

Project No. & Name:	9670 – Our Lady’s RC High School, Manchester	Prepared by:	Rev:	Date:
Document Ref:	9670-WML-ZZ-XX-RP-C-1001	Daniel Baker	P02	February 2021

DRAINAGE STRATEGY

Background

1. The below Drainage Strategy Report has been created by WML to support and inform an initial drainage scope for Our Lady’s RC High School, Manchester
2. It is understood that the development will comprise the construction of a two storey standalone teaching block which includes classrooms and a library on an area of soft landscaping adjacent the existing school building.

Surface Water Drainage Strategy

3. The proposed drainage strategy for this site will incorporate the principles of, and where appropriate demonstrate compliance with the NPPF and the SUDS manual.
4. The proposed drainage system should be designed in accordance with BS EN 752 and Building Regulations Part H (2010). Approved Document H indicates the following hierarchy for the disposal of surface water drainage from the new development sites, firstly discharge via infiltration, secondly discharge via watercourse and lastly discharge to sewer.
5. These options are discussed in further detail below.
6. **Surface water discharge via infiltration:** From a review of the BGS it is understood that the ground conditions across the site comprise clay over mudstone and therefore infiltration is not a viable solution for this development.
7. **Surface water discharge via watercourse:** It is understood that there are no watercourses within the vicinity of the proposed development and therefore disposal of surface water via this technique is not a viable solution for this site.
8. **Surface water discharge via public sewer connection:** As neither of the above options are viable solutions for the disposal of surface water from this development, a connection to the public sewer will be required.
9. It is understood from a review of the as-built drainage information and Sonde Survey for the existing site that there are multiple private foul and surface water drains in the vicinity of the of the new building which may be suitable for a connection from the new building.
10. However as there appears to be discrepancies between both sets of information it is recommended that a CCTV survey should be undertaken to confirm location, depth and condition/suitability of all existing drainage prior to reuse by the new development.
11. From the information available it appears that a portion of the existing drainage will require diverting to avoid clashes with proposed building foundations. The full extent of diversion works is to be confirmed upon receipt of the CCTV survey report.

Surface Water Proposal

12. Reference should be made to WML Proposed Drainage GA 9670-WML-ZZ-XX-DR-C-1001 appended to this report.
13. It is understood that LLFA policy is that any new development should aim to discharge surface water runoff at the pre-developed Greenfield runoff rate.
14. In consideration of the above, a greenfield runoff assessment was undertaken using Microdrainage software which concluded the following flow rates;

Return Period	Flow (l/s)
1 in 1 year	0.8
1 in 30 year	1.5
1 in 100 year	1.8

15. A copy of the Greenfield runoff calculation can be found appended to this report.
16. The proposals for the new build development intend to discharge all surface water at the above Greenfield runoff rates including a 40% climate change allowance.
17. It is proposed to collect surface water via traditional rainwater pipes/channel drains and discharge at a restricted flow rate into a local point along the existing private surface water drainage network.
18. It should be noted that a new connection to the existing drainage network at a point local to the new building will likely be upstream of the existing site hydrobrake/flow control. Whilst the small restricted flows from the new development are not expected to adversely impact the existing drainage design, it is recommended that an assessment of the existing drainage system is carried out during detailed design to confirm a suitable connection point.
19. A below ground attenuation system has been incorporated within the new drainage system to store surface water for all storms up to and including the critical 100 year event plus 40% climate change allowance prior to being discharged at a restricted flow rate.

Waste Water proposal

20. As noted in section 9, a review of the as-built drainage drawings have confirmed the presence of foul water sewers drains in the vicinity of the proposed building footprint.
21. It is therefore proposed to collect waste water from the new development via traditional soil stacks/SVPs and discharge via a new connection to the nearest private foul water drain.

SUDs Review

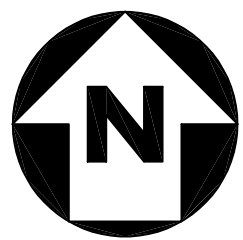
22. SUDs should be considered as part of the detailed drainage design for the new build development area and are discussed in further detail below.
23. Storing water for later use could be a viable option for this site. The expected limited roof space available on the new school building is considered not practical for the incorporation green roofs/water gardens, however water butts located on the rain water pipes could be used for gardening/grounds keeping or domestic purposes. This option should be discussed with the client during detailed design.
24. Above ground storage basins/swales have been considered for the storage of surface water prior to disposal into the existing drainage network, however it is considered that the additional health & safety risks associated with such systems are unwanted by the school.
25. Permeable paving has been specified by the architect for all external construction across the development. Given the anticipated ground conditions noted in section 6, it is expected that the actual volume of surface water runoff disposed via infiltration will be very low and therefore it is also proposed to drain all external areas via traditional gullies/channel drains.

Maintenance Strategy

26. The proposed drainage system has been designed in accordance with the current standards and guidelines to achieve a minimum self-cleansing velocity, however excessive debris in the system could still result in loss of performance.
27. The proposed drainage design will consists of traditional manholes, pipes and channels.
28. It is proposed to check the underground drainage system and lift manhole/inspection chamber covers to ensure that the pipework associated with each chamber is operating correctly twice yearly and ensure drainage channels are free from debris.
29. Any problems encountered should be investigated by CCTV survey if required and any remedial works necessary carried out in a timely manner.
30. Attenuation has been provided in the form of a below ground storage crate system/soakaway system. A recommended maintenance schedule, checklist and a preferred cleaning procedure should be included from the supplier in the O&M Manual however it is anticipated that this should include twice yearly checking that the upstream manholes are free from debris and ensure that no sediment is being passed into the storage crates.
31. The proposed drainage system includes a permeable paving drainage solution. It is proposed to check and clean the permeable surface regularly to ensure that surface water runoff is not prevented from draining into the sub base, especially during the autumn period where a build-up leaves could occur.

Appendix 01

WML Proposed Drainage GA – 9670-WML-ZZ-XX-DR-C-1001



GENERAL NOTES

DO NOT SCALE FROM THIS DRAWING WORK TO FIGURED DIMENSIONS ONLY.

NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING IS ALLOWED WITHOUT PRIOR PERMISSION IN WRITING.

ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.

THE CONTRACTOR SHALL INCORPORATE ALL THE REQUIREMENTS OF THE PRE-TENDER STAGE HEALTH AND SAFETY PLAN.

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH WML DRAINAGE DETAIL DRAWINGS FOR DETAILS OF MATERIALS AND WORKMANSHIP REFER TO THE SPECIFICATION.

THE CONTRACTOR IS RESPONSIBLE FOR CHECKING INVERT LEVELS AND POSITIONS OF ALL EXISTING DRAINS, SEWERS, INSPECTION CHAMBERS AND MANHOLES SHOWN ON THIS DRAWING IMMEDIATELY ON SITE ESTABLISHMENT. ANY DISCREPANCIES MUST BE REPORTED TO WML CONSULTING IMMEDIATELY.

WHERE THE NEW SITE DRAINAGE CONNECTS IN TO EXISTING MANHOLES IN CARRIAGEWAYS AND/OR EXISTING ADOPTED SEWERS, THE CONTRACTOR IS RESPONSIBLE FOR ALL LIAISON WITH THE RELEVANT STATUTORY UNDERTAKER AND LOCAL AUTHORITY WITH REGARD TO ROAD CLOSURES, TRAFFIC MANAGEMENT, PERMITS TO WORK, SUBMISSION OF CONTRACTORS METHOD STATEMENTS AND RISK ASSESSMENTS AND OTHER DOCUMENTATION AND CORRESPONDENCE ASSOCIATED WITH THE SITE STAGE (PART 2) ELEMENT OF THE WORKS.

ROCKER PIPES TO BE PROVIDED AT ALL CONCRETE CASED INTERFACES.

PROVIDE ADEQUATE PROTECTION TO MAINTAIN MINIMUM COVER TO DRAINS DURING THE CONSTRUCTION PERIOD.

COVER LEVELS ON THIS DRAWING ARE APPROXIMATE AND INDICATIVE ONLY ARCHITECT TO CONFIRM COVER LEVELS TO ALL MANHOLES AND GULLIES PRIOR TO CONSTRUCTION.

THE LAYOUT OF DRAINAGE ON THIS DRAWING IS INDICATIVE ONLY ARCHITECT TO CONFIRM EXACT LOCATION OF MANHOLES AND GULLIES.

U.N.O SURFACE WATER DRAINAGE PIPES OVER 610mm TO BE TWIN WALLED STRUCTURED PLASTIC APPROVED BY THE ENGINEER.
U.N.O FOUL WATER DRAINAGE PIPES TO BE SUPERSEVITRIFIED CLAY PIPES OR SIMILAR.

ALL COVERS AND RODDING ACCESS POINTS TO BE SEALED AND SCREWED TIGHT.

ALL INTERNAL MANHOLE COVERS TO BE DOUBLE SEALED, LOCKABLE AND RECESSED TO ACCEPT FLOOR FINISHES WHERE APPLICABLE.

SETTING OUT OF ALL INTERNAL GULLY/PLUMBING CONNECTIONS TO BE CO-ORDINATED BETWEEN THE SERVICE ENGINEERS AND THE ARCHITECT.

ALL INTERNAL GULLIES, PLUMBING CONNECTIONS, SOIL STACKS, SYPS AND ALL OTHER CONNECTIONS OF FOUL AND SURFACE WATER DRAINS TO BELOW GROUND TO BE FITTED WITH ACCESSIBLE RODDING POINTS ABOVE SLAB LEVEL.

ALL SURFACE WATER CONNECTIONS TO BE 100mm DIAMETER AT MINIMUM FALLS OF 1:80 UNLESS NOTED OTHERWISE.

ALL FOUL WATER CONNECTIONS TO BE 100mm DIAMETER AT MINIMUM FALLS OF 1:40 UNLESS NOTED OTHERWISE.

ALL CONNECTIONS TO BE MADE IN ACCORDANCE WITH STANDARD DETAIL DRAWINGS.

ALL PIPEWORK TO BE INSTALLED WITH SOFFITS LEVEL (E.G. AT CHANGES IN PIPE SIZE) U.N.O.

FOR DETAILS OF GREASE TRAP/MACERATOR REQUIREMENTS ASSOCIATED WITH KITCHENS REFER TO SERVICE ENGINEER.

ON COMPLETION OF DRAINAGE WORKS, THE NEW DRAINAGE SYSTEM IS TO BE THOROUGHLY CLEANED AND A CCTV SURVEY CARRIED OUT TO CONFIRM NO CONSTRUCTION DEBRIS OR BLOCKAGES REMAIN.

CONNECTIONS TO CARRIER DRAINS ARE TO BE 'Y' JUNCTIONS.

ALL PRIVATE DRAINAGE IS TO COMPLY WITH BS EN 752 AND BUILDING REGS. PART H.

PIPE GRADIENTS ARE INDICATIVE MINIMUMS.

SURFACE CHANNEL DRAINS TO BE ACO MULTIDRAIN OR SIMILAR.

MANHOLES:

ALL PROPOSED NEW MANHOLES TO BE PRECAST RING MANHOLES TYPE B UNLESS NOTED OTHERWISE. INTERNAL DIAMETERS OF MANHOLES TO BE 1050mm WHERE DEPTH TO PIPE SOFFIT IS LESS THAN 1.5m, AND 1200mm Ø ELSEWHERE UNLESS NOTED OTHERWISE. IC - DENOTES POLYPROPYLENE INSPECTION CHAMBER BY HEPWORTH OR SIMILAR APPROVED INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.

MANHOLE COVERS:

CARRIAGEWAYS GENERAL - EN124 CLASS D400
CARRIAGEWAYS WITHIN 0.5m OF KERB - EN124 CLASS C250
SLOW MOVING HOV (280) - EN 124 CLASS B125 SLOW MOVING
GLV (10) - EN 124 CLASS B125 SLOW MOVING PRIVATE CARS - EN124 CLASS B125.

INTERNAL - JONES OF OSWESTRY - SUPRASTEEL DOUBLE SEALED WITH NEOPRENE GASKET AND COVER GREASE OR SIMILAR APPROVED.

REFER TO ARCHITECTS DRAWINGS FOR DETAILS OF ANY MANHOLE COVERS WHICH REQUIRE INSET PANELS.

LEGEND

- EXISTING PRIVATE SURFACE WATER SEWER
- EXISTING PRIVATE FOUL WATER SEWER
- EXISTING SEWER TO BE REMOVED/GRUBBED UP.
- PROPOSED PRIVATE SURFACE WATER SEWER
- PROPOSED PRIVATE FOUL WATER SEWER
- NEW POLYSTORM ATTENUATION/SAKAWAY SYSTEM
- NEW CHANEL DRAIN

**SUBJECT TO APPROVAL FROM
LOCAL PLANNING AUTHORITY
AND UNITED UTILITIES**

RESIDUAL RISK REGISTER -

REFER TO WML CIVIL / STRUCTURAL DESIGN RISK REGISTER IN ADDITION TO THE HAZARDS / RISKS NORMALLY ASSOCIATED WITH THE TYPE OF WORKS INDICATED ON THIS DRAWING. NOTE THE FOLLOWING:-

- CONTRACTOR TO SCAN FOR SERVICES & CLEARLY MARK AT GROUND LEVEL PRIOR TO COMMENCEMENT OF EXCAVATION.
- 'UNKNOWN' SERVICES TO BE TESTED TO SEE IF LIVE PRIOR TO COMMENCEMENT OF EXCAVATION.

DRAWING NOTES

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE WML DRAINAGE STRATEGY DOCUMENT 9670-WML-ZZ-XX-RP-C-1001.

DESIGN NOTES

ALL EXISTING DRAINAGE IS SHOWN INDICATIVE ONLY AND BASED UPON AS-BUILT RECORDS AND SONDE SURVEY. DUE TO DISCREPANCIES BETWEEN BOTH SETS OF INFORMATION, EXISTING INVERT LEVELS HAVE NOT BEEN SHOWN AT THIS TIME.

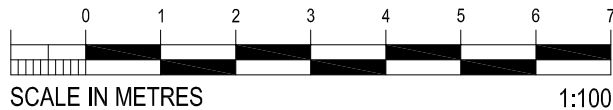
IT IS RECOMMENDED THAT A CCTV SURVEY HAS CONTRACTOR IS TO CONFIRM THE LOCATION, DEPTH AND CONDITION OF ALL EXISTING DRAINAGE PRIOR TO CONSTRUCTION. ESPECIALLY WHERE PROPOSED CONNECTIONS ARE SHOWN.

PRIOR TO MAKING ANY NEW DRAINAGE CONNECTION THE CONTRACTOR IS TO CONFIRM THE ACCURACY OF ALL EXISTING DRAINAGE INFORMATION PROVIDED AND REPORT ANY DISCREPANCIES TO THE ENGINEER IMMEDIATELY.

THE PROPOSED DRAINAGE INFORMATION SHOWN ON THIS DRAWING IS INDICATIVE ONLY AND IS SUBJECT TO DETAILED DESIGN UPON RECEIPT OF THE FINAL SITE DESIGN LEVELS.

THE PROPOSED DRAINAGE SHOWN HAS BEEN BASED ON ASSUMED RAIN WATER PIPES AND SLAB PENETRATION LOCATIONS. THE ARCHITECT IS TO CONFIRM FINAL POSITIONS PRIOR TO DETAILED DESIGN.

THE SIZE OF THE PROPOSED ATTENUATION TANK IS INDICATIVE ONLY AND IS SUBJECT TO FURTHER DESIGN UPON RECEIPT OF THE FINAL SITE DESIGN LEVELS.



P01	PRELIMINARY ISSUE.		26.02.21		DB	CM
Rev.	Amendment		Date		By	Chkd
Project OUR LADY'S RC HIGH SCHOOL, MANCHESTER						
ARCHITECT POZZONI						
Title PROPOSED SITE DRAINAGE GA						
WML Job No.	9670	Drawn	DB	Checked	CM	Date FEB 2021
					Scale	1:100 @ A0
WML CONSULTING Civil, Structural & Geotechnical Engineers						
No 3 Oak Green East Road Stanley Green Business Park Cheshire B92 4JL Tel : 0191 462 8000 Fax : 0161 486 9210 e-mail: info@wmlconsulting.com www.wmlconsulting.com						
Drawing No.						
Project	Originator	Volume	Level	Type	Role	Number
9670	WML	ZZ	XX	DR	C	1001
						Rev P01

Appendix 02
Greenfield Runoff Calculation

WML Consulting Ltd		Page 1
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL		
Date 25/02/2021 15:04 File	Designed by DBaker Checked by	
Innovyze		Source Control 2014.1.1
<u>ICP SUDS Mean Annual Flood</u> Input Return Period (years) 100 Soil 0.450 Area (ha) 0.157 Urban 0.000 SAAR (mm) 864 Region Number Region 10 Results 1/s QBAR Rural 0.9 QBAR Urban 0.9 Q100 years 1.8 Q1 year 0.8 Q30 years 1.5 Q100 years 1.8		
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Appendix 03

WML Surface Water Drainage Calculations – 9670-WML-ZZ-XX-CA-C-1001

Surface Water Drainage Calculations

For a site referred to as

Our Lady's RC High School

Undertaken on behalf of

Pozzoni

Job No: 9670

Document No: 9670-WML-ZZ-XX-CA-C-1001

Date: February 2021

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No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL		
Date 26/02/2021 11:48	Designed by DBaker	
File 9670 - SURFACE WATER - ...	Checked by	
Innovyze		Network 2014.1.1

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S1	102.270	0.900	Open Manhole	450	S1.000	101.370	150				
S2	102.270	1.140	Open Manhole	450	S1.001	101.130	150	S1.000	101.130	150	
S-RE	102.700	1.330	Open Manhole	450	S2.000	101.370	150				
S3	102.100	0.820	Open Manhole	450	S3.000	101.280	150				
S4	102.270	1.110	Open Manhole	450	S2.001	101.160	150	S2.000	101.160	150	
								S3.000	101.160	150	
S5	102.270	1.160	Open Manhole	450	S2.002	101.110	150	S2.001	101.110	150	
S6	102.270	1.505	Open Manhole	600	S1.002	100.765	225	S1.001	100.840	150	
								S2.002	100.840	150	
S7	102.400	2.160	Open Manhole		S1.003	100.240	300	S1.002	100.740	225	423
S-TANK	102.500	2.280	Junction	0	S1.004	100.220	300	S1.003	100.220	300	
S8	102.500	2.300	Open Manhole	1200	S1.005	100.200	150	S1.004	100.200	300	
S	102.500	2.800	Open Manhole	0		OUTFALL		S1.005	99.700	150	

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No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL		
Date 26/02/2021 11:48 File 9670 - SURFACE WATER - ...		
Designed by DBaker Checked by		
Innovyze		Network 2014.1.1

Simulation Criteria for Storm

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

Number of Input Hydrographs	0	Number of 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	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.359		

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Date 26/02/2021 11:48 File 9670 - SURFACE WATER - ...	Designed by DBaker Checked by	
Innovyze	Network 2014.1.1	

Online Controls for Storm

Hydro-Brake Optimum® Manhole: S8, DS/PN: S1.005, Volume (m³): 3.1

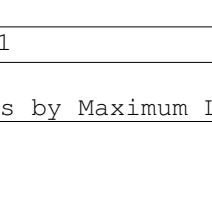
Unit Reference	MD-SCU-0035-8000-0300-8000
Design Head (m)	0.300
Design Flow (l/s)	0.8
Flush-Flo™	Calculated
Objective	Linear discharge profile
Diameter (mm)	35
Invert Level (m)	100.200
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.300	0.8
Flush-Flo™	0.053	0.4
Kick-Flo®	0.053	0.4
Mean Flow over Head Range	-	0.5

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	0.5	1.200	1.5	3.000	2.3	7.000	3.5
0.200	0.7	1.400	1.6	3.500	2.4	7.500	3.6
0.300	0.8	1.600	1.7	4.000	2.6	8.000	3.7
0.400	0.9	1.800	1.8	4.500	2.8	8.500	3.8
0.500	1.0	2.000	1.9	5.000	2.9	9.000	3.9
0.600	1.1	2.200	2.0	5.500	3.1	9.500	4.0
0.800	1.2	2.400	2.0	6.000	3.2		
1.000	1.4	2.600	2.1	6.500	3.3		

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Innovyze		Network 2014.1.1																																																																																				
<u>Storage Structures for Storm</u> <u>Cellular Storage Manhole: S-TANK, DS/PN: S1.004</u> Invert Level (m) 100.220 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table border="1"> <thead> <tr> <th>Depth (m)</th> <th>Area (m²)</th> <th>Inf. Area (m²)</th> <th>Depth (m)</th> <th>Area (m²)</th> <th>Inf. Area (m²)</th> </tr> </thead> <tbody> <tr><td>0.000</td><td>65.0</td><td>65.0</td><td>2.600</td><td>0.0</td><td>106.9</td></tr> <tr><td>0.200</td><td>65.0</td><td>71.4</td><td>2.800</td><td>0.0</td><td>106.9</td></tr> <tr><td>0.400</td><td>65.0</td><td>77.9</td><td>3.000</td><td>0.0</td><td>106.9</td></tr> <tr><td>0.600</td><td>65.0</td><td>84.3</td><td>3.200</td><td>0.0</td><td>106.9</td></tr> <tr><td>0.800</td><td>65.0</td><td>90.8</td><td>3.400</td><td>0.0</td><td>106.9</td></tr> <tr><td>1.000</td><td>65.0</td><td>97.2</td><td>3.600</td><td>0.0</td><td>106.9</td></tr> <tr><td>1.200</td><td>65.0</td><td>103.7</td><td>3.800</td><td>0.0</td><td>106.9</td></tr> <tr><td>1.400</td><td>0.0</td><td>106.9</td><td>4.000</td><td>0.0</td><td>106.9</td></tr> <tr><td>1.600</td><td>0.0</td><td>106.9</td><td>4.200</td><td>0.0</td><td>106.9</td></tr> <tr><td>1.800</td><td>0.0</td><td>106.9</td><td>4.400</td><td>0.0</td><td>106.9</td></tr> <tr><td>2.000</td><td>0.0</td><td>106.9</td><td>4.600</td><td>0.0</td><td>106.9</td></tr> <tr><td>2.200</td><td>0.0</td><td>106.9</td><td>4.800</td><td>0.0</td><td>106.9</td></tr> <tr><td>2.400</td><td>0.0</td><td>106.9</td><td>5.000</td><td>0.0</td><td>106.9</td></tr> </tbody> </table>			Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	0.000	65.0	65.0	2.600	0.0	106.9	0.200	65.0	71.4	2.800	0.0	106.9	0.400	65.0	77.9	3.000	0.0	106.9	0.600	65.0	84.3	3.200	0.0	106.9	0.800	65.0	90.8	3.400	0.0	106.9	1.000	65.0	97.2	3.600	0.0	106.9	1.200	65.0	103.7	3.800	0.0	106.9	1.400	0.0	106.9	4.000	0.0	106.9	1.600	0.0	106.9	4.200	0.0	106.9	1.800	0.0	106.9	4.400	0.0	106.9	2.000	0.0	106.9	4.600	0.0	106.9	2.200	0.0	106.9	4.800	0.0	106.9	2.400	0.0	106.9	5.000	0.0	106.9
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Innovyze		Network 2014.1.1	

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 2.000
Hot Start Level (mm) 0	Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500	Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000	

Number of Input Hydrographs 0	Number of 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 0.359
Region England and Wales Cv (Summer)	0.750	
M5-60 (mm)	18.000 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	OFF

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

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1.000	15 Winter	1	0%	100/15 Summer	100/15 Winter			1
S1.001	15 Winter	1	0%	30/15 Summer				
S2.000	15 Winter	1	0%	100/15 Summer				
S3.000	15 Winter	1	0%	100/15 Summer				
S2.001	15 Winter	1	0%	100/15 Summer				
S2.002	15 Winter	1	0%	100/15 Summer				
S1.002	15 Winter	1	0%	30/15 Summer				
S1.003	360 Winter	1	0%	30/30 Summer				
S1.004	360 Winter	1	0%	30/30 Summer				
S1.005	360 Winter	1	0%	1/30 Summer				

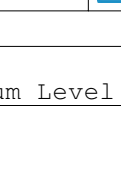
PN	US/MH Name	Water	Flooded		Pipe			Status
		Level (m)	Surch'd Depth (m)	Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	
S1.000	S1	101.426	-0.094	0.000	0.30	0.0	5.0	OK
S1.001	S2	101.198	-0.082	0.000	0.42	0.0	7.1	OK
S2.000	S-RE	101.394	-0.126	0.000	0.06	0.0	1.3	OK
S3.000	S3	101.323	-0.107	0.000	0.18	0.0	2.9	OK
S2.001	S4	101.216	-0.094	0.000	0.29	0.0	4.1	OK

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

PN	US/MH Name	Water		Flooded		Pipe		Status
		Level (m)	Surch'd Depth (m)	Volume (m³)	Flow / Cap.	O'flow (l/s)	Flow (l/s)	
S2.002	S5	101.167	-0.093	0.000	0.31	0.0	5.2	OK
S1.002	S6	100.882	-0.108	0.000	0.53	0.0	15.9	OK
S1.003	S7	100.443	-0.097	0.000	0.08	0.0	2.9	OK
S1.004	S-TANK	100.443	-0.077	0.000	0.04	0.0	1.9	OK*
S1.005	S8	100.451	0.101	0.000	0.02	0.0	0.7	SURCHARGED

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of 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	0.359
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.000	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	OFF

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

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1.000	15 Winter	30	0%	100/15 Summer	100/15 Winter			1
S1.001	15 Winter	30	0%	30/15 Summer				
S2.000	15 Winter	30	0%	100/15 Summer				
S3.000	15 Winter	30	0%	100/15 Summer				
S2.001	15 Winter	30	0%	100/15 Summer				
S2.002	15 Winter	30	0%	100/15 Summer				
S1.002	15 Winter	30	0%	30/15 Summer				
S1.003	360 Winter	30	0%	30/30 Summer				
S1.004	360 Winter	30	0%	30/30 Summer				
S1.005	360 Winter	30	0%	1/30 Summer				

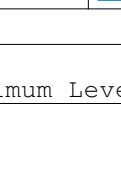
PN	US/MH Name	Water		Flooded		Pipe		Status
		Level (m)	Surch'd Depth (m)	Volume (m³)	Flow / Cap. (l/s)	O'flow (l/s)	Flow (l/s)	
S1.000	S1	101.468	-0.052	0.000	0.72	0.0	12.1	OK
S1.001	S2	101.346	0.066	0.000	1.02	0.0	17.4	SURCHARGED
S2.000	S-RE	101.409	-0.111	0.000	0.15	0.0	3.1	OK
S3.000	S3	101.350	-0.080	0.000	0.44	0.0	7.0	OK
S2.001	S4	101.256	-0.054	0.000	0.71	0.0	10.0	OK

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

PN	US/MH Name	Water	Surch'd Depth (m)	Flooded	Flow / Cap.	O'flow (l/s)	Pipe	Status
		Level (m)		Volume (m ³)			Flow (l/s)	
S2.002	S5	101.212	-0.048	0.000	0.77	0.0	13.1	OK
S1.002	S6	101.038	0.048	0.000	1.35	0.0	40.4	SURCHARGED
S1.003	S7	100.818	0.278	0.000	0.17	0.0	6.4	SURCHARGED
S1.004	S-TANK	100.817	0.297	0.000	0.10	0.0	4.8	SURCHARGED*
S1.005	S8	100.846	0.496	0.000	0.02	0.0	1.1	SURCHARGED

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of 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	0.359
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.000	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	OFF

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

PN	Storm	Return Period	Climate Change	First X Surge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1.000	15 Winter	100	+40%	100/15 Summer	100/15 Winter			1
S1.001	15 Winter	100	+40%	30/15 Summer				
S2.000	15 Winter	100	+40%	100/15 Summer				
S3.000	15 Winter	100	+40%	100/15 Summer				
S2.001	15 Winter	100	+40%	100/15 Summer				
S2.002	15 Winter	100	+40%	100/15 Summer				
S1.002	480 Winter	100	+40%	30/15 Summer				
S1.003	480 Winter	100	+40%	30/30 Summer				
S1.004	480 Winter	100	+40%	30/30 Summer				
S1.005	480 Winter	100	+40%	1/30 Summer				

PN	US/MH Name	Water Level (m)	Surch'd Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	O'flow (l/s)	Pipe Flow (l/s)	Status
S1.000	S1	102.270	0.750	0.060	1.15	0.0	19.4	FLOOD
S1.001	S2	101.983	0.703	0.000	1.64	0.0	27.9	FLOOD RISK
S2.000	S-RE	101.684	0.164	0.000	0.24	0.0	5.0	SURCHARGED
S3.000	S3	101.726	0.296	0.000	0.70	0.0	11.3	SURCHARGED
S2.001	S4	101.664	0.354	0.000	1.18	0.0	16.5	SURCHARGED

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