Project Name	: Land South of Greenhill Road, Herne Bay
Job No	: 20-278
Note Title	: Drainage Technical Note
Author	: Aoife Mulholland
Checked	: Tom Graham
Approved	: Ryan Saul
Date	: January 2021

1.0 INTRODUCTION

1.1 This Drainage Technical Note has been produced by Odyssey in support of Bellway's Reserved Matters (RM) application for the residential development of 450 dwellings at Land South of Greenhill Road, Herne Bay. The proposed development was granted outline planning permission by Canterbury City Council on 15th October 2020 (planning reference CA//17/02907). The outline application reserved all matters.

1.2 The description of the development at the outline application was:

"Outline application for up to 450 dwellings with all matters reserved also including community facilities, a link road, pedestrian and cycle links, sustainable urban design drainage measures, landscaped bund/earthworks and boundary treatments, public open space, highway-related and utilities infrastructure."

1.3 A number of plans, supporting drawings and documents were submitted as part of the outline planning application. Those documents provide a framework within which a future detailed planning application (the reserved matters) would be submitted. Numerous planning conditions were additionally attached to the outline permission, some of which required details to be submitted to the planning authority with any subsequent reserved matters application. The outline consent has therefore established the principle of development.

1.4 The purpose of this report is to support the discharge of planning conditions 19, 20 and 22 associated with the outline consent. These conditions are for convenience quoted below:

Condition 19

"No development within a Phase as approved under condition 8 shall commence until an overarching surface water drainage strategy based on sustainable drainage principles and an assessment of the hydrological and hydrogeological context of the development has been submitted to and approved in writing by the local planning authority. The scheme shall:

- *identify methods to manage surface water runoff up to the 1:100 year event plus climate change to not exceed run off from the undeveloped site following the corresponding rainfall event to not increase the risk of flooding both on and off-site;*
- *set out the proposed methods to delay and control the surface water discharged from the site in order to mitigate the risk of surface water flooding on the site (including the provision of measures to prevent the discharge of surface water onto the highway), avoid increasing the flood risk downstream and prevent pollution of the receiving groundwater and/or surface waters;*
- *outline a management and maintenance plan, which shall include the arrangements for adoption by any public authority or statutory undertaker and any other arrangements to secure the operation of the scheme throughout the lifetime of the development."*

Condition 20

"No development within a Phase as approved under condition 8 shall commence until a detailed surface water drainage scheme for that phase has been submitted to and approved in writing by the local planning authority. The scheme for each phase shall be in accordance with the overarching site-wide surface water drainage strategy approved under condition 18 and shall include details of:

- *the location, design and capacity of proposed sustainable drainage systems within the phase;*
- *a timetable for implementation of the scheme, ownership, adoption, monitoring arrangements and responsibilities; and*
- *a management and maintenance plan, which shall include the arrangements for adoption by any public body or statutory undertaker, or any other arrangements to secure the effective operation of the sustainable drainage system throughout the lifetime of the development.*

Within each phase of development the surface water drainage system shall be implemented and thereafter managed and maintained in accordance with the approved details."

Condition 22

"No development within a Phase as approved under condition 8 shall commence until details of the proposed means of foul sewerage disposal for that Phase, including a timetable for implementation, have been submitted to and approved by the Local Planning Authority, in consultation with Southern Water. The Phase shall not be carried out other than in accordance with the details as approved."

2.0 PROPOSED SURFACE WATER DRAINAGE STRATEGY

2.1 The surface water drainage strategy is shown on the drawings listed below which are included at **Appendix A:**

- 20-278/002 Preliminary Drainage Strategy Sheet 1
- 20-278/003 Preliminary Drainage Strategy Sheet 2

2.2 The surface water drainage strategy has been designed in accordance with the over-arching strategy set out in PBA's Flood Risk Assessment (FRA) submitted as part of the outline planning application for the site. The illustrative over-arching drainage strategy drawing is included for reference at **Appendix C**.

2.3 The FRA splits the site into sub-catchments which are each served by a strategic attenuation feature to convey and store surface water run-off from the proposed development prior to discharging into the existing ditches which bound the site and an existing Southern Water manhole to the north of the site. As the site is located within Drainage Zone 1, the FRA proposes that flows from each sub-catchment are restricted to 4l/s/ha in accordance with the Canterbury City Drainage Policy.

2.4 The surface water drainage network for the proposed development would be divided into three sub-catchments owing to the proposed highways levels and location of the existing ditches and existing surface water drainage connections within the site. Surface water discharge from each sub-catchment would be conveyed through a gravity fed pipe network where it would be attenuated within its respective basin. Surface water discharge from each basin would be controlled by a hydrobrake flow control chamber prior to sub-catchment A and C discharging into existing ditches and sub-catchment B discharging into an existing Southern Water surface water manhole.

2.5 The flow rate for each sub-catchment is listed below:

Sub-Catchment	Area	100 Year Plus 20% Climate Change Discharge Rate
A	1.6 ha	6.4 l/s
B	3.0 ha	12.0 l/s
C	3.2 ha	12.8 l/s

2.6 The surface water system has been designed to cater for a 1 in 100 year storm event with an additional allowance for 20% climate change. Any flooding arising during this extreme event would be contained within carriageways and routed away from properties to the associated

strategic SuDS basins where possible, as shown on Odyssey Overland Flow Route drawings 20-278/012 and 20-278/013 included at **Appendix A.**

2.7 In the case of an exceedance event, calculations have been undertaken for 1 in 100 year storm event with an additional allowance for 40% climate change. Relevant MicroDrainage calculations are included at **Appendix B.**

2.8 The CIRIA SuDS Manual sets out the pollution hazard level for different land use classifications, as shown below in **Table 2.1**

Table 2.1: Pollution Hazard Levels (CIRIA SuDS Manual)

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Individual property driveways, residential car parks, low traffic roads (e.g. cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (e.g. schools, offices) i.e. < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (e.g. hospitals, retail), all roads except low traffic roads and trunk roads/motorways	Medium	0.7	0.6	0.7

2.9 As the proposed development will generate more than 300 traffic movements per day, the pollution hazard level is 'medium'.

2.10 Surface water runoff from the proposed on-site highway along with hard-standing areas would be conveyed to an attenuation basin which would provide treatment for pollutants prior to discharging into the existing ditch or manhole within that sub-catchment.

2.11 The CIRIA SuDS Manual Methodology has been applied to the drainage design. The mitigation indices in **Table 2.2** show that flows draining directly to a pond would receive sufficient treatment.

Table 2.2: SuDS Mitigation Indices – Pond Only Catchment

Type of SuDS Component	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Pond/wetland	0.8	0.8	0.8

2.12 In addition to the above, trapped gullies and catchpits that form part of the piped network would provide further treatment of surface water.

2.13 Regarding implementation of the drainage infrastructure, all drainage would be installed as per the approved drawings and would be constructed in phases. All attenuation basins would be online prior to any plots being connected to the network.

3.0 PROPOSED FOUL WATER DRAINAGE STRATEGY

3.1 The foul water drainage strategy is shown on the Odyssey drawings listed below which are included at **Appendix A**.

- 20-278/002 Preliminary Drainage Strategy Sheet 1
- 20-278/003 Preliminary Drainage Strategy Sheet 2
- 20-278/006 Foul Water Rising Main Offsite Connection Sheet 1
- 20-278/007 Foul Water Rising Main Offsite Connection Sheet 2
- 20-278/008 Foul Water Rising Main Offsite Connection Sheet 3

3.2 The overarching strategy within the FRA detailed by PBA and submitted as part of the outline planning application suggested that the proposed foul flows would be conveyed to the north of the site by gravity fed pipe network combined with a pumping station for the western sub-catchment where it would connect into the existing Southern Water foul drainage network in Greenhill Road.

3.3 However, the FRA also includes correspondence from Southern Water following a capacity check which confirms there is insufficient capacity within the existing foul network to the north of the site and suggests the proposed foul flows would have to be pumped to an existing chamber approximately 1,600m from the site.

3.4 The proposed foul drainage strategy has been designed in accordance with Southern Water's recommendation included within the FRA and would utilise two pumping stations located within the development. Sub-catchment C would discharge foul flows via a gravity fed pipe network to a pumping station located adjacent to Basin 5. Foul drainage would then be pumped via a rising main where it would connect into another gravity fed foul pipe network in the centre of the development conveying foul flows from sub-catchments A and B.

3.5 The gravity network would discharge into the second pumping station located on the western boundary of the site which would accommodate all private foul discharge from the development. Foul drainage would then be pumped via a rising main and connect to an existing Southern Water foul chamber located approximately 1,760m from the site in a westerly direction.

3.6 The foul water system has been designed in accordance with Sewers for Adoption 7th Edition.

4.0 MAINTENANCE

4.1 All foul and surface water sewer networks shown on drawings 20-278/002, 003, 006, 007 and 008 are to be offered for adoption by Southern Water and as such will be maintained by Southern Water in accordance with their maintenance and management program.

4.2 Any surface water drainage systems that take highway drainage only will be offered for adoption by Kent County Council and as such will be maintained by Kent County Council in accordance with their maintenance and management program.

4.3 Any drainage solely serving an individual property within the property curtilage will be maintained by the property owner.

4.4 Any drainage features not offered for adoption and any surfaces with granular sub-base that fall outside of the area to be offered to Kent County Council under a Section 38 agreement are to be maintained by a private management company in accordance with the following schedule and any recommendations made by manufacturers.

Table 4.1: Attenuation Basin Maintenance Regime

Maintenance Category	Maintenance Activity	Comments	Frequency
Routine Maintenance	Litter and debris removal.	Litter & debris to be removed prior to any grass cutting activity (of perimeter areas) to minimise risk of shredding litter. Particular attention should be paid to inlet pipes and grilles (if in place)	Monthly.
	Grass cutting: landscaped areas, spillways and access routes.	All cuttings to be removed from SUDS component.	Monthly (during growing season) or as required.
	Grass cutting: meadow grass.	All cuttings to be removed from SUDS component.	Half yearly (Spring before nesting season, and Autumn).
	Remove dead vegetation from pond edge.		1-3 years, or as required.
	Hand cut submerged and emergent aquatic plants (at a minimum of 0.1m above pond base; max 1/3 of pond surface).	Thinning of emergent barrier vegetation. Areas of tall emergent plants obscuring visual inspection (for safety) of the	As required.

		open water should be regularly trimmed.	
	Cut and remove bank vegetation from waters edge to a minimum of 1m above water level.	To provide access to pond edge / emergent vegetation for maintenance and inspection.	Monthly (for first 3 years) then as required.
	Manage other vegetation and remove nuisance plants.	Weeding should be conducted by hand or use non-toxic and biodegradable weed killer. Invasive species should be removed in accordance with best practice.	Monthly (at implementation) then as required.
	Tidy all dead growth before start of growing season.		Annually.
Infrequent Maintenance	Re-seed or replant areas of poor vegetation growth.		As required.
	Prune and trim trees and remove cuttings.	Where vegetation is planted as a barrier management of upward growth to encourage outward growth is necessary (after shrub seedlings are established).	As required.
	Remove sediment from forestry and main body of large ponds when pool volume is reduced by 20%.	Sediment level will be dependent upon presence and type of upstream SUDS, size and land use of catchment as well as local soil conditions. Refer to above point for pond liner.	>25 years usually, or as required.
Corrective Maintenance	Repair erosion or other damage.		As required.
	Repair / rehabilitation of inlets.		As required.

Table 4.2: Cellular Storage Maintenance Regime

	Maintenance Activity	**Comments**	**Frequency**
Routine Maintenance	Inspect and identify any areas that are not operating correctly.		Monthly (for the first 3 months) then six monthly.
	Remove sediment from upstream silt trap (sump).	Remove sediment from sump when 50% volume lost. N.B. Sumps must be maintained to limit sediment entry into the underground cells.	Six monthly, or as required.
Infrequent Maintenance	Clear blockage of ½ perforated underflow	Stormcell system (if used) should be designed with	As required.

	pipes (Stormcell only) by rodding / jetting.	underflow pipes laid at self-cleansing velocity; reducing likelihood of blockage.	
Corrective Maintenance	Excavate, uncover & jet cells to remove sediment (Wavin Aquacell or similar).		As required.

Table 4.3: Pipe Systems, Gullies, and Manholes Maintenance Regime

Maintenance Category	Maintenance Activity	Comments	Frequency
Routine Maintenance	Inspect and identify any areas that are not operating correctly.	Gullies and private manholes and inspection chambers	Monthly (for the first 3 months) then annually.
	Remove debris from gratings, sumps / silt traps.		Annually
Infrequent Maintenance	Clear blockages.	Piped system.	As required.

5.0 CONCLUSION

5.1 Odyssey has been commissioned by Bellway to prepare a Drainage Technical Note to support the discharge of Conditions 19, 20 and 22 associated with the planning consent for the Land South of Greenhill Road, Herne Bay.

5.2 This technical note provides details of the proposed surface water and foul drainage systems proposed within the site.

5.3 A maintenance and management schedule for the surface water design has been provided within this technical note.

5.4 This note has displayed how the proposals accord with the FRA, Canterbury City Drainage Policy, NPPF and Local Planning Policies with regards to surface water and foul water drainage.

APPENDIX A

Odyssey Engineering Drawings

AREA OF BASIN 2
PERMANENTLY WET FOR
ECOLOGICAL ASPECTS
300mm DEEP

BASIN 2
1.2m DEEP
IL: 8.526m
300mm FREEBOARD FOR 1 in
100 YEAR + CC STORM

BASIN 3
0.75m DEEP
IL: 9.530m
418mm FREEBOARD FOR 1 in
100 YEAR + CC STORM

FOUL PUMP STATION
IL: 6.390m

BASIN 1
1.5m DEEP
IL: 10.556m
388mm FREEBOARD FOR 1
in 100 YEAR + CC STORM

CATCHMENT A: 1.6ha
FLOW CONTROL CHAMBER TO
RESTRICT DISCHARGE RATE TO 6.4l/s

DITCH

BUND

Possible future stop

FOR CONTINUATION SEE DRAWING 20-278-003

NOTES

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6. PROPOSED BASINS ARE SUBJECT TO CHANGE BASED UPON APPROVAL FROM LANDSCAPE ARCHITECT AND KENT COUNTY COUNCIL.

LEGEND

- SITE BOUNDARY
- PROPOSED BASIN CONTOURS
- PROPOSED SURFACE WATER MANHOLE AND SEWER
- PROPOSED FOUL WATER MANHOLE AND SEWER
- PROPOSED HEADWALL
- PROPOSED CELLULAR STORAGE TANK
- PROPOSED FOUL WATER RISING MAIN
- PROPOSED PUMPING STATION
- EXISTING SURFACE WATER SEWER
- EXISTING FOUL WATER SEWER
- EXISTING SURFACE WATER DITCH

KEY PLAN
NOT TO SCALE

SHEET 1 SHEET 2 INSET

Rev	Amendments	Drn	Chk	App	Date
A	UPDATED TO SUIT NEW SITE LAYOUT	LS	AM	TG	27.01.21

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Job Title
LAND SOUTH OF
GREENHILL ROAD, HERNE BAY

Drawing Title
DRAINAGE STRATEGY
SHEET 1 OF 2

Client
Bellway

Scale	Date	Designed
1:500 @A0	DEC 20	KR
Drawn	Checked	Approved
LS	AM	TG
Job No	Drawing No	Rev
20-278	20-278/002	A

P:\20-278 - Land South of Greenhill Road, Herne Bay\Tech\Acad\Drawings\Planning\20-278-002 Preliminary Drainage Strategy, Sheet 1.dwg

EXISTING SOUTHERN WATER SURFACE WATER MANHOLE

CATCHMENT B: 3.0ha
FLOW CONTROL DEVICE
TO RESTRICT DISCHARGE
RATE TO 12 l/s

CELLULAR STORAGE TANK
210m² X 0.4m DEEP

CATCHMENT C: 3.2ha
FLOW CONTROL DEVICE
TO RESTRICT DISCHARGE
RATE TO 12.8 l/s

BASIN 5
1.2m DEPTH
IL: 8.950m
326mm FREEBOARD FOR 1
in 100 YEAR + CC STORM

BASIN 4
1.2m DEEP
338mm FREEBOARD FOR 1 in
100 YEAR + CC STORM

FOUL PUMP STATION
IL: 8.045m

FOR CONTINUATION SEE INSET BELOW

FOR CONTINUATION SEE DRAWING 20-278-002

INSET A
SCALE 1:500

FOUL AND SURFACE WATER DRAINAGE CONNECTION POINTS FOR COMMUNITY CENTRE AND MUGA

NOTES

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LEGEND

- SITE BOUNDARY
- PROPOSED BASIN CONTOURS
- PROPOSED SURFACE WATER MANHOLE AND SEWER
- PROPOSED FOUL WATER MANHOLE AND SEWER
- PROPOSED HEADWALL
- PROPOSED CELLULAR STORAGE TANK
- PROPOSED FOUL WATER RISING MAIN
- PROPOSED PUMPING STATION
- EXISTING SURFACE WATER SEWER
- EXISTING FOUL WATER SEWER
- EXISTING SURFACE WATER DITCH

KEY PLAN
NOT TO SCALE

SHEET 1 SHEET 2 INSET

Rev	Amendments	Drn	Chk	App	Date
A	UPDATED TO SUIT NEW SITE LAYOUT	LS	AM	TG	27.01.21

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Job Title
LAND SOUTH OF
GREENHILL ROAD, HERNE BAY

Drawing Title
DRAINAGE STRATEGY
SHEET 2 OF 2

Client
Bellway

Scale	Date	Designed
1:500 @A0	DEC 20	KR
Drawn	Checked	Approved
LS	AM	TG
Job No	Drawing No	Rev
20-278	20-278/003	A

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LEGEND

- SITE BOUNDARY
- PROPOSED FOUL WATER MANHOLE AND SEWER
- PROPOSED FOUL WATER RISING MAIN
- PROPOSED PUMPING STATION
- 300 ALIGNMENT CHAINAGE

KEY PLAN
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Rev	Amendments	Drn	Chk	App	Date

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Job Title
LAND SOUTH OF
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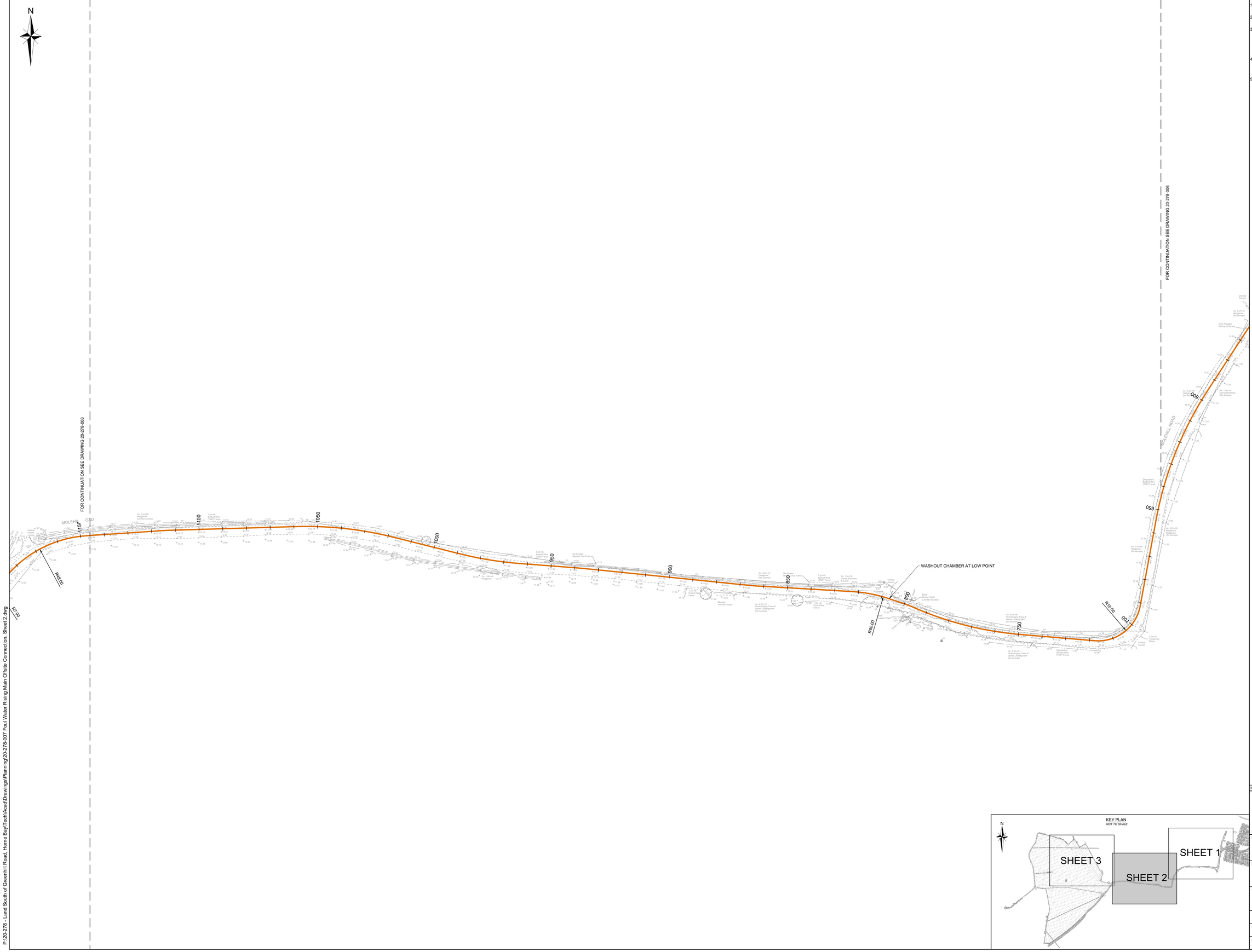
Drawing Title
FOUL WATER RISING MAIN
OFFSITE CONNECTION. SHEET 1 OF 3

Client
Bellway

Scale	Date	Designed
1:500 @A0	JAN 21	LP
Drawn	Checked	Approved
LS	LP	TG
Job No	Drawing No	Rev
20-278	20-278/006	

P:\20-278 - Land South of Greenhill Road, Herne Bay\Tech\Acad\Drawings\Planning\20-278-006 Foul Water Rising Main Offsite Connection. Sheet 1.dwg

N



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LEGEND

- SITE BOUNDARY
- PROPOSED FOUL WATER MANHOLE AND SEWER
- PROPOSED FOUL WATER RISING MAIN
- PROPOSED PUMPING STATION
- 300 ALIGNMENT CHAINAGE

KEY PLAN
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LAND SOUTH OF
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Drawing Title
FOUL WATER RISING MAIN
OFFSITE CONNECTION SHEET 2 OF 3

Client
Bellway

Scale	Date	Designed
1:500 @A0	JAN 21	LP
Drawn	Checked	Approved
LS	LP	TG
Job No	Drawing No	Rev
20-278	20-278/007	

P:\20-278 - Land South of Greenhill Road, Herne Bay\Tech\Acad\Drawings\Planning\20-278-007 Foul Water Rising Main Offsite Connection. Sheet 2.dwg

N

1771
1750
1700
1650
1600
1550
1500
1450
1400
1350
1300
1250
1200

5.21m
6.01m
6.5m
5.0m

R7.00
R44.00

POTENTIAL ALTERNATIVE ROUTE TO AVOID CROSSING OVERHEAD HV CABLES

DITCH CROSSING

FOR CONTINUATION SEE DRAWING 20-278-007

KEY PLAN
NOT TO SCALE

SHEET 1
SHEET 2
SHEET 3

NOTES

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LEGEND

- SITE BOUNDARY
- PROPOSED FOUL WATER MANHOLE AND SEWER
- PROPOSED FOUL WATER RISING MAIN
- PROPOSED PUMPING STATION
- 300 ALIGNMENT CHAINAGE

Rev	Amendments	Drn	Chk	App	Date

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LAND SOUTH OF GREEN HILL ROAD, HERNE BAY

Drawing Title
FOUL WATER RISING MAIN OFFSITE CONNECTION. SHEET 3 OF 3

Client
Bellway

Scale	Date	Designed
1:500 @A0	JAN 21	LP
Drawn	Checked	Approved
LS	LP	TG
Job No	Drawing No	Rev
20-278	20-278/008	

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LEGEND

- SITE BOUNDARY
- 14.00 — PROPOSED CONTOURS
- INDICATIVE DIRECTION OF OVERLAND FLOW
- HP — HIGH POINT
- LP — LOW POINT
- EXISTING SURFACE WATER DITCH
- FFL 8.60 — FINISHED FLOOR LEVEL
- FGL 8.60 — FINISHED GARAGE LEVEL
- 22.850 × — PROPOSED PRIVATE LEVEL
- 1:20 — PROPOSED GRADIENT

BASIN 1
BASIN 2
BASIN 3
PUMP ST
DITCH
BUND
HAWKS ROAD
BUS STOP
Thernden House
Five Gables
Virginia
Faraway
Mast
El Sub Sta
72-77
131-136
173-178
188-193
208-215
13-18
236-241
FOR CONTINUATION SEE DRAWING 20-278-013

KEY PLAN
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SHEET 1 | SHEET 2 | INSET

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Job Title
LAND SOUTH OF
GREEN HILL ROAD, HERNE BAY

Drawing Title
OVERLAND FLOW ROUTE
SHEET 1 OF 2

Client
Bellway

Scale	Date	Designed
1:500 @A0	JAN 21	LS
Drawn	Checked	Approved
LS	AM	TG
Job No	Drawing No	Rev
20-278	20-278/012	

P:\20-278 - Land South of Greenhill Road, Herne Bay\Tech\Acad\Drawings\Planning\20-278-012 Overland Flow Route.Sheet 1.dwg

NOTES

1. DO NOT SCALE FROM THIS DRAWING. WORK FROM FIGURED DIMENSIONS ONLY.
2. ALL DIMENSIONS SHOWN IN METRES UNLESS NOTED OTHERWISE.
3. ALL DIMENSIONS, LEVELS AND SURVEY GRID CO-ORDINATES ARE TO BE CHECKED ONSITE AND THE ENGINEER NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES PRIOR TO THE COMMENCEMENT OF THE WORKS.
4. ODYSSEY DOES NOT ACCEPT RESPONSIBILITY FOR THE ACCURACY OF SURVEY INFORMATION PROVIDED BY OTHERS.
5. THIS DRAWING IS A PRELIMINARY DRAINAGE REVIEW AND IS SUBJECT TO CHANGE THROUGH THE DETAILED DESIGN PROCESS.
6. PROPOSED BASINS ARE SUBJECT TO CHANGE BASED UPON APPROVAL FROM LANDSCAPE ARCHITECT AND KENT COUNTY COUNCIL.

LEGEND

- SITE BOUNDARY
- 14.00 — PROPOSED CONTOURS
- INDICATIVE DIRECTION OF OVERLAND FLOW
- HP — HIGH POINT
- LP — LOW POINT
- EXISTING SURFACE WATER DITCH
- FFL 8.60 — FINISHED FLOOR LEVEL
- FGL 8.60 — FINISHED GARAGE LEVEL
- 22.850 × — PROPOSED PRIVATE LEVEL
- 1:30 — PROPOSED GRADIENT

CYCLEWAY LEVELS SUBJECT TO CHANGE. RETAINING WALL MAY BE NEEDED ON EAST SIDE OF PATH DEPENDANT ON PROPOSED LEVEL OF PLAYING FIELDS

FOR CONTINUATION SEE INSET BELOW

FOR CONTINUATION SEE DRAWING 20-278-012

INSET A
SCALE 1:500

KEY PLAN
NOT TO SCALE

Rev	Amendments	Drn	Chk	App	Date

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Job Title
LAND SOUTH OF GREENHILL ROAD, HERNE BAY

Drawing Title
OVERLAND FLOW ROUTE SHEET 2 OF 2

Client
Bellway

Scale	Date	Designed
1:500 @A0	JAN 21	LS
Drawn	Checked	Approved
LS	AM	TG
Job No	Drawing No	Rev
20-278	20-278/013	

P:\20-278 - Land South of Greenhill Road, Herne Bay\Tech\Acad\Drawings\Planning\20-278-013 Overland Flow Route.Sheet 2.dwg

APPENDIX B

MicroDrainage Calculations

Catchment A

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	19.700	Add Flow / Climate Change (%)	40
Ratio R	0.400	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Online Controls for Storm

Hydro-Brake® Optimum Manhole: SBasin, DS/PN: S1.009, Volume (m³): 14.3

Unit Reference	MD-SHE-0111-6400-1500-6400
Design Head (m)	1.500
Design Flow (l/s)	6.4
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	111
Invert Level (m)	10.556
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	6.4
Flush-Flo™	0.445	6.4
Kick-Flo®	0.920	5.1
Mean Flow over Head Range	-	5.6

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.8	1.200	5.8	3.000	8.9	7.000	13.2
0.200	5.8	1.400	6.2	3.500	9.5	7.500	13.7
0.300	6.2	1.600	6.6	4.000	10.1	8.000	14.1
0.400	6.4	1.800	7.0	4.500	10.7	8.500	14.5
0.500	6.4	2.000	7.3	5.000	11.3	9.000	14.9
0.600	6.3	2.200	7.7	5.500	11.8	9.500	15.3
0.800	5.8	2.400	8.0	6.000	12.3		
1.000	5.3	2.600	8.3	6.500	12.8		

Storage Structures for Storm

Tank or Pond Manhole: SBasin, DS/PN: S1.009

Invert Level (m) 10.556

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	453.2	0.900	940.8	0.902	1004.2	1.500	1385.9

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.700	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	15 Winter	1	+0%	100/15 Summer			
S1.001	S2	15 Winter	1	+0%	30/15 Summer			
S2.000	S3	15 Summer	1	+0%	30/15 Summer	100/15 Summer		
S2.001	S3A	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
S1.002	S4	15 Winter	1	+0%	30/15 Summer			
S1.003	S5	15 Winter	1	+0%	30/15 Summer			
S3.000	S6	15 Winter	1	+0%	30/15 Summer			
S3.001	S6A	15 Winter	1	+0%	30/15 Summer			
S1.004	S7	15 Winter	1	+0%	30/15 Summer			
S1.005	S8	15 Winter	1	+0%	30/15 Summer			
S4.000	S9	15 Winter	1	+0%	30/15 Summer			
S1.006	S10	15 Winter	1	+0%	30/15 Summer			
S1.007	S11	15 Winter	1	+0%	30/15 Summer			
S1.008	SDummy	15 Winter	1	+0%	30/15 Summer			
S5.000	S12	15 Winter	1	+0%	30/15 Summer			
S5.001	S12A	15 Winter	1	+0%	30/15 Summer			
S5.002	S13	15 Winter	1	+0%	30/15 Summer	100/15 Winter		
S6.000	S14a	15 Summer	1	+0%	30/15 Summer			

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	12.046	-0.112	0.000	0.15			2.5	OK	
S1.001	S2	11.830	-0.096	0.000	0.28			4.7	OK	
S2.000	S3	12.038	-0.087	0.000	0.37			6.0	OK	4
S2.001	S3A	11.920	-0.063	0.000	0.62			11.5	OK	4
S1.002	S4	11.552	-0.094	0.000	0.61			23.5	OK	
S1.003	S5	11.190	-0.152	0.000	0.48			33.8	OK	
S3.000	S6	11.621	-0.083	0.000	0.41			6.7	OK	
S3.001	S6A	11.483	-0.063	0.000	0.63			10.6	OK	
S1.004	S7	11.081	-0.182	0.000	0.47			48.4	OK	
S1.005	S8	11.033	-0.104	0.000	0.63			52.1	OK	
S4.000	S9	11.522	-0.078	0.000	0.46			8.9	OK	
S1.006	S10	11.011	-0.090	0.000	0.70			59.7	OK	
S1.007	S11	10.992	-0.078	0.000	0.48			62.4	OK	
S1.008	SDummy	10.950	-0.071	0.000	1.00			59.5	OK	
S5.000	S12	12.107	-0.166	0.000	0.16			5.9	OK	
S5.001	S12A	11.962	-0.120	0.000	0.44			16.5	OK	
S5.002	S13	11.767	-0.107	0.000	0.53			16.3	OK	1
S6.000	S14a	12.478	-0.092	0.000	0.32			5.1	OK	

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) Surcharge	First (Y) Flood	First (Z) Overflow
S6.001	S14	15 Winter	1	+0%	30/15 Summer	100/15 Winter	
S6.002	S15	15 Winter	1	+0%	30/15 Summer		
S5.003	S16	15 Winter	1	+0%	30/15 Summer		
S5.004	S17	15 Winter	1	+0%	30/15 Summer		
S5.005	S18	15 Winter	1	+0%	30/15 Summer		
S7.000	S19	15 Winter	1	+0%	100/15 Summer		
S5.006	S20	15 Winter	1	+0%	30/15 Summer		
S5.007	S21	15 Winter	1	+0%	30/15 Summer		
S8.000	S22	15 Winter	1	+0%			
S8.001	S23	15 Winter	1	+0%	100/15 Winter		
S5.008	S24	15 Winter	1	+0%	30/120 Winter		
S5.009	S25	15 Winter	1	+0%	30/15 Winter		
S5.010	Sdummy pipe	360 Winter	1	+0%	30/60 Winter		
S9.000	S26	15 Winter	1	+0%	100/15 Summer		
S9.001	S27	15 Winter	1	+0%	30/15 Summer		
S9.002	S28	15 Winter	1	+0%	30/15 Summer	100/15 Summer	
S10.000	S29	15 Winter	1	+0%	30/15 Summer	100/15 Winter	
S11.000	S30	15 Winter	1	+0%	30/15 Summer	100/15 Summer	
S9.003	S31	15 Winter	1	+0%	1/15 Summer	100/15 Summer	
S9.004	SDummy	480 Winter	1	+0%	1/15 Summer		
S1.009	SBasin	360 Winter	1	+0%	1/15 Summer		

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
S6.001	S14		12.371	-0.066	0.000	0.59			11.1
S6.002	S15		11.986	-0.136	0.000	0.33			15.0
S5.003	S16		11.725	-0.102	0.000	0.76			37.5
S5.004	S17		11.674	-0.129	0.000	0.60			40.3
S5.005	S18		11.411	-0.183	0.000	0.42			47.0
S7.000	S19		11.869	-0.085	0.000	0.39			7.6
S5.006	S20		11.358	-0.133	0.000	0.74			56.9
S5.007	S21		11.285	-0.181	0.000	0.51			54.6
S8.000	S22		11.649	-0.151	0.000	0.23			9.6
S8.001	S23		11.285	-0.150	0.000	0.24			15.3
S5.008	S24		11.006	-0.226	0.000	0.42			61.6
S5.009	S25		10.936	-0.190	0.000	0.63			61.0
S5.010	Sdummy pipe		10.903	-0.201	0.000	0.10			13.1
S9.000	S26		12.036	-0.119	0.000	0.09			1.9
S9.001	S27		11.748	-0.095	0.000	0.29			5.7
S9.002	S28		11.426	-0.136	0.000	0.32			19.8
S10.000	S29		11.219	-0.090	0.000	0.34			6.7
S11.000	S30		11.221	-0.079	0.000	0.44			7.6
S9.003	S31		10.969	0.065	0.000	1.18			37.2
S9.004	SDummy		10.904	0.050	0.000	0.18			5.3
S1.009	SBasin		10.901	0.195	0.000	0.42			6.3

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

PN	US/MH Name	Status	Level Exceeded
S6.001	S14	OK	1
S6.002	S15	OK	
S5.003	S16	OK	
S5.004	S17	OK	
S5.005	S18	OK	
S7.000	S19	OK	
S5.006	S20	OK	
S5.007	S21	OK	
S8.000	S22	OK	
S8.001	S23	OK	
S5.008	S24	OK	
S5.009	S25	OK	
S5.010	Sdummy pipe	OK	
S9.000	S26	OK	
S9.001	S27	OK	
S9.002	S28	OK	2
S10.000	S29	OK	1
S11.000	S30	OK	4
S9.003	S31	SURCHARGED	4
S9.004	SDummy	SURCHARGED	
S1.009	SBasin	SURCHARGED	

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.700	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	15 Winter	30	+0%	100/15 Summer			
S1.001	S2	15 Winter	30	+0%	30/15 Summer			
S2.000	S3	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
S2.001	S3A	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
S1.002	S4	15 Winter	30	+0%	30/15 Summer			
S1.003	S5	15 Winter	30	+0%	30/15 Summer			
S3.000	S6	15 Winter	30	+0%	30/15 Summer			
S3.001	S6A	15 Winter	30	+0%	30/15 Summer			
S1.004	S7	15 Winter	30	+0%	30/15 Summer			
S1.005	S8	15 Winter	30	+0%	30/15 Summer			
S4.000	S9	15 Winter	30	+0%	30/15 Summer			
S1.006	S10	600 Winter	30	+0%	30/15 Summer			
S1.007	S11	600 Winter	30	+0%	30/15 Summer			
S1.008	SDummy	600 Winter	30	+0%	30/15 Summer			
S5.000	S12	15 Winter	30	+0%	30/15 Summer			
S5.001	S12A	15 Winter	30	+0%	30/15 Summer			
S5.002	S13	15 Winter	30	+0%	30/15 Summer	100/15 Winter		
S6.000	S14a	15 Winter	30	+0%	30/15 Summer			

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1	12.157	-0.001	0.000	0.36			6.1	OK
S1.001	S2	12.139	0.213	0.000	0.63			10.7	SURCHARGED
S2.000	S3	12.593	0.468	0.000	0.64			10.4	SURCHARGED
S2.001	S3A	12.541	0.558	0.000	1.18			21.9	SURCHARGED
S1.002	S4	12.085	0.439	0.000	1.21			46.5	SURCHARGED
S1.003	S5	11.625	0.283	0.000	1.01			71.2	SURCHARGED
S3.000	S6	12.051	0.347	0.000	0.74			12.1	SURCHARGED
S3.001	S6A	11.964	0.418	0.000	1.23			21.0	SURCHARGED
S1.004	S7	11.533	0.270	0.000	1.00			102.4	SURCHARGED
S1.005	S8	11.399	0.262	0.000	1.47			122.5	SURCHARGED
S4.000	S9	11.750	0.150	0.000	0.98			18.8	SURCHARGED
S1.006	S10	11.319	0.218	0.000	0.22			18.4	SURCHARGED
S1.007	S11	11.319	0.249	0.000	0.15			19.9	SURCHARGED
S1.008	SDummy	11.318	0.297	0.000	0.33			19.7	SURCHARGED
S5.000	S12	12.430	0.157	0.000	0.34			12.9	SURCHARGED
S5.001	S12A	12.404	0.322	0.000	0.93			35.2	SURCHARGED
S5.002	S13	12.225	0.351	0.000	1.13			34.4	SURCHARGED
S6.000	S14a	12.818	0.248	0.000	0.59			9.6	SURCHARGED

PN	US/MH Name	Level Exceeded
S1.000	S1	
S1.001	S2	
S2.000	S3	4
S2.001	S3A	4
S1.002	S4	
S1.003	S5	
S3.000	S6	
S3.001	S6A	
S1.004	S7	
S1.005	S8	
S4.000	S9	
S1.006	S10	
S1.007	S11	
S1.008	SDummy	
S5.000	S12	
S5.001	S12A	
S5.002	S13	1
S6.000	S14a	

30 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) Surcharge	First (Y) Flood	First (Z) Overflow
S6.001	S14	15 Winter	30	+0%	30/15 Summer	100/15 Winter	
S6.002	S15	15 Winter	30	+0%	30/15 Summer		
S5.003	S16	15 Winter	30	+0%	30/15 Summer		
S5.004	S17	15 Winter	30	+0%	30/15 Summer		
S5.005	S18	15 Winter	30	+0%	30/15 Summer		
S7.000	S19	15 Winter	30	+0%	100/15 Summer		
S5.006	S20	15 Winter	30	+0%	30/15 Summer		
S5.007	S21	15 Winter	30	+0%	30/15 Summer		
S8.000	S22	15 Winter	30	+0%			
S8.001	S23	15 Winter	30	+0%	100/15 Winter		
S5.008	S24	600 Winter	30	+0%	30/120 Winter		
S5.009	S25	600 Winter	30	+0%	30/15 Winter		
S5.010	Sdummy pipe	600 Winter	30	+0%	30/60 Winter		
S9.000	S26	15 Winter	30	+0%	100/15 Summer		
S9.001	S27	15 Winter	30	+0%	30/15 Summer		
S9.002	S28	15 Winter	30	+0%	30/15 Summer	100/15 Summer	
S10.000	S29	15 Winter	30	+0%	30/15 Summer	100/15 Winter	
S11.000	S30	15 Winter	30	+0%	30/15 Summer	100/15 Summer	
S9.003	S31	15 Winter	30	+0%	1/15 Summer	100/15 Summer	
S9.004	SDummy	15 Winter	30	+0%	1/15 Summer		
S1.009	SBasin	600 Winter	30	+0%	1/15 Summer		

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
S6.001	S14		12.775	0.338	0.000	1.29			24.4
S6.002	S15		12.285	0.163	0.000	0.68			31.1
S5.003	S16		12.156	0.329	0.000	1.59			78.5
S5.004	S17		12.058	0.255	0.000	1.25			84.8
S5.005	S18		11.721	0.127	0.000	0.88			98.2
S7.000	S19		11.944	-0.010	0.000	0.93			18.0
S5.006	S20		11.623	0.132	0.000	1.59			122.4
S5.007	S21		11.525	0.059	0.000	1.10			117.0
S8.000	S22		11.698	-0.102	0.000	0.56			23.5
S8.001	S23		11.344	-0.091	0.000	0.65			41.0
S5.008	S24		11.320	0.088	0.000	0.13			19.2
S5.009	S25		11.319	0.193	0.000	0.20			19.3
S5.010	Sdummy pipe		11.318	0.214	0.000	0.15			19.2
S9.000	S26		12.118	-0.037	0.000	0.23			4.7
S9.001	S27		12.108	0.265	0.000	0.70			14.0
S9.002	S28		12.038	0.476	0.000	0.71			43.2
S10.000	S29		11.847	0.538	0.000	0.58			11.6
S11.000	S30		11.943	0.643	0.000	0.76			13.1
S9.003	S31		11.704	0.800	0.000	2.60			81.7
S9.004	SDummy		11.355	0.501	0.000	2.82			81.5
S1.009	SBasin		11.317	0.611	0.000	0.42			6.4

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

PN	US/MH Name	Status	Level Exceeded
S6.001	S14	SURCHARGED	1
S6.002	S15	SURCHARGED	
S5.003	S16	SURCHARGED	
S5.004	S17	SURCHARGED	
S5.005	S18	SURCHARGED	
S7.000	S19	OK	
S5.006	S20	SURCHARGED	
S5.007	S21	SURCHARGED	
S8.000	S22	OK	
S8.001	S23	OK	
S5.008	S24	SURCHARGED	
S5.009	S25	SURCHARGED	
S5.010	Sdummy pipe	SURCHARGED	
S9.000	S26	OK	
S9.001	S27	SURCHARGED	
S9.002	S28	SURCHARGED	2
S10.000	S29	SURCHARGED	1
S11.000	S30	SURCHARGED	4
S9.003	S31	SURCHARGED	4
S9.004	SDummy	SURCHARGED	
S1.009	SBasin	SURCHARGED	

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

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.700	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	15 Winter	100	+20%	100/15 Summer			
S1.001	S2	15 Winter	100	+20%	30/15 Summer			
S2.000	S3	15 Winter	100	+20%	30/15 Summer	100/15 Summer		
S2.001	S3A	15 Winter	100	+20%	30/15 Summer	100/15 Summer		
S1.002	S4	15 Winter	100	+20%	30/15 Summer			
S1.003	S5	15 Winter	100	+20%	30/15 Summer			
S3.000	S6	15 Winter	100	+20%	30/15 Summer			
S3.001	S6A	15 Winter	100	+20%	30/15 Summer			
S1.004	S7	15 Winter	100	+20%	30/15 Summer			
S1.005	S8	15 Winter	100	+20%	30/15 Summer			
S4.000	S9	15 Winter	100	+20%	30/15 Summer			
S1.006	S10	720 Winter	100	+20%	30/15 Summer			
S1.007	S11	720 Winter	100	+20%	30/15 Summer			
S1.008	SDummy	720 Winter	100	+20%	30/15 Summer			
S5.000	S12	15 Winter	100	+20%	30/15 Summer			
S5.001	S12A	15 Winter	100	+20%	30/15 Summer			
S5.002	S13	15 Winter	100	+20%	30/15 Summer	100/15 Winter		
S6.000	S14a	15 Winter	100	+20%	30/15 Summer			

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1	13.026	0.868	0.000	0.43			7.3	SURCHARGED
S1.001	S2	13.000	1.074	0.000	0.88			15.0	FLOOD RISK
S2.000	S3	13.326	1.201	0.581	0.92			15.0	FLOOD
S2.001	S3A	13.228	1.245	2.097	1.66			30.7	FLOOD
S1.002	S4	12.906	1.260	0.000	1.49			57.4	SURCHARGED
S1.003	S5	12.238	0.896	0.000	1.37			96.3	SURCHARGED
S3.000	S6	12.987	1.283	0.000	1.00			16.5	FLOOD RISK
S3.001	S6A	12.835	1.289	0.000	1.69			28.8	SURCHARGED
S1.004	S7	12.086	0.824	0.000	1.38			140.4	SURCHARGED
S1.005	S8	11.840	0.703	0.000	2.08			172.8	SURCHARGED
S4.000	S9	12.531	0.931	0.000	1.32			25.5	FLOOD RISK
S1.006	S10	11.686	0.585	0.000	0.28			24.0	SURCHARGED
S1.007	S11	11.685	0.615	0.000	0.20			25.9	SURCHARGED
S1.008	SDummy	11.684	0.663	0.000	0.43			25.8	SURCHARGED
S5.000	S12	13.423	1.150	0.000	0.37			14.1	FLOOD RISK
S5.001	S12A	13.388	1.306	0.000	1.25			47.1	FLOOD RISK
S5.002	S13	13.091	1.217	0.006	1.50			45.9	FLOOD
S6.000	S14a	13.762	1.192	0.000	0.84			13.7	FLOOD RISK

PN	US/MH Name	Level Exceeded
S1.000	S1	
S1.001	S2	
S2.000	S3	4
S2.001	S3A	4
S1.002	S4	
S1.003	S5	
S3.000	S6	
S3.001	S6A	
S1.004	S7	
S1.005	S8	
S4.000	S9	
S1.006	S10	
S1.007	S11	
S1.008	SDummy	
S5.000	S12	
S5.001	S12A	
S5.002	S13	1
S6.000	S14a	

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) Surcharge	First (Y) Flood	First (Z) Overflow
S6.001	S14	15 Winter	100	+20%	30/15 Summer	100/15 Winter	
S6.002	S15	15 Winter	100	+20%	30/15 Summer		
S5.003	S16	15 Winter	100	+20%	30/15 Summer		
S5.004	S17	15 Winter	100	+20%	30/15 Summer		
S5.005	S18	15 Winter	100	+20%	30/15 Summer		
S7.000	S19	15 Winter	100	+20%	100/15 Summer		
S5.006	S20	15 Winter	100	+20%	30/15 Summer		
S5.007	S21	15 Winter	100	+20%	30/15 Summer		
S8.000	S22	15 Winter	100	+20%			
S8.001	S23	720 Winter	100	+20%	100/15 Winter		
S5.008	S24	720 Winter	100	+20%	30/120 Winter		
S5.009	S25	720 Winter	100	+20%	30/15 Winter		
S5.010	Sdummy pipe	720 Winter	100	+20%	30/60 Winter		
S9.000	S26	15 Winter	100	+20%	100/15 Summer		
S9.001	S27	15 Winter	100	+20%	30/15 Summer		
S9.002	S28	15 Winter	100	+20%	30/15 Summer	100/15 Summer	
S10.000	S29	15 Winter	100	+20%	30/15 Summer	100/15 Winter	
S11.000	S30	15 Winter	100	+20%	30/15 Summer	100/15 Summer	
S9.003	S31	15 Winter	100	+20%	1/15 Summer	100/15 Summer	
S9.004	SDummy	30 Winter	100	+20%	1/15 Summer		
S1.009	SBasin	720 Winter	100	+20%	1/15 Summer		

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
S6.001	S14		13.638	1.201	0.803	1.41			26.6
S6.002	S15		13.160	1.038	0.000	0.78			35.7
S5.003	S16		12.994	1.167	0.000	2.02			100.1
S5.004	S17		12.837	1.035	0.000	1.62			109.3
S5.005	S18		12.277	0.683	0.000	1.17			130.3
S7.000	S19		12.609	0.655	0.000	1.11			21.5
S5.006	S20		12.138	0.647	0.000	2.19			168.2
S5.007	S21		11.972	0.506	0.000	1.49			159.1
S8.000	S22		11.742	-0.058	0.000	0.87			36.6
S8.001	S23		11.687	0.252	0.000	0.08			4.9
S5.008	S24		11.687	0.455	0.000	0.18			26.5
S5.009	S25		11.685	0.559	0.000	0.27			26.3
S5.010	Sdummy pipe		11.685	0.581	0.000	0.20			26.2
S9.000	S26		12.996	0.841	0.000	0.32			6.6
S9.001	S27		12.975	1.132	0.000	0.87			17.3
S9.002	S28		12.763	1.201	0.730	1.00			61.0
S10.000	S29		12.509	1.200	0.105	0.99			19.6
S11.000	S30		12.501	1.201	0.970	1.00			17.2
S9.003	S31		12.108	1.204	4.001	3.14			98.6
S9.004	SDummy		11.707	0.853	0.000	3.30			95.3
S1.009	SBasin		11.683	0.977	0.000	0.42			6.4

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

PN	US/MH Name	Status	Level Exceeded
S6.001	S14	FLOOD	1
S6.002	S15	FLOOD RISK	
S5.003	S16	FLOOD RISK	
S5.004	S17	FLOOD RISK	
S5.005	S18	SURCHARGED	
S7.000	S19	SURCHARGED	
S5.006	S20	SURCHARGED	
S5.007	S21	SURCHARGED	
S8.000	S22	OK	
S8.001	S23	SURCHARGED	
S5.008	S24	SURCHARGED	
S5.009	S25	SURCHARGED	
S5.010	Sdummy pipe	SURCHARGED	
S9.000	S26	SURCHARGED	
S9.001	S27	FLOOD RISK	
S9.002	S28	FLOOD	2
S10.000	S29	FLOOD	1
S11.000	S30	FLOOD	4
S9.003	S31	FLOOD	4
S9.004	SDummy	SURCHARGED	
S1.009	SBasin	SURCHARGED	

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

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.700	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320
Return Period(s) (years)	100
Climate Change (%)	40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	15 Winter	100	+40%	100/15 Summer			
S1.001	S2	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S2.000	S3	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S2.001	S3A	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S1.002	S4	15 Winter	100	+40%	100/15 Summer			
S1.003	S5	15 Winter	100	+40%	100/15 Summer			
S3.000	S6	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S3.001	S6A	15 Winter	100	+40%	100/15 Summer			
S1.004	S7	15 Winter	100	+40%	100/15 Summer			
S1.005	S8	15 Winter	100	+40%	100/15 Summer			
S4.000	S9	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S1.006	S10	960 Winter	100	+40%	100/15 Summer			
S1.007	S11	960 Winter	100	+40%	100/15 Summer			
S1.008	SDummy	960 Winter	100	+40%	100/15 Summer			
S5.000	S12	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S5.001	S12A	15 Winter	100	+40%	100/15 Summer	100/15 Winter		
S5.002	S13	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S6.000	S14a	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S6.001	S14	15 Winter	100	+40%	100/15 Summer	100/15 Summer		

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1	13.246	1.088	0.000	0.53			9.1	FLOOD RISK
S1.001	S2	13.175	1.249	0.956	1.16			19.7	FLOOD
S2.000	S3	13.327	1.202	1.639	1.02			16.7	FLOOD
S2.001	S3A	13.231	1.248	5.344	1.89			35.0	FLOOD
S1.002	S4	13.140	1.494	0.000	1.54			59.1	FLOOD RISK
S1.003	S5	12.526	1.184	0.000	1.50			105.9	SURCHARGED
S3.000	S6	13.007	1.303	2.192	1.45			23.9	FLOOD
S3.001	S6A	13.013	1.467	0.000	1.83			31.0	FLOOD RISK
S1.004	S7	12.348	1.085	0.000	1.50			152.8	SURCHARGED
S1.005	S8	12.057	0.920	0.000	2.31			192.7	SURCHARGED
S4.000	S9	12.800	1.200	0.387	1.46			28.1	FLOOD
S1.006	S10	11.837	0.736	0.000	0.26			22.0	SURCHARGED
S1.007	S11	11.837	0.767	0.000	0.18			23.7	SURCHARGED
S1.008	SDummy	11.836	0.815	0.000	0.40			23.7	SURCHARGED
S5.000	S12	13.475	1.202	2.515	0.65			24.9	FLOOD
S5.001	S12A	13.520	1.438	0.159	1.40			52.9	FLOOD
S5.002	S13	13.095	1.221	3.986	2.10			64.0	FLOOD
S6.000	S14a	13.770	1.200	0.445	0.99			16.1	FLOOD
S6.001	S14	13.641	1.204	3.702	1.56			29.4	FLOOD

PN	US/MH Name	Level Exceeded
S1.000	S1	
S1.001	S2	2
S2.000	S3	4
S2.001	S3A	4
S1.002	S4	
S1.003	S5	
S3.000	S6	4
S3.001	S6A	
S1.004	S7	
S1.005	S8	
S4.000	S9	2
S1.006	S10	
S1.007	S11	
S1.008	SDummy	
S5.000	S12	4
S5.001	S12A	1
S5.002	S13	4
S6.000	S14a	3
S6.001	S14	4

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
S6.002	S15	15 Summer	100	+40%	100/15 Summer		
S5.003	S16	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S5.004	S17	15 Winter	100	+40%	100/15 Summer		
S5.005	S18	15 Winter	100	+40%	100/15 Summer		
S7.000	S19	15 Winter	100	+40%	100/15 Summer		
S5.006	S20	15 Winter	100	+40%	100/15 Summer		
S5.007	S21	15 Winter	100	+40%	100/15 Summer		
S8.000	S22	15 Winter	100	+40%	100/15 Summer		
S8.001	S23	960 Winter	100	+40%	100/15 Summer		
S5.008	S24	960 Winter	100	+40%	100/15 Summer		
S5.009	S25	960 Winter	100	+40%	100/15 Summer		
S5.010	Sdummy pipe	960 Winter	100	+40%	100/15 Summer		
S9.000	S26	15 Summer	100	+40%	100/15 Summer		
S9.001	S27	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S9.002	S28	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S10.000	S29	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S11.000	S30	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S9.003	S31	30 Winter	100	+40%	100/15 Summer	100/15 Summer	
S9.004	SDummy	960 Winter	100	+40%	100/15 Summer		
S1.009	SBasin	960 Winter	100	+40%	100/15 Summer		

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
S6.002	S15		13.264	1.142	0.000	0.81			37.0
S5.003	S16		13.040	1.213	2.085	2.09			103.3
S5.004	S17		12.944	1.141	0.000	1.60			108.0
S5.005	S18		12.516	0.922	0.000	1.24			137.8
S7.000	S19		12.992	1.038	0.000	1.20			23.4
S5.006	S20		12.383	0.892	0.000	2.40			183.9
S5.007	S21		12.189	0.723	0.000	1.60			170.7
S8.000	S22		11.862	0.062	0.000	0.97			41.0
S8.001	S23		11.839	0.404	0.000	0.07			4.3
S5.008	S24		11.838	0.606	0.000	0.17			24.1
S5.009	S25		11.837	0.711	0.000	0.25			24.0
S5.010	Sdummy pipe		11.836	0.732	0.000	0.18			23.9
S9.000	S26		13.082	0.927	0.000	0.31			6.4
S9.001	S27		13.043	1.200	0.349	0.99			19.7
S9.002	S28		12.766	1.204	4.050	1.00			61.1
S10.000	S29		12.510	1.201	0.915	1.00			19.7
S11.000	S30		12.502	1.202	2.362	1.00			17.1
S9.003	S31		12.112	1.208	8.266	3.12			98.2
S9.004	SDummy		11.837	0.983	0.000	0.42			12.0
S1.009	SBasin		11.835	1.129	0.000	0.42			6.4

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

PN	US/MH Name	Status	Level Exceeded
S6.002	S15	FLOOD RISK	
S5.003	S16	FLOOD	4
S5.004	S17	FLOOD RISK	
S5.005	S18	SURCHARGED	
S7.000	S19	FLOOD RISK	
S5.006	S20	SURCHARGED	
S5.007	S21	SURCHARGED	
S8.000	S22	SURCHARGED	
S8.001	S23	SURCHARGED	
S5.008	S24	SURCHARGED	
S5.009	S25	SURCHARGED	
S5.010	Sdummy pipe	SURCHARGED	
S9.000	S26	FLOOD RISK	
S9.001	S27	FLOOD	2
S9.002	S28	FLOOD	4
S10.000	S29	FLOOD	4
S11.000	S30	FLOOD	5
S9.003	S31	FLOOD	5
S9.004	SDummy	SURCHARGED	
S1.009	SBasin	FLOOD RISK	

Catchment B

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	19.700	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Online Controls for Storm

Hydro-Brake® Optimum Manhole: SBasin3, DS/PN: S34.002, Volume (m³): 1.5

Unit Reference	MD-SHE-0049-8000-0450-8000
Design Head (m)	0.450
Design Flow (l/s)	0.8
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	49
Invert Level (m)	9.530
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.450	0.8
Flush-Flo™	0.134	0.8
Kick-Flo®	0.298	0.7
Mean Flow over Head Range	-	0.7

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.8	1.200	1.2	3.000	1.9	7.000	2.8
0.200	0.8	1.400	1.3	3.500	2.0	7.500	2.9
0.300	0.7	1.600	1.4	4.000	2.1	8.000	3.0
0.400	0.8	1.800	1.5	4.500	2.3	8.500	3.1
0.500	0.8	2.000	1.6	5.000	2.4	9.000	3.2
0.600	0.9	2.200	1.6	5.500	2.5	9.500	3.3
0.800	1.0	2.400	1.7	6.000	2.6		
1.000	1.1	2.600	1.8	6.500	2.7		

Hydro-Brake® Optimum Manhole: SBasin 2, DS/PN: S35.014, Volume (m³): 7.5

Unit Reference	MD-SHE-0154-1100-0900-1100
Design Head (m)	0.900
Design Flow (l/s)	11.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	154
Invert Level (m)	8.526
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Hydro-Brake® Optimum Manhole: SBasin 2, DS/PN: S35.014, Volume (m³): 7.5

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.900	11.0
Flush-Flo™	0.286	11.0
Kick-Flo®	0.629	9.3
Mean Flow over Head Range	-	9.3

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.5	1.200	12.6	3.000	19.5	7.000	29.2
0.200	10.7	1.400	13.5	3.500	20.9	7.500	30.2
0.300	11.0	1.600	14.4	4.000	22.3	8.000	31.2
0.400	10.8	1.800	15.2	4.500	23.6	8.500	32.1
0.500	10.5	2.000	16.0	5.000	24.9	9.000	33.0
0.600	9.7	2.200	16.8	5.500	26.0	9.500	33.8
0.800	10.4	2.400	17.5	6.000	27.1		
1.000	11.5	2.600	18.2	6.500	28.2		

Hydro-Brake® Optimum Manhole: S47, DS/PN: S33.002, Volume (m³): 3.8

Unit Reference	MD-SHE-0159-1200-0950-1200
Design Head (m)	0.950
Design Flow (l/s)	12.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	159
Invert Level (m)	7.924
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.950	12.0
Flush-Flo™	0.301	12.0
Kick-Flo®	0.662	10.1
Mean Flow over Head Range	-	10.2

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.7	0.300	12.0	0.500	11.6	0.800	11.1
0.200	11.7	0.400	11.9	0.600	11.0	1.000	12.3

Hydro-Brake® Optimum Manhole: S47, DS/PN: S33.002, Volume (m³): 3.8

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
1.200	13.4	2.400	18.6	5.000	26.5	8.000	33.2
1.400	14.4	2.600	19.4	5.500	27.7	8.500	34.2
1.600	15.4	3.000	20.7	6.000	28.9	9.000	35.2
1.800	16.2	3.500	22.3	6.500	30.1	9.500	36.1
2.000	17.1	4.000	23.8	7.000	31.1		
2.200	17.9	4.500	25.2	7.500	32.2		

Storage Structures for Storm

Tank or Pond Manhole: STank, DS/PN: S33.001

Invert Level (m) 8.307

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	205.0	0.400	205.0	0.401	0.0

Tank or Pond Manhole: SBasin3, DS/PN: S34.002

Invert Level (m) 9.530

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	116.8	0.250	171.7	0.254	283.3	0.750	389.8

Tank or Pond Manhole: SBasin 2, DS/PN: S35.014

Invert Level (m) 8.526

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	339.1	0.350	1960.7	0.900	4443.5
0.300	413.3	0.850	2749.2	1.200	5906.9

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 Coeffiecient	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 Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.700	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
S33.000	S1A	15 Winter	1	+0%	100/15 Summer		
S33.001	STank	360 Winter	1	+0%	100/120 Summer		
S34.000	S1	15 Summer	1	+0%	30/15 Summer		
S34.001	S2	15 Winter	1	+0%	30/15 Summer	100/15 Summer	
S34.002	SBasin3	240 Winter	1	+0%	30/30 Summer		
S35.000	S3	15 Summer	1	+0%	30/15 Summer	100/15 Summer	
S36.000	S4	15 Winter	1	+0%	30/15 Summer	100/15 Winter	
S36.001	S5	15 Winter	1	+0%	30/15 Summer		
S35.001	S6	15 Winter	1	+0%	30/15 Summer	100/15 Summer	
S35.002	S7	15 Winter	1	+0%	30/15 Summer	100/15 Summer	
S37.000	S8 dummy	15 Summer	1	+0%	30/15 Summer	100/15 Summer	
S37.001	S8	15 Winter	1	+0%	30/15 Summer	100/15 Summer	
S37.002	S9	15 Winter	1	+0%	30/15 Summer		
S37.003	S10	15 Winter	1	+0%	30/15 Summer		
S35.003	S11	15 Winter	1	+0%	30/15 Summer	100/15 Summer	
S35.004	S12	15 Winter	1	+0%	30/15 Summer		
S35.005	S13	15 Winter	1	+0%	30/15 Summer		
S35.006	S14	15 Winter	1	+0%	30/15 Summer	100/15 Winter	

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
S33.000	S1A		8.763	-0.137	0.000	0.32			13.2
S33.001	STank		8.362	-0.170	0.000	0.02			0.9
S34.000	S1		10.066	-0.099	0.000	0.26			4.9
S34.001	S2		9.943	-0.042	0.000	0.86			14.4
S34.002	SBasin3		9.629	-0.051	0.000	0.02			0.8
S35.000	S3		11.007	-0.097	0.000	0.28			7.1
S36.000	S4		11.083	-0.092	0.000	0.32			5.4
S36.001	S5		10.750	-0.154	0.000	0.21			10.1
S35.001	S6		10.595	-0.111	0.000	0.50			21.0
S35.002	S7		10.436	-0.181	0.000	0.33			26.1
S37.000	S8 dummy		10.800	-0.160	0.000	0.18			5.4
S37.001	S8		10.761	-0.155	0.000	0.21			10.0
S37.002	S9		10.551	-0.120	0.000	0.44			15.8
S37.003	S10		10.474	-0.132	0.000	0.36			17.2
S35.003	S11		10.289	-0.082	0.000	0.87			53.3
S35.004	S12		10.221	-0.077	0.000	0.89			58.9
S35.005	S13		10.002	-0.148	0.000	0.67			67.0
S35.006	S14		9.840	-0.207	0.000	0.41			74.6

PN	US/MH Name	Status	Level Exceeded
S33.000	S1A	OK	
S33.001	STank	OK	
S34.000	S1	OK	
S34.001	S2	OK	2
S34.002	SBasin3	OK	
S35.000	S3	OK	2
S36.000	S4	OK	1
S36.001	S5	OK	
S35.001	S6	OK	4
S35.002	S7	OK	4
S37.000	S8 dummy	OK	4
S37.001	S8	OK	4
S37.002	S9	OK	
S37.003	S10	OK	
S35.003	S11	OK	4
S35.004	S12	OK	
S35.005	S13	OK	
S35.006	S14	OK	1

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) Surcharge	First (Y) Flood	First (Z) Overflow
S35.007	S15	15 Winter	1	+0%	30/15 Summer	100/15 Winter	
S35.008	S16	15 Winter	1	+0%	30/15 Summer		
S35.009	S17	15 Winter	1	+0%	30/15 Summer		
S35.010	S18	15 Winter	1	+0%	30/15 Summer		
S35.011	S19	15 Winter	1	+0%	30/15 Summer		
S38.000	S20 dummy	15 Winter	1	+0%	100/15 Summer		
S38.001	S20	15 Winter	1	+0%	30/15 Winter		
S39.000	S21 dummy	15 Winter	1	+0%	100/15 Summer		
S39.001	S21	15 Winter	1	+0%	30/15 Summer		
S38.002	S22	15 Winter	1	+0%	30/15 Summer	100/15 Winter	
S40.000	S23 dummy L	15 Summer	1	+0%	30/15 Summer		
S41.000	S23 dummy R	15 Summer	1	+0%	30/15 Summer		
S40.001	S23	15 Winter	1	+0%	30/15 Summer	100/15 Winter	
S42.000	S23A dummy	15 Summer	1	+0%	30/15 Summer		
S40.002	S23A	15 Winter	1	+0%	30/15 Summer		
S43.000	S24 dummy	15 Winter	1	+0%	30/15 Summer		
S38.003	S24	15 Winter	1	+0%	30/15 Summer	100/15 Summer	
S38.004	S25	15 Winter	1	+0%	30/15 Summer		
S38.005	S26	15 Winter	1	+0%	30/15 Summer		
S38.006	S27	15 Winter	1	+0%	30/15 Summer	100/15 Winter	
S38.007	S28	15 Winter	1	+0%	30/15 Summer		
S44.000	S29	15 Winter	1	+0%	30/15 Summer		
S44.001	S30	15 Winter	1	+0%	100/15 Summer		
S38.008	S31	15 Winter	1	+0%	30/15 Summer		
S38.009	S32	15 Winter	1	+0%	100/15 Summer		
S45.000	S33 dummy	15 Summer	1	+0%	30/15 Summer		
S45.001	S33	15 Winter	1	+0%	30/15 Summer	100/15 Summer	
S46.000	S34 dummy	15 Summer	1	+0%	30/15 Summer		
S46.001	S34	15 Winter	1	+0%	30/15 Summer	100/15 Summer	
S45.002	S35	15 Winter	1	+0%	30/15 Summer		
S45.003	S36	15 Winter	1	+0%	30/15 Summer	100/15 Winter	
S38.010	S37	15 Winter	1	+0%	30/15 Summer		
S38.011	S38	15 Winter	1	+0%	30/15 Summer		
S47.000	S39 dummy	15 Winter	1	+0%	100/15 Summer		
S47.001	S39	15 Winter	1	+0%	30/15 Winter		
S47.002	S40	15 Winter	1	+0%	30/15 Summer		
S38.012	S41	15 Winter	1	+0%	30/15 Summer		
S38.013	S42	15 Winter	1	+0%	30/15 Summer		
S38.014	S43	15 Winter	1	+0%	30/15 Summer		
S35.012	S44	15 Winter	1	+0%	30/15 Summer		
S35.013	SBasin 2 Dummy	15 Winter	1	+0%	30/15 Winter		
S35.014	SBasin 2	240 Winter	1	+0%	1/15 Summer		
S34.003	S45	180 Winter	1	+0%	100/15 Winter		
S34.004	S46	180 Winter	1	+0%	30/15 Winter		
S33.002	S47	180 Winter	1	+0%	1/30 Winter		

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S35.007	S15		9.682	-0.100	0.000	0.88		
S35.008	S16		9.627	-0.124	0.000	0.76		
S35.009	S17		9.368	-0.187	0.000	0.64		
S35.010	S18		9.297	-0.207	0.000	0.56		
S35.011	S19		9.216	-0.234	0.000	0.47		
S38.000	S20 dummy		12.618	-0.182	0.000	0.08		
S38.001	S20		12.029	-0.157	0.000	0.20		
S39.000	S21 dummy		12.607	-0.193	0.000	0.05		
S39.001	S21		11.872	-0.166	0.000	0.15		
S38.002	S22		11.511	-0.176	0.000	0.34		
S40.000	S23 dummy L		11.708	-0.161	0.000	0.18		
S41.000	S23 dummy R		11.722	-0.162	0.000	0.18		
S40.001	S23		11.604	-0.196	0.000	0.26		
S42.000	S23A dummy		11.571	-0.157	0.000	0.20		
S40.002	S23A		11.471	-0.183	0.000	0.32		
S43.000	S24 dummy		11.312	-0.120	0.000	0.19		
S38.003	S24		11.306	-0.078	0.000	0.87		
S38.004	S25		11.106	-0.088	0.000	0.94		
S38.005	S26		11.028	-0.144	0.000	0.69		
S38.006	S27		10.942	-0.112	0.000	0.83		
S38.007	S28		10.861	-0.109	0.000	0.84		
S44.000	S29		11.529	-0.077	0.000	0.47		
S44.001	S30		11.041	-0.132	0.000	0.35		
S38.008	S31		10.762	-0.096	0.000	0.98		
S38.009	S32		10.545	-0.292	0.000	0.27		
S45.000	S33 dummy		10.755	-0.143	0.000	0.29		
S45.001	S33		10.638	-0.137	0.000	0.32		
S46.000	S34 dummy		10.596	-0.173	0.000	0.12		
S46.001	S34		10.487	-0.168	0.000	0.14		
S45.002	S35		10.378	-0.073	0.000	0.78		
S45.003	S36		10.187	-0.048	0.000	0.97		
S38.010	S37		9.957	-0.210	0.000	0.55		
S38.011	S38		9.718	-0.237	0.000	0.46		
S47.000	S39 dummy		10.254	-0.168	0.000	0.15		
S47.001	S39		10.146	-0.146	0.000	0.27		
S47.002	S40		9.887	-0.116	0.000	0.47		
S38.012	S41		9.479	-0.210	0.000	0.55		
S38.013	S42		9.212	-0.234	0.000	0.62		
S38.014	S43		9.156	-0.240	0.000	0.61		
S35.012	S44		9.090	-0.251	0.000	0.71		
S35.013	SBasin 2 Dummy		8.954	-0.329	0.000	0.52		
S35.014	SBasin 2		8.950	0.199	0.000	0.29		
S34.003	S45		8.412	-0.148	0.000	0.18		
S34.004	S46		8.397	-0.007	0.000	0.18		
S33.002	S47		8.363	0.064	0.000	0.15		

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

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S35.007	S15	75.9	OK	2
S35.008	S16	80.4	OK	
S35.009	S17	83.9	OK	
S35.010	S18	86.1	OK	
S35.011	S19	87.1	OK	
S38.000	S20 dummy	5.9	OK	
S38.001	S20	11.1	OK	
S39.000	S21 dummy	4.1	OK	
S39.001	S21	7.5	OK	
S38.002	S22	23.3	OK	1
S40.000	S23 dummy L	6.2	OK	
S41.000	S23 dummy R	6.2	OK	
S40.001	S23	16.9	OK	1
S42.000	S23A dummy	6.8	OK	
S40.002	S23A	28.6	OK	
S43.000	S24 dummy	5.7	OK	
S38.003	S24	58.7	OK	4
S38.004	S25	69.0	OK	
S38.005	S26	69.9	OK	
S38.006	S27	81.3	OK	1
S38.007	S28	84.8	OK	
S44.000	S29	8.2	OK	
S44.001	S30	17.1	OK	
S38.008	S31	94.0	OK	
S38.009	S32	96.6	OK	
S45.000	S33 dummy	8.8	OK	
S45.001	S33	15.6	OK	4
S46.000	S34 dummy	3.7	OK	
S46.001	S34	7.2	OK	4
S45.002	S35	29.4	OK	
S45.003	S36	33.3	OK	1
S38.010	S37	127.4	OK	
S38.011	S38	132.4	OK	
S47.000	S39 dummy	7.5	OK	
S47.001	S39	14.5	OK	
S47.002	S40	23.1	OK	
S38.012	S41	151.3	OK	
S38.013	S42	154.1	OK	
S38.014	S43	156.4	OK	
S35.012	S44	242.8	OK	
S35.013	SBasin 2 Dummy	242.0	OK	
S35.014	SBasin 2	10.9	SURCHARGED	
S34.003	S45	12.6	OK	
S34.004	S46	12.4	OK	
S33.002	S47	12.0	SURCHARGED	

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 Coeffiecient	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 Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.700	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
S33.000	S1A	15 Winter	30	+0%	100/15 Summer		
S33.001	STank	240 Winter	30	+0%	100/120 Summer		
S34.000	S1	15 Winter	30	+0%	30/15 Summer		
S34.001	S2	15 Winter	30	+0%	30/15 Summer	100/15 Summer	
S34.002	SBasin3	360 Winter	30	+0%	30/30 Summer		
S35.000	S3	15 Winter	30	+0%	30/15 Summer	100/15 Summer	
S36.000	S4	15 Winter	30	+0%	30/15 Summer	100/15 Winter	
S36.001	S5	15 Winter	30	+0%	30/15 Summer		
S35.001	S6	15 Winter	30	+0%	30/15 Summer	100/15 Summer	
S35.002	S7	15 Winter	30	+0%	30/15 Summer	100/15 Summer	
S37.000	S8 dummy	15 Winter	30	+0%	30/15 Summer	100/15 Summer	
S37.001	S8	15 Winter	30	+0%	30/15 Summer	100/15 Summer	
S37.002	S9	15 Winter	30	+0%	30/15 Summer		
S37.003	S10	15 Winter	30	+0%	30/15 Summer		
S35.003	S11	15 Winter	30	+0%	30/15 Summer	100/15 Summer	
S35.004	S12	15 Winter	30	+0%	30/15 Summer		
S35.005	S13	15 Winter	30	+0%	30/15 Summer		
S35.006	S14	15 Winter	30	+0%	30/15 Summer	100/15 Winter	

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
S33.000	S1A		8.827	-0.073	0.000	0.79			32.1
S33.001	STank		8.461	-0.071	0.000	0.06			2.9
S34.000	S1		10.655	0.490	0.000	0.52			9.9
S34.001	S2		10.612	0.627	0.000	1.94			32.6
S34.002	SBasin3		9.769	0.089	0.000	0.02			0.8
S35.000	S3		11.364	0.260	0.000	0.65			16.6
S36.000	S4		11.389	0.214	0.000	0.71			12.1
S36.001	S5		11.334	0.430	0.000	0.46			21.7
S35.001	S6		11.301	0.595	0.000	0.91			38.3
S35.002	S7		11.193	0.576	0.000	0.57			45.7
S37.000	S8 dummy		11.306	0.346	0.000	0.41			12.2
S37.001	S8		11.298	0.382	0.000	0.50			23.9
S37.002	S9		11.261	0.589	0.000	0.85			30.7
S37.003	S10		11.176	0.570	0.000	0.61			29.5
S35.003	S11		11.094	0.723	0.000	1.57			96.0
S35.004	S12		10.926	0.628	0.000	1.68			111.0
S35.005	S13		10.557	0.407	0.000	1.28			128.7
S35.006	S14		10.398	0.351	0.000	0.81			147.0

PN	US/MH Name	Status	Level Exceeded
S33.000	S1A	OK	
S33.001	STank	OK	
S34.000	S1	SURCHARGED	
S34.001	S2	SURCHARGED	2
S34.002	SBasin3	SURCHARGED	
S35.000	S3	SURCHARGED	2
S36.000	S4	SURCHARGED	1
S36.001	S5	SURCHARGED	
S35.001	S6	SURCHARGED	4
S35.002	S7	SURCHARGED	4
S37.000	S8 dummy	SURCHARGED	4
S37.001	S8	SURCHARGED	4
S37.002	S9	SURCHARGED	
S37.003	S10	SURCHARGED	
S35.003	S11	SURCHARGED	4
S35.004	S12	SURCHARGED	
S35.005	S13	SURCHARGED	
S35.006	S14	SURCHARGED	1

30 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) Surcharge	First (Y) Flood	First (Z) Overflow
S35.007	S15	15 Winter	30	+0%	30/15 Summer	100/15 Winter	
S35.008	S16	15 Winter	30	+0%	30/15 Summer		
S35.009	S17	15 Winter	30	+0%	30/15 Summer		
S35.010	S18	15 Winter	30	+0%	30/15 Summer		
S35.011	S19	15 Winter	30	+0%	30/15 Summer		
S38.000	S20 dummy	15 Winter	30	+0%	100/15 Summer		
S38.001	S20	15 Winter	30	+0%	30/15 Winter		
S39.000	S21 dummy	15 Winter	30	+0%	100/15 Summer		
S39.001	S21	15 Winter	30	+0%	30/15 Summer		
S38.002	S22	15 Winter	30	+0%	30/15 Summer	100/15 Winter	
S40.000	S23 dummy L	15 Winter	30	+0%	30/15 Summer		
S41.000	S23 dummy R	15 Winter	30	+0%	30/15 Summer		
S40.001	S23	15 Winter	30	+0%	30/15 Summer	100/15 Winter	
S42.000	S23A dummy	15 Winter	30	+0%	30/15 Summer		
S40.002	S23A	15 Winter	30	+0%	30/15 Summer		
S43.000	S24 dummy	15 Winter	30	+0%	30/15 Summer		
S38.003	S24	15 Winter	30	+0%	30/15 Summer	100/15 Summer	
S38.004	S25	15 Winter	30	+0%	30/15 Summer		
S38.005	S26	15 Winter	30	+0%	30/15 Summer		
S38.006	S27	15 Winter	30	+0%	30/15 Summer	100/15 Winter	
S38.007	S28	15 Winter	30	+0%	30/15 Summer		
S44.000	S29	15 Winter	30	+0%	30/15 Summer		
S44.001	S30	15 Winter	30	+0%	100/15 Summer		
S38.008	S31	15 Winter	30	+0%	30/15 Summer		
S38.009	S32	15 Winter	30	+0%	100/15 Summer		
S45.000	S33 dummy	15 Winter	30	+0%	30/15 Summer		
S45.001	S33	15 Winter	30	+0%	30/15 Summer	100/15 Summer	
S46.000	S34 dummy	15 Winter	30	+0%	30/15 Summer		
S46.001	S34	15 Winter	30	+0%	30/15 Summer	100/15 Summer	
S45.002	S35	15 Winter	30	+0%	30/15 Summer		
S45.003	S36	15 Winter	30	+0%	30/15 Summer	100/15 Winter	
S38.010	S37	15 Winter	30	+0%	30/15 Summer		
S38.011	S38	15 Winter	30	+0%	30/15 Summer		
S47.000	S39 dummy	15 Winter	30	+0%	100/15 Summer		
S47.001	S39	15 Winter	30	+0%	30/15 Winter		
S47.002	S40	15 Winter	30	+0%	30/15 Summer		
S38.012	S41	15 Winter	30	+0%	30/15 Summer		
S38.013	S42	15 Winter	30	+0%	30/15 Summer		
S38.014	S43	15 Winter	30	+0%	30/15 Summer		
S35.012	S44	15 Winter	30	+0%	30/15 Summer		
S35.013	SBasin 2 Dummy	15 Winter	30	+0%	30/15 Winter		
S35.014	SBasin 2	480 Winter	30	+0%	1/15 Summer		
S34.003	S45	60 Winter	30	+0%	100/15 Winter		
S34.004	S46	60 Winter	30	+0%	30/15 Winter		
S33.002	S47	60 Winter	30	+0%	1/30 Winter		

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S35.007	S15		10.236	0.454	0.000	1.72		
S35.008	S16		10.108	0.357	0.000	1.47		
S35.009	S17		9.710	0.155	0.000	1.23		
S35.010	S18		9.627	0.123	0.000	1.08		
S35.011	S19		9.563	0.113	0.000	0.89		
S38.000	S20 dummy		12.644	-0.156	0.000	0.21		
S38.001	S20		12.215	0.029	0.000	0.55		
S39.000	S21 dummy		12.628	-0.172	0.000	0.13		
S39.001	S21		12.193	0.155	0.000	0.41		
S38.002	S22		12.162	0.475	0.000	0.71		
S40.000	S23 dummy L		12.290	0.421	0.000	0.42		
S41.000	S23 dummy R		12.293	0.409	0.000	0.42		
S40.001	S23		12.277	0.477	0.000	0.58		
S42.000	S23A dummy		12.211	0.483	0.000	0.44		
S40.002	S23A		12.196	0.542	0.000	0.56		
S43.000	S24 dummy		12.082	0.650	0.000	0.34		
S38.003	S24		12.075	0.691	0.000	1.43		
S38.004	S25		11.697	0.503	0.000	1.56		
S38.005	S26		11.608	0.435	0.000	1.17		
S38.006	S27		11.448	0.394	0.000	1.53		
S38.007	S28		11.241	0.271	0.000	1.58		
S44.000	S29		11.690	0.084	0.000	1.07		
S44.001	S30		11.170	-0.003	0.000	0.90		
S38.008	S31		10.944	0.086	0.000	2.09		
S38.009	S32		10.675	-0.162	0.000	0.58		
S45.000	S33 dummy		11.202	0.304	0.000	0.55		
S45.001	S33		11.185	0.410	0.000	0.64		
S46.000	S34 dummy		11.095	0.326	0.000	0.23		
S46.001	S34		11.090	0.435	0.000	0.25		
S45.002	S35		11.070	0.619	0.000	1.54		
S45.003	S36		10.647	0.412	0.000	1.90		
S38.010	S37		10.470	0.303	0.000	1.17		
S38.011	S38		10.181	0.226	0.000	0.96		
S47.000	S39 dummy		10.317	-0.105	0.000	0.35		
S47.001	S39		10.296	0.004	0.000	0.68		
S47.002	S40		10.194	0.191	0.000	1.17		
S38.012	S41		9.935	0.246	0.000	1.19		
S38.013	S42		9.608	0.162	0.000	1.32		
S38.014	S43		9.535	0.139	0.000	1.31		
S35.012	S44		9.453	0.112	0.000	1.46		
S35.013	SBasin 2 Dummy		9.312	0.029	0.000	1.04		
S35.014	SBasin 2		9.202	0.451	0.000	0.29		
S34.003	S45		8.560	0.000	0.000	0.23		
S34.004	S46		8.521	0.117	0.000	0.24		
S33.002	S47		8.504	0.205	0.000	0.15		

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

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S35.007	S15	147.8	SURCHARGED	2
S35.008	S16	155.0	SURCHARGED	
S35.009	S17	161.7	SURCHARGED	
S35.010	S18	165.1	SURCHARGED	
S35.011	S19	166.4	SURCHARGED	
S38.000	S20 dummy	14.4	OK	
S38.001	S20	31.0	SURCHARGED	
S39.000	S21 dummy	10.1	OK	
S39.001	S21	20.2	SURCHARGED	
S38.002	S22	47.9	SURCHARGED	1
S40.000	S23 dummy L	14.5	SURCHARGED	
S41.000	S23 dummy R	14.5	SURCHARGED	
S40.001	S23	38.5	SURCHARGED	1
S42.000	S23A dummy	15.3	SURCHARGED	
S40.002	S23A	50.5	SURCHARGED	
S43.000	S24 dummy	10.4	SURCHARGED	
S38.003	S24	96.2	SURCHARGED	4
S38.004	S25	114.4	SURCHARGED	
S38.005	S26	119.4	SURCHARGED	
S38.006	S27	149.5	SURCHARGED	1
S38.007	S28	160.4	SURCHARGED	
S44.000	S29	18.5	SURCHARGED	
S44.001	S30	43.7	OK	
S38.008	S31	201.3	SURCHARGED	
S38.009	S32	209.6	OK	
S45.000	S33 dummy	17.1	SURCHARGED	
S45.001	S33	31.1	SURCHARGED	4
S46.000	S34 dummy	7.0	SURCHARGED	
S46.001	S34	12.1	SURCHARGED	4
S45.002	S35	58.2	SURCHARGED	
S45.003	S36	65.5	SURCHARGED	1
S38.010	S37	270.9	SURCHARGED	
S38.011	S38	279.8	SURCHARGED	
S47.000	S39 dummy	17.7	OK	
S47.001	S39	36.5	SURCHARGED	
S47.002	S40	57.3	SURCHARGED	
S38.012	S41	326.9	SURCHARGED	
S38.013	S42	330.0	SURCHARGED	
S38.014	S43	335.4	SURCHARGED	
S35.012	S44	495.7	SURCHARGED	
S35.013	SBasin 2 Dummy	483.0	SURCHARGED	
S35.014	SBasin 2	10.9	SURCHARGED	
S34.003	S45	16.2	OK	
S34.004	S46	16.5	SURCHARGED	
S33.002	S47	12.0	SURCHARGED	

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 Coeffiecient	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 Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.700	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
S33.000	S1A	15 Winter	100	+20%	100/15 Summer		
S33.001	STank	1440 Winter	100	+20%	100/120 Summer		
S34.000	S1	15 Winter	100	+20%	30/15 Summer		
S34.001	S2	15 Winter	100	+20%	30/15 Summer	100/15 Summer	
S34.002	SBasin3	480 Winter	100	+20%	30/30 Summer		
S35.000	S3	15 Winter	100	+20%	30/15 Summer	100/15 Summer	
S36.000	S4	15 Winter	100	+20%	30/15 Summer	100/15 Winter	
S36.001	S5	15 Winter	100	+20%	30/15 Summer		
S35.001	S6	15 Winter	100	+20%	30/15 Summer	100/15 Summer	
S35.002	S7	15 Winter	100	+20%	30/15 Summer	100/15 Summer	
S37.000	S8 dummy	15 Winter	100	+20%	30/15 Summer	100/15 Summer	
S37.001	S8	15 Winter	100	+20%	30/15 Summer	100/15 Summer	
S37.002	S9	15 Summer	100	+20%	30/15 Summer		
S37.003	S10	15 Summer	100	+20%	30/15 Summer		
S35.003	S11	15 Winter	100	+20%	30/15 Summer	100/15 Summer	
S35.004	S12	15 Winter	100	+20%	30/15 Summer		
S35.005	S13	15 Winter	100	+20%	30/15 Summer		
S35.006	S14	15 Winter	100	+20%	30/15 Summer	100/15 Winter	

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
S33.000	S1A		9.062	0.162	0.000	1.16			47.4
S33.001	STank		8.690	0.158	0.000	0.02			0.8
S34.000	S1		11.336	1.171	0.000	0.84			15.9
S34.001	S2		11.186	1.201	1.255	2.54			42.7
S34.002	SBasin3		9.862	0.182	0.000	0.02			0.8
S35.000	S3		12.304	1.200	0.245	0.69			17.6
S36.000	S4		12.375	1.200	0.081	0.82			13.8
S36.001	S5		12.222	1.318	0.000	0.59			27.6
S35.001	S6		12.117	1.411	1.208	1.15			48.4
S35.002	S7		12.000	1.383	2.816	0.71			56.4
S37.000	S8 dummy		12.152	1.192	2.219	0.60			17.9
S37.001	S8		12.151	1.235	0.848	0.50			24.0
S37.002	S9		12.149	1.477	0.000	0.90			32.5
S37.003	S10		12.052	1.447	0.000	0.78			37.4
S35.003	S11		11.906	1.535	6.371	2.04			125.3
S35.004	S12		11.832	1.534	0.000	1.98			130.8
S35.005	S13		11.504	1.354	0.000	1.51			151.1
S35.006	S14		11.276	1.229	0.027	1.01			182.7

PN	US/MH Name	Status	Level Exceeded
S33.000	S1A	SURCHARGED	
S33.001	STank	SURCHARGED	
S34.000	S1	FLOOD RISK	
S34.001	S2	FLOOD	2
S34.002	SBasin3	SURCHARGED	
S35.000	S3	FLOOD	2
S36.000	S4	FLOOD	1
S36.001	S5	FLOOD RISK	
S35.001	S6	FLOOD	4
S35.002	S7	FLOOD	4
S37.000	S8 dummy	FLOOD	4
S37.001	S8	FLOOD	4
S37.002	S9	FLOOD RISK	
S37.003	S10	FLOOD RISK	
S35.003	S11	FLOOD	4
S35.004	S12	FLOOD RISK	
S35.005	S13	FLOOD RISK	
S35.006	S14	FLOOD	1

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) Surcharge	First (Y) Flood	First (Z) Overflow
S35.007	S15	15 Winter	100	+20%	30/15 Summer	100/15 Winter	
S35.008	S16	15 Winter	100	+20%	30/15 Summer		
S35.009	S17	15 Winter	100	+20%	30/15 Summer		
S35.010	S18	15 Winter	100	+20%	30/15 Summer		
S35.011	S19	15 Winter	100	+20%	30/15 Summer		
S38.000	S20 dummy	15 Winter	100	+20%	100/15 Summer		
S38.001	S20	15 Winter	100	+20%	30/15 Winter		
S39.000	S21 dummy	15 Winter	100	+20%	100/15 Summer		
S39.001	S21	15 Winter	100	+20%	30/15 Summer		
S38.002	S22	15 Winter	100	+20%	30/15 Summer	100/15 Winter	
S40.000	S23 dummy L	15 Winter	100	+20%	30/15 Summer		
S41.000	S23 dummy R	15 Winter	100	+20%	30/15 Summer		
S40.001	S23	15 Winter	100	+20%	30/15 Summer	100/15 Winter	
S42.000	S23A dummy	15 Winter	100	+20%	30/15 Summer		
S40.002	S23A	15 Winter	100	+20%	30/15 Summer		
S43.000	S24 dummy	15 Winter	100	+20%	30/15 Summer		
S38.003	S24	15 Winter	100	+20%	30/15 Summer	100/15 Summer	
S38.004	S25	15 Winter	100	+20%	30/15 Summer		
S38.005	S26	15 Winter	100	+20%	30/15 Summer		
S38.006	S27	15 Winter	100	+20%	30/15 Summer	100/15 Winter	
S38.007	S28	15 Winter	100	+20%	30/15 Summer		
S44.000	S29	15 Winter	100	+20%	30/15 Summer		
S44.001	S30	15 Winter	100	+20%	100/15 Summer		
S38.008	S31	15 Winter	100	+20%	30/15 Summer		
S38.009	S32	15 Winter	100	+20%	100/15 Summer		
S45.000	S33 dummy	15 Summer	100	+20%	30/15 Summer		
S45.001	S33	15 Winter	100	+20%	30/15 Summer	100/15 Summer	
S46.000	S34 dummy	15 Summer	100	+20%	30/15 Summer		
S46.001	S34	15 Winter	100	+20%	30/15 Summer	100/15 Summer	
S45.002	S35	15 Summer	100	+20%	30/15 Summer		
S45.003	S36	15 Winter	100	+20%	30/15 Summer	100/15 Winter	
S38.010	S37	15 Winter	100	+20%	30/15 Summer		
S38.011	S38	15 Winter	100	+20%	30/15 Summer		
S47.000	S39 dummy	15 Winter	100	+20%	100/15 Summer		
S47.001	S39	15 Winter	100	+20%	30/15 Winter		
S47.002	S40	15 Winter	100	+20%	30/15 Summer		
S38.012	S41	15 Winter	100	+20%	30/15 Summer		
S38.013	S42	15 Winter	100	+20%	30/15 Summer		
S38.014	S43	15 Winter	100	+20%	30/15 Summer		
S35.012	S44	15 Winter	100	+20%	30/15 Summer		
S35.013	SBasin 2 Dummy	15 Winter	100	+20%	30/15 Winter		
S35.014	SBasin 2	720 Winter	100	+20%	1/15 Summer		
S34.003	S45	1440 Winter	100	+20%	100/15 Winter		
S34.004	S46	1440 Winter	100	+20%	30/15 Winter		
S33.002	S47	1440 Winter	100	+20%	1/30 Winter		

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S35.007	S15		10.985	1.203	1.886	2.06		
S35.008	S16		10.826	1.075	0.000	1.83		
S35.009	S17		10.213	0.658	0.000	1.61		
S35.010	S18		10.068	0.564	0.000	1.45		
S35.011	S19		9.908	0.458	0.000	1.22		
S38.000	S20 dummy		13.145	0.345	0.000	0.30		
S38.001	S20		13.100	0.914	0.000	0.60		
S39.000	S21 dummy		13.030	0.230	0.000	0.19		
S39.001	S21		12.995	0.957	0.000	0.47		
S38.002	S22		12.901	1.214	0.601	0.94		
S40.000	S23 dummy L		13.064	1.195	0.000	0.52		
S41.000	S23 dummy R		13.066	1.182	0.000	0.51		
S40.001	S23		13.001	1.201	0.505	0.68		
S42.000	S23A dummy		12.999	1.271	0.000	0.57		
S40.002	S23A		12.942	1.288	0.000	0.89		
S43.000	S24 dummy		12.781	1.349	0.000	0.80		
S38.003	S24		12.718	1.334	24.210	1.91		
S38.004	S25		12.689	1.495	0.000	1.89		
S38.005	S26		12.642	1.469	0.000	1.39		
S38.006	S27		12.519	1.466	0.461	1.83		
S38.007	S28		12.313	1.343	0.000	1.89		
S44.000	S29		12.604	0.998	0.000	1.26		
S44.001	S30		12.215	1.042	0.000	1.12		
S38.008	S31		11.974	1.116	0.000	2.40		
S38.009	S32		11.810	0.973	0.000	0.68		
S45.000	S33 dummy		12.068	1.170	0.000	0.67		
S45.001	S33		11.978	1.203	3.046	0.77		
S46.000	S34 dummy		11.880	1.111	0.000	0.36		
S46.001	S34		11.859	1.204	4.430	0.77		
S45.002	S35		11.910	1.459	0.000	1.76		
S45.003	S36		11.623	1.388	0.248	2.11		
S38.010	S37		11.499	1.332	0.000	1.41		
S38.011	S38		11.079	1.124	0.000	1.18		
S47.000	S39 dummy		11.290	0.868	0.000	0.39		
S47.001	S39		11.270	0.978	0.000	0.78		
S47.002	S40		11.151	1.148	0.000	1.44		
S38.012	S41		10.701	1.012	0.000	1.52		
S38.013	S42		10.132	0.686	0.000	1.73		
S38.014	S43		9.942	0.546	0.000	1.74		
S35.012	S44		9.740	0.399	0.000	1.98		
S35.013	SBasin 2 Dummy		9.455	0.172	0.000	1.45		
S35.014	SBasin 2		9.426	0.675	0.000	0.29		
S34.003	S45		8.718	0.158	0.000	0.17		
S34.004	S46		8.705	0.301	0.000	0.18		
S33.002	S47		8.693	0.394	0.000	0.15		

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

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S35.007	S15	176.7	FLOOD	2
S35.008	S16	193.3	FLOOD RISK	
S35.009	S17	212.0	SURCHARGED	
S35.010	S18	220.9	SURCHARGED	
S35.011	S19	227.2	SURCHARGED	
S38.000	S20 dummy	21.3	SURCHARGED	
S38.001	S20	34.0	FLOOD RISK	
S39.000	S21 dummy	15.2	SURCHARGED	
S39.001	S21	23.2	FLOOD RISK	
S38.002	S22	63.6	FLOOD	1
S40.000	S23 dummy L	17.8	FLOOD RISK	
S41.000	S23 dummy R	18.0	FLOOD RISK	
S40.001	S23	45.0	FLOOD	1
S42.000	S23A dummy	19.4	SURCHARGED	
S40.002	S23A	80.1	FLOOD RISK	
S43.000	S24 dummy	24.6	FLOOD RISK	
S38.003	S24	128.4	FLOOD	4
S38.004	S25	138.8	SURCHARGED	
S38.005	S26	141.7	SURCHARGED	
S38.006	S27	179.4	FLOOD	1
S38.007	S28	191.4	SURCHARGED	
S44.000	S29	21.7	FLOOD RISK	
S44.001	S30	54.4	FLOOD RISK	
S38.008	S31	230.7	FLOOD RISK	
S38.009	S32	245.2	FLOOD RISK	
S45.000	S33 dummy	20.8	FLOOD RISK	
S45.001	S33	37.5	FLOOD	4
S46.000	S34 dummy	10.6	FLOOD RISK	
S46.001	S34	38.0	FLOOD	4
S45.002	S35	66.5	FLOOD RISK	
S45.003	S36	72.6	FLOOD	1
S38.010	S37	325.3	FLOOD RISK	
S38.011	S38	343.2	FLOOD RISK	
S47.000	S39 dummy	19.9	SURCHARGED	
S47.001	S39	41.9	FLOOD RISK	
S47.002	S40	70.3	FLOOD RISK	
S38.012	S41	414.9	FLOOD RISK	
S38.013	S42	431.2	SURCHARGED	
S38.014	S43	444.9	SURCHARGED	
S35.012	S44	674.5	SURCHARGED	
S35.013	SBasin 2 Dummy	674.6	SURCHARGED	
S35.014	SBasin 2	10.9	SURCHARGED	
S34.003	S45	12.1	SURCHARGED	
S34.004	S46	12.6	SURCHARGED	
S33.002	S47	12.0	SURCHARGED	

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 Coeffiecient	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 Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.700	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320
Return Period(s) (years)	100
Climate Change (%)	40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S33.000	S1A	15 Winter	100	+40%	100/15 Summer			
S33.001	STank	600 Winter	100	+40%	100/60 Summer			
S34.000	S1	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S34.001	S2	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S34.002	SBasin3	480 Winter	100	+40%	100/15 Summer			
S35.000	S3	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S36.000	S4	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S36.001	S5	15 Summer	100	+40%	100/15 Summer	100/15 Summer		
S35.001	S6	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S35.002	S7	30 Winter	100	+40%	100/15 Summer	100/15 Summer		
S37.000	S8 dummy	30 Winter	100	+40%	100/15 Summer	100/15 Summer		
S37.001	S8	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S37.002	S9	15 Summer	100	+40%	100/15 Summer			
S37.003	S10	15 Winter	100	+40%	100/15 Summer			
S35.003	S11	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S35.004	S12	15 Summer	100	+40%	100/15 Summer			
S35.005	S13	15 Winter	100	+40%	100/15 Summer			
S35.006	S14	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S35.007	S15	15 Winter	100	+40%	100/15 Summer	100/15 Summer		

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S33.000	S1A	9.241	0.341	0.000	1.33			54.4	SURCHARGED
S33.001	STank	8.868	0.336	0.000	0.02			0.8	SURCHARGED
S34.000	S1	11.365	1.200	0.223	0.99			18.6	FLOOD
S34.001	S2	11.189	1.204	3.977	2.55			42.8	FLOOD
S34.002	SBasin3	9.901	0.221	0.000	0.02			0.8	SURCHARGED
S35.000	S3	12.305	1.201	1.268	0.70			17.8	FLOOD
S36.000	S4	12.376	1.201	0.986	0.85			14.5	FLOOD
S36.001	S5	12.246	1.342	0.004	0.66			31.1	FLOOD
S35.001	S6	12.119	1.413	3.499	1.18			49.6	FLOOD
S35.002	S7	12.003	1.386	6.301	0.82			65.3	FLOOD
S37.000	S8 dummy	12.154	1.194	4.340	0.74			22.0	FLOOD
S37.001	S8	12.153	1.237	2.770	0.65			31.0	FLOOD
S37.002	S9	12.184	1.512	0.000	0.99			35.9	FLOOD RISK
S37.003	S10	12.089	1.483	0.000	0.97			46.5	FLOOD RISK
S35.003	S11	11.914	1.543	14.137	2.13			130.3	FLOOD
S35.004	S12	11.869	1.571	0.000	1.99			131.6	FLOOD RISK
S35.005	S13	11.585	1.435	0.000	1.59			159.8	FLOOD RISK
S35.006	S14	11.278	1.231	1.749	1.05			189.9	FLOOD
S35.007	S15	10.992	1.210	8.870	2.20			188.6	FLOOD

PN	US/MH Name	Level Exceeded
S33.000	S1A	
S33.001	STank	
S34.000	S1	2
S34.001	S2	4
S34.002	SBasin3	
S35.000	S3	4
S36.000	S4	4
S36.001	S5	1
S35.001	S6	5
S35.002	S7	6
S37.000	S8 dummy	6
S37.001	S8	5
S37.002	S9	
S37.003	S10	
S35.003	S11	6
S35.004	S12	
S35.005	S13	
S35.006	S14	4
S35.007	S15	4

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
S35.008	S16	30 Summer	100	+40%	100/15 Summer		
S35.009	S17	15 Winter	100	+40%	100/15 Summer		
S35.010	S18	15 Winter	100	+40%	100/15 Summer		
S35.011	S19	15 Winter	100	+40%	100/15 Summer		
S38.000	S20 dummy	15 Winter	100	+40%	100/15 Summer		
S38.001	S20	15 Winter	100	+40%	100/15 Summer		
S39.000	S21 dummy	15 Winter	100	+40%	100/15 Summer		
S39.001	S21	15 Winter	100	+40%	100/15 Summer		
S38.002	S22	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S40.000	S23 dummy L	15 Summer	100	+40%	100/15 Summer		
S41.000	S23 dummy R	15 Summer	100	+40%	100/15 Summer		
S40.001	S23	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S42.000	S23A dummy	15 Winter	100	+40%	100/15 Summer		
S40.002	S23A	15 Winter	100	+40%	100/15 Summer		
S43.000	S24 dummy	15 Summer	100	+40%	100/15 Summer		
S38.003	S24	30 Winter	100	+40%	100/15 Summer	100/15 Summer	
S38.004	S25	15 Winter	100	+40%	100/15 Summer		
S38.005	S26	15 Winter	100	+40%	100/15 Summer		
S38.006	S27	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S38.007	S28	15 Summer	100	+40%	100/15 Summer		
S44.000	S29	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S44.001	S30	15 Winter	100	+40%	100/15 Summer	100/15 Winter	
S38.008	S31	15 Winter	100	+40%	100/15 Summer	100/15 Winter	
S38.009	S32	15 Winter	100	+40%	100/15 Summer		
S45.000	S33 dummy	15 Summer	100	+40%	100/15 Summer		
S45.001	S33	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S46.000	S34 dummy	15 Summer	100	+40%	100/15 Summer		
S46.001	S34	30 Winter	100	+40%	100/15 Summer	100/15 Summer	
S45.002	S35	15 Summer	100	+40%	100/15 Summer		
S45.003	S36	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S38.010	S37	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S38.011	S38	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S47.000	S39 dummy	15 Winter	100	+40%	100/15 Summer		
S47.001	S39	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S47.002	S40	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S38.012	S41	15 Summer	100	+40%	100/15 Summer		
S38.013	S42	15 Winter	100	+40%	100/15 Summer		
S38.014	S43	15 Winter	100	+40%	100/15 Summer		
S35.012	S44	15 Winter	100	+40%	100/15 Summer		
S35.013	SBasin 2 Dummy	960 Winter	100	+40%	100/15 Summer		
S35.014	SBasin 2	960 Winter	100	+40%	100/15 Summer		
S34.003	S45	600 Winter	100	+40%	100/15 Summer		
S34.004	S46	600 Winter	100	+40%	100/15 Summer		
S33.002	S47	600 Winter	100	+40%	100/15 Summer		

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S35.008	S16		10.888	1.137	0.000	1.81		
S35.009	S17		10.336	0.781	0.000	1.67		
S35.010	S18		10.180	0.676	0.000	1.54		
S35.011	S19		10.000	0.550	0.000	1.31		
S38.000	S20 dummy		13.305	0.505	0.000	0.31		
S38.001	S20		13.245	1.059	0.000	0.79		
S39.000	S21 dummy		13.113	0.313	0.000	0.20		
S39.001	S21		13.067	1.029	0.000	0.62		
S38.002	S22		12.905	1.218	4.910	0.94		
S40.000	S23 dummy L		13.113	1.244	0.000	0.70		
S41.000	S23 dummy R		13.119	1.235	0.000	0.69		
S40.001	S23		13.005	1.205	4.570	0.64		
S42.000	S23A dummy		13.080	1.352	0.000	0.80		
S40.002	S23A		12.977	1.323	0.000	0.94		
S43.000	S24 dummy		12.795	1.363	0.000	0.80		
S38.003	S24		12.740	1.356	45.576	2.04		
S38.004	S25		12.820	1.626	0.000	1.95		
S38.005	S26		12.729	1.556	0.000	1.44		
S38.006	S27		12.526	1.472	6.571	1.91		
S38.007	S28		12.426	1.455	0.000	1.93		
S44.000	S29		12.807	1.201	1.236	1.32		
S44.001	S30		12.505	1.332	0.132	1.12		
S38.008	S31		12.110	1.252	0.042	2.49		
S38.009	S32		11.932	1.095	0.000	0.72		
S45.000	S33 dummy		12.096	1.198	0.000	1.14		
S45.001	S33		11.983	1.208	7.795	0.82		
S46.000	S34 dummy		11.919	1.150	0.000	0.50		
S46.001	S34		11.865	1.210	10.013	1.00		
S45.002	S35		11.973	1.522	0.000	1.82		
S45.003	S36		11.627	1.392	4.348	2.24		
S38.010	S37		11.559	1.392	2.036	1.43		
S38.011	S38		11.158	1.203	1.085	1.20		
S47.000	S39 dummy		11.592	1.170	0.000	0.48		
S47.001	S39		11.492	1.200	0.309	0.97		
S47.002	S40		11.217	1.214	3.981	1.51		
S38.012	S41		10.803	1.114	0.000	1.57		
S38.013	S42		10.233	0.787	0.000	1.79		
S38.014	S43		10.040	0.644	0.000	1.83		
S35.012	S44		9.823	0.482	0.000	2.10		
S35.013	SBasin 2 Dummy		9.498	0.215	0.000	0.23		
S35.014	SBasin 2		9.497	0.746	0.000	0.29		
S34.003	S45		8.892	0.332	0.000	0.18		
S34.004	S46		8.878	0.474	0.000	0.20		
S33.002	S47		8.866	0.567	0.000	0.15		

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

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S35.008	S16	191.6	FLOOD RISK	
S35.009	S17	219.7	SURCHARGED	
S35.010	S18	235.1	SURCHARGED	
S35.011	S19	243.8	SURCHARGED	
S38.000	S20 dummy	21.4	SURCHARGED	
S38.001	S20	44.5	FLOOD RISK	
S39.000	S21 dummy	16.2	SURCHARGED	
S39.001	S21	30.4	FLOOD RISK	
S38.002	S22	63.4	FLOOD	4
S40.000	S23 dummy L	24.1	FLOOD RISK	
S41.000	S23 dummy R	24.2	FLOOD RISK	
S40.001	S23	42.3	FLOOD	4
S42.000	S23A dummy	27.7	FLOOD RISK	
S40.002	S23A	84.9	FLOOD RISK	
S43.000	S24 dummy	24.6	FLOOD RISK	
S38.003	S24	136.9	FLOOD	6
S38.004	S25	143.5	FLOOD RISK	
S38.005	S26	146.6	FLOOD RISK	
S38.006	S27	187.1	FLOOD	4
S38.007	S28	195.2	SURCHARGED	
S44.000	S29	22.7	FLOOD	4
S44.001	S30	54.3	FLOOD	1
S38.008	S31	239.4	FLOOD	
S38.009	S32	259.1	FLOOD RISK	
S45.000	S33 dummy	35.1	FLOOD RISK	
S45.001	S33	40.0	FLOOD	6
S46.000	S34 dummy	14.9	FLOOD RISK	
S46.001	S34	49.3	FLOOD	6
S45.002	S35	68.9	FLOOD RISK	
S45.003	S36	77.3	FLOOD	4
S38.010	S37	328.8	FLOOD	4
S38.011	S38	348.3	FLOOD	4
S47.000	S39 dummy	24.4	FLOOD RISK	
S47.001	S39	52.5	FLOOD	2
S47.002	S40	73.8	FLOOD	4
S38.012	S41	428.2	FLOOD RISK	
S38.013	S42	446.0	SURCHARGED	
S38.014	S43	468.3	SURCHARGED	
S35.012	S44	715.8	SURCHARGED	
S35.013	SBasin 2 Dummy	107.4	SURCHARGED	
S35.014	SBasin 2	10.9	SURCHARGED	
S34.003	S45	12.7	SURCHARGED	
S34.004	S46	13.6	SURCHARGED	
S33.002	S47	12.1	FLOOD RISK	

Catchment C

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	19.700	Add Flow / Climate Change (%)	40
Ratio R	0.400	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Online Controls for Storm

Hydro-Brake® Optimum Manhole: SC Basin 4, DS/PN: S8.005, Volume (m³): 8.7

Unit Reference	MD-SHE-0107-5000-0900-5000
Design Head (m)	0.900
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	107
Invert Level (m)	10.125
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.900	5.0
Flush-Flo™	0.271	5.0
Kick-Flo®	0.590	4.1
Mean Flow over Head Range	-	4.3

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.6	1.200	5.7	3.000	8.8	7.000	13.1
0.200	4.9	1.400	6.1	3.500	9.4	7.500	13.6
0.300	5.0	1.600	6.5	4.000	10.1	8.000	14.0
0.400	4.9	1.800	6.9	4.500	10.6	8.500	14.4
0.500	4.6	2.000	7.2	5.000	11.2	9.000	14.8
0.600	4.1	2.200	7.6	5.500	11.7	9.500	15.2
0.800	4.7	2.400	7.9	6.000	12.2		
1.000	5.2	2.600	8.2	6.500	12.7		

Hydro-Brake® Optimum Manhole: SE Basin 5, DS/PN: S1.004, Volume (m³): 10.8

Unit Reference	MD-SHE-0164-1280-0900-1280
Design Head (m)	0.900
Design Flow (l/s)	12.8
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	164
Invert Level (m)	8.950
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Hydro-Brake® Optimum Manhole: SE Basin 5, DS/PN: S1.004, Volume (m³): 10.8

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.900	12.8
Flush-Flo™	0.293	12.8
Kick-Flo®	0.637	10.9
Mean Flow over Head Range	-	10.8

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.9	1.200	14.7	3.000	22.7	7.000	34.1
0.200	12.5	1.400	15.8	3.500	24.4	7.500	35.3
0.300	12.8	1.600	16.8	4.000	26.1	8.000	36.4
0.400	12.6	1.800	17.8	4.500	27.6	8.500	37.5
0.500	12.3	2.000	18.7	5.000	29.0	9.000	38.5
0.600	11.5	2.200	19.6	5.500	30.4	9.500	39.4
0.800	12.1	2.400	20.4	6.000	31.7		
1.000	13.5	2.600	21.2	6.500	32.9		

Storage Structures for Storm

Tank or Pond Manhole: SC Basin 4, DS/PN: S8.005

Invert Level (m) 10.125

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	541.7	0.700	1044.1	0.750	2163.3	1.200	3075.2

Tank or Pond Manhole: SE Basin 5, DS/PN: S1.004

Invert Level (m) 8.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	835.3	1.200	1360.4

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 Coeffiecient	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 Storage Structures	2
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.700	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	SE1	15 Winter	1	+0%	30/15 Summer			
S2.000	SE2	15 Winter	1	+0%	30/15 Summer			
S1.001	SE3	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
S3.000	SE Dummy A	15 Winter	1	+0%	100/15 Summer			
S4.000	SE Dummy B	15 Summer	1	+0%	100/15 Summer			
S3.001	SE4	15 Winter	1	+0%	30/15 Summer			
S3.002	SE4A	15 Winter	1	+0%	30/15 Summer			
S5.000	SE5	15 Winter	1	+0%	100/15 Summer			
S1.002	SE6	15 Winter	1	+0%	30/15 Summer			
S6.000	SE7 Dummy	15 Summer	1	+0%	30/15 Summer			
S6.001	SE7	15 Winter	1	+0%	30/15 Summer			
S7.000	SE8A	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
S7.001	SE8B	15 Winter	1	+0%	30/15 Summer			
S7.002	SE8	15 Winter	1	+0%	30/15 Summer			
S7.003	SE9	15 Winter	1	+0%	30/15 Summer			
S7.004	SE10	15 Winter	1	+0%	100/15 Summer			
S7.005	SE11	15 Winter	1	+0%	30/15 Summer			
S1.003	SE12	15 Winter	1	+0%	30/15 Summer			

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	SE1	10.164	-0.142	0.000	0.29			10.9	OK
S2.000	SE2	10.188	-0.153	0.000	0.22			8.2	OK
S1.001	SE3	10.058	-0.094	0.000	0.60			23.4	OK
S3.000	SE Dummy A	10.265	-0.172	0.000	0.13			7.1	OK
S4.000	SE Dummy B	10.285	-0.172	0.000	0.13			7.1	OK
S3.001	SE4	10.082	-0.118	0.000	0.45			16.9	OK
S3.002	SE4A	9.883	-0.119	0.000	0.45			24.6	OK
S5.000	SE5	10.436	-0.103	0.000	0.21			6.2	OK
S1.002	SE6	9.606	-0.175	0.000	0.54			61.2	OK
S6.000	SE7 Dummy	9.849	-0.096	0.000	0.28			5.4	OK
S6.001	SE7	9.650	-0.066	0.000	0.60			9.9	OK
S7.000	SE8A	10.710	-0.082	0.000	0.69			26.7	OK
S7.001	SE8B	10.273	-0.151	0.000	0.49			30.9	OK
S7.002	SE8	10.193	-0.140	0.000	0.53			36.1	OK
S7.003	SE9	9.956	-0.125	0.000	0.61			41.5	OK
S7.004	SE10	9.608	-0.210	0.000	0.40			48.4	OK
S7.005	SE11	9.457	-0.216	0.000	0.38			53.2	OK
S1.003	SE12	9.334	-0.209	0.000	0.56			119.3	OK

PN	US/MH Name	Level Exceeded
S1.000	SE1	
S2.000	SE2	
S1.001	SE3	2
S3.000	SE Dummy A	
S4.000	SE Dummy B	
S3.001	SE4	
S3.002	SE4A	
S5.000	SE5	
S1.002	SE6	
S6.000	SE7 Dummy	
S6.001	SE7	
S7.000	SE8A	4
S7.001	SE8B	
S7.002	SE8	
S7.003	SE9	
S7.004	SE10	
S7.005	SE11	
S1.003	SE12	

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) Surcharge	First (Y) Flood	First (Z) Overflow
S8.000	SC6	15 Winter	1	+0%	100/15 Winter		
S8.001	SC7	15 Winter	1	+0%	100/15 Summer		
S9.000	SC8 dummy	15 Summer	1	+0%	30/15 Summer	100/15 Winter	
S9.001	SC8	15 Winter	1	+0%	30/15 Summer	100/15 Winter	
S10.000	SC9 Dummy R	15 Summer	1	+0%	30/15 Summer	100/15 Summer	
S11.000	SC9 Dummy L	15 Winter	1	+0%	30/15 Summer	100/15 Summer	
S10.001	SC9	15 Winter	1	+0%	30/15 Summer	100/15 Summer	
S9.002	SC10	15 Winter	1	+0%	30/15 Summer		
S12.000	SC11 Dummy	15 Winter	1	+0%	30/15 Winter		
S9.003	SC11	15 Winter	1	+0%	30/15 Summer		
S9.004	SC12	15 Winter	1	+0%	30/15 Summer		
S9.005	SC13	15 Winter	1	+0%	30/15 Summer		
S13.000	SC14	15 Winter	1	+0%	100/15 Summer		
S13.001	SC15	15 Winter	1	+0%	100/15 Summer		
S14.000	SC16	15 Summer	1	+0%	100/15 Summer		
S13.002	SC17	15 Winter	1	+0%	30/15 Winter		
S15.000	SC18 Dummy L	15 Winter	1	+0%	30/15 Summer	100/15 Winter	
S16.000	SC18 Dummy R	15 Winter	1	+0%	30/15 Summer	100/15 Winter	
S15.001	SC18	15 Winter	1	+0%	30/15 Summer		
S13.003	SC19	15 Winter	1	+0%	30/15 Summer		
S9.006	SC20	15 Winter	1	+0%	30/15 Summer		
S9.007	SC21	15 Winter	1	+0%	30/15 Summer		
S8.002	SC22	15 Winter	1	+0%	30/15 Summer		
S8.003	SC23	15 Winter	1	+0%	30/15 Summer		
S8.004	SC24	15 Winter	1	+0%	30/15 Winter		
S8.005	SC Basin 4	480 Winter	1	+0%	1/240 Winter		
S8.006	SC25	60 Winter	1	+0%	100/15 Summer		
S17.000	SC 1 Dummy	15 Winter	1	+0%	30/15 Summer	100/15 Summer	
S17.001	SC1	15 Winter	1	+0%	30/15 Summer	100/15 Summer	
S17.002	SC2	15 Winter	1	+0%	30/15 Summer		
S17.003	SC3	15 Winter	1	+0%	30/15 Summer		
S8.007	SC26	15 Winter	1	+0%	30/15 Summer		
S18.000	SC4	15 Winter	1	+0%	100/15 Summer		
S18.001	SC5	15 Winter	1	+0%	100/15 Winter		
S8.008	SC27	15 Winter	1	+0%	100/15 Summer		
S8.009	SSouth Connection	15 Winter	1	+0%	30/240 Winter		
S1.004	SE Basin 5	480 Winter	1	+0%	1/240 Winter		

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S8.000	SC6		11.172	-0.153	0.000	0.22		
S8.001	SC7		10.873	-0.198	0.000	0.25		
S9.000	SC8 dummy		11.736	-0.154	0.000	0.22		
S9.001	SC8		11.705	-0.140	0.000	0.29		
S10.000	SC9 Dummy R		11.979	-0.126	0.000	0.40		

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S11.000	SC9 Dummy L		11.974	-0.169	0.000	0.13		
S10.001	SC9		11.930	-0.110	0.000	0.51		
S9.002	SC10		11.414	-0.118	0.000	0.66		
S12.000	SC11 Dummy		11.074	-0.273	0.000	0.07		
S9.003	SC11		11.067	-0.158	0.000	0.63		
S9.004	SC12		10.953	-0.197	0.000	0.47		
S9.005	SC13		10.914	-0.176	0.000	0.69		
S13.000	SC14		11.621	-0.159	0.000	0.19		
S13.001	SC15		11.432	-0.138	0.000	0.31		
S14.000	SC16		11.426	-0.149	0.000	0.25		
S13.002	SC17		11.243	-0.247	0.000	0.24		
S15.000	SC18 Dummy L		11.551	-0.149	0.000	0.22		
S16.000	SC18 Dummy R		11.583	-0.159	0.000	0.19		
S15.001	SC18		11.522	-0.108	0.000	0.52		
S13.003	SC19		11.112	-0.179	0.000	0.50		
S9.006	SC20		10.843	-0.217	0.000	0.61		
S9.007	SC21		10.746	-0.214	0.000	0.64		
S8.002	SC22		10.650	-0.222	0.000	0.60		
S8.003	SC23		10.602	-0.223	0.000	0.60		
S8.004	SC24		10.532	-0.237	0.000	0.67		
S8.005	SC Basin 4		10.435	0.010	0.000	0.08		
S8.006	SC25		10.095	-0.249	0.000	0.07		
S17.000	SC 1 Dummy		10.552	-0.045	0.000	0.59		
S17.001	SC1		10.438	-0.076	0.000	0.48		
S17.002	SC2		10.042	-0.105	0.000	0.54		
S17.003	SC3		9.842	-0.100	0.000	0.59		
S8.007	SC26		9.735	-0.132	0.000	0.57		
S18.000	SC4		10.722	-0.083	0.000	0.42		
S18.001	SC5		9.567	-0.153	0.000	0.22		
S8.008	SC27		9.276	-0.241	0.000	0.43		
S8.009	SSouth Connection		9.240	-0.237	0.000	0.45		
S1.004	SE Basin 5		9.191	0.016	0.000	0.34		

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S8.000	SC6	8.5	OK	
S8.001	SC7	17.0	OK	
S9.000	SC8 dummy	6.5	OK	1
S9.001	SC8	11.3	OK	1
S10.000	SC9 Dummy R	13.5	OK	4
S11.000	SC9 Dummy L	4.8	OK	4
S10.001	SC9	26.3	OK	2
S9.002	SC10	47.7	OK	
S12.000	SC11 Dummy	10.0	OK	
S9.003	SC11	67.3	OK	

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

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S9.004	SC12	67.9	OK	
S9.005	SC13	71.5	OK	
S13.000	SC14	8.5	OK	
S13.001	SC15	12.5	OK	
S14.000	SC16	10.3	OK	
S13.002	SC17	25.2	OK	
S15.000	SC18 Dummy L	7.4	OK	1
S16.000	SC18 Dummy R	6.9	OK	1
S15.001	SC18	21.7	OK	
S13.003	SC19	56.1	OK	
S9.006	SC20	131.4	OK	
S9.007	SC21	136.3	OK	
S8.002	SC22	142.3	OK	
S8.003	SC23	141.7	OK	
S8.004	SC24	142.9	OK	
S8.005	SC Basin 4	5.0	SURCHARGED	
S8.006	SC25	6.9	OK	
S17.000	SC 1 Dummy	3.4	OK	3
S17.001	SC1	8.2	OK	2
S17.002	SC2	20.4	OK	
S17.003	SC3	20.4	OK	
S8.007	SC26	39.4	OK	
S18.000	SC4	9.6	OK	
S18.001	SC5	9.7	OK	
S8.008	SC27	57.6	OK	
S8.009	SSouth Connection	57.3	OK	
S1.004	SE Basin 5	12.7	SURCHARGED	

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 Coeffiecient	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 Storage Structures	2
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.700	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	SE1	15 Winter	30	+0%	30/15 Summer			
S2.000	SE2	15 Winter	30	+0%	30/15 Summer			
S1.001	SE3	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
S3.000	SE Dummy A	15 Winter	30	+0%	100/15 Summer			
S4.000	SE Dummy B	15 Winter	30	+0%	100/15 Summer			
S3.001	SE4	15 Winter	30	+0%	30/15 Summer			
S3.002	SE4A	15 Winter	30	+0%	30/15 Summer			
S5.000	SE5	15 Winter	30	+0%	100/15 Summer			
S1.002	SE6	15 Winter	30	+0%	30/15 Summer			
S6.000	SE7 Dummy	15 Winter	30	+0%	30/15 Summer			
S6.001	SE7	15 Winter	30	+0%	30/15 Summer			
S7.000	SE8A	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
S7.001	SE8B	15 Winter	30	+0%	30/15 Summer			
S7.002	SE8	15 Winter	30	+0%	30/15 Summer			
S7.003	SE9	15 Winter	30	+0%	30/15 Summer			
S7.004	SE10	15 Winter	30	+0%	100/15 Summer			
S7.005	SE11	15 Winter	30	+0%	30/15 Summer			
S1.003	SE12	15 Winter	30	+0%	30/15 Summer			

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	SE1	10.579	0.273	0.000	0.61			22.6	SURCHARGED
S2.000	SE2	10.558	0.217	0.000	0.47			17.5	SURCHARGED
S1.001	SE3	10.518	0.366	0.000	1.24			48.1	SURCHARGED
S3.000	SE Dummy A	10.323	-0.114	0.000	0.31			17.1	OK
S4.000	SE Dummy B	10.324	-0.133	0.000	0.31			17.3	OK
S3.001	SE4	10.297	0.097	0.000	0.99			37.4	SURCHARGED
S3.002	SE4A	10.121	0.119	0.000	0.99			54.2	SURCHARGED
S5.000	SE5	10.466	-0.073	0.000	0.52			15.1	OK
S1.002	SE6	9.902	0.121	0.000	1.15			131.6	SURCHARGED
S6.000	SE7 Dummy	10.004	0.059	0.000	0.62			11.8	SURCHARGED
S6.001	SE7	9.914	0.198	0.000	1.45			24.0	SURCHARGED
S7.000	SE8A	11.362	0.570	0.000	1.47			56.9	SURCHARGED
S7.001	SE8B	10.586	0.162	0.000	0.96			60.9	SURCHARGED
S7.002	SE8	10.506	0.173	0.000	1.05			72.0	SURCHARGED
S7.003	SE9	10.211	0.130	0.000	1.21			83.1	SURCHARGED
S7.004	SE10	9.787	-0.030	0.000	0.77			93.9	OK
S7.005	SE11	9.702	0.029	0.000	0.79			111.8	SURCHARGED
S1.003	SE12	9.573	0.031	0.000	1.17			248.8	SURCHARGED

PN	US/MH Name	Level Exceeded
S1.000	SE1	
S2.000	SE2	
S1.001	SE3	2
S3.000	SE Dummy A	
S4.000	SE Dummy B	
S3.001	SE4	
S3.002	SE4A	
S5.000	SE5	
S1.002	SE6	
S6.000	SE7 Dummy	
S6.001	SE7	
S7.000	SE8A	4
S7.001	SE8B	
S7.002	SE8	
S7.003	SE9	
S7.004	SE10	
S7.005	SE11	
S1.003	SE12	

30 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) Surcharge	First (Y) Flood	First (Z) Overflow
S8.000	SC6	15 Winter	30	+0%	100/15 Winter		
S8.001	SC7	15 Winter	30	+0%	100/15 Summer		
S9.000	SC8 dummy	15 Winter	30	+0%	30/15 Summer	100/15 Winter	
S9.001	SC8	15 Winter	30	+0%	30/15 Summer	100/15 Winter	
S10.000	SC9 Dummy R	15 Winter	30	+0%	30/15 Summer	100/15 Summer	
S11.000	SC9 Dummy L	15 Winter	30	+0%	30/15 Summer	100/15 Summer	
S10.001	SC9	15 Winter	30	+0%	30/15 Summer	100/15 Summer	
S9.002	SC10	15 Winter	30	+0%	30/15 Summer		
S12.000	SC11 Dummy	15 Winter	30	+0%	30/15 Winter		
S9.003	SC11	15 Winter	30	+0%	30/15 Summer		
S9.004	SC12	15 Winter	30	+0%	30/15 Summer		
S9.005	SC13	15 Winter	30	+0%	30/15 Summer		
S13.000	SC14	15 Winter	30	+0%	100/15 Summer		
S13.001	SC15	15 Winter	30	+0%	100/15 Summer		
S14.000	SC16	15 Winter	30	+0%	100/15 Summer		
S13.002	SC17	15 Winter	30	+0%	30/15 Winter		
S15.000	SC18 Dummy L	15 Winter	30	+0%	30/15 Summer	100/15 Winter	
S16.000	SC18 Dummy R	15 Winter	30	+0%	30/15 Summer	100/15 Winter	
S15.001	SC18	15 Winter	30	+0%	30/15 Summer		
S13.003	SC19	15 Winter	30	+0%	30/15 Summer		
S9.006	SC20	15 Winter	30	+0%	30/15 Summer		
S9.007	SC21	15 Winter	30	+0%	30/15 Summer		
S8.002	SC22	15 Winter	30	+0%	30/15 Summer		
S8.003	SC23	15 Winter	30	+0%	30/15 Summer		
S8.004	SC24	720 Winter	30	+0%	30/15 Winter		
S8.005	SC Basin 4	720 Winter	30	+0%	1/240 Winter		
S8.006	SC25	15 Winter	30	+0%	100/15 Summer		
S17.000	SC 1 Dummy	15 Winter	30	+0%	30/15 Summer	100/15 Summer	
S17.001	SC1	15 Winter	30	+0%	30/15 Summer	100/15 Summer	
S17.002	SC2	15 Winter	30	+0%	30/15 Summer		
S17.003	SC3	15 Winter	30	+0%	30/15 Summer		
S8.007	SC26	15 Winter	30	+0%	30/15 Summer		
S18.000	SC4	15 Winter	30	+0%	100/15 Summer		
S18.001	SC5	15 Summer	30	+0%	100/15 Winter		
S8.008	SC27	360 Winter	30	+0%	100/15 Summer		
S8.009	SSouth Connection	480 Winter	30	+0%	30/240 Winter		
S1.004	SE Basin 5	480 Winter	30	+0%	1/240 Winter		

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S8.000	SC6		11.219	-0.106	0.000	0.53		
S8.001	SC7		10.959	-0.112	0.000	0.66		
S9.000	SC8 dummy		12.058	0.168	0.000	0.47		
S9.001	SC8		12.046	0.201	0.000	0.63		
S10.000	SC9 Dummy R		12.503	0.398	0.000	0.74		

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S11.000	SC9 Dummy L		12.452	0.309	0.000	0.25		
S10.001	SC9		12.437	0.397	0.000	0.98		
S9.002	SC10		11.940	0.408	0.000	1.34		
S12.000	SC11 Dummy		11.400	0.053	0.000	0.16		
S9.003	SC11		11.395	0.170	0.000	1.28		
S9.004	SC12		11.299	0.149	0.000	0.95		
S9.005	SC13		11.251	0.161	0.000	1.39		
S13.000	SC14		11.663	-0.117	0.000	0.47		
S13.001	SC15		11.544	-0.026	0.000	0.84		
S14.000	SC16		11.534	-0.041	0.000	0.61		
S13.002	SC17		11.519	0.029	0.000	0.59		
S15.000	SC18 Dummy L		11.854	0.154	0.000	0.44		
S16.000	SC18 Dummy R		11.859	0.117	0.000	0.38		
S15.001	SC18		11.832	0.202	0.000	1.15		
S13.003	SC19		11.432	0.141	0.000	1.06		
S9.006	SC20		11.214	0.154	0.000	1.21		
S9.007	SC21		11.070	0.110	0.000	1.27		
S8.002	SC22		10.925	0.053	0.000	1.23		
S8.003	SC23		10.859	0.034	0.000	1.23		
S8.004	SC24		10.799	0.030	0.000	0.18		
S8.005	SC Basin 4		10.798	0.373	0.000	0.08		
S8.006	SC25		10.174	-0.170	0.000	0.17		
S17.000	SC 1 Dummy		10.980	0.383	0.000	1.12		
S17.001	SC1		10.886	0.372	0.000	0.95		
S17.002	SC2		10.590	0.443	0.000	1.19		
S17.003	SC3		10.285	0.343	0.000	1.31		
S8.007	SC26		10.158	0.291	0.000	1.30		
S18.000	SC4		10.801	-0.004	0.000	0.98		
S18.001	SC5		9.611	-0.109	0.000	0.52		
S8.008	SC27		9.517	0.000	0.000	0.21		
S8.009	SSouth Connection		9.508	0.031	0.000	0.19		
S1.004	SE Basin 5		9.505	0.330	0.000	0.35		

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S8.000	SC6	20.2	OK	
S8.001	SC7	44.6	OK	
S9.000	SC8 dummy	13.9	SURCHARGED	1
S9.001	SC8	24.4	SURCHARGED	1
S10.000	SC9 Dummy R	25.2	SURCHARGED	4
S11.000	SC9 Dummy L	9.1	SURCHARGED	4
S10.001	SC9	50.8	SURCHARGED	2
S9.002	SC10	97.1	SURCHARGED	
S12.000	SC11 Dummy	22.5	SURCHARGED	
S9.003	SC11	137.3	SURCHARGED	

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

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S9.004	SC12	137.9	SURCHARGED	
S9.005	SC13	145.1	SURCHARGED	
S13.000	SC14	20.8	OK	
S13.001	SC15	33.2	OK	
S14.000	SC16	25.2	OK	
S13.002	SC17	62.2	SURCHARGED	
S15.000	SC18 Dummy L	15.2	SURCHARGED	1
S16.000	SC18 Dummy R	13.7	SURCHARGED	1
S15.001	SC18	48.2	SURCHARGED	
S13.003	SC19	118.3	SURCHARGED	
S9.006	SC20	262.4	SURCHARGED	
S9.007	SC21	270.4	SURCHARGED	
S8.002	SC22	292.9	SURCHARGED	
S8.003	SC23	293.8	SURCHARGED	
S8.004	SC24	38.6	SURCHARGED	
S8.005	SC Basin 4	5.0	SURCHARGED	
S8.006	SC25	17.7	OK	
S17.000	SC 1 Dummy	6.4	SURCHARGED	3
S17.001	SC1	16.2	SURCHARGED	2
S17.002	SC2	44.8	SURCHARGED	
S17.003	SC3	45.3	SURCHARGED	
S8.007	SC26	90.0	SURCHARGED	
S18.000	SC4	22.7	OK	
S18.001	SC5	22.7	OK	
S8.008	SC27	28.9	OK	
S8.009	SSouth Connection	23.8	SURCHARGED	
S1.004	SE Basin 5	12.8	SURCHARGED	

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 Coeffiecient	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 Storage Structures	2
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.700	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
S1.000	SE1	15 Winter	100	+20%	30/15 Summer		
S2.000	SE2	15 Winter	100	+20%	30/15 Summer		
S1.001	SE3	15 Winter	100	+20%	30/15 Summer	100/15 Summer	
S3.000	SE Dummy A	15 Winter	100	+20%	100/15 Summer		
S4.000	SE Dummy B	15 Winter	100	+20%	100/15 Summer		
S3.001	SE4	15 Winter	100	+20%	30/15 Summer		
S3.002	SE4A	15 Winter	100	+20%	30/15 Summer		
S5.000	SE5	15 Winter	100	+20%	100/15 Summer		
S1.002	SE6	15 Winter	100	+20%	30/15 Summer		
S6.000	SE7 Dummy	15 Winter	100	+20%	30/15 Summer		
S6.001	SE7	15 Winter	100	+20%	30/15 Summer		
S7.000	SE8A	15 Winter	100	+20%	30/15 Summer	100/15 Summer	
S7.001	SE8B	15 Winter	100	+20%	30/15 Summer		
S7.002	SE8	15 Winter	100	+20%	30/15 Summer		
S7.003	SE9	15 Winter	100	+20%	30/15 Summer		
S7.004	SE10	15 Winter	100	+20%	100/15 Summer		
S7.005	SE11	15 Winter	100	+20%	30/15 Summer		
S1.003	SE12	720 Winter	100	+20%	30/15 Summer		

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
S1.000	SE1		11.497	1.191	0.000	0.84			31.1
S2.000	SE2		11.454	1.113	0.000	0.62			23.4
S1.001	SE3		11.354	1.202	1.304	1.66			64.2
S3.000	SE Dummy A		11.117	0.680	0.000	0.37			20.4
S4.000	SE Dummy B		11.118	0.661	0.000	0.38			20.9
S3.001	SE4		11.083	0.883	0.000	1.24			46.7
S3.002	SE4A		10.793	0.791	0.000	1.28			69.8
S5.000	SE5		10.687	0.148	0.000	0.78			22.6
S1.002	SE6		10.424	0.643	0.000	1.58			179.6
S6.000	SE7 Dummy		10.580	0.635	0.000	0.82			15.6
S6.001	SE7		10.428	0.712	0.000	1.94			32.1
S7.000	SE8A		12.032	1.240	5.948	1.71			66.3
S7.001	SE8B		11.438	1.014	0.000	1.15			72.6
S7.002	SE8		11.336	1.003	0.000	1.33			90.7
S7.003	SE9		10.905	0.824	0.000	1.64			112.2
S7.004	SE10		10.156	0.338	0.000	1.11			134.7
S7.005	SE11		9.969	0.297	0.000	1.07			151.1
S1.003	SE12		9.826	0.284	0.000	0.21			44.1

PN	US/MH Name	Status	Level Exceeded
S1.000	SE1	FLOOD RISK	
S2.000	SE2	FLOOD RISK	
S1.001	SE3	FLOOD	2
S3.000	SE Dummy A	FLOOD RISK	
S4.000	SE Dummy B	FLOOD RISK	
S3.001	SE4	SURCHARGED	
S3.002	SE4A	SURCHARGED	
S5.000	SE5	SURCHARGED	
S1.002	SE6	SURCHARGED	
S6.000	SE7 Dummy	SURCHARGED	
S6.001	SE7	SURCHARGED	
S7.000	SE8A	FLOOD	4
S7.001	SE8B	FLOOD RISK	
S7.002	SE8	SURCHARGED	
S7.003	SE9	SURCHARGED	
S7.004	SE10	SURCHARGED	
S7.005	SE11	SURCHARGED	
S1.003	SE12	SURCHARGED	

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) Surcharge	First (Y) Flood	First (Z) Overflow
S8.000	SC6	15 Winter	100	+20%	100/15 Winter		
S8.001	SC7	15 Winter	100	+20%	100/15 Summer		
S9.000	SC8 dummy	15 Winter	100	+20%	30/15 Summer	100/15 Winter	
S9.001	SC8	15 Winter	100	+20%	30/15 Summer	100/15 Winter	
S10.000	SC9 Dummy R	15 Winter	100	+20%	30/15 Summer	100/15 Summer	
S11.000	SC9 Dummy L	15 Winter	100	+20%	30/15 Summer	100/15 Summer	
S10.001	SC9	15 Winter	100	+20%	30/15 Summer	100/15 Summer	
S9.002	SC10	15 Winter	100	+20%	30/15 Summer		
S12.000	SC11 Dummy	15 Winter	100	+20%	30/15 Winter		
S9.003	SC11	15 Winter	100	+20%	30/15 Summer		
S9.004	SC12	15 Winter	100	+20%	30/15 Summer		
S9.005	SC13	15 Winter	100	+20%	30/15 Summer		
S13.000	SC14	15 Winter	100	+20%	100/15 Summer		
S13.001	SC15	15 Winter	100	+20%	100/15 Summer		
S14.000	SC16	15 Winter	100	+20%	100/15 Summer		
S13.002	SC17	15 Winter	100	+20%	30/15 Winter		
S15.000	SC18 Dummy L	15 Winter	100	+20%	30/15 Summer	100/15 Winter	
S16.000	SC18 Dummy R	15 Winter	100	+20%	30/15 Summer	100/15 Winter	
S15.001	SC18	15 Winter	100	+20%	30/15 Summer		
S13.003	SC19	15 Winter	100	+20%	30/15 Summer		
S9.006	SC20	15 Winter	100	+20%	30/15 Summer		
S9.007	SC21	15 Winter	100	+20%	30/15 Summer		
S8.002	SC22	15 Winter	100	+20%	30/15 Summer		
S8.003	SC23	15 Winter	100	+20%	30/15 Summer		
S8.004	SC24	960 Winter	100	+20%	30/15 Winter		
S8.005	SC Basin 4	960 Winter	100	+20%	1/240 Winter		
S8.006	SC25	15 Winter	100	+20%	100/15 Summer		
S17.000	SC 1 Dummy	15 Winter	100	+20%	30/15 Summer	100/15 Summer	
S17.001	SC1	15 Winter	100	+20%	30/15 Summer	100/15 Summer	
S17.002	SC2	15 Winter	100	+20%	30/15 Summer		
S17.003	SC3	15 Winter	100	+20%	30/15 Summer		
S8.007	SC26	15 Winter	100	+20%	30/15 Summer		
S18.000	SC4	15 Winter	100	+20%	100/15 Summer		
S18.001	SC5	720 Winter	100	+20%	100/15 Winter		
S8.008	SC27	720 Winter	100	+20%	100/15 Summer		
S8.009	SSouth Connection	720 Winter	100	+20%	30/240 Winter		
S1.004	SE Basin 5	720 Winter	100	+20%	1/240 Winter		

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S8.000	SC6		11.396	0.071	0.000	0.82		
S8.001	SC7		11.356	0.285	0.000	0.94		
S9.000	SC8 dummy		13.046	1.156	0.715	0.65		
S9.001	SC8		13.045	1.200	0.067	0.80		
S10.000	SC9 Dummy R		13.245	1.140	4.919	1.39		

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S11.000	SC9 Dummy L		13.241	1.098	1.376	0.49		
S10.001	SC9		13.240	1.200	0.124	1.16		
S9.002	SC10		12.940	1.408	0.000	1.60		
S12.000	SC11 Dummy		12.260	0.913	0.000	0.22		
S9.003	SC11		12.247	1.022	0.000	1.67		
S9.004	SC12		12.058	0.908	0.000	1.24		
S9.005	SC13		11.961	0.871	0.000	1.82		
S13.000	SC14		12.488	0.708	0.000	0.67		
S13.001	SC15		12.452	0.882	0.000	0.99		
S14.000	SC16		12.427	0.852	0.000	0.79		
S13.002	SC17		12.369	0.879	0.000	0.67		
S15.000	SC18 Dummy L		12.830	1.130	0.122	0.50		
S16.000	SC18 Dummy R		12.830	1.088	0.193	0.45		
S15.001	SC18		12.815	1.185	0.000	1.32		
S13.003	SC19		12.282	0.991	0.000	1.41		
S9.006	SC20		11.850	0.790	0.000	1.68		
S9.007	SC21		11.562	0.602	0.000	1.83		
S8.002	SC22		11.265	0.393	0.000	1.80		
S8.003	SC23		11.087	0.262	0.000	1.82		
S8.004	SC24		10.988	0.219	0.000	0.24		
S8.005	SC Basin 4		10.987	0.562	0.000	0.08		
S8.006	SC25		10.876	0.532	0.000	0.19		
S17.000	SC 1 Dummy		11.715	1.118	1.431	2.33		
S17.001	SC1		11.715	1.201	0.520	1.26		
S17.002	SC2		11.557	1.410	0.000	1.55		
S17.003	SC3		11.052	1.110	0.000	1.73		
S8.007	SC26		10.853	0.986	0.000	1.76		
S18.000	SC4		11.508	0.703	0.000	1.26		
S18.001	SC5		9.831	0.111	0.000	0.06		
S8.008	SC27		9.830	0.313	0.000	0.20		
S8.009	SSouth Connection		9.828	0.351	0.000	0.21		
S1.004	SE Basin 5		9.824	0.649	0.000	0.35		

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S8.000	SC6	31.4	SURCHARGED	
S8.001	SC7	63.3	SURCHARGED	
S9.000	SC8 dummy	19.4	FLOOD	1
S9.001	SC8	30.9	FLOOD	1
S10.000	SC9 Dummy R	47.0	FLOOD	4
S11.000	SC9 Dummy L	17.4	FLOOD	4
S10.001	SC9	59.7	FLOOD	2
S9.002	SC10	116.2	SURCHARGED	
S12.000	SC11 Dummy	30.5	FLOOD RISK	
S9.003	SC11	178.2	FLOOD RISK	

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

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S9.004	SC12	179.9	FLOOD RISK	
S9.005	SC13	189.4	SURCHARGED	
S13.000	SC14	29.7	SURCHARGED	
S13.001	SC15	39.4	SURCHARGED	
S14.000	SC16	32.6	SURCHARGED	
S13.002	SC17	71.3	SURCHARGED	
S15.000	SC18 Dummy L	17.3	FLOOD	1
S16.000	SC18 Dummy R	16.1	FLOOD	1
S15.001	SC18	55.2	FLOOD RISK	
S13.003	SC19	156.8	SURCHARGED	
S9.006	SC20	365.2	SURCHARGED	
S9.007	SC21	388.9	SURCHARGED	
S8.002	SC22	427.2	SURCHARGED	
S8.003	SC23	433.1	SURCHARGED	
S8.004	SC24	51.2	SURCHARGED	
S8.005	SC Basin 4	5.0	SURCHARGED	
S8.006	SC25	19.1	SURCHARGED	
S17.000	SC 1 Dummy	13.2	FLOOD	3
S17.001	SC1	21.5	FLOOD	2
S17.002	SC2	58.4	FLOOD RISK	
S17.003	SC3	59.5	FLOOD RISK	
S8.007	SC26	121.5	FLOOD RISK	
S18.000	SC4	29.3	SURCHARGED	
S18.001	SC5	2.8	SURCHARGED	
S8.008	SC27	26.6	SURCHARGED	
S8.009	SSouth Connection	26.7	SURCHARGED	
S1.004	SE Basin 5	12.8	SURCHARGED	

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 Coeffiecient	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 Storage Structures	2
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.700	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320
Return Period(s) (years)	100
Climate Change (%)	40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
S1.000	SE1	15 Winter	100	+40%	100/15 Summer		
S2.000	SE2	15 Winter	100	+40%	100/15 Summer		
S1.001	SE3	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S3.000	SE Dummy A	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S4.000	SE Dummy B	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S3.001	SE4	15 Winter	100	+40%	100/15 Summer		
S3.002	SE4A	15 Winter	100	+40%	100/15 Summer		
S5.000	SE5	15 Winter	100	+40%	100/15 Summer		
S1.002	SE6	15 Winter	100	+40%	100/15 Summer		
S6.000	SE7 Dummy	15 Winter	100	+40%	100/15 Summer		
S6.001	SE7	15 Winter	100	+40%	100/15 Summer		
S7.000	SE8A	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S7.001	SE8B	15 Winter	100	+40%	100/15 Summer	100/15 Winter	
S7.002	SE8	15 Winter	100	+40%	100/15 Summer		
S7.003	SE9	15 Winter	100	+40%	100/15 Summer		
S7.004	SE10	15 Winter	100	+40%	100/15 Summer		
S7.005	SE11	15 Winter	100	+40%	100/15 Summer		
S1.003	SE12	720 Winter	100	+40%	100/15 Summer		
S8.000	SC6	15 Winter	100	+40%	100/15 Summer		

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
S1.000	SE1		11.612	1.306	0.000	1.19			44.1
S2.000	SE2		11.538	1.197	0.000	0.88			33.0
S1.001	SE3		11.360	1.208	6.991	1.75			67.8
S3.000	SE Dummy A		11.401	0.964	0.607	0.43			23.9
S4.000	SE Dummy B		11.401	0.944	0.643	0.43			23.6
S3.001	SE4		11.379	1.179	0.000	1.49			56.2
S3.002	SE4A		11.129	1.127	0.000	1.42			77.2
S5.000	SE5		11.027	0.488	0.000	0.78			22.6
S1.002	SE6		10.668	0.887	0.000	1.71			194.7
S6.000	SE7 Dummy		10.912	0.967	0.000	0.90			17.2
S6.001	SE7		10.727	1.011	0.000	2.13			35.2
S7.000	SE8A		12.040	1.248	14.233	1.83			70.9
S7.001	SE8B		11.723	1.299	0.789	1.20			75.5
S7.002	SE8		11.696	1.363	0.000	1.34			91.2
S7.003	SE9		11.257	1.176	0.000	1.75			119.9
S7.004	SE10		10.371	0.553	0.000	1.23			150.1
S7.005	SE11		10.137	0.464	0.000	1.23			174.2
S1.003	SE12		9.961	0.419	0.000	0.25			52.7
S8.000	SC6		11.623	0.298	0.000	0.90			34.5

PN	US/MH Name	Status	Level Exceeded
S1.000	SE1	FLOOD RISK	
S2.000	SE2	FLOOD RISK	
S1.001	SE3	FLOOD	4
S3.000	SE Dummy A	FLOOD	2
S4.000	SE Dummy B	FLOOD	2
S3.001	SE4	FLOOD RISK	
S3.002	SE4A	SURCHARGED	
S5.000	SE5	SURCHARGED	
S1.002	SE6	SURCHARGED	
S6.000	SE7 Dummy	FLOOD RISK	
S6.001	SE7	FLOOD RISK	
S7.000	SE8A	FLOOD	5
S7.001	SE8B	FLOOD	1
S7.002	SE8	FLOOD RISK	
S7.003	SE9	FLOOD RISK	
S7.004	SE10	SURCHARGED	
S7.005	SE11	SURCHARGED	
S1.003	SE12	SURCHARGED	
S8.000	SC6	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
S8.001	SC7	15 Winter	100	+40%	100/15 Summer		
S9.000	SC8 dummy	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S9.001	SC8	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S10.000	SC9 Dummy R	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S11.000	SC9 Dummy L	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S10.001	SC9	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S9.002	SC10	15 Winter	100	+40%	100/15 Summer		
S12.000	SC11 Dummy	15 Winter	100	+40%	100/15 Summer	100/15 Winter	
S9.003	SC11	15 Winter	100	+40%	100/15 Summer	100/15 Winter	
S9.004	SC12	15 Winter	100	+40%	100/15 Summer		
S9.005	SC13	15 Winter	100	+40%	100/15 Summer		
S13.000	SC14	15 Winter	100	+40%	100/15 Summer		
S13.001	SC15	15 Winter	100	+40%	100/15 Summer	100/15 Winter	
S14.000	SC16	15 Winter	100	+40%	100/15 Summer	100/15 Winter	
S13.002	SC17	15 Winter	100	+40%	100/15 Summer	100/15 Winter	
S15.000	SC18 Dummy L	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S16.000	SC18 Dummy R	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S15.001	SC18	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S13.003	SC19	15 Winter	100	+40%	100/15 Summer		
S9.006	SC20	15 Winter	100	+40%	100/15 Summer		
S9.007	SC21	15 Winter	100	+40%	100/15 Summer		
S8.002	SC22	15 Winter	100	+40%	100/15 Summer		
S8.003	SC23	15 Winter	100	+40%	100/15 Summer		
S8.004	SC24	960 Winter	100	+40%	100/15 Summer		
S8.005	SC Basin 4	960 Winter	100	+40%	100/15 Summer		
S8.006	SC25	15 Winter	100	+40%	100/15 Summer		
S17.000	SC 1 Dummy	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S17.001	SC1	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S17.002	SC2	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S17.003	SC3	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
S8.007	SC26	15 Winter	100	+40%	100/15 Summer		
S18.000	SC4	15 Winter	100	+40%	100/15 Summer		
S18.001	SC5	720 Winter	100	+40%	100/15 Summer		
S8.008	SC27	720 Winter	100	+40%	100/15 Summer		
S8.009	SSouth Connection	720 Winter	100	+40%	100/15 Summer		
S1.004	SE Basin 5	720 Winter	100	+40%	100/15 Summer		

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S8.001	SC7		11.544	0.473	0.000	0.99		
S9.000	SC8 dummy		13.049	1.159	4.421	1.26		
S9.001	SC8		13.047	1.202	2.388	1.02		
S10.000	SC9 Dummy R		13.250	1.145	10.319	1.65		
S11.000	SC9 Dummy L		13.244	1.101	3.857	0.73		
S10.001	SC9		13.242	1.202	1.723	1.22		
S9.002	SC10		13.101	1.569	0.000	1.60		

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S12.000	SC11 Dummy		12.428	1.081	3.008	0.34		
S9.003	SC11		12.426	1.201	0.937	1.78		
S9.004	SC12		12.295	1.145	0.000	1.33		
S9.005	SC13		12.201	1.111	0.000	1.94		
S13.000	SC14		12.842	1.062	0.000	0.63		
S13.001	SC15		12.770	1.200	0.177	0.98		
S14.000	SC16		12.775	1.200	0.039	0.86		
S13.002	SC17		12.690	1.200	0.117	0.73		
S15.000	SC18 Dummy L		12.833	1.133	3.499	0.82		
S16.000	SC18 Dummy R		12.833	1.091	3.342	0.75		
S15.001	SC18		12.830	1.200	0.202	1.49		
S13.003	SC19		12.607	1.316	0.000	1.51		
S9.006	SC20		12.083	1.023	0.000	1.84		
S9.007	SC21		11.779	0.819	0.000	2.00		
S8.002	SC22		11.426	0.554	0.000	2.01		
S8.003	SC23		11.194	0.369	0.000	2.04		
S8.004	SC24		11.061	0.292	0.000	0.28		
S8.005	SC Basin 4		11.060	0.635	0.000	0.08		
S8.006	SC25		11.103	0.759	0.000	0.21		
S17.000	SC 1 Dummy		11.717	1.120	2.972	2.85		
S17.001	SC1		11.716	1.202	2.109	1.51		
S17.002	SC2		11.572	1.425	2.137	1.56		
S17.003	SC3		11.144	1.202	1.677	2.22		
S8.007	SC26		11.072	1.205	0.000	1.87		
S18.000	SC4		11.942	1.137	0.000	1.38		
S18.001	SC5		9.966	0.246	0.000	0.07		
S8.008	SC27		9.965	0.448	0.000	0.22		
S8.009	SSouth Connection		9.963	0.486	0.000	0.23		
S1.004	SE Basin 5		9.959	0.784	0.000	0.37		

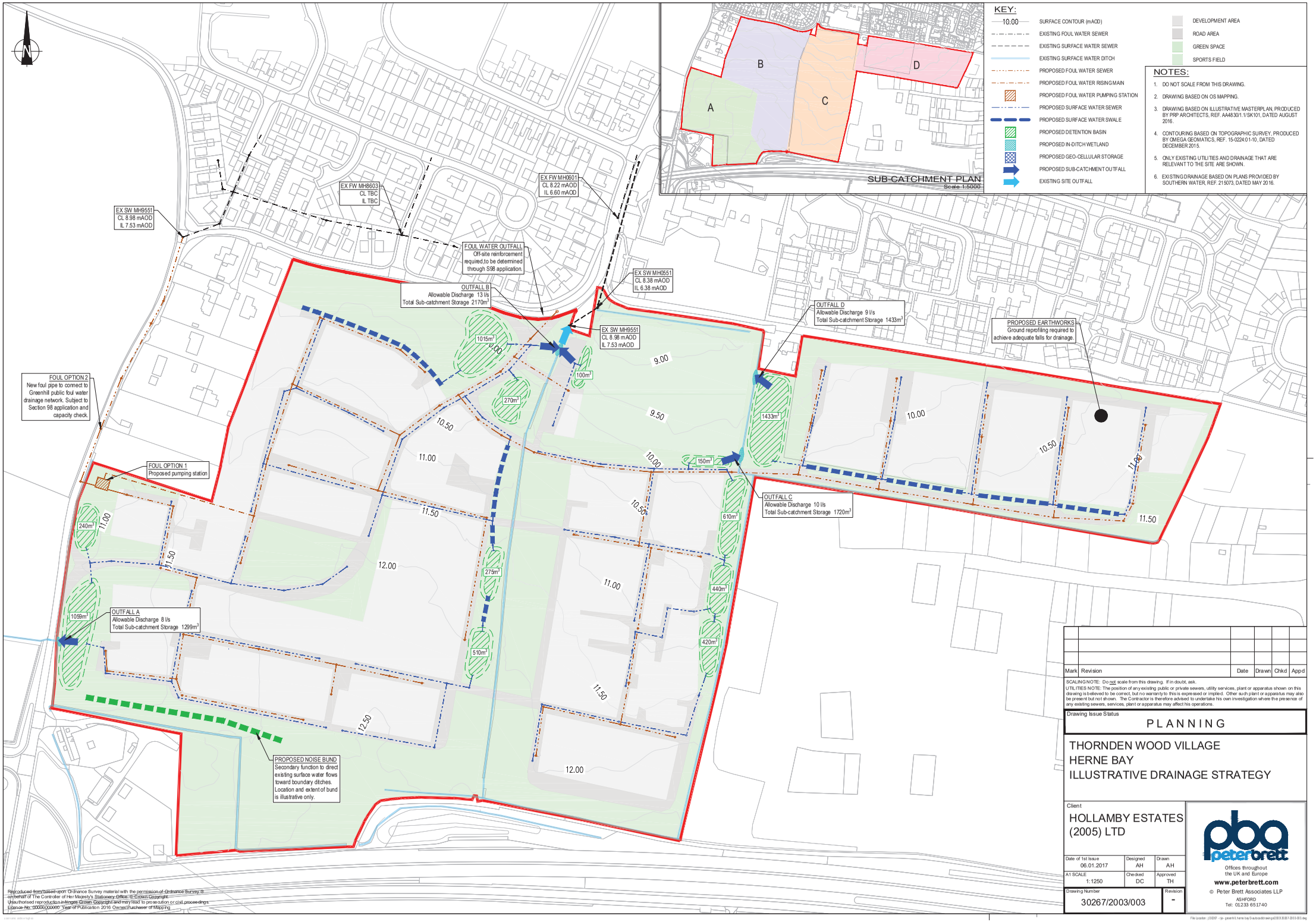
PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S8.001	SC7	66.5	SURCHARGED	
S9.000	SC8 dummy	37.6	FLOOD	4
S9.001	SC8	39.2	FLOOD	4
S10.000	SC9 Dummy R	55.9	FLOOD	5
S11.000	SC9 Dummy L	26.3	FLOOD	4
S10.001	SC9	62.9	FLOOD	4
S9.002	SC10	116.7	FLOOD RISK	
S12.000	SC11 Dummy	46.0	FLOOD	2
S9.003	SC11	190.1	FLOOD	1
S9.004	SC12	192.8	FLOOD RISK	
S9.005	SC13	202.6	FLOOD RISK	
S13.000	SC14	28.3	FLOOD RISK	
S13.001	SC15	39.0	FLOOD	1
S14.000	SC16	35.5	FLOOD	1

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

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S13.002	SC17	77.2	FLOOD	1
S15.000	SC18 Dummy L	28.0	FLOOD	4
S16.000	SC18 Dummy R	27.1	FLOOD	4
S15.001	SC18	62.3	FLOOD	4
S13.003	SC19	167.9	SURCHARGED	
S9.006	SC20	398.4	FLOOD RISK	
S9.007	SC21	425.2	SURCHARGED	
S8.002	SC22	478.0	SURCHARGED	
S8.003	SC23	485.8	SURCHARGED	
S8.004	SC24	59.5	SURCHARGED	
S8.005	SC Basin 4	5.1	SURCHARGED	
S8.006	SC25	21.2	SURCHARGED	
S17.000	SC 1 Dummy	16.2	FLOOD	4
S17.001	SC1	25.8	FLOOD	4
S17.002	SC2	59.0	FLOOD	3
S17.003	SC3	76.5	FLOOD	2
S8.007	SC26	129.2	FLOOD RISK	
S18.000	SC4	32.1	FLOOD RISK	
S18.001	SC5	3.2	SURCHARGED	
S8.008	SC27	29.7	SURCHARGED	
S8.009	SSouth Connection	29.4	FLOOD RISK	
S1.004	SE Basin 5	13.5	FLOOD RISK	

APPENDIX C

PBA Overarching Drainage Strategy Drawing (included within the FRA)



Mark	Revision	Date	Drawn	Chkd	Appd

SCALING NOTE: Do not scale from this drawing. If in doubt, ask.

UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake his own investigation where the presence of any existing sewers, services, plant or apparatus may affect his operations.

Drawing Issue Status

PLANNING

THORNDEN WOOD VILLAGE
HERNE BAY
ILLUSTRATIVE DRAINAGE STRATEGY

Client

HOLLAMBY ESTATES (2005) LTD

Date of 1st Issue	Designed	Drawn
06.01.2017	AH	AH
A1 SCALE	Checked	Approved
1:1250	DC	TH
Drawing Number		Revision
30267/2003/003		-

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