

# **LAND AT 15 - 17 OXFORD ROAD, BIRKDALE, SOUTHPORT.**

**DRAINAGE STRATEGY REPORT  
HAMILTON TECHNICAL SERVICES  
1 CHILTERN AVE, EUXTON, CHORLEY, LANCS, PR7 6NU**

**ISSUE 1  
3/1/2021  
C-0963**

**Document Control Sheet**

Land at 15 – 17 Oxford Road, Birkdale, Southport.  
Drainage Strategy Report

Job	Date	Issue	Copy
C0963	1st March 2021	1	

*Originator.....G Hamilton.....*

*Checker.....G Hamilton.....*

*Approver.....G Hamilton.....*

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## **Contents**

- 1.0 Introduction**
- 2.0 Description of existing site**
- 3.0 Proposals for Development**
- 4.0 Conclusions**

## **Figures and Plans**

# 1. Introduction

- 1.1. Hamilton Technical Services have been commissioned through Lulworth Developments Ltd, to prepare a Drainage Strategy Report, in support of a redevelopment scheme, located on land at 15-17 Oxford Road, Ainsdale, Southport, Merseyside.
- 1.2. The site comprises an area of land lying on the northeast side of Oxford Road, Birkdale, Southport. The site has been occupied by residential property for many years and most recently has been used as a residential care facility. The location of the site is illustrated in **Figure 1** appended to this report.
- 1.3. The national grid reference for the site is 332360E, 416012N.
- 1.4. It is understood that permission is being sought to redevelop the site to provide three detached residential properties. A development layout plan is attached to this report as **Figure 2**.

## 2. Description of the existing site.

- 2.1. The site is bounded to the northwest, southeast and northeast by residential properties. The southwest boundary is onto Oxford Road and further residential areas.
- 2.2. Consultation of Environment Agency Flood maps, through their website, shows that the site lies in Flood Zone 1 and not at risk of flooding from rivers or the sea. Further consultation of the flood mapping system shows some of the rear garden areas of the site are at low risk of flooding from surface water and that the site is at very low risk of flooding from reservoir failure.
- 2.3. Excavations show that the open areas of land on the site are covered by grass and landscaping, on a layer of topsoil, lying on fine blown sand with a high water table. The excavations confirm the details shown on the British Geological Survey maps. The superficial deposits on the site are wind-blown sand and these overly a bedrock of the Singleton Mudstone Member.
- 2.4. Consultation of the Cranfield Institute Soilscape maps confirms the ground to be naturally wet, very acid sandy and loamy with impeded drainage.
- 2.5. Standing water indicating the water table was encountered at 900-1200mm below existing ground level indicating that the use of traditional soak-aways will not be feasible in this case. However the use of permeable surfaces to driveways will be available.
- 2.6. The existing development is served by a system of combined foul and surface water drains that outfall to the public sewer systems in Oxford Road. A plan showing the existing outfall point and the surface water catchment areas draining to this outfall is attached as **Figure 3** of this report.
- 2.7. A series of run-off calculations has been completed to evaluate the existing rates of run-off during a range of storm events. Copies of these calculations are contained in **Appendix 1** of this report and show the following rates of discharge to the public combined sewers.
- 2.8. During a 1 in 2 Yr event the rate of run-off is 21.0 l/s; during a 1 in 30 Yr event the run-off is 35.4 l/s and during a 1 in 100 Yr event the run-off is 39.4 l/s.

### 3. Proposals for Redevelopment

- 3.1. The redevelopment of the site will consist of the demolition of the existing buildings and concrete driveway areas and the erection of three new detached residential properties with associated driveways, paths and gardens.
- 3.2. The site access will be taken off Oxford Road using two existing gateways and an additional central entry point.
- 3.3. As there are fully separate foul and surface water sewer systems in Oxford Road drainage; foul and surface water drainage of the site will be provided by two separate systems with foul water being discharged to the public foul sewer system in Oxford Road using the existing site outfall drainage. It is required that a fully separate system of surface water drainage is provided to serve the redevelopment and that the rates of discharge from the redeveloped site are at a reduced rate compared to those existing rates noted in 2.8 above.
- 3.4. Surface water drainage will be provided by two methods, in the form of porous surfacing to the driveway areas and positive drainage servicing the roof areas. The positive drainage will discharge into the public surface water sewer in Oxford Road by means of a new outfall drain connected to an existing manhole roughly central to the site frontage.
- 3.5. The driveway areas will be constructed using a sub-base layer made up of crushed concrete, brick and other suitable materials reclaimed for the demolition of the existing buildings. This sub-base layer will be overlain by a porous surfacing system to allow rainwater to be absorbed into the ground and the underlying water table.
- 3.6. The roof run-off will be collected by a new system of surface water drains that will conduct the run-off to the public sewer at a much reduced rate of discharge in all storm events.
- 3.7. A plan showing the proposed drainage layout for the redeveloped site is attached as **Figure 4** of this report. A series of calculations has again been completed to illustrate the final run-off rates during storms of 1 in 2 Yr return frequency and also for 1 in 30 Yr events and 1 in 100 Yr events. The calculations for the 1 in 30 and 1 in 100 Yr events also include a climate change allowance of 40% rainfall increase.

3.8. These calculations, based on the catchment zones shown on **Figure 5** of this report, show that the maximum rates of run-off will be; 11.1 l/s during the 1 in 2 Yr events; 19.4 l/s during the 1 in 30 Yr events and 22.8 l/s during the 1 in 100 Yr events. These figures represent a reduction in run-off rates of 47% in a 1 in 2 Yr event; 45% in a 1 in 30Yr event and 42% during a 1 in 100 Yr event.

## 4. Future Maintenance Proposals

On completion of the development all the access driveways, parking areas, landscaping and drainage will remain privately owned and will be the joint responsibility of the three properties.

All new property owners will enter a legal agreement to jointly fund and maintain the shared assets.

Maintenance of the porous driveway surfaces will include cleaning using a “suction” sweeper at annual intervals to maintain maximum porosity. All manholes, soak-aways and inspection chambers will initially be inspected at six month intervals and cleaned or repaired as required. The inspection intervals will be adjusted to suit the site drainage conditions and operational activities.

## 5. Conclusions

Based on the above principals and proposals it will be possible to design and construct suitable systems of foul and surface water drainage that are highly sustainable and that will prevent the occurrence of flooding on or out with the development site.

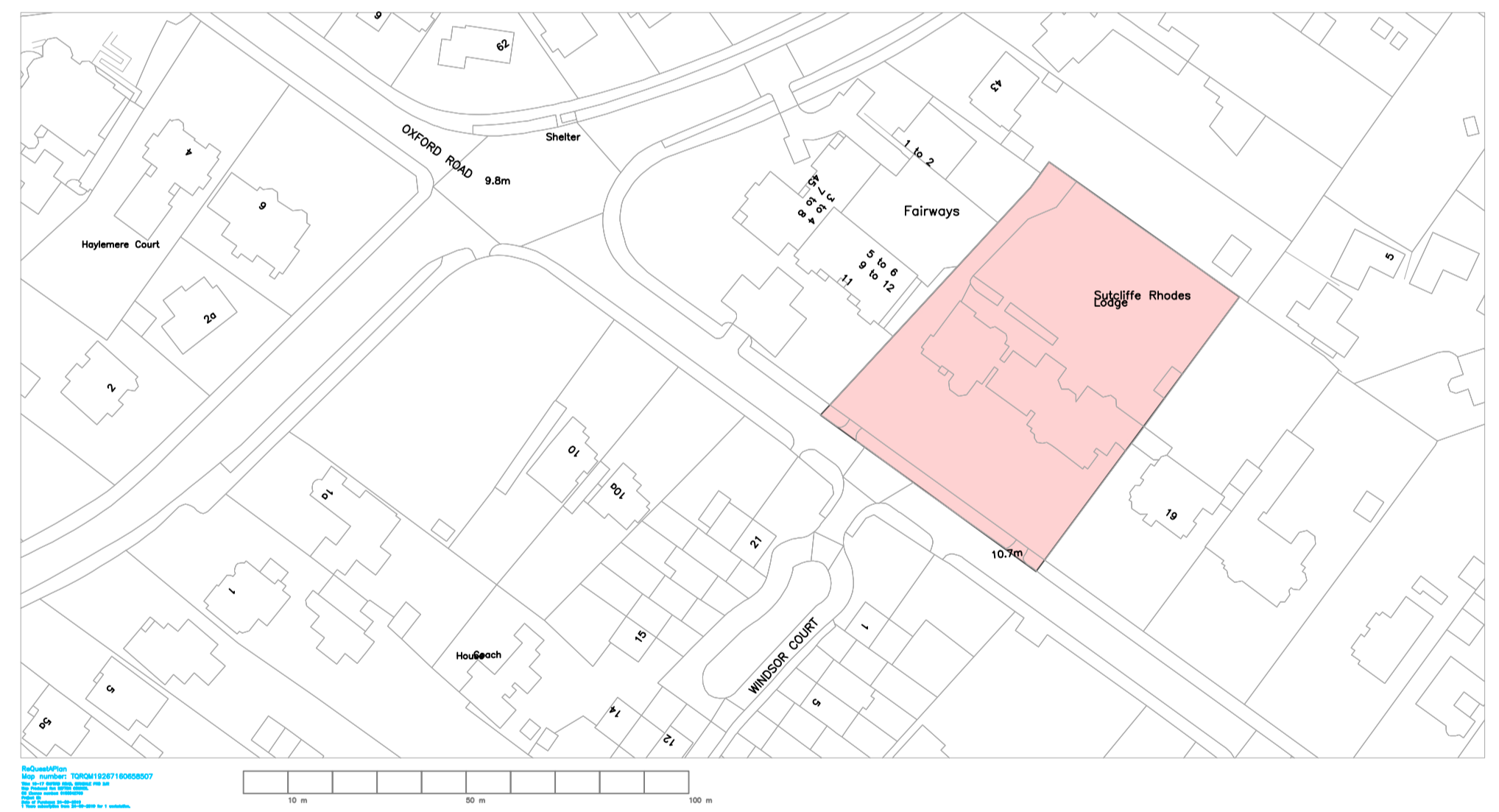
### **Figures;**

- Figure 1 – Site Location Plan
- Figure 2 – Site Development Plan
- Figure 3 – Existing Site Drainage and Catchments
- Figure 4 – Proposed Site Drainage Plan
- Figure 5 – Proposed SW Catchments Plan

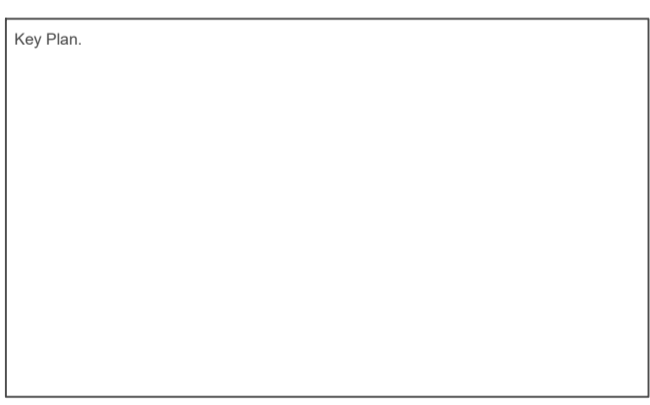
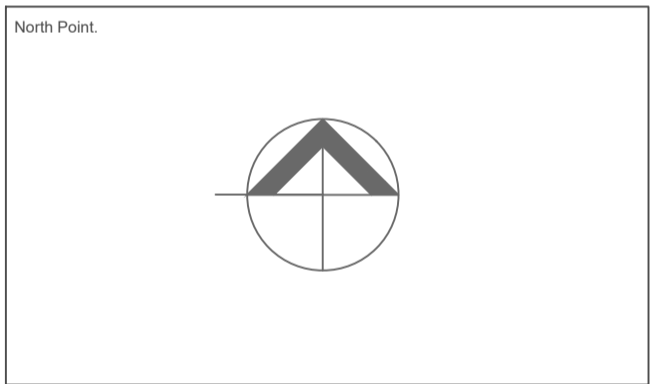
- Appendix 1 – Existing SW Run-off Calculations.
- Appendix 2 – Proposed SW Run-off Calculations



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SITE LOCATION PLAN 1:1250



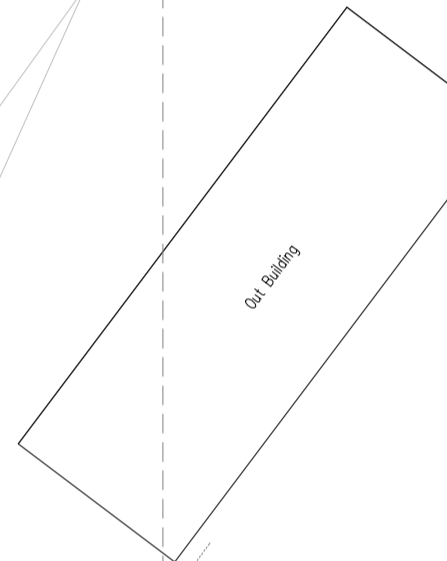
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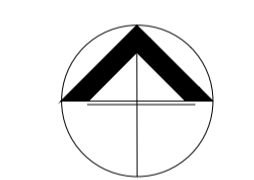
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Drawing title SITE LOCATION PLAN				
Status PLANNING		File Name PH PLANNING 1		X-Ref File
Drawn by SB	Date 24 09 19	checked by	Date	Scale at A1 1250
Scale at A3 2500	Revision		Job No. 1914	
CPI ref. 000	Draw No. EX 101	Revision P1		
Contractors Drawing No.				



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North Point:



Key Plan:

Rev	Date	Revision Note	By	Check



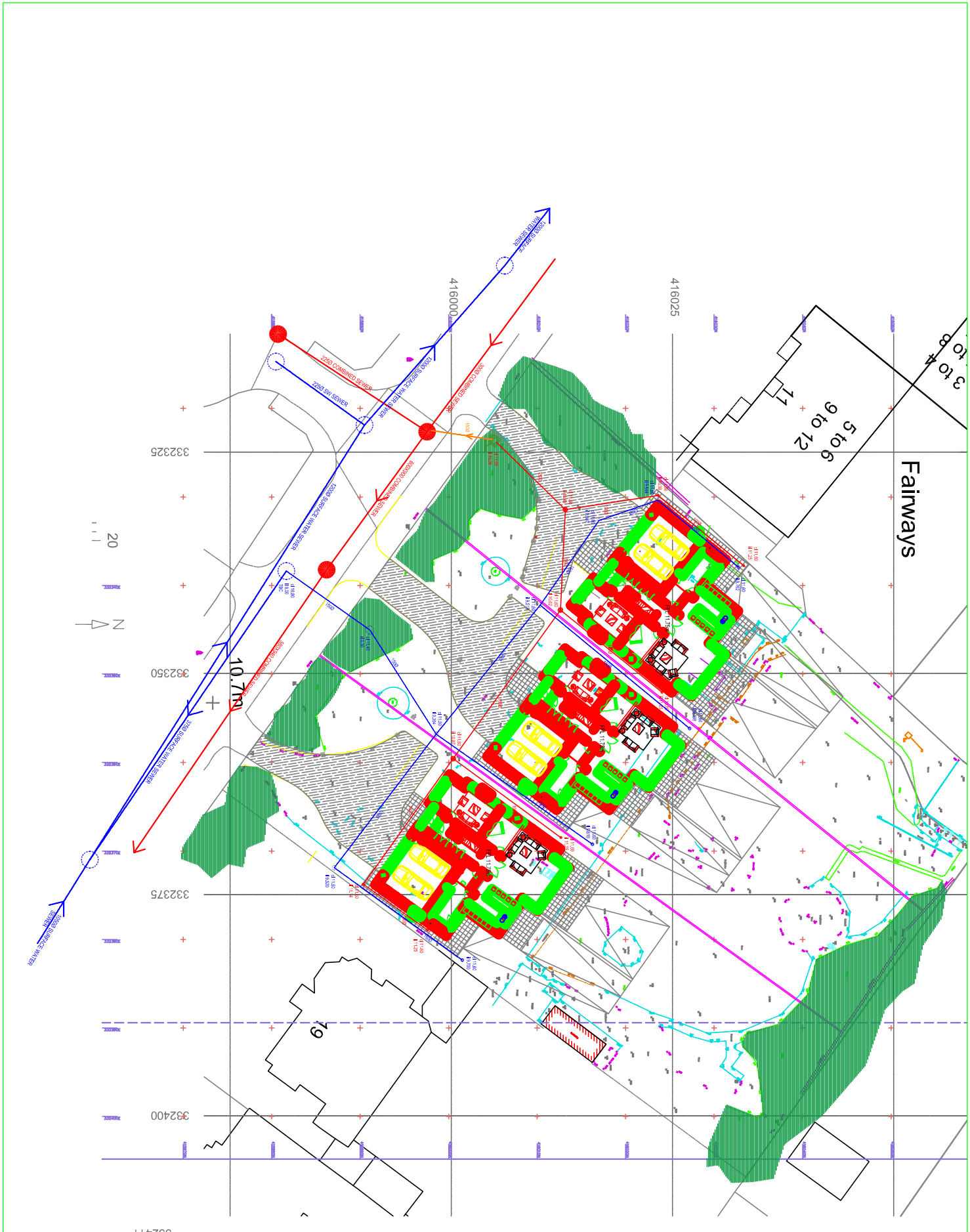
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Drawing title PROPOSED DETAILED SITE PLAN				
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Drawn by SB	Date 31.10.20	Checked by	Date	Draw No. RPL 107
Job No. 1914	CPI ref. 000			
Contractors Drawing No.				

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PROPOSED SITE PLAN - SITE BOUNDARY & OWNERSHIP 1:200







Rev	Details	By	Date

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 DEVELOPMENTS LTD.

Project: REDEVELOPMENT AT  
 15 - 17 OXFORD ROAD  
 SOUTHPORT

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 CHECKED BY: [Name]  
 PROJECT NO: C-0983-02



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415975  
41597  
SD321

Rev	Details	By	Date
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<p>Client: DEVELOPMENTS LTD.</p> <p>Project: REDEVELOPMENT AT 15-17 OXFORD ROAD SOUTHPORT</p> <p>Task: PROPOSED SV CATCHMENT LAYOUT</p>			
File: C-0983-03	Rev: 202202	Rev: 202004	Rev: 1901

**15 – 17 Oxford Road, Birkdale, L&C Dev's Ltd**

**Appendix 1**

**Existing SW Run-off Calculations**

1 Chiltern Ave  
Euxton  
Chorley PR7 6NU

15-17 Oxford Road, S'port  
Existing SW Run-off Estimate  
1 in 2 Yr - 100 Yr Storm Sims



Date 26.02.2021  
File EX SW.MDX

Designed by Geoff Hamilton  
Checked by


Micro Drainage Network 2014.1

Time Area Diagram for Storm

<b>Time (mins)</b>	<b>Area (ha)</b>	<b>Time (mins)</b>	<b>Area (ha)</b>
0-4	0.131	4-8	0.009

Total Area Contributing (ha) = 0.140

Total Pipe Volume (m<sup>3</sup>) = 0.309

Hamilton Technical Services		Page 2
1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Existing SW Run-off Estimate 1 in 2 Yr - 100 Yr Storm Sims	
Date 26.02.2021 File EX SW.MDX	Designed by Geoff Hamilton Checked by	
Micro Drainage		Network 2014.1

STORM SEWER DESIGN by the Modified Rational Method

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)
1.000	10.500	0.120	87.5	0.140	4.00	0.0	0.600	o	150
1.001	7.000	0.088	80.0	0.000	0.00	0.0	0.600	o	150

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	4.16	10.500	0.140	0.0	0.0	0.0	1.08	19.0	0.0
1.001	0.00	4.27	10.380	0.140	0.0	0.0	0.0	1.12	19.9	0.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.001	SEWER	11.200	10.293	10.200	1200	0


Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1
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		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	15
Ratio R	0.372		




Hamilton Technical Services		Page 3
1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Existing SW Run-off Estimate 1 in 2 Yr - 100 Yr Storm Sims	
Date 26.02.2021 File EX SW.MDX	Designed by Geoff Hamilton Checked by	
Micro Drainage	Network 2014.1	

Summary of Results for 15 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0      DVD Status OFF  
 Analysis Timestep Fine Inertia Status OFF  
 DTS Status ON

PN	US/MH Name	Water Surcharged Flooded			Pipe			Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Flow (l/s)		
1.000	1	10.759	0.109	0.000	1.24	0.0	21.1	SURCHARGED
1.001	2	10.569	0.039	0.000	1.24	0.0	21.0	SURCHARGED

Hamilton Technical Services		Page 1
1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Existing SW Run-off Estimate 1 in 2 Yr - 100 Yr Storm Sims	
Date 26.02.2021 File EX SW.MDX	Designed by Geoff Hamilton Checked by	
Micro Drainage Network 2014.1		

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.131	4-8	0.009

Total Area Contributing (ha) = 0.140

Total Pipe Volume (m<sup>3</sup>) = 0.309

Free Flowing Outfall Details for Storm


Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.001	SEWER	11.200	10.293	10.200	1200	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1
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		

Synthetic Rainfall Details


Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	15
Ratio R	0.372		

Hamilton Technical Services		Page 2
1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Existing SW Run-off Estimate 1 in 2 Yr - 100 Yr Storm Sims	
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Micro Drainage	Network 2014.1	

Summary of Results for 15 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0      DVD Status OFF  
 Analysis Timestep Fine Inertia Status OFF  
 DTS Status ON

PN	US/MH Name	Water Surcharged			Flooded		Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Flow (l/s)		
1.000	1	11.353	0.703	0.000	2.08	0.0	35.3	FLOOD RISK	
1.001	2	10.820	0.290	0.000	2.08	0.0	35.4	SURCHARGED	

Hamilton Technical Services		Page 1
1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Existing SW Run-off Estimate 1 in 2 Yr - 100 Yr Storm Sims	
Date 26.02.2021 File EX SW.MDX	Designed by Geoff Hamilton Checked by	
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Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.131	4-8	0.009

Total Area Contributing (ha) = 0.140

Total Pipe Volume (m<sup>3</sup>) = 0.309

Free Flowing Outfall Details for Storm


Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.001	SEWER	11.200	10.293	10.200	1200	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1
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		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	15
Ratio R	0.372		

Hamilton Technical Services		Page 2
1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Existing SW Run-off Estimate 1 in 2 Yr - 100 Yr Storm Sims	
Date 26.02.2021 File EX SW.MDX	Designed by Geoff Hamilton Checked by	
Micro Drainage	Network 2014.1	

Summary of Results for 15 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0      DVD Status OFF  
 Analysis Timestep      Fine Inertia Status OFF  
 DTS Status      ON

PN	US/MH Name	Water Surcharged			Flooded		Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Flow (l/s)		
1.000	1	11.551	0.901	1.398	2.32	0.0	39.4	FLOOD	
1.001	2	10.911	0.381	0.000	2.32	0.0	39.4	SURCHARGED	

**15 – 17 Oxford Road, Birkdale, L&C Dev's Ltd**

**Appendix 2**

**Proposed SW Run-off Calculations**

1 Chiltern Ave  
Euxton  
Chorley PR7 6NU

15-17 Oxford Road, S'port  
Proposed SW Run-off Calcs  
1 in 2 Yr Storms



Date 26.02.2021  
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Time Area Diagram for Storm

<b>Time (mins)</b>	<b>Area (ha)</b>		<b>Time (mins)</b>	<b>Area (ha)</b>
0-4	0.049		4-8	0.020

Total Area Contributing (ha) = 0.069

Total Pipe Volume (m<sup>3</sup>) = 2.740

Hamilton Technical Services		Page 2
1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Proposed SW Run-off Calcs 1 in 2 Yr Storms	
Date 26.02.2021 File NEW SW.MDX	Designed by Geoff Hamilton Checked by	
Micro Drainage	Network 2014.1	

STORM SEWER DESIGN by the Modified Rational Method

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)
1.000	11.830	0.118	100.3	0.011	4.00	0.0	0.600	o	150
1.001	7.030	0.047	149.6	0.000	0.00	0.0	0.600	o	150
1.002	11.660	0.078	149.5	0.000	0.00	0.0	0.600	o	150
2.000	21.890	0.219	100.0	0.024	4.00	0.0	0.600	o	150
1.003	18.730	0.125	149.8	0.000	0.00	0.0	0.600	o	150
3.000	21.610	0.216	100.0	0.023	4.00	0.0	0.600	o	150
4.000	17.840	0.180	99.1	0.011	4.00	0.0	0.600	o	150
4.001	18.970	0.126	150.6	0.000	0.00	0.0	0.600	o	150
1.004	13.930	0.094	148.2	0.000	0.00	0.0	0.600	o	150
1.005	11.580	0.075	154.4	0.000	0.00	0.0	0.600	o	150


Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E 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	4.20	9.762	0.011	0.0	0.0	0.0	1.00	17.7	0.0
1.001	0.00	4.34	9.644	0.011	0.0	0.0	0.0	0.82	14.5	0.0
1.002	0.00	4.58	9.597	0.011	0.0	0.0	0.0	0.82	14.5	0.0
2.000	0.00	4.36	9.738	0.024	0.0	0.0	0.0	1.01	17.8	0.0
1.003	0.00	4.96	9.519	0.035	0.0	0.0	0.0	0.82	14.5	0.0
3.000	0.00	4.36	9.610	0.023	0.0	0.0	0.0	1.00	17.8	0.0
4.000	0.00	4.29	9.700	0.011	0.0	0.0	0.0	1.01	17.8	0.0
4.001	0.00	4.68	9.520	0.011	0.0	0.0	0.0	0.82	14.4	0.0
1.004	0.00	5.24	9.394	0.069	0.0	0.0	0.0	0.82	14.5	0.0
1.005	0.00	5.48	9.300	0.069	0.0	0.0	0.0	0.81	14.2	0.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.005	SEWER	10.800	9.225	9.225	1200	0




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1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Proposed SW Run-off Calcs 1 in 2 Yr Storms	
Date 26.02.2021 File NEW SW.MDX	Designed by Geoff Hamilton Checked by	
Micro Drainage	Network 2014.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1
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		

Synthetic Rainfall Details


Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
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Ratio R	0.372		

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1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Proposed SW Run-off Calcs 1 in 2 Yr Storms	
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Micro Drainage		Network 2014.1

Summary of Results for 15 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0      DVD Status OFF  
 Analysis Timestep    Fine Inertia Status OFF  
 DTS Status            ON

PN	US/MH Name	Water Surcharged			Flooded		Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Flow (l/s)		
1.000	1	9.796	-0.116	0.000	0.12	0.0	1.9	OK	
1.001	2	9.683	-0.111	0.000	0.15	0.0	1.9	OK	
1.002	3	9.635	-0.112	0.000	0.14	0.0	1.8	OK	
2.000	4	9.788	-0.100	0.000	0.24	0.0	4.0	OK	
1.003	5	9.588	-0.081	0.000	0.43	0.0	5.8	OK	
3.000	6	9.659	-0.101	0.000	0.23	0.0	3.9	OK	
4.000	7	9.733	-0.117	0.000	0.11	0.0	1.9	OK	
4.001	8	9.557	-0.113	0.000	0.13	0.0	1.8	OK	
1.004	9	9.499	-0.045	0.000	0.83	0.0	11.1	OK	
1.005	10	9.409	-0.041	0.000	0.86	0.0	11.1	OK	

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1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Proposed SW Run-off Calcs 1 in 2 Yr Storms	
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Micro Drainage	Network 2014.1	

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.049	4-8	0.020

Total Area Contributing (ha) = 0.069

Total Pipe Volume (m<sup>3</sup>) = 2.740

Free Flowing Outfall Details for Storm


Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
1.005	SEWER	10.800	9.225	9.225	1200	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1
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		

Synthetic Rainfall Details


Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.372		

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1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Proposed SW Run-off Calcs 1 in 2 Yr Storms	
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Micro Drainage		Network 2014.1

Summary of Results for 30 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0      DVD Status OFF  
 Analysis Timestep      Fine Inertia Status OFF  
 DTS Status      ON

PN	US/MH Name	Water Surcharged			Flooded		Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Flow (l/s)		
1.000	1	9.792	-0.120	0.000	0.09	0.0	1.4	OK	
1.001	2	9.677	-0.117	0.000	0.11	0.0	1.4	OK	
1.002	3	9.629	-0.118	0.000	0.11	0.0	1.4	OK	
2.000	4	9.781	-0.107	0.000	0.18	0.0	3.0	OK	
1.003	5	9.577	-0.092	0.000	0.32	0.0	4.4	OK	
3.000	6	9.652	-0.108	0.000	0.17	0.0	2.9	OK	
4.000	7	9.729	-0.121	0.000	0.08	0.0	1.4	OK	
4.001	8	9.552	-0.118	0.000	0.10	0.0	1.4	OK	
1.004	9	9.482	-0.062	0.000	0.64	0.0	8.6	OK	
1.005	10	9.390	-0.060	0.000	0.66	0.0	8.5	OK	

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1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Proposed SW Run-off Calcs 1 in 2 Yr Storms	
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Micro Drainage	Network 2014.1	

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.049	4-8	0.020

Total Area Contributing (ha) = 0.069

Total Pipe Volume (m<sup>3</sup>) = 2.740

Free Flowing Outfall Details for Storm


Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.005	SEWER	10.800	9.225	9.225	1200	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1
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		

Synthetic Rainfall Details


Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	60
Ratio R	0.372		

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1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Proposed SW Run-off Calcs 1 in 2 Yr Storms	
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Micro Drainage		Network 2014.1

Summary of Results for 60 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0      DVD Status OFF  
 Analysis Timestep      Fine Inertia Status OFF  
 DTS Status      ON

PN	US/MH Name	Water Surcharged			Flooded		Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Flow (l/s)		
1.000	1	9.785	-0.127	0.000	0.06	0.0	0.9	OK	
1.001	2	9.671	-0.123	0.000	0.07	0.0	0.9	OK	
1.002	3	9.623	-0.124	0.000	0.07	0.0	0.9	OK	
2.000	4	9.772	-0.116	0.000	0.12	0.0	2.0	OK	
1.003	5	9.566	-0.103	0.000	0.21	0.0	2.9	OK	
3.000	6	9.644	-0.116	0.000	0.11	0.0	1.9	OK	
4.000	7	9.723	-0.127	0.000	0.06	0.0	0.9	OK	
4.001	8	9.545	-0.125	0.000	0.07	0.0	0.9	OK	
1.004	9	9.462	-0.082	0.000	0.43	0.0	5.7	OK	
1.005	10	9.370	-0.080	0.000	0.44	0.0	5.7	OK	

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1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Proposed SW Run-off Calcs 1 in 30 Yr Storms + CC	
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Micro Drainage	Network 2014.1	

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.049	4-8	0.020

Total Area Contributing (ha) = 0.069

Total Pipe Volume (m<sup>3</sup>) = 2.740

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.005	SEWER	10.800	9.225	9.225	1200	0


Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	15
Ratio R	0.372		


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1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Proposed SW Run-off Calcs 1 in 30 Yr Storms + CC	
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Micro Drainage	Network 2014.1	

Summary of Results for 15 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0      DVD Status OFF  
 Analysis Timestep    Fine Inertia Status OFF  
 DTS Status            ON

PN	US/MH Name	Water		Surcharged		Flooded		Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Flow / Cap.	Flow (l/s)	Flow (l/s)		
1.000	1	9.830	-0.082	0.000	0.31	0.0	4.9		OK	
1.001	2	9.818	0.024	0.000	0.36	0.0	4.4		SURCHARGED	
1.002	3	9.810	0.063	0.000	0.32	0.0	4.1		SURCHARGED	
2.000	4	9.847	-0.041	0.000	0.64	0.0	10.7		OK	
1.003	5	9.799	0.130	0.000	0.72	0.0	9.8		SURCHARGED	
3.000	6	9.782	0.022	0.000	0.57	0.0	9.5		SURCHARGED	
4.000	7	9.766	-0.084	0.000	0.29	0.0	4.9		OK	
4.001	8	9.752	0.082	0.000	0.24	0.0	3.3		SURCHARGED	
1.004	9	9.737	0.193	0.000	1.46	0.0	19.4		SURCHARGED	
1.005	10	9.539	0.089	0.000	1.51	0.0	19.4		SURCHARGED	



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1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Proposed SW Run-off Calcs 1 in 30 Yr Storms + CC	
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Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.049	4-8	0.020

Total Area Contributing (ha) = 0.069

Total Pipe Volume (m<sup>3</sup>) = 2.740

Free Flowing Outfall Details for Storm


Outfall Pipe Number	Outfall C. Level Name	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.005	SEWER	10.800	9.225	9.225	1200 0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1
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		

Synthetic Rainfall Details


Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.372		

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1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Proposed SW Run-off Calcs 1 in 30 Yr Storms + CC	
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Micro Drainage	Network 2014.1	

Summary of Results for 30 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0      DVD Status OFF  
 Analysis Timestep    Fine Inertia Status OFF  
 DTS Status            ON

PN	US/MH Name	Water		Surcharged		Flooded		Pipe Flow (l/s)	Status
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)			
1.000	1	9.811	-0.101	0.000	0.23	0.0	3.7	OK	
1.001	2	9.751	-0.043	0.000	0.29	0.0	3.6	OK	
1.002	3	9.743	-0.004	0.000	0.24	0.0	3.1	OK	
2.000	4	9.812	-0.076	0.000	0.48	0.0	8.0	OK	
1.003	5	9.733	0.064	0.000	0.67	0.0	9.1	SURCHARGED	
3.000	6	9.707	-0.053	0.000	0.46	0.0	7.7	OK	
4.000	7	9.748	-0.102	0.000	0.22	0.0	3.7	OK	
4.001	8	9.690	0.020	0.000	0.21	0.0	2.9	SURCHARGED	
1.004	9	9.677	0.133	0.000	1.33	0.0	17.8	SURCHARGED	
1.005	10	9.510	0.060	0.000	1.38	0.0	17.8	SURCHARGED	

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1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Proposed SW Run-off Calcs 1 in 30 Yr Storms + CC	
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Micro Drainage	Network 2014.1	

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.049	4-8	0.020

Total Area Contributing (ha) = 0.069

Total Pipe Volume (m<sup>3</sup>) = 2.740

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.005	SEWER	10.800	9.225	9.225	1200	0


Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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		

Synthetic Rainfall Details


Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	60
Ratio R	0.372		

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1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Proposed SW Run-off Calcs 1 in 30 Yr Storms + CC	
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Micro Drainage	Network 2014.1	

Summary of Results for 60 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0      DVD Status OFF  
 Analysis Timestep      Fine Inertia Status OFF  
 DTS Status      ON

PN	US/MH Name	Water		Surcharged		Flooded		Pipe Flow (l/s)	Status
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)			
1.000	1	9.801	-0.111	0.000	0.15	0.0	2.5	OK	
1.001	2	9.689	-0.105	0.000	0.20	0.0	2.5	OK	
1.002	3	9.641	-0.106	0.000	0.19	0.0	2.5	OK	
2.000	4	9.796	-0.092	0.000	0.32	0.0	5.3	OK	
1.003	5	9.604	-0.065	0.000	0.57	0.0	7.8	OK	
3.000	6	9.667	-0.093	0.000	0.31	0.0	5.1	OK	
4.000	7	9.738	-0.112	0.000	0.15	0.0	2.5	OK	
4.001	8	9.578	-0.092	0.000	0.17	0.0	2.4	OK	
1.004	9	9.568	0.024	0.000	1.07	0.0	14.3	SURCHARGED	
1.005	10	9.460	0.010	0.000	1.11	0.0	14.3	SURCHARGED	

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1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Proposed SW Run-off Calcs 1 in 100 Yr Storms + CC	
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Micro Drainage	Network 2014.1	

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.049	4-8	0.020

Total Area Contributing (ha) = 0.069

Total Pipe Volume (m<sup>3</sup>) = 2.740

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.005	SEWER	10.800	9.225	9.225	1200	0


Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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		

Synthetic Rainfall Details


Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	15
Ratio R	0.372		

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1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Proposed SW Run-off Calcs 1 in 100 Yr Storms + CC	
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Micro Drainage	Network 2014.1	

Summary of Results for 15 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0      DVD Status OFF  
 Analysis Timestep    Fine Inertia Status OFF  
 DTS Status            ON

PN	US/MH Name	Water    Surcharged    Flooded			Pipe			Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Flow (l/s)	
1.000	1	9.994	0.082	0.000	0.38	0.0	6.1	SURCHARGED
1.001	2	9.980	0.186	0.000	0.36	0.0	4.5	SURCHARGED
1.002	3	9.970	0.223	0.000	0.39	0.0	5.1	SURCHARGED
2.000	4	10.019	0.131	0.000	0.73	0.0	12.3	SURCHARGED
1.003	5	9.959	0.290	0.000	0.83	0.0	11.3	SURCHARGED
3.000	6	9.938	0.178	0.000	0.66	0.0	11.0	SURCHARGED
4.000	7	9.910	0.060	0.000	0.36	0.0	5.9	SURCHARGED
4.001	8	9.893	0.223	0.000	0.29	0.0	3.9	SURCHARGED
1.004	9	9.875	0.331	0.000	1.70	0.0	22.7	SURCHARGED
1.005	10	9.603	0.153	0.000	1.77	0.0	22.8	SURCHARGED

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1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Proposed SW Run-off Calcs 1 in 100 Yr Storms + CC	
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Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.049	4-8	0.020

Total Area Contributing (ha) = 0.069

Total Pipe Volume (m<sup>3</sup>) = 2.740

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.005	SEWER	10.800	9.225	9.225	1200	0


Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.372		


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1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Proposed SW Run-off Calcs 1 in 100 Yr Storms + CC	
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Micro Drainage	Network 2014.1	

Summary of Results for 30 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0      DVD Status OFF  
 Analysis Timestep    Fine Inertia Status OFF  
 DTS Status            ON

PN	US/MH Name	Water		Surcharged		Flooded		Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Flow / Cap.	Flow (l/s)	Flow (l/s)		
1.000	1	9.911	-0.001	0.000	0.30	0.0	4.8		OK	
1.001	2	9.898	0.104	0.000	0.32	0.0	3.9		SURCHARGED	
1.002	3	9.889	0.142	0.000	0.34	0.0	4.5		SURCHARGED	
2.000	4	9.927	0.039	0.000	0.60	0.0	10.1		SURCHARGED	
1.003	5	9.878	0.209	0.000	0.78	0.0	10.6		SURCHARGED	
3.000	6	9.848	0.088	0.000	0.53	0.0	8.9		SURCHARGED	
4.000	7	9.835	-0.015	0.000	0.29	0.0	4.8		OK	
4.001	8	9.819	0.149	0.000	0.27	0.0	3.7		SURCHARGED	
1.004	9	9.804	0.260	0.000	1.58	0.0	21.1		SURCHARGED	
1.005	10	9.569	0.119	0.000	1.64	0.0	21.1		SURCHARGED	



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1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Proposed SW Run-off Calcs 1 in 100 Yr Storms + CC	
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Micro Drainage	Network 2014.1	

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.049	4-8	0.020

Total Area Contributing (ha) = 0.069

Total Pipe Volume (m<sup>3</sup>) = 2.740

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.005	SEWER	10.800	9.225	9.225	1200	0


Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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		

Synthetic Rainfall Details


Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	60
Ratio R	0.372		

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1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Proposed SW Run-off Calcs 1 in 100 Yr Storms + CC	
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Micro Drainage	Network 2014.1	

Summary of Results for 60 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0      DVD Status OFF  
 Analysis Timestep    Fine Inertia Status OFF  
 DTS Status            ON

PN	US/MH Name	Water		Surcharged		Flooded		Pipe Flow (l/s)	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)			
1.000	1	9.807	-0.105	0.000	0.20	0.0	3.2	OK	
1.001	2	9.735	-0.059	0.000	0.25	0.0	3.1	OK	
1.002	3	9.728	-0.019	0.000	0.22	0.0	2.9	OK	
2.000	4	9.806	-0.082	0.000	0.42	0.0	7.0	OK	
1.003	5	9.717	0.048	0.000	0.65	0.0	8.8	SURCHARGED	
3.000	6	9.693	-0.067	0.000	0.40	0.0	6.7	OK	
4.000	7	9.745	-0.105	0.000	0.19	0.0	3.2	OK	
4.001	8	9.677	0.007	0.000	0.21	0.0	2.8	SURCHARGED	
1.004	9	9.664	0.120	0.000	1.30	0.0	17.4	SURCHARGED	
1.005	10	9.504	0.054	0.000	1.35	0.0	17.4	SURCHARGED	

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1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Proposed SW Run-off Calcs 1 in 100 Yr Storms + CC	
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Micro Drainage	Network 2014.1	

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.049	4-8	0.020

Total Area Contributing (ha) = 0.069

Total Pipe Volume (m<sup>3</sup>) = 2.740

Free Flowing Outfall Details for Storm


Outfall Pipe Number	Outfall C. Level Name	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.005	SEWER	10.800	9.225	9.225	1200 0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1
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		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	120
Ratio R	0.372		

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1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Proposed SW Run-off Calcs 1 in 100 Yr Storms + CC	
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Micro Drainage	Network 2014.1	

Summary of Results for 120 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0      DVD Status OFF  
 Analysis Timestep      Fine Inertia Status OFF  
 DTS Status      ON

PN	US/MH Name	Water Surcharged			Flooded		Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Flow (l/s)		
1.000	1	9.797	-0.115	0.000	0.13	0.0	2.0	OK	
1.001	2	9.684	-0.110	0.000	0.16	0.0	2.0	OK	
1.002	3	9.636	-0.111	0.000	0.15	0.0	2.0	OK	
2.000	4	9.790	-0.098	0.000	0.26	0.0	4.4	OK	
1.003	5	9.592	-0.077	0.000	0.47	0.0	6.4	OK	
3.000	6	9.661	-0.099	0.000	0.25	0.0	4.2	OK	
4.000	7	9.735	-0.115	0.000	0.12	0.0	2.0	OK	
4.001	8	9.558	-0.112	0.000	0.15	0.0	2.0	OK	
1.004	9	9.509	-0.035	0.000	0.94	0.0	12.6	OK	
1.005	10	9.418	-0.032	0.000	0.98	0.0	12.6	OK	

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.049	4-8	0.020

Total Area Contributing (ha) = 0.069

Total Pipe Volume (m<sup>3</sup>) = 2.740

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.005	SEWER	10.800	9.225	9.225	1200	0


Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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		

Synthetic Rainfall Details


Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	300
Ratio R	0.372		

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Micro Drainage	Network 2014.1	

Summary of Results for 300 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0      DVD Status OFF  
 Analysis Timestep      Fine Inertia Status OFF  
 DTS Status      ON

PN	US/MH Name	Water Surcharged			Flooded		Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Flow (l/s)		
1.000	1	9.787	-0.125	0.000	0.06	0.0	1.0	OK	
1.001	2	9.673	-0.121	0.000	0.08	0.0	1.0	OK	
1.002	3	9.625	-0.122	0.000	0.08	0.0	1.0	OK	
2.000	4	9.774	-0.114	0.000	0.13	0.0	2.2	OK	
1.003	5	9.569	-0.100	0.000	0.24	0.0	3.3	OK	
3.000	6	9.645	-0.115	0.000	0.13	0.0	2.1	OK	
4.000	7	9.724	-0.126	0.000	0.06	0.0	1.0	OK	
4.001	8	9.547	-0.123	0.000	0.08	0.0	1.0	OK	
1.004	9	9.467	-0.077	0.000	0.48	0.0	6.4	OK	
1.005	10	9.375	-0.075	0.000	0.50	0.0	6.4	OK	

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1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Proposed SW Run-off Calcs 1 in 100 Yr Storms + CC	
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Micro Drainage	Network 2014.1	

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.049	4-8	0.020

Total Area Contributing (ha) = 0.069

Total Pipe Volume (m<sup>3</sup>) = 2.740

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.005	SEWER	10.800	9.225	9.225	1200	0


Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	600
Ratio R	0.372		

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1 Chiltern Ave Euxton Chorley PR7 6NU	15-17 Oxford Road, S'port Proposed SW Run-off Calcs 1 in 100 Yr Storms + CC	
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Micro Drainage	Network 2014.1	

Summary of Results for 600 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0      DVD Status OFF  
 Analysis Timestep      Fine Inertia Status OFF  
 DTS Status      ON

PN	US/MH Name	Level (m)	Water Surcharged Flooded			Pipe		Status
			Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Flow (l/s)		
1.000	1	9.781	-0.131	0.000	0.04	0.0	0.6	OK
1.001	2	9.665	-0.129	0.000	0.05	0.0	0.6	OK
1.002	3	9.617	-0.130	0.000	0.05	0.0	0.6	OK
2.000	4	9.766	-0.122	0.000	0.08	0.0	1.3	OK
1.003	5	9.556	-0.113	0.000	0.14	0.0	1.9	OK
3.000	6	9.637	-0.123	0.000	0.07	0.0	1.3	OK
4.000	7	9.718	-0.132	0.000	0.04	0.0	0.6	OK
4.001	8	9.540	-0.130	0.000	0.04	0.0	0.6	OK
1.004	9	9.448	-0.096	0.000	0.28	0.0	3.8	OK
1.005	10	9.355	-0.095	0.000	0.29	0.0	3.8	OK