WML CONSULTING
Civil, Structural and Geotechnical Engineers

DRAINAGE DESIGN INFORMATION

for a development at

KNOWL GROVE, MIRFIELD

Undertaken on behalf of

KIRKLEES NEIGHBOURHOOD HOUSING

Report No. 9738/DDI/02
September 2021

WML CONSULTING
Civil, Structural and Geotechnical Engineers

Report Title:	**Drainage Design Information**
Report Reference:	**9738/DDI/02**
Client:	**Kirklees Neighbourhood Housing**
Issue Date:	**September 2021**
Drafted By:	**Kevin Tyldesley**
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1.0 INTRODUCTION

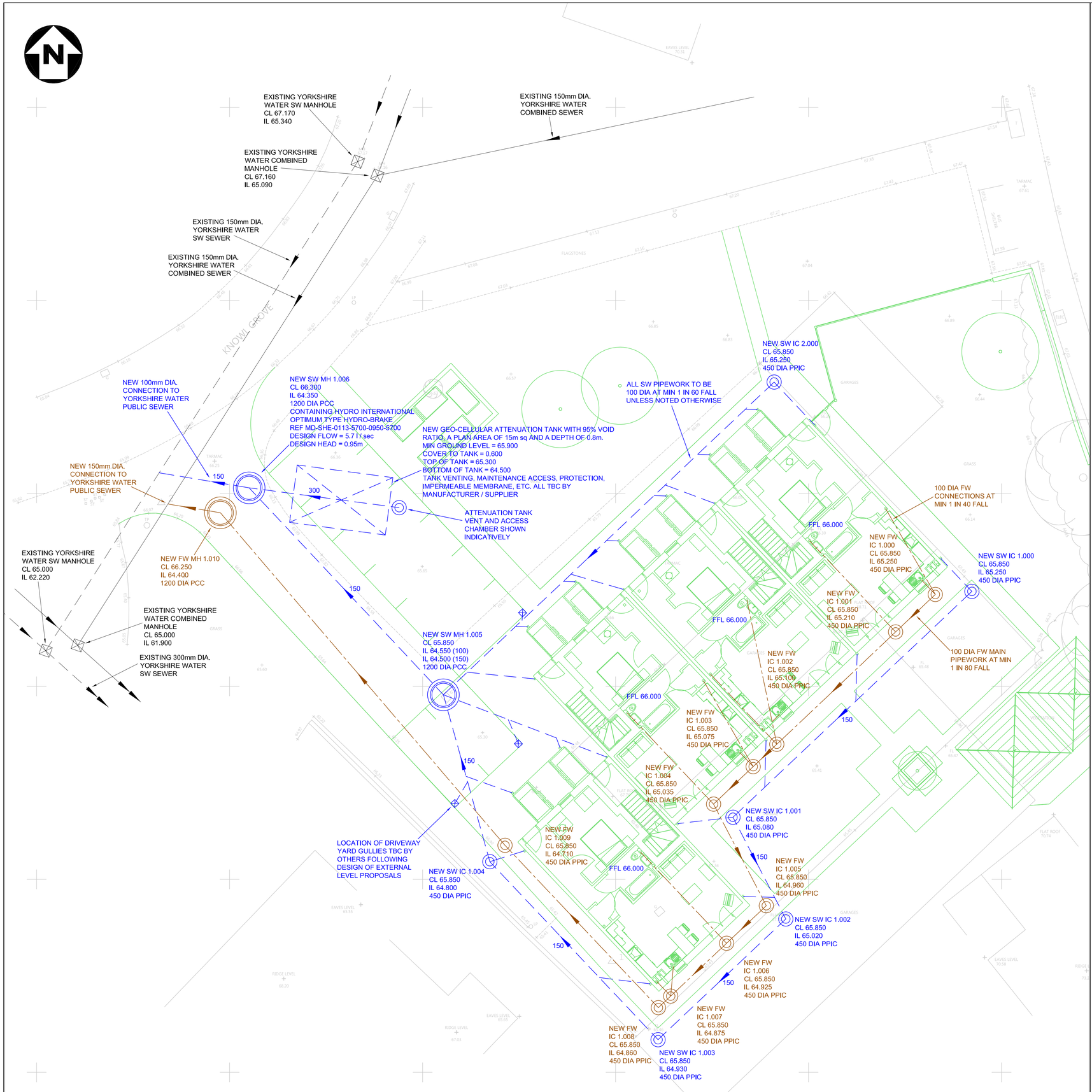
1.1 WML Consulting have been commissioned by Kirklees Neighbourhood Housing to provide drainage design information for a residential development at Knowl Grove, Mirfield.

1.2 This document contains a drawing at appendix 01 that indicates the below ground foul and surface water drainage proposals and outlines the surface water drainage strategy.

1.3 Appendix 02 contains supporting surface water drainage calculations.

APPENDIX 01

Proposed drainage layout plan



SURFACE WATER DRAINAGE STRATEGY

THE SURFACE WATER DRAINAGE PROPOSALS HAVE BEEN DESIGNED IN ACCORDANCE WITH BS EN 752-4 AND THE BUILDING REGULATIONS APPROVED DOCUMENT H (2010), WHICH INDICATES THE FOLLOWING HIERARCHY FOR THE DISPOSAL OF SURFACE WATER DRAINAGE FROM DEVELOPMENT SITES:-

1. DISCHARGE VIA INFILTRATION;
2. DISCHARGE TO WATERCOURSE;
3. DISCHARGE TO SEWER.

THESE OPTIONS ARE DISCUSSED IN FURTHER DETAIL BELOW.

SURFACE WATER DISCHARGE VIA INFILTRATION

FROM THE ONLINE BGS RECORDS THE GROUND CONDITIONS AT THE SITE APPEAR UNLIKELY TO SUIT THE USE OF INFILTRATION TECHNIQUES FOR DRAINING THE PROPOSED DWELLINGS AND THEIR ASSOCIATED HARD LANDSCAPED AREAS. THE GROUND CONDITIONS SHOULD BE CONFIRMED BY INTRUSIVE INVESTIGATION BEFORE WORK COMMENCES ON SITE, AND IF IT IS FOUND THAT THEY ARE SUITED TO INFILTRATION TECHNIQUES THEN THE PROPOSALS SHOWN CAN BE AMENDED TO SUIT.

SURFACE WATER DISCHARGE VIA WATERCOURSE

THERE ARE NO WATERCOURSES WITHIN OR ADJACENT TO THE SITE, HENCE IT WILL NOT BE FEASIBLE TO DISCHARGE THE SURFACE WATER RUNOFF TO A WATERCOURSE.

SURFACE WATER DISCHARGE VIA THE PUBLIC SEWERAGE SYSTEM

GIVEN THE ABOVE IT WILL BE NECESSARY TO DISCHARGE THE SURFACE WATER RUNOFF GENERATED BY THE DWELLINGS AND THEIR ASSOCIATED HARD LANDSCAPED AREAS TO THE PUBLIC SEWER NETWORK.

PROPOSED RUNOFF RATE

THE EXISTING SITE HAS A DRAINED AREA OF 820m sq. APPLYING A 50mm / hr RAINFALL INTENSITY TO THIS AREA GIVES AN EXISTING DISCHARGE RATE OF 11.4 l / sec.

APPLYING A 50% REDUCTION TO THIS FIGURE GIVES AN ALLOWABLE DISCHARGE RATE FOR THE PROPOSED DEVELOPMENT OF 5.7 l / sec FOR ALL STORM EVENTS UP TO AND INCLUDING THE CRITICAL 1 IN 100 YEAR EVENT INCLUDING A 40% CLIMATE CHANGE ALLOWANCE.

TO ENSURE THAT THE ALLOWABLE DISCHARGE RATE IS NOT EXCEEDED, A HYDRO-BRAKE FLOW CONTROL DEVICE WILL BE EMPLOYED AT THE DOWNSTREAM END OF THE PROPOSED DRAINAGE SYSTEM, WITH ATTENUATION STORAGE PROVIDED IN A GEO-CELLULAR TANK.

IN LINE WITH MODERN DESIGN STANDARDS FOR SURFACE WATER DRAINAGE SYSTEMS, THE PROPOSALS SHOWN HAVE BEEN FORMULATED TO ENSURE THERE WILL BE:-

1. NO SURCHARGING OF SEWERS FOR THE CRITICAL 1 IN 1 YEAR STORM EVENT.
2. NO SURFACE FLOODING FOR THE CRITICAL 1 IN 30 YEAR EVENT.
3. NO SURFACE FLOODING THAT MAY AFFECT BUILDINGS ON OR OFF SITE FOR THE CRITICAL 1 IN 100 YEAR EVENT INCLUDING A 30% CLIMATE CHANGE ALLOWANCE.

MAINTENANCE OF THE BELOW GROUND DRAINAGE SYSTEM

THE SURFACE WATER DRAINAGE PROPOSALS INDICATED ARE RELATIVELY TRADITIONAL IN NATURE, AND SHOULD PROVIDE YEARS OF RELATIVELY LOW MAINTENANCE OPERATION IN RELATION TO THE ANTICIPATED LIFESPAN OF THE PROPOSED DEVELOPMENT.

IN LINE WITH CURRENT GOOD PRACTICE:-

- GULLIES AND LINEAR DRAINAGE CHANNELS SHOULD BE INSPECTED AND / OR CLEANED OUT AT 6 MONTHLY INTERVALS.
- INSPECTION CHAMBERS, MANHOLES, CATCHPITS, ETC. SHOULD BE INSPECTED AT 6 MONTHLY INTERVALS TO ENSURE THAT THE PIPEWORK ASSOCIATED WITH THEM ARE OPERATING EFFECTIVELY.
- ANY PROBLEMS HIGHLIGHTED BY THESE INSPECTIONS WILL NEED TO BE INVESTIGATED, POSSIBLY BY CCTV SURVEY, TO CONFIRM THE NATURE OF THE PROBLEM AND TO ALLOW IT TO BE REMEDIED IN A TIMELY MANNER. IT IS UNDERSTOOD THAT THE MONITORING AND ROUTINE MAINTENANCE OF THE BELOW GROUND DRAINAGE SYSTEM WILL BE CARRIED OUT BY THE RESIDENTS WITH ADDITIONAL HELP PROVIDED BY EXTERNAL SPECIALIST DRAINAGE PROFESSIONALS BROUGHT IN AS REQUIRED.

PRELIMINARY

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.

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.

UNLESS NOTED OTHERWISE PIPEWORK AND FITTINGS TO BE:-

- UPTO 225 DIA (AND INCLUDING) TO BE SUPERSLEVE VITRIFIED CLAY PIPES OR SIMILAR.
- 300 DIA AND ABOVE TO BE CONCRETE BY STANTON BONNA OR SIMILAR.

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

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, SVPS AND ALL OTHER CONNECTIONS OF FOUL AND SURFACE WATER DRAINS TO BELOW GROUND TO BE FITTED WITH ACCESSIBLE RODDING POINTS ABOVE SLAB LEVEL.

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.

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.

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.

MANHOLE COVERS TO BE EN124 CLASS D400 IN VEHICULAR AREAS AND EN124 CLASS C250 IN NON - VEHICULAR AREAS.

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

Rev.	Amendment	Date	By	Chkd
P02	AMENDED TO SUIT LLFA COMMENTS.	21.09.21	KPT	SS
P01	PRELIMINARY ISSUE	18.06.21	KPT	SS

Project
KNOWL GROVE
MIRFIELD

Client
KIRKLEES NEIGHBOURHOOD HOUSING

Title
PROPOSED DRAINAGE LAYOUT

WML Job No.	Drawn	Checked	Date	Scale
9738	KPT	SS	JUNE 2021	1:100 @ A1

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Drawing No.

Project	Originator	Volume	Level	Type	Role	Number	Rev
9738	- WML -	00	- XX -	DR	- C -	1001	P02

APPENDIX 02

Surface water drainage calculations

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)	1	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.000	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	5	Min Design Depth for Optimisation (m)	0.000
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

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.055	4-8	0.015

Total Area Contributing (ha) = 0.070

Total Pipe Volume (m³) = 1.496

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	17.000	0.170	100.0	0.010	5.00	0.0	0.600	o	150	
1.001	6.000	0.060	100.0	0.010	0.00	0.0	0.600	o	150	
1.002	9.000	0.090	100.0	0.010	0.00	0.0	0.600	o	150	
1.003	13.000	0.130	100.0	0.010	0.00	0.0	0.600	o	150	
1.004	9.000	0.300	30.0	0.010	0.00	0.0	0.600	o	150	
2.000	24.000	0.700	34.3	0.010	5.00	0.0	0.600	o	100	

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	5.00	5.28	65.250	0.010	0.0	0.0	0.0	1.00	17.8	0.1
1.001	5.00	5.38	65.080	0.020	0.0	0.0	0.0	1.00	17.8	0.3
1.002	5.00	5.53	65.020	0.030	0.0	0.0	0.0	1.00	17.8	0.4
1.003	5.00	5.75	64.930	0.040	0.0	0.0	0.0	1.00	17.8	0.5
1.004	5.00	5.83	64.800	0.050	0.0	0.0	0.0	1.84	32.6	0.7
2.000	5.00	5.30	65.250	0.010	0.0	0.0	0.0	1.32	10.4	0.1

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
1.005	15.000	0.150	100.0	0.010	0.00	0.0	0.600	o	150	
1.006	5.000	0.100	50.0	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)
1.005	5.00	6.08	64.500	0.070	0.0	0.0	0.0	1.00	17.8	0.9
1.006	5.00	6.13	64.350	0.070	0.0	0.0	0.0	1.43	25.2	0.9

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
1	65.850	0.600	Open Manhole	450	1.000	65.250	150				
2	65.850	0.770	Open Manhole	450	1.001	65.080	150	1.000	65.080	150	
3	65.850	0.830	Open Manhole	450	1.002	65.020	150	1.001	65.020	150	
4	65.850	0.920	Open Manhole	450	1.003	64.930	150	1.002	64.930	150	
5	65.850	1.050	Open Manhole	450	1.004	64.800	150	1.003	64.800	150	
6	65.850	0.600	Open Manhole	450	2.000	65.250	100				
7	65.850	1.350	Open Manhole	1200	1.005	64.500	150	1.004	64.500	150	
								2.000	64.550	100	
8	65.850	1.500	Open Manhole	1200	1.006	64.350	150	1.005	64.350	150	
	66.100	1.850	Open Manhole	0		OUTFALL		1.006	64.250	150	

Online Controls for Storm

Hydro-Brake Optimum® Manhole: 8, DS/PN: 1.006, Volume (m³): 1.9

Unit Reference	MD-SHE-0113-5700-0950-5700
Design Head (m)	0.950
Design Flow (l/s)	5.7
Flush-Flo™	User Defined
Objective	Minimise upstream storage
Diameter (mm)	113
Invert Level (m)	64.350
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.950	5.7
Flush-Flo™	0.282	5.7
Kick-Flo®	0.618	4.6
Mean Flow over Head Range	-	4.9

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.9	1.200	6.3	3.000	9.7	7.000	14.5
0.200	5.5	1.400	6.8	3.500	10.4	7.500	15.0
0.300	5.6	1.600	7.2	4.000	11.1	8.000	15.5
0.400	5.5	1.800	7.6	4.500	11.8	8.500	15.9
0.500	5.3	2.000	8.0	5.000	12.4	9.000	16.4
0.600	4.8	2.200	8.4	5.500	13.0	9.500	16.8
0.800	5.2	2.400	8.7	6.000	13.5		
1.000	5.8	2.600	9.1	6.500	14.0		

Storage Structures for Storm

Cellular Storage Manhole: 8, DS/PN: 1.006

Invert Level (m) 64.500 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	15.0	0.0	0.801	0.0	0.0
0.800	15.0	0.0			

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
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.
1.000	15 Winter	1	0%	100/15 Summer				
1.001	15 Winter	1	0%	100/15 Summer				
1.002	15 Winter	1	0%	100/15 Summer				
1.003	15 Winter	1	0%	100/15 Summer				
1.004	15 Winter	1	0%	30/15 Winter				
2.000	15 Winter	1	0%	100/15 Summer				
1.005	15 Winter	1	0%	30/15 Summer				
1.006	15 Winter	1	0%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	1	65.278	-0.122	0.000	0.08	0.0	1.2	OK
1.001	2	65.120	-0.110	0.000	0.16	0.0	2.3	OK
1.002	3	65.067	-0.103	0.000	0.22	0.0	3.4	OK
1.003	4	64.984	-0.096	0.000	0.28	0.0	4.5	OK
1.004	5	64.845	-0.105	0.000	0.19	0.0	5.5	OK
2.000	6	65.274	-0.076	0.000	0.12	0.0	1.3	OK
1.005	7	64.573	-0.077	0.000	0.48	0.0	7.8	OK
1.006	8	64.528	0.028	0.000	0.28	0.0	5.5	SURCHARGED

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
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.
1.000	15 Winter	30	0%	100/15 Summer				
1.001	15 Winter	30	0%	100/15 Summer				
1.002	15 Winter	30	0%	100/15 Summer				
1.003	15 Winter	30	0%	100/15 Summer				
1.004	15 Winter	30	0%	30/15 Winter				
2.000	15 Winter	30	0%	100/15 Summer				
1.005	15 Winter	30	0%	30/15 Summer				
1.006	30 Winter	30	0%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	1	65.294	-0.106	0.000	0.19	0.0	3.1	OK
1.001	2	65.149	-0.081	0.000	0.43	0.0	6.3	OK
1.002	3	65.106	-0.064	0.000	0.61	0.0	9.6	OK
1.003	4	65.032	-0.048	0.000	0.79	0.0	12.8	OK
1.004	5	64.956	0.006	0.000	0.53	0.0	15.1	SURCHARGED
2.000	6	65.288	-0.062	0.000	0.30	0.0	3.1	OK
1.005	7	64.889	0.239	0.000	1.18	0.0	19.3	SURCHARGED
1.006	8	64.820	0.320	0.000	0.29	0.0	5.6	SURCHARGED

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
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.
1.000	15 Winter	100	+40%	100/15 Summer				
1.001	15 Winter	100	+40%	100/15 Summer				
1.002	15 Winter	100	+40%	100/15 Summer				
1.003	15 Winter	100	+40%	100/15 Summer				
1.004	15 Winter	100	+40%	30/15 Winter				
2.000	15 Winter	100	+40%	100/15 Summer				
1.005	30 Winter	100	+40%	30/15 Summer				
1.006	60 Winter	100	+40%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	1	65.742	0.342	0.000	0.28	0.0	4.6	FLOOD RISK
1.001	2	65.723	0.493	0.000	0.58	0.0	8.6	FLOOD RISK
1.002	3	65.703	0.533	0.000	0.80	0.0	12.6	FLOOD RISK
1.003	4	65.643	0.563	0.000	1.04	0.0	16.9	FLOOD RISK
1.004	5	65.502	0.552	0.000	0.74	0.0	21.3	SURCHARGED
2.000	6	65.484	0.134	0.000	0.51	0.0	5.1	SURCHARGED
1.005	7	65.363	0.713	0.000	1.47	0.0	24.1	SURCHARGED
1.006	8	65.326	0.826	0.000	0.29	0.0	5.7	SURCHARGED