PROPOSED DEVELOPMENT, ON LAND AT VICTORIA TERRACE, MELLOR BROOK, Nr PRESTON.

DRAINAGE STRATEGY REPORT

HAMILTON TECHNICAL SERVICES
1 CHILTERN AVE, EUXTON, CHORLEY, PR7 6NU

ISSUE 1
3/29/2019
C-0886

Document Control Sheet

Proposed Development, to provide 3 New Dwellings, on land at Victoria Terrace, Mellor Brook, Nr Preston.

Drainage Strategy Report

Job	Date	Issue	Copy
C0886	29th March 2019	1	

Originator……..G Hamilton… ……………………….

Checker………G Hamilton…………………………..

Approver………G Hamilton …..……………………..

Contents

1. Introduction

1.1. Hamilton Technical Services have been commissioned through Partington & Associates Ltd., to act on behalf of the developer MFH Projects (Harrison), to prepare a Foul and Surface Water Drainage Strategy Report, in support of a development scheme, to provide three new dwellings and associated access and landscaping.

1.2. The site comprises an area of land adjacent to Victoria Terrace, Mellor Brook, Nr Preston. The location of the site is illustrated in **Figure 1** appended to this report.

1.3. The national grid reference for the site is 364153E, 431079N.

1.4. It is understood that permission is being sought to develop the site to provide three detached dwellings with access and landscaping areas. A proposed site layout plan is attached as **Figure 2** of this report.

2. Description of the existing site.

2.1. The site is located on the west side of Victoria Terrace, south of its junction with Mellor Brow. The site is bounded to the north, east and on all sides by mainly residential properties with a mix of some commercial properties.

2.2. The site is presently occupied by grassed open space, with some existing trees and a small watercourse exiting its northern edge.

2.3. The site has been considered as a green field site. As such the existing green field run-off rates would be very low and much less than 5.0 l/s.

2.4. The site is covered by a thin layer of topsoil overlying clay strata to depth and is considered to be unsuitable for the use of soak-aways to disperse surface water run-off.

3. Proposals for Development

3.1. The redevelopment of the site will consist of the construction of three detached dwellings with driveways and garden areas and will be constructed with access taken from Mellor Brow. The scheme will include the de-culverting of approximately 60.0 meters of the existing culvert passing through the site and replacing this with a new open channel section of the watercourse.

3.2. The site is, as described in 2.4 above, unsuitable for soak-away employment. Further if soak-aways were introduced on a steep site such as this, water could flow across the surface of the clay sub-strata and emerge as springs, leading to destabilisation of the sloping ground across the site.

3.3. An existing culverted watercourse that flows along the eastern side of the site will have its flow diverted into a new open section of watercourse passing from south to north through the new development as indicated on the drainage layout. The open watercourse will have sides constructed in stone with a sloping landscaped bank to either side, blending into the general site wide landscaping.

3.4. The existing culverted section through the site will be fully surveyed by CCTC cameras to ascertain the location of any existing pipework connections along the length of culvert that is to be abandoned. Any connections found will have their pipework extended to connect to the new open watercourse, to allow any existing surface water to continue flowing into the new open section, preserving existing rights of drainage.

3.5. Surface water run-off will be collected in new surface water drains that will discharge through a new outfall into the new open watercourse at the north end of the site. Foul run-off will be collected in a new system of foul drains and will flow northwards to discharge into the existing public sewer in Mellor Brow. A plan of the new drainage layout is attached as **Figure 3** along with a SW catchment plan attached as **Figure 4** of this report.

3.6. The new site surface water drainage will be restricted to a maximum discharge rate of 5.0 l/s prior to being discharged to the watercourse. Flows will be controlled by a Hydro-brake unit installed in the last surface water manhole and all required attenuation will be provided within a new attenuation tank sited within the surface drainage immediately prior to entering the Hydro-brake chamber.

3.7. A series of storm simulation calculations have been completed to demonstrate the operation of the proposed surface water drainage system. These calculations show that no exceedance flows will be created during storms of 1 in 2 Yr to 1 in 100 Yr return periods and with a climate change allowance of 35% included in calculations. A copy of a selection of the simulation calculations is attached as **Appendix 1** of this report.

4. Construction Method Statement

4.1. Excavation for the new open channel will be commenced at the downstream end of the new watercourse length.

4.2. The existing turf will be removed from the working area and stored for re-use at the final landscaping stage of the new works.

4.3. All remaining excavated material will be retained and stored on site temporarily to be used to infill behind the new sidewalls of the open section of watercourse and to contour and landscape the bank areas of the new works, prior to reintroduction of the stored turf and topsoil.

4.4. The sides of the new watercourse will be constructed using local stone built up as shown on the construction detail drawing attached to this report as **Figure 5.**

4.5. On completion of the open channel construction the upstream end of the existing culvert will be sealed off by continuing the sidewall construction across the end of the existing culvert, thus diverting flows along the new section of the watercourse.

4.6. Any existing connection into the abandoned length of culvert will then be extended into the new open channel.

4.7. On completion of any necessary connection extensions the downstream end of the abandoned length of culvert will be sealed by completing the construction of the channel sidewall across the existing outlet apron.

4.8. The existing retained materials will then be used to infill around the new sidewalls and to contour the bank areas to blend in with the remaining site levels.

4.9. Retained topsoil and turfs will be re-laid to complete the new landscaping of the bank areas. Any additional excavated materials will be used as part of the general site landscape works.

5. Maintenance of Site Including Sustainable Assets

5.1 The developed estate will remain privately owned and managed. On completion of the development works a suitably qualified management company will be employed and will carry out the future inspection, maintenance and repair of the road and car park surfaces and the foul and surface water drainage systems.

5.2 These works will be carried out as part of the annual maintenance programme and will be funded from annual maintenance fees charged by the management company.

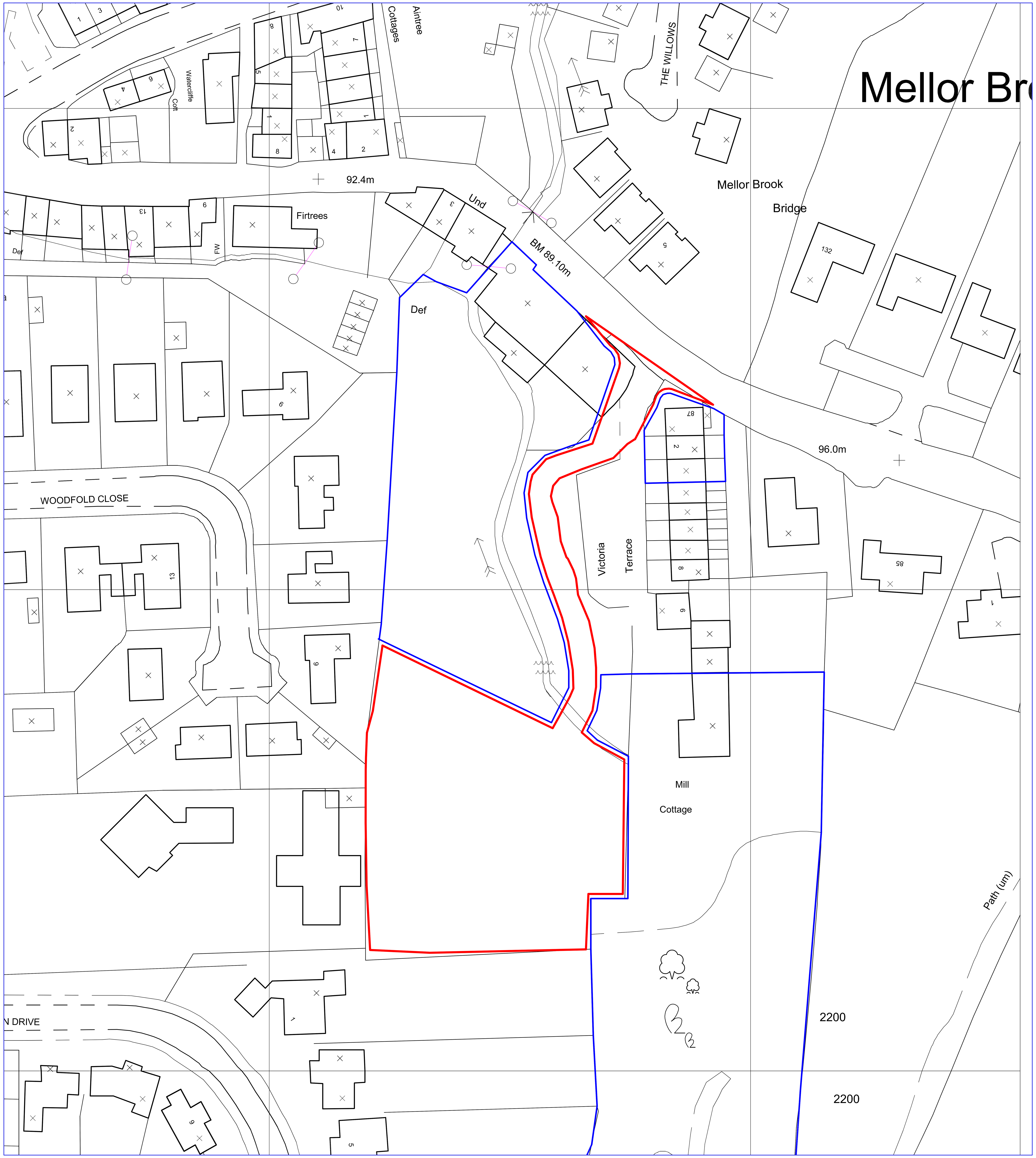
5.3 The foul drainage and surface water drainage including the sustainable elements of the systems will be inspected at six monthly intervals and any accumulated silt and debris will be removed to an off-site tip. Any necessary maintenance or repairs will be carried out by the management company.

5.4 The open channel will be inspected annually in spring and any necessary maintenance or repair works will be completed as soon as they are identified.

6. Conclusions

Based on the above details and proposals it will be possible to design, construct and install the proposed works in a sustainable manner that will not increase any flood risk and that will prevent the occurrence of flooding on or out-with the development site.

Figures;



North

0 10 20 30 40 50 60 70 80 90 100m

scale 1:1250

revisions:

A 02.10.12 - site boundary updated
B: 15.02.16 - site boundary updated

campbell driverpartnership

architects designers surveyors

client: leehand properties ltd

project: land at victoria terrace

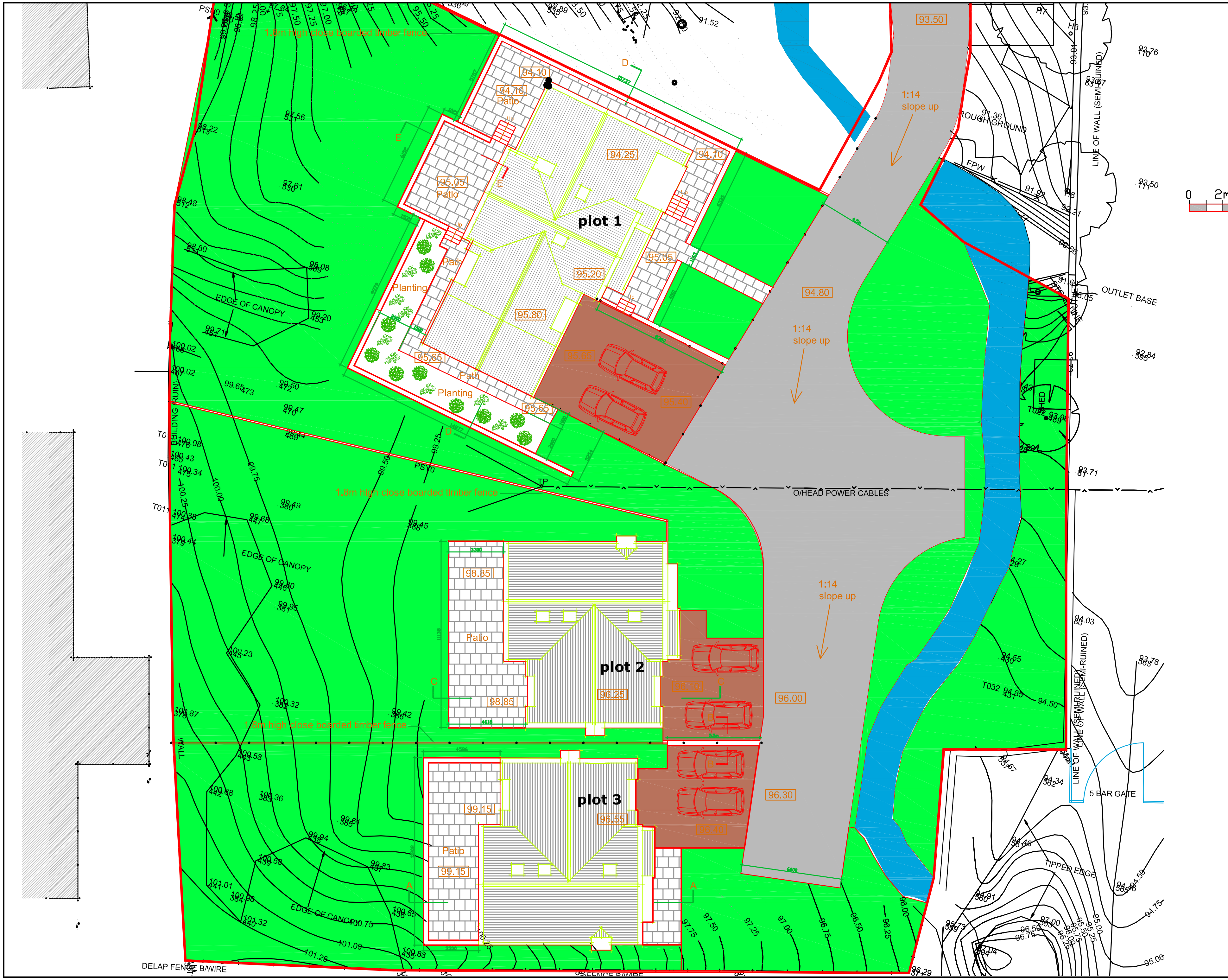
mellor brook

sheet: Location Plan

dwg no: 11.138	12	B

scale: 1:1250 @ A4
date: 13.09.12
drawn: ep

capricorn park
blakewater road
blackburn bb1 5qr
t: 01254 297700
f: 01254 297701
email: design@cdparchitects.co.uk



0 2m 4m 6m 8m 10m

N

This drawing is to be read in conjunction with all relevant Architect, consultants' and specialists' drawings and specifications. The Architect is to be notified of any discrepancies before proceeding. Do not scale from this drawing. All dimensions and levels are to be checked on site. This drawing is subject to copyright. All work carried out before Planning and Building Permission has been granted is at the contractor/clients risk.

Client	MFH Projects (Harrison)
Job Title	Proposed Dwellings Mellor Brook
Drawing Title	Proposed Site Plan - Boundary Treatment
Scale	1:100 @ A1
Date	March 2019
Drawn	Craig Harrison

spa
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Rev	Details	By	Date

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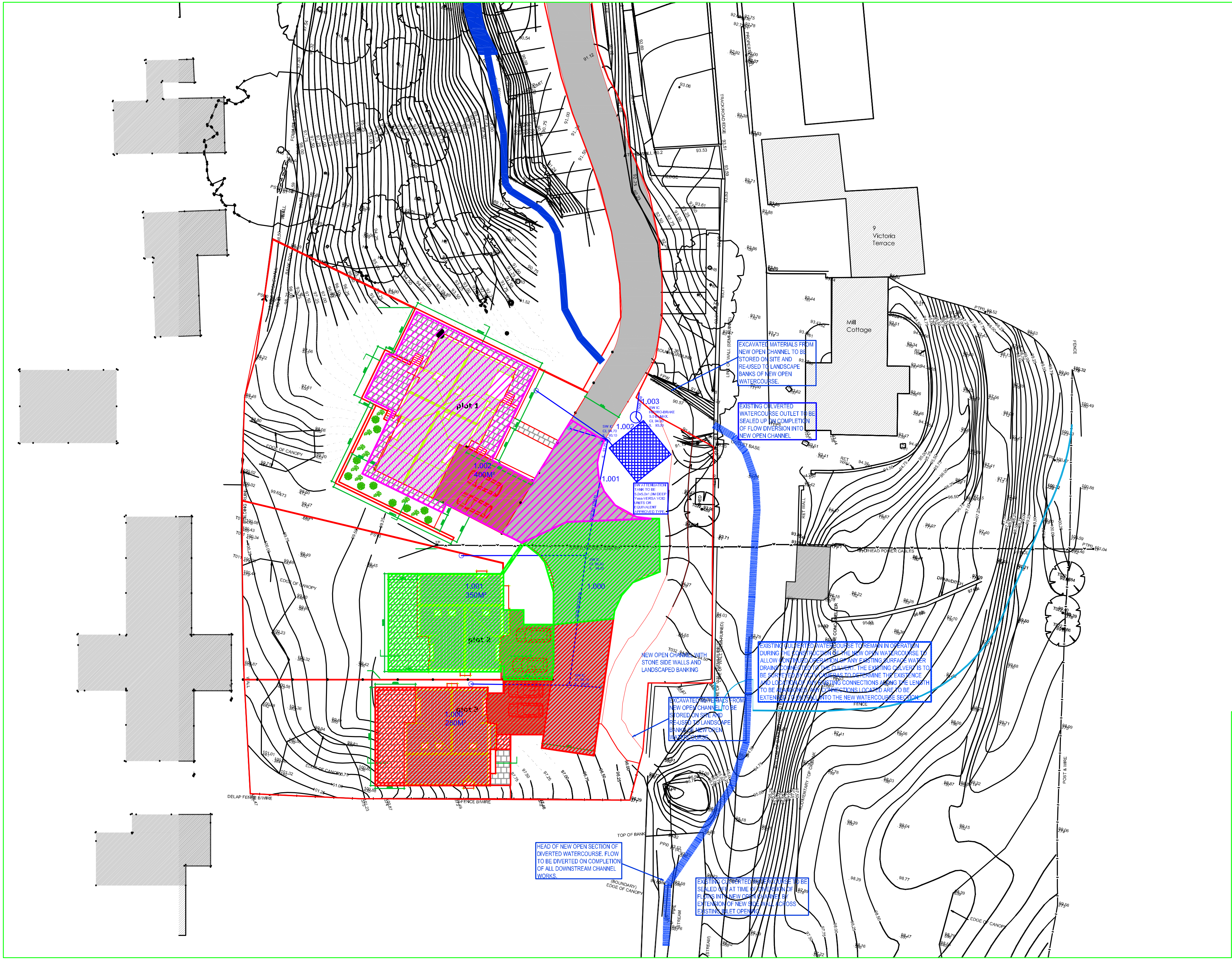
Client: MFH PROJECTS (HARRISON)

Project: LAND AT VICTORIA TERRACE MELLOR BROOK

Title: PROPOSED DRAINAGE LAYOUT

Dwg No: C - 0886 - 01 | Rev: - | Date: 29.03.2019 | Scale: 1/200@A1 | Drawn: RGH | Check: RGH



Rev	Details	By	Date
-	-	-	-

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1 Chiltern Ave.,
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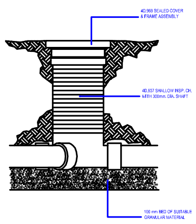
Client: MFH PROJECTS (HARRISON) -

Project: LAND AT VICTORIA TERRACE MELLOR BROOK

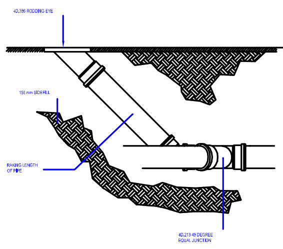
Title: PROPOSED SW CATCHMENTS LAYOUT

Drg.No.	Rev'n	Date	Scale
C - 0886 - 02	-	29.03.2019	1/200@A1
		Drawn: RGH	Check: RGH

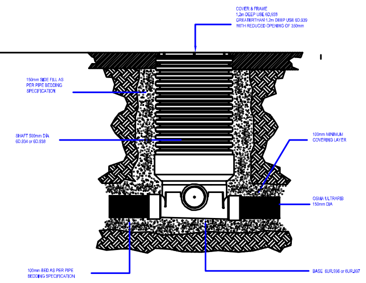
TYPICAL SHALLOW 300mm Ø INSPECTION CHAMBER DETAIL (SCALE 1:20)

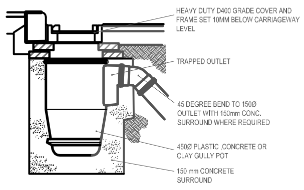


TYPICAL RODDING EYE DETAIL (SCALE 1:20)



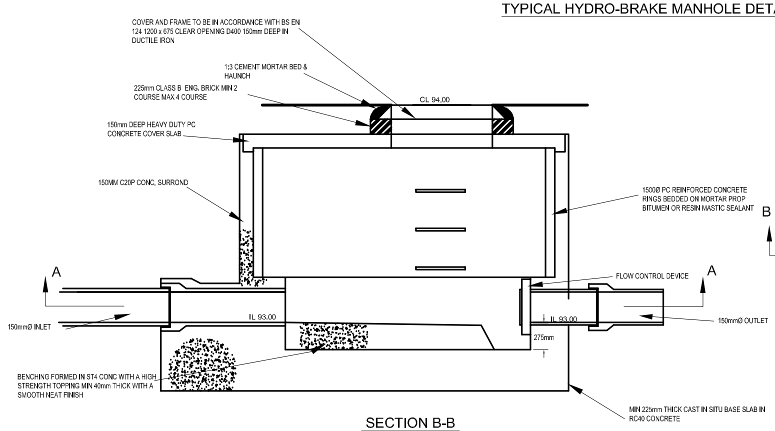
TYPICAL 500mm Ø INSPECTION CHAMBER DETAIL (SCALE 1:20)



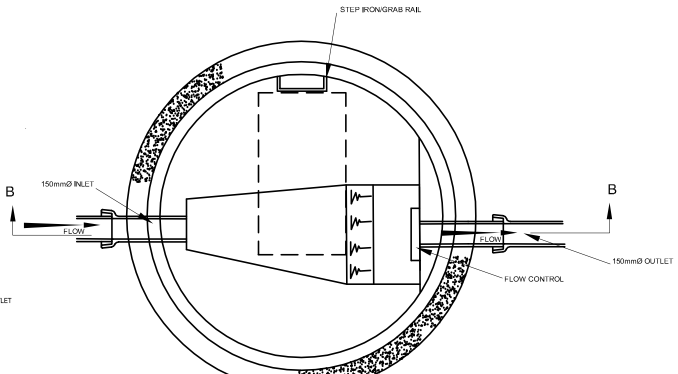


450mm DIA. ROAD GULLY TO CAR PARK AREA (SCALE 1:20)

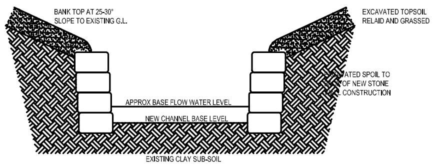
TYPICAL HYDRO-BRAKE MANHOLE DETAIL



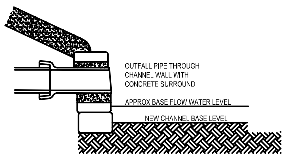
SECTION B-B



SECTION A-A



NEW CHANNEL SECTION



NEW OUTFALL SECTION

Rev	Details	By	Date
-	-	-	-

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Client: MFH PROJECTS (HARRISON)

Project: LAND AT VICTORIA TERRACE MELLOR BROOK

Title: PROPOSED CONSTRUCTION DETAILS

Dwg No: C - 0886 - 03 | Rev: - | Date: 29.03.2019 | Drawn: RGH | Scale: 1/200@A1 | Check: RGH

Victoria Terrace, Mellor Brook, Preston.

Appendix 1

SW Drainage System, Simulation Calculations.

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.089	4-8	0.004

Total Area Contributing (ha) = 0.093

Total Pipe Volume (m³) = 0.624

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)
1.003	wATERCOURSE	93.750	92.950	92.950	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	35.000
Hot Start (mins)	0	MADD Factor * 10m³/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	1
Number of Online Controls	1	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)	18.800	Storm Duration (mins)	15
Ratio R	0.306		

Online Controls for Storm

Hydro-Brake Optimum® Manhole: 4, DS/PN: 1.003, Volume (m³): 1.2

Unit Reference	MD-SHE-0105-5000-1000-5000
Design Head (m)	1.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	105
Invert Level (m)	93.000
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	**Head (m)**	**Flow (l/s)**	**Control Points**	**Head (m)**	**Flow (l/s)**
Design Point (Calculated)	1.000	5.0	Kick-Flo®	0.636	4.0
Flush-Flo™	0.295	4.9	Mean Flow over Head Range	-	4.3

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

Depth (m)	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**
0.100	3.6	1.200	5.4	3.000	8.3	7.000	12.4
0.200	4.8	1.400	5.8	3.500	8.9	7.500	12.8
0.300	4.9	1.600	6.2	4.000	9.5	8.000	13.2
0.400	4.9	1.800	6.5	4.500	10.1	8.500	13.6
0.500	4.7	2.000	6.9	5.000	10.6	9.000	14.0
0.600	4.3	2.200	7.2	5.500	11.1	9.500	14.4
0.800	4.5	2.400	7.5	6.000	11.5		
1.000	5.0	2.600	7.8	6.500	12.0		

Storage Structures for Storm

Cellular Storage Manhole: 4, DS/PN: 1.003

Invert Level (m) 93.000 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	25.0	0.0	1.000	25.0	0.0
0.500	25.0	0.0	1.001	0.0	0.0

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 Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	1	95.057	-0.093	0.000	0.31	0.0	11.8	OK
1.001	2	94.306	-0.044	0.000	0.84	0.0	26.6	OK
1.002	3	93.667	0.417	0.000	1.86	0.0	36.8	SURCHARGED
1.003	4	93.525	0.375	0.000	0.35	0.0	4.9	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.089	4-8	0.004

Total Area Contributing (ha) = 0.093

Total Pipe Volume (m³) = 0.624

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)
1.003	wATERCOURSE	93.750	92.950	92.950	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	35.000
Hot Start (mins)	0	MADD Factor * 10m³/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	1
Number of Online Controls	1	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)	18.800	Storm Duration (mins)	30
Ratio R	0.306		

Online Controls for Storm

Hydro-Brake Optimum® Manhole: 4, DS/PN: 1.003, Volume (m³): 1.2

Unit Reference	MD-SHE-0105-5000-1000-5000
Design Head (m)	1.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	105
Invert Level (m)	93.000
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	**Head (m)**	**Flow (l/s)**	**Control Points**	**Head (m)**	**Flow (l/s)**
Design Point (Calculated)	1.000	5.0	Kick-Flo®	0.636	4.0
Flush-Flo™	0.295	4.9	Mean Flow over Head Range	-	4.3

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

Depth (m)	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**
0.100	3.6	1.200	5.4	3.000	8.3	7.000	12.4
0.200	4.8	1.400	5.8	3.500	8.9	7.500	12.8
0.300	4.9	1.600	6.2	4.000	9.5	8.000	13.2
0.400	4.9	1.800	6.5	4.500	10.1	8.500	13.6
0.500	4.7	2.000	6.9	5.000	10.6	9.000	14.0
0.600	4.3	2.200	7.2	5.500	11.1	9.500	14.4
0.800	4.5	2.400	7.5	6.000	11.5		
1.000	5.0	2.600	7.8	6.500	12.0		

Storage Structures for Storm

Cellular Storage Manhole: 4, DS/PN: 1.003

Invert Level (m) 93.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	**Area (m^2)**	**Inf. Area (m^2)**	**Depth (m)**	**Area (m^2)**	**Inf. Area (m^2)**
0.000	25.0	0.0	1.000	25.0	0.0
0.500	25.0	0.0	1.001	0.0	0.0

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 Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	1	95.050	-0.100	0.000	0.24	0.0	9.2	OK
1.001	2	94.289	-0.061	0.000	0.66	0.0	20.7	OK
1.002	3	93.660	0.410	0.000	1.46	0.0	29.0	SURCHARGED
1.003	4	93.653	0.503	0.000	0.35	0.0	4.9	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
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Simulation Criteria for Storm

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Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
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Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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Number of Offline Controls	0		

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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)	18.800	Storm Duration (mins)	60
Ratio R	0.306		

Online Controls for Storm

Hydro-Brake Optimum® Manhole: 4, DS/PN: 1.003, Volume (m³): 1.2

Unit Reference	MD-SHE-0105-5000-1000-5000
Design Head (m)	1.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	105
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Suggested Manhole Diameter (mm)	1200

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Design Point (Calculated)	1.000	5.0	Kick-Flo®	0.636	4.0
Flush-Flo™	0.295	4.9	Mean Flow over Head Range	-	4.3

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Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
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0.200	4.8	1.400	5.8	3.500	8.9	7.500	12.8
0.300	4.9	1.600	6.2	4.000	9.5	8.000	13.2
0.400	4.9	1.800	6.5	4.500	10.1	8.500	13.6
0.500	4.7	2.000	6.9	5.000	10.6	9.000	14.0
0.600	4.3	2.200	7.2	5.500	11.1	9.500	14.4
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Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	25.0	0.0	1.000	25.0	0.0
0.500	25.0	0.0	1.001	0.0	0.0

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 Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	1	95.041	-0.109	0.000	0.17	0.0	6.3	OK
1.001	2	94.270	-0.080	0.000	0.45	0.0	14.2	OK
1.002	3	93.713	0.463	0.000	1.01	0.0	20.0	SURCHARGED
1.003	4	93.705	0.555	0.000	0.35	0.0	4.9	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.089	4-8	0.004

Total Area Contributing (ha) = 0.093

Total Pipe Volume (m³) = 0.624

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)
1.003	wATERCOURSE	93.750	92.950	92.950	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	35.000
Hot Start (mins)	0	MADD Factor * 10m³/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	1
Number of Online Controls	1	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)	18.800	Storm Duration (mins)	15
Ratio R	0.306		

Online Controls for Storm

Hydro-Brake Optimum® Manhole: 4, DS/PN: 1.003, Volume (m³): 1.2

Unit Reference	MD-SHE-0105-5000-1000-5000
Design Head (m)	1.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	105
Invert Level (m)	93.000
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	**Head (m)**	**Flow (l/s)**	**Control Points**	**Head (m)**	**Flow (l/s)**
Design Point (Calculated)	1.000	5.0	Kick-Flo®	0.636	4.0
Flush-Flo™	0.295	4.9	Mean Flow over Head Range	-	4.3

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

Depth (m)	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**
0.100	3.6	1.200	5.4	3.000	8.3	7.000	12.4
0.200	4.8	1.400	5.8	3.500	8.9	7.500	12.8
0.300	4.9	1.600	6.2	4.000	9.5	8.000	13.2
0.400	4.9	1.800	6.5	4.500	10.1	8.500	13.6
0.500	4.7	2.000	6.9	5.000	10.6	9.000	14.0
0.600	4.3	2.200	7.2	5.500	11.1	9.500	14.4
0.800	4.5	2.400	7.5	6.000	11.5		
1.000	5.0	2.600	7.8	6.500	12.0		

Storage Structures for Storm

Cellular Storage Manhole: 4, DS/PN: 1.003

Invert Level (m) 93.000 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	25.0	0.0	1.000	25.0	0.0
0.500	25.0	0.0	1.001	0.0	0.0

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 Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	1	95.066	-0.084	0.000	0.40	0.0	15.3	OK
1.001	2	94.433	0.083	0.000	1.03	0.0	32.5	SURCHARGED
1.002	3	93.957	0.707	0.000	2.26	0.0	44.8	SURCHARGED
1.003	4	93.711	0.561	0.000	0.35	0.0	4.9	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.089	4-8	0.004

Total Area Contributing (ha) = 0.093

Total Pipe Volume (m³) = 0.624

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)
1.003	wATERCOURSE	93.750	92.950	92.950	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	35.000
Hot Start (mins)	0	MADD Factor * 10m³/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	1
Number of Online Controls	1	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)	18.800	Storm Duration (mins)	30
Ratio R	0.306		

Online Controls for Storm

Hydro-Brake Optimum® Manhole: 4, DS/PN: 1.003, Volume (m^3): 1.2

Unit Reference	MD-SHE-0105-5000-1000-5000
Design Head (m)	1.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	105
Invert Level (m)	93.000
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	5.0	Kick-Flo®	0.636	4.0
Flush-Flo™	0.295	4.9	Mean Flow over Head Range	-	4.3

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.6	1.200	5.4	3.000	8.3	7.000	12.4
0.200	4.8	1.400	5.8	3.500	8.9	7.500	12.8
0.300	4.9	1.600	6.2	4.000	9.5	8.000	13.2
0.400	4.9	1.800	6.5	4.500	10.1	8.500	13.6
0.500	4.7	2.000	6.9	5.000	10.6	9.000	14.0
0.600	4.3	2.200	7.2	5.500	11.1	9.500	14.4
0.800	4.5	2.400	7.5	6.000	11.5		
1.000	5.0	2.600	7.8	6.500	12.0		

Storage Structures for Storm

Cellular Storage Manhole: 4, DS/PN: 1.003

Invert Level (m) 93.000 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	25.0	0.0	1.000	25.0	0.0
0.500	25.0	0.0	1.001	0.0	0.0

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 Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	1	95.058	-0.092	0.000	0.32	0.0	12.0	OK
1.001	2	94.308	-0.042	0.000	0.86	0.0	27.0	OK
1.002	3	93.912	0.662	0.000	1.89	0.0	37.3	SURCHARGED
1.003	4	93.897	0.747	0.000	0.35	0.0	4.9	FLOOD RISK

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.089	4-8	0.004

Total Area Contributing (ha) = 0.093

Total Pipe Volume (m³) = 0.624

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)
1.003	wATERCOURSE	93.750	92.950	92.950	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	35.000
Hot Start (mins)	0	MADD Factor * 10m³/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	1
Number of Online Controls	1	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)	18.800	Storm Duration (mins)	60
Ratio R	0.306		

Online Controls for Storm

Hydro-Brake Optimum® Manhole: 4, DS/PN: 1.003, Volume (m^3): 1.2

Unit Reference	MD-SHE-0105-5000-1000-5000
Design Head (m)	1.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	105
Invert Level (m)	93.000
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	5.0	Kick-Flo®	0.636	4.0
Flush-Flo™	0.295	4.9	Mean Flow over Head Range	-	4.3

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.6	1.200	5.4	3.000	8.3	7.000	12.4
0.200	4.8	1.400	5.8	3.500	8.9	7.500	12.8
0.300	4.9	1.600	6.2	4.000	9.5	8.000	13.2
0.400	4.9	1.800	6.5	4.500	10.1	8.500	13.6
0.500	4.7	2.000	6.9	5.000	10.6	9.000	14.0
0.600	4.3	2.200	7.2	5.500	11.1	9.500	14.4
0.800	4.5	2.400	7.5	6.000	11.5		
1.000	5.0	2.600	7.8	6.500	12.0		

Storage Structures for Storm

Cellular Storage Manhole: 4, DS/PN: 1.003

Invert Level (m) 93.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m^2)	Inf. Area (m^2)	Depth (m)	Area (m^2)	Inf. Area (m^2)
0.000	25.0	0.0	1.000	25.0	0.0
0.500	25.0	0.0	1.001	0.0	0.0

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 Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	1	95.047	-0.103	0.000	0.22	0.0	8.3	OK
1.001	2	94.283	-0.067	0.000	0.59	0.0	18.6	OK
1.002	3	94.007	0.757	0.000	1.31	0.0	26.0	SURCHARGED
1.003	4	93.999	0.849	0.000	0.35	0.0	5.0	FLOOD RISK

Time Area Diagram for Storm

Time (mins)	**Area (ha)**	**Time (mins)**	**Area (ha)**
0-4	0.089	4-8	0.004

Total Area Contributing (ha) = 0.093

Total Pipe Volume (m³) = 0.624

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)**
1.003	wATERCOURSE	93.750	92.950	92.950	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	35.000
Hot Start (mins)	0	MADD Factor * 10m³/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	1
Number of Online Controls	1	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)	18.800	Storm Duration (mins)	120
Ratio R	0.306		

Online Controls for Storm

Hydro-Brake Optimum® Manhole: 4, DS/PN: 1.003, Volume (m^3): 1.2

Unit Reference	MD-SHE-0105-5000-1000-5000
Design Head (m)	1.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	105
Invert Level (m)	93.000
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	**Head (m)**	**Flow (l/s)**	**Control Points**	**Head (m)**	**Flow (l/s)**
Design Point (Calculated)	1.000	5.0	Kick-Flo®	0.636	4.0
Flush-Flo™	0.295	4.9	Mean Flow over Head Range	-	4.3

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

Depth (m)	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**
0.100	3.6	1.200	5.4	3.000	8.3	7.000	12.4
0.200	4.8	1.400	5.8	3.500	8.9	7.500	12.8
0.300	4.9	1.600	6.2	4.000	9.5	8.000	13.2
0.400	4.9	1.800	6.5	4.500	10.1	8.500	13.6
0.500	4.7	2.000	6.9	5.000	10.6	9.000	14.0
0.600	4.3	2.200	7.2	5.500	11.1	9.500	14.4
0.800	4.5	2.400	7.5	6.000	11.5		
1.000	5.0	2.600	7.8	6.500	12.0		

Storage Structures for Storm

Cellular Storage Manhole: 4, DS/PN: 1.003

Invert Level (m) 93.000 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	25.0	0.0	1.000	25.0	0.0
0.500	25.0	0.0	1.001	0.0	0.0

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 Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	1	95.037	-0.113	0.000	0.14	0.0	5.3	OK
1.001	2	94.264	-0.086	0.000	0.38	0.0	12.0	OK
1.002	3	94.003	0.753	0.000	0.86	0.0	16.9	SURCHARGED
1.003	4	93.995	0.845	0.000	0.35	0.0	5.0	FLOOD RISK

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.089	4-8	0.004

Total Area Contributing (ha) = 0.093

Total Pipe Volume (m³) = 0.624

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)
1.003	wATERCOURSE	93.750	92.950	92.950	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	35.000
Hot Start (mins)	0	MADD Factor * 10m³/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	1
Number of Online Controls	1	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)	18.800	Storm Duration (mins)	240
Ratio R	0.306		

Online Controls for Storm

Hydro-Brake Optimum® Manhole: 4, DS/PN: 1.003, Volume (m^3): 1.2

Unit Reference	MD-SHE-0105-5000-1000-5000
Design Head (m)	1.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	105
Invert Level (m)	93.000
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	**Head (m)**	**Flow (l/s)**	**Control Points**	**Head (m)**	**Flow (l/s)**
Design Point (Calculated)	1.000	5.0	Kick-Flo®	0.636	4.0
Flush-Flo™	0.295	4.9	Mean Flow over Head Range	-	4.3

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

Depth (m)	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**
0.100	3.6	1.200	5.4	3.000	8.3	7.000	12.4
0.200	4.8	1.400	5.8	3.500	8.9	7.500	12.8
0.300	4.9	1.600	6.2	4.000	9.5	8.000	13.2
0.400	4.9	1.800	6.5	4.500	10.1	8.500	13.6
0.500	4.7	2.000	6.9	5.000	10.6	9.000	14.0
0.600	4.3	2.200	7.2	5.500	11.1	9.500	14.4
0.800	4.5	2.400	7.5	6.000	11.5		
1.000	5.0	2.600	7.8	6.500	12.0		

Storage Structures for Storm

Cellular Storage Manhole: 4, DS/PN: 1.003

Invert Level (m) 93.000 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	25.0	0.0	1.000	25.0	0.0
0.500	25.0	0.0	1.001	0.0	0.0

Summary of Results for 240 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 Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	1	95.029	-0.121	0.000	0.09	0.0	3.3	OK
1.001	2	94.249	-0.101	0.000	0.23	0.0	7.4	OK
1.002	3	93.818	0.568	0.000	0.53	0.0	10.5	SURCHARGED
1.003	4	93.810	0.660	0.000	0.35	0.0	4.9	FLOOD RISK

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.089	4-8	0.004

Total Area Contributing (ha) = 0.093

Total Pipe Volume (m³) = 0.624

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)
1.003	wATERCOURSE	93.750	92.950	92.950	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	35.000
Hot Start (mins)	0	MADD Factor * 10m³/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	1
Number of Online Controls	1	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)	18.800	Storm Duration (mins)	400
Ratio R	0.306		

Online Controls for Storm

Hydro-Brake Optimum® Manhole: 4, DS/PN: 1.003, Volume (m³): 1.2

Unit Reference	MD-SHE-0105-5000-1000-5000
Design Head (m)	1.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	105
Invert Level (m)	93.000
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	5.0	Kick-Flo®	0.636	4.0
Flush-Flo™	0.295	4.9	Mean Flow over Head Range	-	4.3

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.6	1.200	5.4	3.000	8.3	7.000	12.4
0.200	4.8	1.400	5.8	3.500	8.9	7.500	12.8
0.300	4.9	1.600	6.2	4.000	9.5	8.000	13.2
0.400	4.9	1.800	6.5	4.500	10.1	8.500	13.6
0.500	4.7	2.000	6.9	5.000	10.6	9.000	14.0
0.600	4.3	2.200	7.2	5.500	11.1	9.500	14.4
0.800	4.5	2.400	7.5	6.000	11.5		
1.000	5.0	2.600	7.8	6.500	12.0		

Storage Structures for Storm

Cellular Storage Manhole: 4, DS/PN: 1.003

Invert Level (m) 93.000 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	25.0	0.0	1.000	25.0	0.0
0.500	25.0	0.0	1.001	0.0	0.0

Summary of Results for 400 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 Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	1	95.024	-0.126	0.000	0.06	0.0	2.3	OK
1.001	2	94.240	-0.110	0.000	0.16	0.0	5.1	OK
1.002	3	93.487	0.237	0.000	0.37	0.0	7.4	SURCHARGED
1.003	4	93.479	0.329	0.000	0.35	0.0	4.9	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.089	4-8	0.004

Total Area Contributing (ha) = 0.093

Total Pipe Volume (m³) = 0.624

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)
1.003	wATERCOURSE	93.750	92.950	92.950	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	35.000
Hot Start (mins)	0	MADD Factor * 10m³/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	1
Number of Online Controls	1	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)	18.800	Storm Duration (mins)	600
Ratio R	0.306		

Online Controls for Storm

Hydro-Brake Optimum® Manhole: 4, DS/PN: 1.003, Volume (m³): 1.2

Unit Reference	MD-SHE-0105-5000-1000-5000
Design Head (m)	1.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	105
Invert Level (m)	93.000
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	**Head (m)**	**Flow (l/s)**	**Control Points**	**Head (m)**	**Flow (l/s)**
Design Point (Calculated)	1.000	5.0	Kick-Flo®	0.636	4.0
Flush-Flo™	0.295	4.9	Mean Flow over Head Range	-	4.3

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

Depth (m)	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**
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0.200	4.8	1.400	5.8	3.500	8.9	7.500	12.8
0.300	4.9	1.600	6.2	4.000	9.5	8.000	13.2
0.400	4.9	1.800	6.5	4.500	10.1	8.500	13.6
0.500	4.7	2.000	6.9	5.000	10.6	9.000	14.0
0.600	4.3	2.200	7.2	5.500	11.1	9.500	14.4
0.800	4.5	2.400	7.5	6.000	11.5		
1.000	5.0	2.600	7.8	6.500	12.0		

Storage Structures for Storm

Cellular Storage Manhole: 4, DS/PN: 1.003

Invert Level (m) 93.000 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	25.0	0.0	1.000	25.0	0.0
0.500	25.0	0.0	1.001	0.0	0.0

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	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	1	95.020	-0.130	0.000	0.04	0.0	1.7	OK
1.001	2	94.234	-0.116	0.000	0.12	0.0	3.8	OK
1.002	3	93.231	-0.019	0.000	0.28	0.0	5.5	OK
1.003	4	93.223	0.073	0.000	0.35	0.0	4.9	SURCHARGED