	0.000	0.15		2.4	OK*	
S1.002	S2.02	0.000	0.23		3.5	OK	
S2.000	S2.04	0.000	0.03		0.6	OK	
S1.003	S2.03	0.000	0.37		4.0	OK	
S1.004	SCS2	0.000	0.00		0.0	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW2 - MAIN EAST N

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

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

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

PN	US/MH		Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level	Surcharged Depth
	Name	Storm							(m)	(m)
S1.000	S2.01	15 Winter	30	+0%	100/15 Summer				13.751	-0.099
S1.001	SNODE1	15 Winter	30	+0%					13.673	-0.013
S1.002	S2.02	15 Winter	30	+0%	30/15 Summer				13.663	0.123
S2.000	S2.04	15 Winter	30	+0%	100/15 Winter				13.998	-0.122
S1.003	S2.03	15 Winter	30	+0%	30/15 Summer				13.651	0.211
S1.004	SCS2	15 Winter	30	+0%	30/15 Summer				13.648	0.208

PN	US/MH Name	Flooded		Pipe		Level Exceeded
		Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)	Status	
S1.000	S2.01	0.000	0.25	3.8	OK	
S1.001	SNODE1	0.000	0.38	6.2	OK*	
S1.002	S2.02	0.000	0.56	8.3	SURCHARGED	
S2.000	S2.04	0.000	0.08	1.5	OK	
S1.003	S2.03	0.000	0.67	7.3	SURCHARGED	
S1.004	SCS2	0.000	0.00	0.0	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW2 -
MAIN EAST N

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

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

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

PN	US/MH		Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged
	Name	Storm							Level (m)	Depth (m)
S1.000	S2.01	30 Winter	100	+40%	100/15 Summer				14.312	0.462
S1.001	SNODE1	15 Winter	100	+40%					13.686	0.000
S1.002	S2.02	30 Winter	100	+40%	30/15 Summer				14.294	0.754
S2.000	S2.04	30 Winter	100	+40%	100/15 Winter				14.282	0.162
S1.003	S2.03	30 Winter	100	+40%	30/15 Summer				14.280	0.840
S1.004	SCS2	30 Winter	100	+40%	30/15 Summer				14.277	0.837

PN	US/MH Name	Flooded		Pipe		Level Exceeded
		Volume (m ³)	Flow / Cap.	Flow (l/s)	Status	
S1.000	S2.01	0.000	0.33	5.0	SURCHARGED	
S1.001	SNODE1	0.000	0.48	7.7	SURCHARGED*	
S1.002	S2.02	0.000	0.64	9.5	SURCHARGED	
S2.000	S2.04	0.000	0.11	2.2	SURCHARGED	
S1.003	S2.03	0.000	0.86	9.3	SURCHARGED	
S1.004	SCS2	0.000	0.00	0.0	SURCHARGED	

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STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for SW3 - MAIN EAST S

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	11.836	0.350	33.8	0.011	5.00	0.0	0.600	o	150	Pipe/Conduit	
S2.000	8.204	0.100	82.0	0.009	5.00	0.0	0.600	o	150	Pipe/Conduit	
S3.000	7.383	0.100	73.8	0.016	5.00	0.0	0.600	o	150	Pipe/Conduit	
S2.001	12.144	0.250	48.6	0.017	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	8.020	0.100	80.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S4.000	3.614	0.200	18.1	0.005	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.002	11.130	0.140	79.5	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.003	8.178	0.100	81.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.004	4.382	0.100	43.8	0.007	0.00	0.0	0.600	o	225	Pipe/Conduit	
S5.000	7.659	0.420	18.2	0.004	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.005	5.484	0.105	52.2	0.004	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.006	2.867	0.000	0.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.007	0.640	0.000	0.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.11	13.970	0.011	0.0	0.0	0.0	1.74	30.7	1.4
S2.000	50.00	5.12	13.970	0.009	0.0	0.0	0.0	1.11	19.6	1.2
S3.000	50.00	5.11	13.970	0.016	0.0	0.0	0.0	1.17	20.7	2.1
S2.001	50.00	5.26	13.870	0.041	0.0	0.0	0.0	1.45	25.6	5.6
S1.001	50.00	5.35	13.545	0.052	0.0	0.0	0.0	1.46	58.1	7.0
S4.000	50.00	5.03	13.720	0.005	0.0	0.0	0.0	2.38	42.1	0.6
S1.002	50.00	5.48	13.445	0.057	0.0	0.0	0.0	1.47	58.4	7.7
S1.003	50.00	5.57	13.305	0.057	0.0	0.0	0.0	1.45	57.5	7.7
S1.004	50.00	5.61	13.205	0.064	0.0	0.0	0.0	1.98	78.8	8.6
S5.000	50.00	5.05	13.600	0.004	0.0	0.0	0.0	2.37	41.9	0.5
S1.005	50.00	5.66	13.105	0.071	0.0	0.0	0.0	1.81	72.1	9.6
S1.006	50.00	6.05	13.000	0.071	0.0	0.0	0.0	0.12	4.9«	9.6
S1.007	50.00	6.14	13.000	0.071	0.0	0.0	0.0	0.12	4.9«	9.6

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Manhole Schedules for SW3 - MAIN EAST S

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S3.01	14.750	0.780	Open Manhole	450	S1.000	13.970	150				
S3.07	14.750	0.780	Open Manhole	450	S2.000	13.970	150				
S3.09	14.750	0.780	Open Manhole	450	S3.000	13.970	150				
S3.08	14.690	0.820	Open Manhole	450	S2.001	13.870	150	S2.000	13.870	150	
								S3.000	13.870	150	
S3.02	14.670	1.125	Open Manhole	450	S1.001	13.545	225	S1.000	13.620	150	
								S2.001	13.620	150	
S3.10	14.750	1.030	Open Manhole	450	S4.000	13.720	150				
SNODE1	14.660	1.215	Junction		S1.002	13.445	225	S1.001	13.445	225	
								S4.000	13.520	150	
S3.03	14.650	1.345	Open Manhole	450	S1.003	13.305	225	S1.002	13.305	225	
S3.04	14.650	1.445	Open Manhole	450	S1.004	13.205	225	S1.003	13.205	225	
SRE1	14.750	1.150	Junction		S5.000	13.600	150				
S3.05	14.750	1.645	Open Manhole	450	S1.005	13.105	225	S1.004	13.105	225	
								S5.000	13.180	150	
S3.06	14.690	1.690	Open Manhole	1200	S1.006	13.000	225	S1.005	13.000	225	
SCS3	14.690	1.690	Open Manhole	300	S1.007	13.000	225	S1.006	13.000	225	
S	14.690	1.690	Open Manhole	0		OUTFALL		S1.007	13.000	225	

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Online Controls for SW3 - MAIN EAST S

Weir Manhole: SCS3, DS/PN: S1.007, Volume (m³): 0.2

Discharge Coef 0.544 Width (m) 0.300 Invert Level (m) 14.600

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Storage Structures for SW3 - MAIN EAST S

Cellular Storage Manhole: SCS3, DS/PN: S1.007

Invert Level (m) 13.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 15.00000

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	5.0	5.0	0.800	5.0	14.6	0.801	0.0	14.6

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW3 -
MAIN EAST S

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

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

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.000	S3.01	15 Winter	1	+0%	100/15 Winter				13.992	-0.128
S2.000	S3.07	15 Winter	1	+0%	100/15 Summer				13.996	-0.124
S3.000	S3.09	15 Winter	1	+0%	100/15 Summer				14.005	-0.115
S2.001	S3.08	15 Winter	1	+0%	100/15 Summer				13.919	-0.101
S1.001	S3.02	15 Winter	1	+0%	100/15 Summer				13.604	-0.166
S4.000	S3.10	15 Winter	1	+0%	100/15 Summer				13.736	-0.134
S1.002	SNODE1	15 Winter	1	+0%					13.502	-0.168
S1.003	S3.03	15 Winter	1	+0%	30/15 Summer				13.367	-0.163
S1.004	S3.04	15 Winter	1	+0%	30/15 Summer				13.270	-0.160
S5.000	SRE1	15 Winter	1	+0%					13.609	-0.141
S1.005	S3.05	15 Winter	1	+0%	30/15 Summer				13.252	-0.078
S1.006	S3.06	15 Winter	1	+0%	1/15 Summer				13.248	0.023
S1.007	SCS3	15 Winter	1	+0%	1/15 Summer				13.245	0.020

		<u>Flooded</u>		<u>Pipe</u>			
PN	US/MH Name	Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S3.01	0.000	0.05		1.5	OK	
S2.000	S3.07	0.000	0.07		1.2	OK	
S3.000	S3.09	0.000	0.12		2.2	OK	
S2.001	S3.08	0.000	0.23		5.3	OK	
S1.001	S3.02	0.000	0.15		6.8	OK	
S4.000	S3.10	0.000	0.02		0.7	OK	
S1.002	SNODE1	0.000	0.14		7.5	OK*	
S1.003	S3.03	0.000	0.17		7.5	OK	
S1.004	S3.04	0.000	0.19		8.3	OK	

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW3 -
MAIN EAST S

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
S5.000	SRE1	0.000	0.01	0.5		OK*	
S1.005	S3.05	0.000	0.20	9.0		OK	
S1.006	S3.06	0.000	0.28	7.6		SURCHARGED	
S1.007	SCS3	0.000	0.00	0.0		SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW3 - MAIN EAST S

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

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

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

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)
S1.000	S3.01	15 Winter	30	+0%	100/15 Winter				14.006	-0.114
S2.000	S3.07	15 Winter	30	+0%	100/15 Summer				14.012	-0.108
S3.000	S3.09	15 Winter	30	+0%	100/15 Summer				14.027	-0.093
S2.001	S3.08	15 Winter	30	+0%	100/15 Summer				13.956	-0.064
S1.001	S3.02	15 Winter	30	+0%	100/15 Summer				13.645	-0.125
S4.000	S3.10	15 Winter	30	+0%	100/15 Summer				13.743	-0.127
S1.002	SNODE1	15 Winter	30	+0%					13.614	-0.056
S1.003	S3.03	15 Winter	30	+0%	30/15 Summer				13.601	0.071
S1.004	S3.04	15 Winter	30	+0%	30/15 Summer				13.589	0.159
S5.000	SRE1	15 Winter	30	+0%					13.617	-0.133
S1.005	S3.05	15 Winter	30	+0%	30/15 Summer				13.581	0.251
S1.006	S3.06	15 Winter	30	+0%	1/15 Summer				13.569	0.344
S1.007	SCS3	15 Winter	30	+0%	1/15 Summer				13.562	0.337

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Cap. (l/s)	Flow (l/s)	Overflow (l/s)		
S1.000	S3.01	0.000	0.13	3.6		OK	
S2.000	S3.07	0.000	0.17	3.0		OK	
S3.000	S3.09	0.000	0.30	5.4		OK	
S2.001	S3.08	0.000	0.62	14.4		OK	
S1.001	S3.02	0.000	0.40	17.9		OK	
S4.000	S3.10	0.000	0.06	1.6		OK	
S1.002	SNODE1	0.000	0.37	19.4		OK*	
S1.003	S3.03	0.000	0.39	17.3		SURCHARGED	
S1.004	S3.04	0.000	0.39	17.4		SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW3 -
MAIN EAST S

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
S5.000	SRE1	0.000	0.03	1.2		OK*	
S1.005	S3.05	0.000	0.41	18.9		SURCHARGED	
S1.006	S3.06	0.000	0.64	17.4		SURCHARGED	
S1.007	SCS3	0.000	0.00	0.0		SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW3 -
MAIN EAST S

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

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

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.000	S3.01	15 Winter	100	+40%	100/15 Winter				14.247	0.127
S2.000	S3.07	15 Winter	100	+40%	100/15 Summer				14.323	0.203
S3.000	S3.09	15 Winter	100	+40%	100/15 Summer				14.330	0.210
S2.001	S3.08	15 Winter	100	+40%	100/15 Summer				14.316	0.296
S1.001	S3.02	15 Winter	100	+40%	100/15 Summer				14.269	0.499
S4.000	S3.10	15 Winter	100	+40%	100/15 Summer				14.227	0.357
S1.002	SNODE1	15 Winter	100	+40%					13.670	0.000
S1.003	S3.03	15 Winter	100	+40%	30/15 Summer				14.312	0.782
S1.004	S3.04	15 Winter	100	+40%	30/15 Summer				14.296	0.866
S5.000	SRE1	15 Winter	100	+40%					13.750	0.000
S1.005	S3.05	15 Winter	100	+40%	30/15 Summer				14.293	0.963
S1.006	S3.06	15 Winter	100	+40%	1/15 Summer				14.283	1.058
S1.007	SCS3	30 Winter	100	+40%	1/15 Summer				14.541	1.316

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Cap.	Flow (l/s)	Overflow (l/s)		
S1.000	S3.01	0.000	0.24	6.6		SURCHARGED	
S2.000	S3.07	0.000	0.29	5.0		SURCHARGED	
S3.000	S3.09	0.000	0.52	9.3		SURCHARGED	
S2.001	S3.08	0.000	1.02	23.6		SURCHARGED	
S1.001	S3.02	0.000	0.63	28.1		SURCHARGED	
S4.000	S3.10	0.000	0.10	2.7		SURCHARGED	
S1.002	SNODE1	0.000	0.50	26.3		SURCHARGED*	
S1.003	S3.03	0.000	0.57	25.2		SURCHARGED	
S1.004	S3.04	0.000	0.65	28.8		SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW3 -
MAIN EAST S

PN	US/MH Name	Flooded		Pipe	Status	Level Exceeded
		Volume (m³)	Flow / Overflow Cap. (l/s)	Flow (l/s)		
S5.000	SRE1	0.000	0.10	4.1	SURCHARGED*	
S1.005	S3.05	0.000	0.66	30.0	SURCHARGED	
S1.006	S3.06	0.000	1.01	27.4	SURCHARGED	
S1.007	SCS3	0.000	0.00	0.0	FLOOD RISK	

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STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for SW4 - ENTRANCE

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	13.079	0.174	75.2	0.010	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	15.207	0.156	97.5	0.010	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.002	3.067	0.000	0.0	0.028	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.003	1.103	0.000	0.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.004	1.103	0.000	0.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.19	12.000	0.010	0.0	0.0	0.0	1.16	20.5	1.4
S1.001	50.00	5.44	11.826	0.021	0.0	0.0	0.0	1.02	18.0	2.8
S1.002	50.00	5.99	11.670	0.049	0.0	0.0	0.0	0.09	1.6«	6.6
S1.003	50.00	6.19	11.670	0.049	0.0	0.0	0.0	0.09	1.6«	6.6
S1.004	50.00	6.38	14.000	0.049	0.0	0.0	0.0	0.09	1.6«	6.6

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Manhole Schedules for SW4 - ENTRANCE

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S4.01	13.390	1.390	Open Manhole	1200	S1.000	12.000	150				
S4.02	14.000	2.174	Open Manhole	1200	S1.001	11.826	150	S1.000	11.826	150	
S4.03	14.700	3.030	Open Manhole	1200	S1.002	11.670	150	S1.001	11.670	150	
SCS4	14.700	3.030	Open Manhole	1200	S1.003	11.670	150	S1.002	11.670	150	
SDMH	14.700	3.030	Open Manhole	1200	S1.004	14.000	150	S1.003	11.670	150	
S	21.000	7.000	Open Manhole	0		OUTFALL		S1.004	14.000	150	

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Storage Structures for SW4 - ENTRANCE

Cellular Storage Manhole: SCS4, DS/PN: S1.003

Invert Level (m) 11.670 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 15.00000

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	4.0	4.0	0.800	4.0	8.0	0.801	0.0	8.0

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW4 - ENTRANCE

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

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

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

US/MH			Return Climate		First (X)	First (Y)	First (Z)	Overflow	Water	Surcharged
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	Level (m)	Depth (m)
S1.000	S4.01	15 Winter	1	+0%	30/15 Summer				12.028	-0.122
S1.001	S4.02	30 Winter	1	+0%	30/15 Summer				11.915	-0.061
S1.002	S4.03	30 Winter	1	+0%	1/15 Summer				11.911	0.091
S1.003	SCS4	30 Winter	1	+0%	1/15 Summer				11.908	0.088
S1.004	SDMH	30 Winter	1	+0%					11.908	-2.242

Flooded			Pipe		Level	
PN	US/MH Name	Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Exceeded
S1.000	S4.01	0.000	0.08	1.4	OK	
S1.001	S4.02	0.000	0.12	2.1	OK	
S1.002	S4.03	0.000	0.37	3.9	SURCHARGED	
S1.003	SCS4	0.000	0.04	0.4	SURCHARGED	
S1.004	SDMH	0.000	0.00	0.0	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW4 - ENTRANCE

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

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

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

									Water	Surcharged
	US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	(m)	(m)
S1.000	S4.01	30 Winter	30	+0%	30/15 Summer				12.261	0.111
S1.001	S4.02	30 Winter	30	+0%	30/15 Summer				12.255	0.279
S1.002	S4.03	30 Winter	30	+0%	1/15 Summer				12.244	0.424
S1.003	SCS4	30 Winter	30	+0%	1/15 Summer				12.235	0.415
S1.004	SDMH	30 Winter	30	+0%					12.235	-1.915

Flooded		Pipe		Level	
PN	US/MH Name	Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status
S1.000	S4.01	0.000	0.12	2.2	SURCHARGED
S1.001	S4.02	0.000	0.20	3.3	SURCHARGED
S1.002	S4.03	0.000	0.89	9.3	SURCHARGED
S1.003	SCS4	0.000	0.10	1.0	SURCHARGED
S1.004	SDMH	0.000	0.00	0.0	OK

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW4 - ENTRANCE

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

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

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

US/MH			Return Climate		First (X)	First (Y)	First (Z)	Overflow	Water	Surcharged
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	Level (m)	Depth (m)
S1.000	S4.01	30 Winter	100	+40%	30/15 Summer				12.976	0.826
S1.001	S4.02	30 Winter	100	+40%	30/15 Summer				12.968	0.992
S1.002	S4.03	30 Winter	100	+40%	1/15 Summer				12.952	1.132
S1.003	SCS4	30 Winter	100	+40%	1/15 Summer				12.939	1.119
S1.004	SDMH	30 Winter	100	+40%					12.939	-1.211

Flooded			Pipe		Level	
PN	US/MH Name	Volume (m³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Exceeded
S1.000	S4.01	0.000	0.15	2.8	SURCHARGED	
S1.001	S4.02	0.000	0.35	5.8	SURCHARGED	
S1.002	S4.03	0.000	1.66	17.5	SURCHARGED	
S1.003	SCS4	0.000	0.29	3.2	SURCHARGED	
S1.004	SDMH	0.000	0.00	0.0	OK	