



ACCOMMODATION UNITS

GREENHOUSE

POLYTUNNELS

GREENHOUSE

GREENHOUSE

Notes:

1. DRAINAGE INFORMATION ADDED TO TOPOGRAPHICAL SURVEY PRODUCED BY MAYER BROWN LTD. JOB NO. AHP117HE.2009 DATE AUGUST 14. NO DRAINAGE INFORMATION CARRIED OUT BY MK SURVEYS UNLESS SPECIFIC TO DRAINAGE
2. DRAINAGE INFORMATION HAS BEEN DETERMINED WITHOUT MAIN ENTRY INTO CHAMBERS AND WHILST EVERY EFFORT HAS BEEN MADE TO CORRECTLY IDENTIFY THIS INFORMATION, IT SHOULD ALWAYS BE CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE PROPOSAL
3. SEWERS ARE PRESUMED TO BE STRAIGHT BETWEEN CHAMBERS WITH ROUTES CONNECTIVITY OBTAINED USING ACUSTIC METHOD ONLY. THESE ARE TO BE CONSIDERED ASSUMED AND SHOULD BE INVESTIGATED FURTHER IN CRITICAL AREAS.

ABBREVIATIONS		DRAINAGE KEY	
(ACP)	ABOVE CONNECTION POINT	LH	LAMP HANDLE
(AS)	ASBESTOS GRINDING	MH	MANHOLE
(AR)	ARMED ROUTE	NP	NO PIPES VISIBLE
BL	BLACK ROUTE	OU	OUTLET
BR	BRICK	CU	CUTALL
BS	BLOCK	PL	POLYPROPYLENE
CI	CAST IRON	PO	PIPE ON WALL
CL	COVER LEVEL	PT	PTAMP
CO	CONCRETE	RG	PIPE TO GROUND
CU	CULVERT	RV	PIPE/VINYL CHLORIDE
CUH	CULVERT HEAD	UL	ULTRAVIOLET
DWS	COMBINED WATER SEWER	P	POODING EYE
DGH	DRAINAGE CHANNEL	R	REINFORCING
FD	FLIGHT	SM	SMALL WATER PIPE
FD	FLITER DRAIN	S	SOFT
FW	FEED WATER	SO	SOIL VENT
FW	FEED WATER SEWER	SW	SURFACE WATER PIPE
IG	INJECTION COVER	U	UNABLE TO GET
IG	INJECTION COVER	U	UNABLE TO SURVEY
INT	INTERCEPTOR	VG	VERTIFIED GLAY
INT	INLET	WL	WATER LEVEL
KD	KEY	WL	WATER LEVEL

LEGEND

COMBINED SENSE	=====	RTMP	=====
25% VIDEO 75% VO	-----	BACKDROP	=====
50% VIDEO 50% VO	-----	SURVEY ANCHORED	=====
75% VIDEO 25% VO	-----	CAPPED RUN	=====
VIDEO RUN	=====	SURVEY BOUNDARY	=====
WHOLE	☐		
CHUNK	☐		

CAUTIONARY NOTES

1. Pipe sizes are shown from visual inspection or taken from record information. Pipe sizes are not millimeters and depths in meters.
2. Connectivity between Manholes has been proven using dye-testing / acoustic methods. It is advised CCTV survey is carried out to confirm conditions. Please ring for further details if a CCTV S is made.



SHEET 1 OF 12



mkSURVEYS

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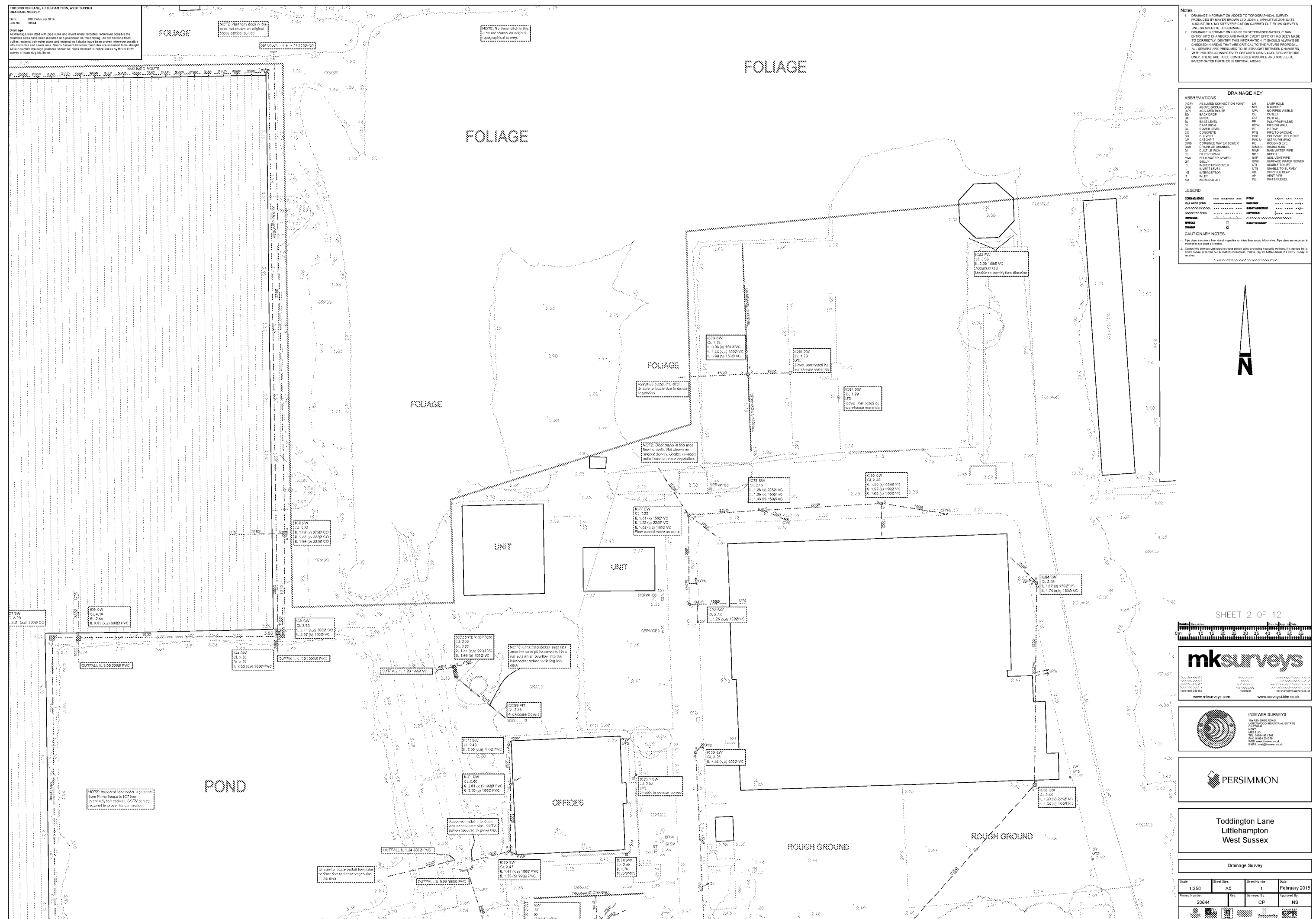


PERSIMMON

Toddington Lane
Littlehampton
West Sussex

Drainage Survey

Scale 1:250	Sheet Size A0	Sheet Number 1	Date February
Project Number 20644	Rev. -	Surveyed By CP	Approved By NS
			     



Notes :

1. DRAINAGE INFORMATION ADDED TO TOPOGRAPHICAL SURVEY PROCURED BY MAYER BROWN LLO JDN INC. APHILITUE 2009 DATE APRIL 2014. NO REVISIONS WERE CARRIED OUT BY MK SURVEYS UNLESS SPECIFIC TO DRAINAGE.
2. DRAINAGE INFORMATION HAS BEEN DETERMINED WITHOUT MAN ENTRY INTO CHAMBERS AND WHILST EVERY EFFORT HAS BEEN MADE TO CORRECTLY IDENTIFY THIS INFORMATION, IT SHOULD ALWAYS BE CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE PRODUCTION OF THE PROJECT.
3. ALL CHAMBERS ARE PREVIEWED TO BE STRAIGHT BETWEEN CHAMBERS WITH ROUTES/CONNECTIVITY OBTAINED USING ACUSTIC METHOD ONLY. THESE ARE TO BE CONSIDERED ASSUMED AND SHOULD BE INVESTIGATED FURTHER IN CRITICAL AREAS.

[illegible]

LEGEND

COMBINED SEWER	---	STUMP	
SEWER	---	BACKSTOP	---
STORM SEWER	---	SLURRY FILL/CHOKED	---
STORM	---	CAPPED PIPE	
STORM	---	SLURRY BOUNDARY	---
WASTEWATER	---		

CAUTIONARY NOTES

1. Pipe 2200 are shown from visual inspection or taken from record information. Pipe sizes are in millimetres and depths in metres.
2. Connectivity between Manholes has been proven using over/under / acoustic methods. It is advised CCTV survey is carried out to confirm connections. Please ring for further details if a CCTV is required.



POLYTUNNELS

GREENHOUSE

GREENHOUSE

SHEET 3 OF 12



mk surveys

26-02-2002 24:00:01	2002-02-24 00:00:01	2002-02-24 00:00:01
26-02-2002 24:00:04	2002-02-24 00:00:04	2002-02-24 00:00:04
26-02-2002 24:00:07	2002-02-24 00:00:07	2002-02-24 00:00:07
26-02-2002 24:00:10	2002-02-24 00:00:10	2002-02-24 00:00:10
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Toddington Lane
Littlehampton
West Sussex

Access

Drainage Survey

Scale 1:250	Sheet Size: A0	Sheet Number: 1	Date: February
Project Number: 20644		Rev: -	Surveyed By: CP Approved By: NS



TODDINGTON LANE, LITTLEHAMPTON, WEST SUSSEX
DRAINAGE SURVEY
Date: 18th February 2014
Job No: 20644
Drainage
All drainage was lifted with pipe sizes and invert levels recorded. Whenever possible the chamber data has been recorded and put based on the drawing. All connections from gullies, external sewer pipes and external and internal have been proven wherever possible into manholes and sewer runs. Drain / sewers between manholes are assumed to be straight. All sub-surface drainage positions should be cross checked in critical areas by R2 or R3P survey or hand dug trial holes.



Notes :
1. DRAINAGE INFORMATION ADDED TO TOPOGRAPHICAL SURVEY
PRODUCED BY MAYHEW BROWN LTD. JOB NO. AP01/11/12/2014 DATE
AUGUST 2014. NO SITE VERIFICATION CARRIED OUT BY MK SURVEYS
UNLESS SPECIFIC TO DRAINAGE.
2. DRAINAGE INFORMATION HAS BEEN DETERMINED WITHOUT MAN
ENTRY INTO CHAMBERS AND WHILST EVERY EFFORT HAS BEEN MADE
TO CORRECTLY IDENTIFY THIS INFORMATION, IT SHOULD ALWAYS BE
CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE PROPOSAL.
3. ALL SEWERS ARE PRESUMED TO BE STRAIGHT BETWEEN CHAMBERS,
WITH ROUTES / CONNECTIVITY OBTAINED USING ACUSTIC METHODS
ONLY. THESE ARE TO BE CONSIDERED ASSUMED AND SHOULD BE
INVESTIGATED FURTHER IN CRITICAL AREAS.

ABBREVIATIONS

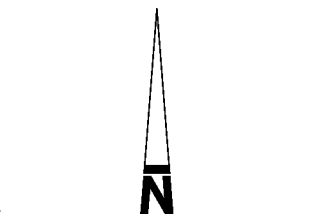
ACPP	ASSUMED CONNECTION POINT	LH	LAMP HOLE
ABD	ABOVE GROUND	MB	MANHOLE
AR	ASSUMED ROUTE	NPV	NO PIPES VISIBLE
BD	BACK DROP	OL	OUTLET
BR	BRICK	OU	OUTFALL
BL	BASE LEVEL	PP	POLYPROPYLENE
CL	CAST IRON	POW	PIPE ON WALL
CL	COVER LEVEL	PT	PIPE TO GROUND
CO	CONCRETE	PTG	PIPE TO GROUND
CU	CULVERT	PVC	POLYETHYLENE
GP	GATEHOLD	PVCU	POLYETHYLENE
DCH	DOWNHILL WATER SEWER	RE	ROOFING EYE
DI	DRAINAGE CHANNEL	RIMAN	RISING MAIN
FI	FLUTE IRON	RWP	RISING WATER PIPE
FD	FLUTE DRAIN	SOF	SOFT
FWS	FULL WATER SEWER	SUP	SURFACE WATER SEWER
GL	GULLY	SW	UNABLE TO SURVEY
IL	INVERT LEVEL	UL	UNABLE TO SURVEY
INT	INTERSECTION	VC	VERTICAL CURVE
IT	INLET	VL	VERTICAL
IO	INLET OUTLET	WL	WATER LEVEL

LEGEND

CAUTIONARY NOTES

1. Pipe sizes are shown from visual inspection or taken from recent information. Pipe sizes are recorded in millimetres and depth in metres.

2. Connections between manholes have been proven using acoustical methods. It is advised that a CCTV survey is carried out to confirm connections. Please ring for further details if a CCTV survey is required.



SHEET 5 OF 12

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PERSIMMON

**Toddington Lane
Littlehampton
West Sussex**

Drainage Survey

Scale	Sheet Size	Sheet Number	Date
1:250	A0	2	February 2015
Project Number	Rev	Drawn By	Approved By
20644	-	CP	NS

TODDINGTON LANE, LITTLEHAMPTON, WEST SUSSEX
DRAINAGE SURVEY
Date: 18th February 2014
Job No: 20644
Drainage
All drainage was lifted with pipe sizes and invert levels recorded. Wherever possible the chamber does have been recorded and put based on the drawing. All cut sections from gullies, external sewer pipes and external not shown have been proven wherever possible into manholes and sewer runs. Drain / sewers between manholes are assumed to be straight. All sub-surface drainage positions should be cross checked in critical areas by RQ or CPE survey or hand dug trial holes.



TODDINGTON LANE, LITTLEHAMPTON, WEST SUSSEX
DRAINAGE SURVEY

Date: 18th February 2014
Job No: 20644

Drainage
All drainage was lifted with pipe sizes and invert levels recorded. Wherever possible the chamber data has been recorded and put based on the drawing. All cut sections from gullies, external sewer pipes and external water pipes have been proven wherever possible into manholes and sewer runs. Drains / sewers between manholes are assumed to be straight. All sub-surface drainage positions should be cross checked in critical areas by RQ or CCTV survey or hand dug trial holes.

NOTES: This drawing has been
checked and is correct to the
best of our knowledge. No evidence of
any other drains.

1000 SW Sky Gully
CL 2.98
BL 2.18
IL 3.42 (at 1000 VC) PLUP VALVE
IL 3.45 (at 1000 VC)

1000 SW
CL 4.30
BL 1.18
IL 3.42 (at 1000 VC) PLUP VALVE
IL 3.45 (at 1000 VC)

1000 SW
CL 2.51
BL 2.51
IL 3.42 (at 1000 VC) PLUP VALVE
IL 3.45 (at 1000 VC)

1000 SW
CL 1.72
BL 1.72
IL 3.42 (at 1000 VC) PLUP VALVE
IL 3.45 (at 1000 VC)

1000 SW
CL 1.78
BL 1.78
IL 3.42 (at 1000 VC) PLUP VALVE
IL 3.45 (at 1000 VC)

1000 SW
CL 2.19
BL 1.18
IL 3.42 (at 1000 VC) PLUP VALVE
IL 3.45 (at 1000 VC)

Notes:

1. DRAINAGE INFORMATION ADDED TO TOPOGRAPHICAL SURVEY
PRODUCED BY MAYER BROWN LTD. JDN/NA. APPLICABLE DATE
AUGUST 2014. NO SITE VERIFICATION CARRIED OUT BY MK SURVEYS
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3. ALL SEWERS ARE PRESUMED TO BE STRAIGHT BETWEEN CHAMBERS,
WITH ROUTES/CONNECTIVITY OBTAINED USING ACUSTIC METHODS
ONLY. THESE ARE TO BE CONSIDERED ASSUMED AND SHOULD BE
INVESTIGATED FURTHER IN CRITICAL AREAS.

DRAINAGE KEY			
ABBREVIATIONS		LAMP HOLE	
ACCP	ASSUMED CONNECTION POINT	LH	LAMP HOLE
ABG	ABOVE GROUND	MB	MANHOLE
AR	ASSUMED ROUTE	NPV	NO PIPES VISIBLE
BD	BACK DROP	OL	OUTLET
BR	BRICK	OU	OUTFALL
BL	BASE LEVEL	PP	POLYPROPYLENE
CL	CASE FROM	POW	PIPE ON WALL
CL	COVER LEVEL	PT	STRAP
CO	CONCRETE	PTG	PIPE TO GROUND
CU	CULVERT	PVC	POLYVINYL CHLORIDE
GP	GATEWAY	PVCU	ULTRA RIG (PVC)
GW	COMBINED WATER SEWER	RE	ROOFING EYE
DCH	DRAINAGE CHANNEL	RMAN	RAIN MAIN
DI	DRAIN	RWP	RAIN WATER PIPE
FD	FILTER DRAIN	SOP	SOFT
FWS	FULL WATER SEWER	SUP	SURFACE WATER SEWER
GF	GULLY	SW	UNABLE TO SURVEY
IC	INVERT COVER	UTL	UNABLE TO SURVEY
INT	INTERSECTION	VC	VERTICAL CURVE
IT	INLET	VL	VENT
LD	LEAK OUTLET	WL	WATER LEVEL

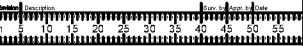
LEGEND	
CONCRETE	CONCRETE
GRAVEL	GRAVEL
GRASS	GRASS
FOLIAGE	FOLIAGE
ROUGH GROUND	ROUGH GROUND

CAUTIONARY NOTES
1. Pipe sizes are shown from visual inspection or taken from access information. Pipe sizes are recorded in
millimetres and depth in metres.
2. Consistently between Manholes has been proven using sounding / acoustic methods. It is advised that a
CCTV survey is carried out to confirm connections. Please refer to further sheets if a CCTV Survey is
not available.



GREENHOUSE

SHEET 7 OF 12



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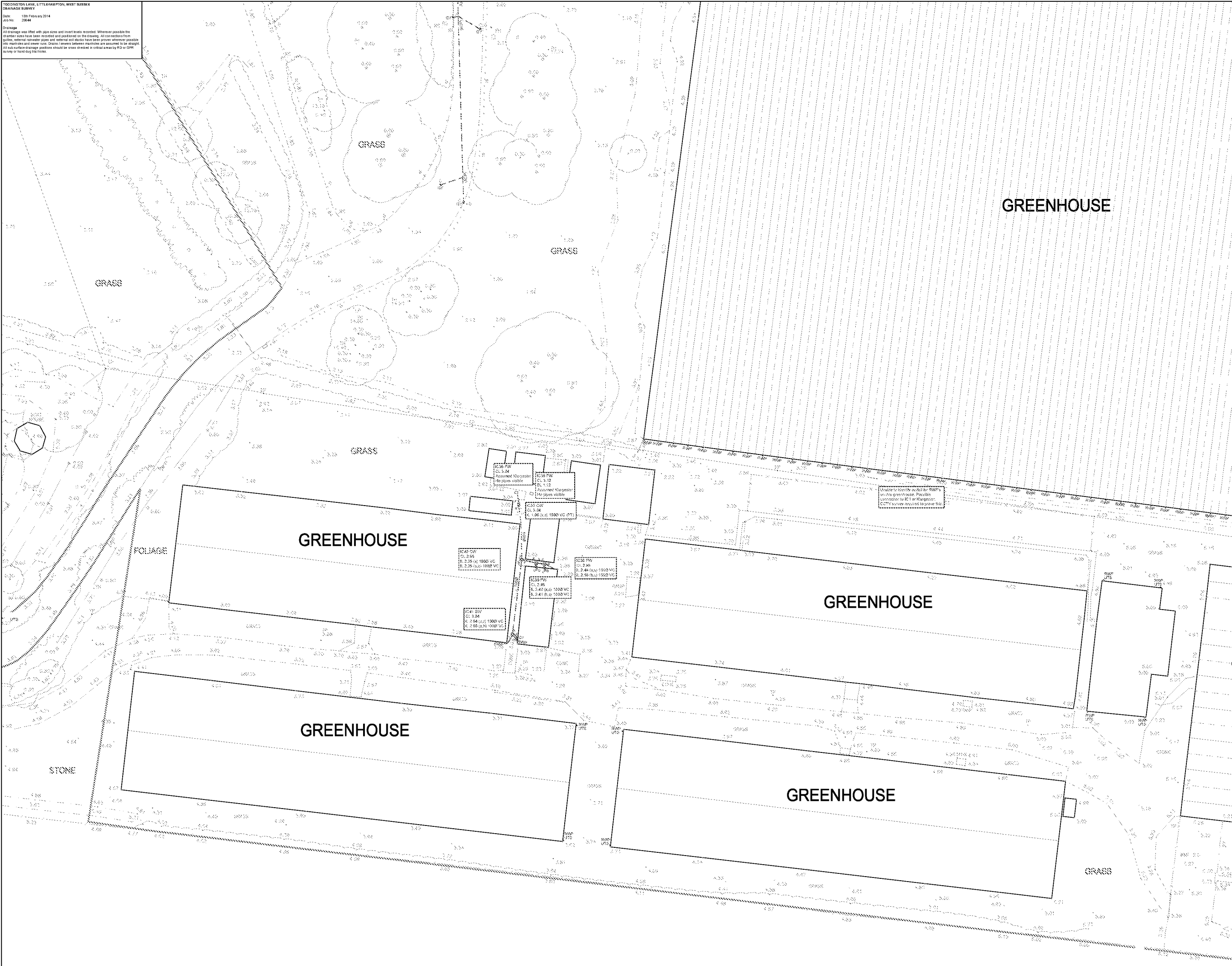
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**Toddington Lane
Littlehampton
West Sussex**

Drainage Survey			
Scale	Sheet Size	Sheet Number	Date
1:250	A0	2	February 2015
Project Number	Rev	Drawn By	Approved By
20644	-	CP	NS

TODDINGTON LANE, LITTLEHAMPTON, WEST SUSSEX
DRAINAGE SURVEY
Date: 18th February 2014
Job No: 20644
Drainage
All drainage was filled with pipe sizes and invert levels recorded. Wherever possible the chamber data has been recorded and put on the drawing. All cut sections from gullies, external sewer pipes and external soil stacks have been drawn wherever possible into manholes and sewer runs. Drains / sewers between manholes are assumed to be straight. All sub-surface drainage positions should be cross checked in critical areas by R.D. or CCTV survey or hand dug trial holes.



- Notes :
1. DRAINAGE INFORMATION ADDED TO TOPOGRAPHICAL SURVEY PROVIDED BY MAYER BROWN LTD. JOB NO. AP/LITTLE 2008 DATE AUGUST 2014. NO SITE VERIFICATION CARRIED OUT BY MK SURVEYS UNLESS SPECIFIC TO DRAINAGE.
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DRAINAGE KEY			
ABBREVIATIONS		LAMP HOLE	
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ABG	ABOVE GROUND	NPV	NO PIPES VISIBLE
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BD	BACK DROP	OU	OUTFALL
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CP	CATCHMENT	PVCU	ULTRA HD PE (PVC)
CWS	COMBINED WATER SEWER	RE	ROOFING EYE
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DI	DRAINAGE INLET	RWP	RAIN WATER PIPE
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GF	GULLY	SW	SOFT WATER SEWER
IL	INVERT LEVEL	UL	UNABLE TO LIFT
INT	INTERSECTION	ULS	UNABLE TO SURVEY
IT	INLET	VC	VENT
LD	LEAK OUTLET	VL	VENT LEVEL

- LEGEND
- CAUTIONARY NOTES
1. Pipe sizes are shown from visual inspection or taken from source information. Pipe sizes are recorded in millimetres and depth in metres.
 2. Completely sealed manholes have been shown using the following methods. If a CCTV survey is carried out to confirm connections. Please ring for further details. If a CCTV survey is not carried out, please ring for further details.

SHEET 11 OF 12

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PERSIMMON

Toddington Lane
Littlehampton
West Sussex

Drainage Survey			
Scale	Sheet Size	Sheet Number	Date
1:250	A0	3	February 2015
Project Number	Rev	Drawn By	Approved By
20644	-	CP	NS

TODDINGTON LANE, LITTLEHAMPTON, WEST SUSSEX
DRAINAGE SURVEY
Date: 18th February 2014
Job No: 20644
Drainage
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ABBREVIATIONS

ACPT	ASSUMED CONNECTION POINT	LH	LAMP HOLE
ABG	ABOVE GROUND	MP	MANHOLE
AR	ASSUMED ROUTE	NPV	NO PIPES VISIBLE
BD	BACK DROP	OL	OUTLET
BK	BRIKE	OU	OUTFALL
BL	BASE LEVEL	PP	POLYPROPYLENE
CI	CAST IRON	POW	PIPE ON WALL
CL	COVER LEVEL	PT	POST
CO	CONCRETE	PTG	PIPE TO GROUND
CU	CULVERT	PVC	POLYVINYL CHLORIDE
GP	CATCHMENT	PVCU	ULTRA HIG (PVC)
DCH	COMBINED WATER SEWER	RE	ROOFING EYE
DI	DRAINAGE CHANNEL	RMAN	REINFORCED MAN
DU	DUCTILE IRON	RWP	RAN WATER PIPE
FD	FILTER DRAIN	SOP	SOFT
FWS	FULL WATER SEWER	SUP	SOL VENT PIPE
GF	GULLY	SW	SURFACE WATER SEWER
IC	INJECTION COVER	UNL	UNABLE TO LIFT
INT	INTERSECTION	UTS	UNABLE TO SURVEY
IT	INLET	VC	VENT PIPE
LD	LEAK OUTLET	VL	VENT LEVEL

LEGEND

CAUTIONARY NOTES

1. Pipe sizes are shown from what is visible or taken from access information. Pipe sizes are recorded in millimetres and depth in metres.
2. Completely between manholes you have proven using over/under methods. It is advised that a CPTV survey is carried out to confirm construction. Please ring for further details if a CPTV survey is required.

DRAINAGE KEY

LEGEND

CAUTIONARY NOTES

1. Pipe sizes are shown from what is visible or taken from access information. Pipe sizes are recorded in millimetres and depth in metres.

2. Completely between manholes you have proven using over/under methods. It is advised that a CPTV survey is carried out to confirm construction. Please ring for further details if a CPTV survey is required.

SHEET 12 OF 12

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PERSIMMON

**Toddington Lane
Littlehampton
West Sussex**

Drainage Survey

Scale	Sheet Size	Sheet Number	Date
1:250	A0	3	February 2015
Project Number	Rev	Drawn By	Approved By
20644	-	CP	NS

GP

Appendix G
Greenfield Runoff Calculation

Glanville Consultants		Page 1
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD		
Date 31/03/2015 15:20 File	Designed by jokelly Checked by	
Micro Drainage Source Control 2015.1		

ICP SUDS Mean Annual Flood

Input

Return Period (years)	1	Soil	0.500
Area (ha)	1.000	Urban	0.750
SAAR (mm)	739	Region Number	Region 7

Results l/s

QBAR Rural	5.9
QBAR Urban	15.0
Q1 year	12.7
Q1 year	12.7
Q30 years	26.0
Q100 years	30.4

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Appendix H
Existing Discharge Rates

Appendix L
Windes Calculations Existing Rates

Glanville Consultants		Page 1
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD		
Date 31/03/2015 10:13 File OUTFALL 1.MDX		
Designed by jokelly Checked by		
Micro Drainage		Network 2015.1

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)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.300	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	10.000	0.050	200.0	0.500	4.00	0.0	0.600	oo	41	
1.001	20.000	0.500	40.0	0.000	0.00	0.0	0.600	oo	41	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	4.15	3.050	0.500	0.0	0.0	0.0	1.11	156.0	0.0
1.001	0.00	4.28	3.000	0.500	0.0	0.0	0.0	2.49	351.0	0.0

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Glanville Consultants		Page 2
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD		
Date 31/03/2015 10:13 File OUTFALL 1.MDX		
Designed by jokelly Checked by		
Micro Drainage		Network 2015.1

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	5.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	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	0.350
Region England and Wales Cv (Summer)			0.750
M5-60 (mm)	19.300	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep		Fine Inertia Status	ON
DTS Status			OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 2, 30, 99, 100
Climate Change (%)	0, 0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	1	+0%	30/15 Summer				3.210
1.001	2	15 Winter	1	+0%					3.092

PN	US/MH Name	Depth (m)	Surcharged Flooded		Flow / Cap. (l/s)	Pipe Flow (l/s)	Level Exceeded
			Volume (m³)	Flow (l/s)			
1.000	1	-0.140	0.000	0.54	65.4	OK	
1.001	2	-0.208	0.000	0.22	66.2	OK	

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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)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.300	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	85.000	0.570	149.1	0.800	4.00	0.0	0.600	o	150	
1.001	20.000	0.780	25.6	0.000	0.00	0.0	0.600	o	150	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	5.73	3.050	0.800	0.0	0.0	0.0	0.82	14.5	0.0
1.001	0.00	5.89	2.480	0.800	0.0	0.0	0.0	2.00	35.3	0.0

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	5.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	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	0.350
Region England and Wales Cv (Summer)			0.750
M5-60 (mm)	19.300	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep		Fine Inertia Status	ON
DTS Status			OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 2, 30, 99, 100
Climate Change (%)	0, 0, 0, 0, 30

US/MH	Return Climate	First (X)	First (Y)	First (Z)	Overflow	Water Level
PN Name Storm	Period Change	Surcharge	Flood	Overflow	Act.	(m)
1.000 1 30 Winter	1 +0%	1/15 Summer	2/30 Winter			4.211
1.001 2 30 Winter	1 +0%					2.574

Surcharged Flooded				Pipe		Level
US/MH	Depth	Volume	Flow / Overflow	Flow		
PN Name	(m)	(m³)	Cap. (l/s)	(l/s)	Status	Exceeded
1.000 1	1.011	0.000	1.66	23.7	FLOOD RISE	58
1.001 2	-0.056	0.000	0.71	23.7	OK	

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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)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.300	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	40.000	0.660	60.6	2.500	4.00	0.0	0.600	oo	41	
2.000	40.000	0.610	65.6	3.300	4.00	0.0	0.600	oo	41	
1.001	20.000	0.760	26.3	0.000	0.00	0.0	0.600	o	300	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	4.33	3.800	2.500	0.0	0.0	0.0	2.02	284.8	0.0
2.000	0.00	4.34	2.610	3.300	0.0	0.0	0.0	1.94	273.7	0.0
1.001	0.00	4.45	2.000	5.800	0.0	0.0	0.0	3.68	217.5	0.0

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	5.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	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	0.350
Region England and Wales Cv (Summer)			0.750
M5-60 (mm)	19.300	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep		Fine Inertia Status	ON
DTS Status			OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 2, 30, 99, 100
Climate Change (%)	0, 0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1 15	Winter	1	+0%	1/15 Summer	30/15 Winter			4.151
2.000	2 15	Winter	1	+0%	1/15 Summer	2/15 Winter			3.531
1.001	3 15	Winter	1	+0%	1/15 Summer	99/15 Winter			3.454

PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.051	0.000	1.04		275.5	SURCHARGED	15
2.000	2	0.621	0.000	0.87		220.8	FLOOD RISK	46
1.001	3	1.154	0.000	1.59		301.4	SURCHARGED	16

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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)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.300	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	36.000	0.210	171.4	1.230	4.00	0.0	0.600	o	225	
1.001	23.000	0.040	575.0	0.000	0.00	0.0	0.600	o	300	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	4.60	0.850	1.230	0.0	0.0	0.0	1.00	39.6	0.0
1.001	0.00	5.19	0.640	1.230	0.0	0.0	0.0	0.65	45.8	0.0

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	5.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	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	0.350
Region England and Wales Cv (Summer)	0.750		
M5-60 (mm)	19.300	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	OFF		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 2, 30, 99, 100
Climate Change (%)	0, 0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	1	+0%	1/15 Summer	30/15 Summer			1.763
1.001	2	15 Winter	1	+0%	1/15 Summer				1.696

PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.688	0.000	1.89		70.6	SURCHARGED	32
1.001	2	0.006	0.000	1.94		70.4	SURCHARGED	

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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)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.300	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	160.000	0.640	250.0	1.700	4.00	0.0	0.600	o	225	
1.001	12.000	0.100	120.0	0.000	0.00	0.0	0.600	o	225	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	7.24	3.240	1.700	0.0	0.0	0.0	0.82	32.7	0.0
1.001	0.00	7.41	2.600	1.700	0.0	0.0	0.0	1.19	47.4	0.0

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	5.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	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	0.350
Region England and Wales Cv (Summer)			0.750
M5-60 (mm)	19.300	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep		Fine Inertia Status	ON
DTS Status			OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 2, 30, 99, 100
Climate Change (%)	0, 0, 0, 0, 30

US/MH	Return Climate	First (X)	First (Y)	First (Z)	Overflow	Water
PN Name Storm	Period Change	Surcharge	Flood	Overflow	Act.	Level (m)
1.000 1 60 Winter	1 +0%	1/15 Summer	2/15 Winter			4.071
1.001 2 60 Winter	1 +0%	1/30 Summer				2.334

Surcharged Flooded				Pipe		Level
US/MH	Depth	Volume	Flow / Overflow	Flow		
PN Name	(m)	(m³)	Cap. (l/s)	(l/s)	Status	Exceeded
1.000 1	0.606	0.000	1.38	44.6	FLOOD RISE	69
1.001 2	0.009	0.000	1.10	44.5	SURCHARGED	

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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)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.300	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	162.000	0.820	197.6	2.220	4.00	0.0	0.600	o	225	
1.001	12.000	0.100	120.0	0.000	0.00	0.0	0.600	o	225	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	6.91	3.270	2.220	0.0	0.0	0.0	0.93	36.8	0.0
1.001	0.00	7.08	2.450	2.220	0.0	0.0	0.0	1.19	47.4	0.0

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	5.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	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	0.350
Region England and Wales Cv (Summer)			0.750
M5-60 (mm)	19.300	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep		Fine Inertia Status	ON
DTS Status			OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 2, 30, 99, 100
Climate Change (%)	0, 0, 0, 0, 30

US/MH	Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Water
PN	Name	Storm	Period	Change	Surcharge	Flood	Level
1.000	1 60 Winter	1	+0%	1/15 Summer	2/15 Winter		4.368
1.001	2 60 Winter	1	+0%	1/15 Summer			2.724

Surcharged Flooded				Pipe		Level
US/MH	Depth	Volume	Flow / Overflow	Flow		
PN	Name	(m)	(m³)	Cap.	(l/s)	(l/s)
1.000	1	0.873	0.000	1.41		51.3 FLOOD RISE
1.001	2	0.049	0.000	1.26		51.2 SUPCHARGED

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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)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.300	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	55.500	0.060	925.0	3.720	4.00	0.0	0.600	o	225	
1.001	12.000	0.100	120.0	0.000	0.00	0.0	0.600	o	225	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	6.19	2.230	3.720	0.0	0.0	0.0	0.42	16.8	0.0
1.001	0.00	6.36	2.170	3.720	0.0	0.0	0.0	1.19	47.4	0.0

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	5.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	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	0.350
Region England and Wales Cv (Summer)			0.750
M5-60 (mm)	19.300	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep		Fine Inertia Status	ON
DTS Status		OFF	

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 2, 30, 99, 100
Climate Change (%)	0, 0, 0, 0, 30

US/MH	Return Climate	First (X)	First (Y)	First (Z)	Overflow	Water			
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	Level
1.000	1	60 Winter	1	+0%	1/15 Summer	1/30 Winter			3.619
1.001	2	60 Winter	1	+0%	1/15 Summer				2.563

Surcharged Flooded				Pipe		Level	
US/MH	Depth	Volume	Flow / Overflow	Flow			
PN	Name	(m)	(m³)	Cap.	(l/s)	(l/s)	Status
1.000	1	1.164	39.094	4.19		67.8	FLOOD
1.001	2	0.168	0.000	1.67		67.8	SUPCHARGED

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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)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.300	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	80.000	0.600	133.3	1.800	4.00	0.0	0.600	o	225	
1.001	12.000	0.100	120.0	0.000	0.00	0.0	0.600	o	225	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	5.18	3.300	1.800	0.0	0.0	0.0	1.13	45.0	0.0
1.001	0.00	5.35	2.700	1.800	0.0	0.0	0.0	1.19	47.4	0.0

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	5.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	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	0.350
Region England and Wales Cv (Summer)	0.750		
M5-60 (mm)	19.300	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	OFF		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 2, 30, 99, 100
Climate Change (%)	0, 0, 0, 0, 30

US/MH	Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Water
PN	Name	Storm	Period	Change	Surcharge	Flood	Level
1.000	1 60 Winter	1	+0%	1/15 Summer	2/15 Winter		3.861
1.001	2 60 Winter	1	+0%	1/15 Summer			3.146

Surcharged Flooded				Pipe		Level
US/MH	Depth	Volume	Flow / Overflow	Flow		
PN	Name	(m)	(m³)	Cap.	(l/s)	(l/s)
1.000	1	0.336	0.000	1.09	47.9	FLOOD RISE
1.001	2	0.215	0.000	1.18	47.9	SUPCHARGED

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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)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.300	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	50.000	0.200	250.0	1.380	4.00	0.0	0.600	o	300	
1.001	10.000	0.100	100.0	0.000	0.00	0.0	0.600	o	300	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	4.84	3.600	1.380	0.0	0.0	0.0	0.99	70.0	0.0
1.001	0.00	4.95	3.400	1.380	0.0	0.0	0.0	1.57	111.1	0.0

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	5.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	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	0.350
Region England and Wales Cv (Summer)			0.750
M5-60 (mm)	19.300	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep		Fine Inertia Status	ON
DTS Status		OFF	

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 2, 30, 99, 100
Climate Change (%)	0, 0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	30 Winter	1	+0%	1/15 Summer	2/30 Winter			4.134
1.001	2	15 Winter	1	+0%	1/15 Summer	100/15 Winter			3.927

PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.234	0.000	1.05		69.0	FLOOD RISK	43
1.001	2	0.227	0.000	0.74		58.7	FLOOD RISK	

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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)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.300	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	43.000	0.540	79.6	0.350	4.00	0.0	0.600	o	225	
1.001	10.000	0.100	100.0	0.000	0.00	0.0	0.600	o	225	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	4.49	1.550	0.350	0.0	0.0	0.0	1.47	58.3	0.0
1.001	0.00	4.62	1.010	0.350	0.0	0.0	0.0	1.31	52.0	0.0

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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)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.300	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	24.000	0.610	39.3	0.065	4.00	0.0	0.600	o	100	
1.001	10.000	0.100	100.0	0.000	0.00	0.0	0.600	o	225	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	I.Area (ha)	Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	4.32	2.080	0.065	0.0	0.0	0.0	1.23	9.7	0.0
1.001	0.00	4.45	1.345	0.065	0.0	0.0	0.0	1.31	52.0	0.0

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	5.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	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	0.350
Region England and Wales Cv (Summer)			0.750
M5-60 (mm)	19.300	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep		Fine Inertia Status	ON
DTS Status			OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 2, 30, 99, 100
Climate Change (%)	0, 0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	1	+0%	1/15 Summer	30/15 Summer			2.204
1.001	2	15 Summer	1	+0%	1/15 Summer				2.016

Surcharged Flooded					Pipe		Level
PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status
1.000	1	0.024	0.000	0.56		5.3	FLOOD RISK
1.001	2	0.446	0.000	0.12		5.2	FLOOD RISK

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APPENDIX I: Drainage Strategy, West of Wetlands