

LEVEL— Related to Ordnance Survey by connection to the OS Active Network by G.P.S

GRID— Related to Ordnance Survey using One Point Localisation on Station S1. Orientation at OS Grid North.

S3 control manhole
Hydrobrake Optimum with
bypass door from
Hydro International UK
Shearwater House
Clevedon Hall Estate
Victoria Road
Clevedon BS21 7RD
Tel 01275 878371
Ref SHE-0076-2200-0650-22000
Heed 0.65m Flow 2.2 lts/sec

Ref SHE-0076-2200-0650-2200
Head 0.65m Flow 2.2 lts/sec

Maximum discharge to Surface water sewer is 2.5 l/s for the 100year storm. 40% allowance made for climate change

Trial holes to be taken at each drainage outfall to confirm location of sewer and invert level. Prior to ANY work on site.

PRIVATE DRAINAGE

All drainage to comply with BS5301
100mm drains to be laid at minimum
gradient 1 : 80. 150mm drains to be
laid at minimum gradient 1 : 150.
All drainage to be 100mm diameter,
unless otherwise stated. All final
connections to main sewer to be
150mm diameter. All connections
joints to remain flexible.

Drains passing under buildings to be retained flexible with a bed and surround of pea gravel. All drains to be bridged over with concrete lintels when passing through walls.

All foundations to be taken below invert level of localized drains where within 1.00m of foundations. All sink wastes not connected to an inspection chamber or manhole to be connected via a roddable gully.

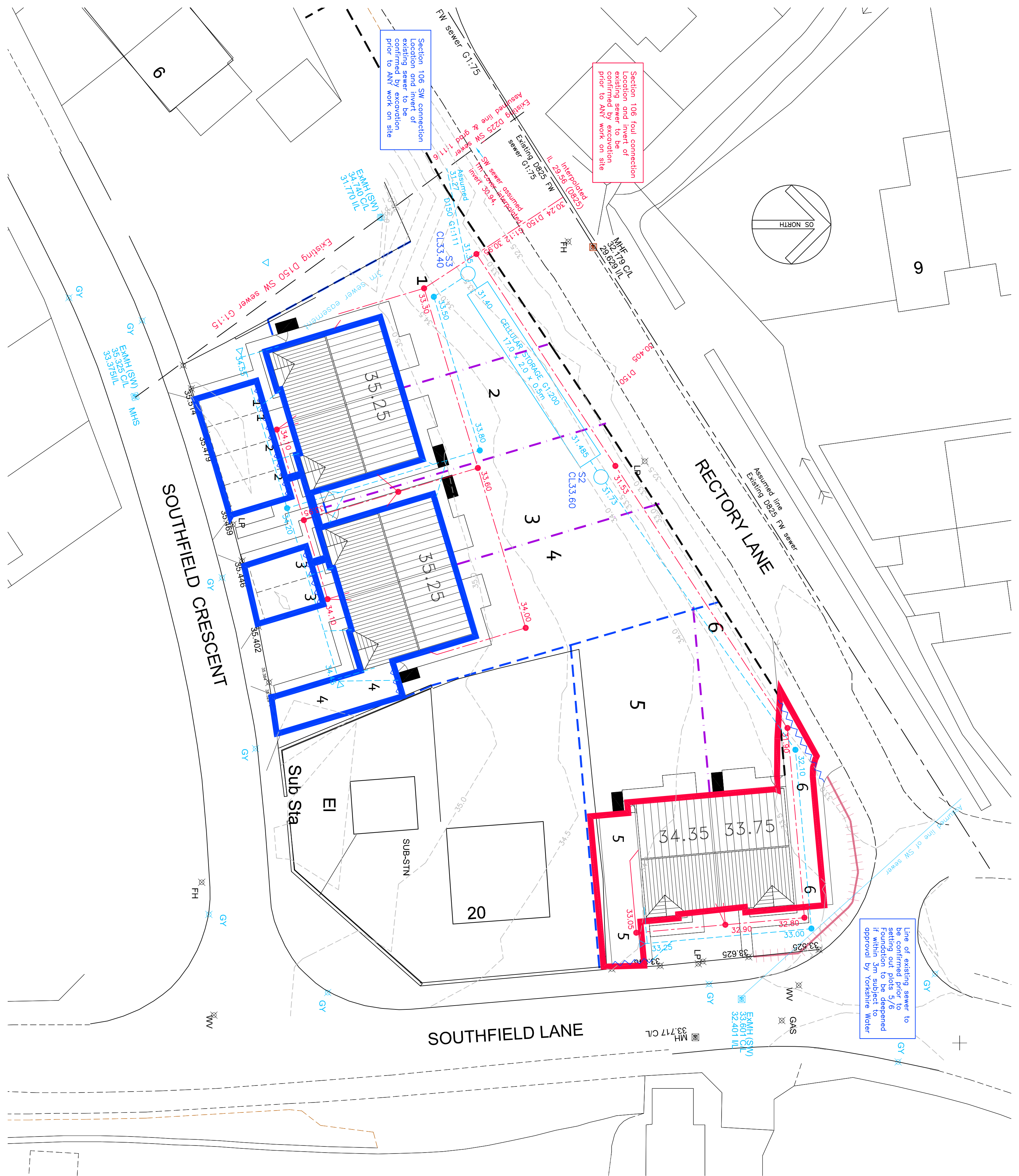
225mm dia inspection chambers to be laid at a maximum depth of 600mm below finished ground level.
450mm dia inspection chambers to be laid at a maximum depth of 1200mm below finished ground level.
1200 x 1000mm pc concrete section to BS 5911 to be laid at a maximum depth of 3,00m below finished ground level.



A. Layout updated to planning drawing, plot 5/6 repositioned 28-11-19

	R.A.B. ENGINEERING DESIGN LTD	
	12 BERRY HOLME CLOSE SHEFFIELD S35 1AB TEL.(0114)2464871	
Blackstone Developments Ltd		
Rectory Lane, Thurnscoe Drainage layout		
DRAWN BY rab	SCALE 1:200 (A2)	DATE Nov/19
DRAWING No 1123-1	REV A	

PRELIMINARY ONLY



Technical Specification

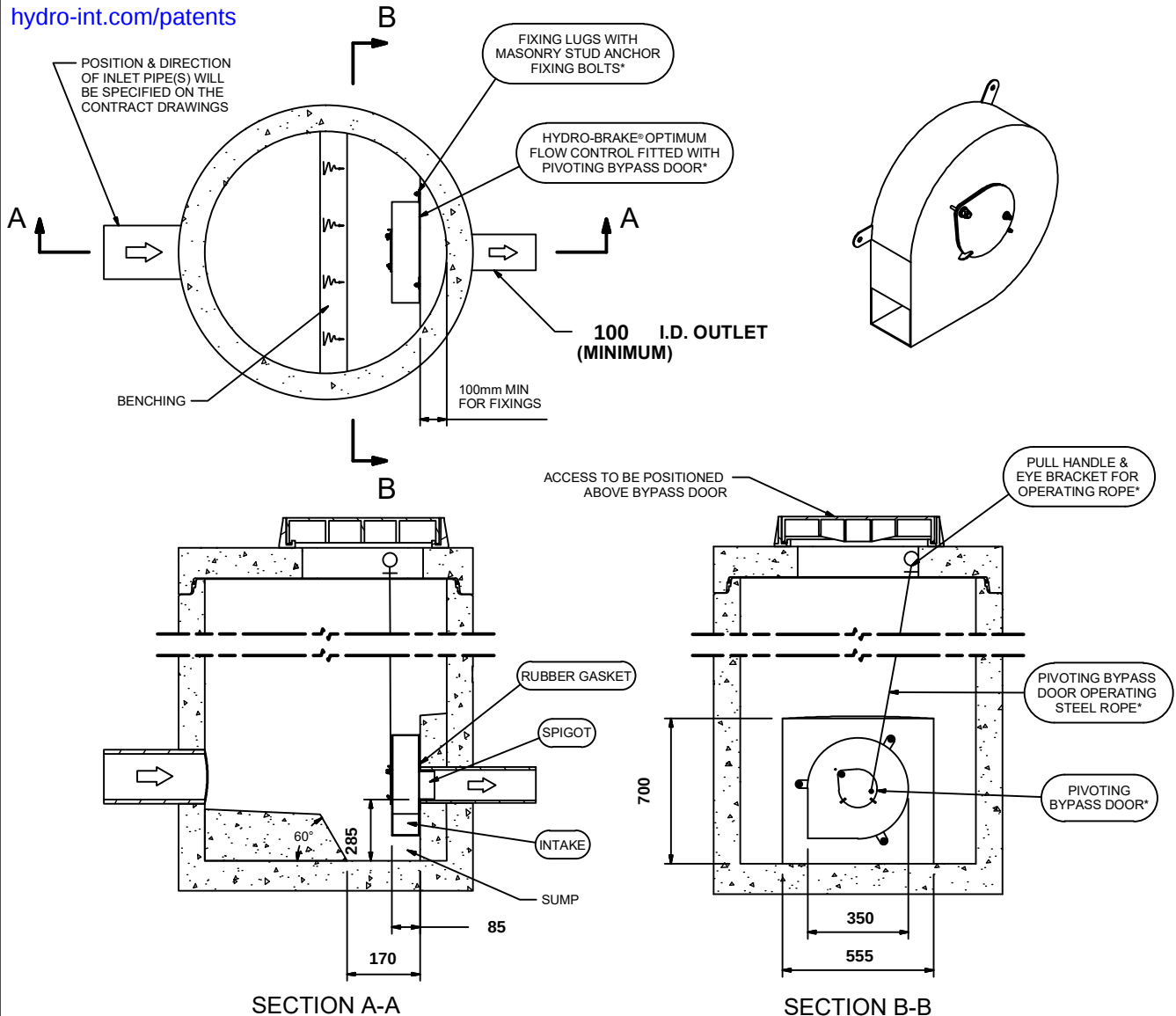
Control Point	Head (m)	Flow (l/s)
Primary Design	0.650	2.200
Flush-Flo™	0.194	2.200
Kick-Flo®	0.428	1.822
Mean Flow		1.906

Hydro-Brake® Optimum Flow Control including:

- 3 mm grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet



hydro-int.com/patents



IMPORTANT: ○ LIMIT OF HYDRO INTERNATIONAL SUPPLY
 THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS
 FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL
 ALL CIVIL AND INSTALLATION WORK BY OTHERS
 * WHERE SUPPLIED
 HYDRO-BRAKE® FLOW CONTROL & HYDRO-BRAKE® OPTIMUM FLOW CONTROL ARE REGISTERED TRADEMARKS FOR FLOW
 CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY HYDRO INTERNATIONAL

THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

DESIGN ADVICE



The head/flow characteristics of this SHE-0076-2200-0650-2200 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.
The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

Hydro
International®

DATE 11/28/2019 3:47 PM

SITE rectory lane

DESIGNER richard bland

REF

SHE-0076-2200-0650-2200

Hydro-Brake® Optimum

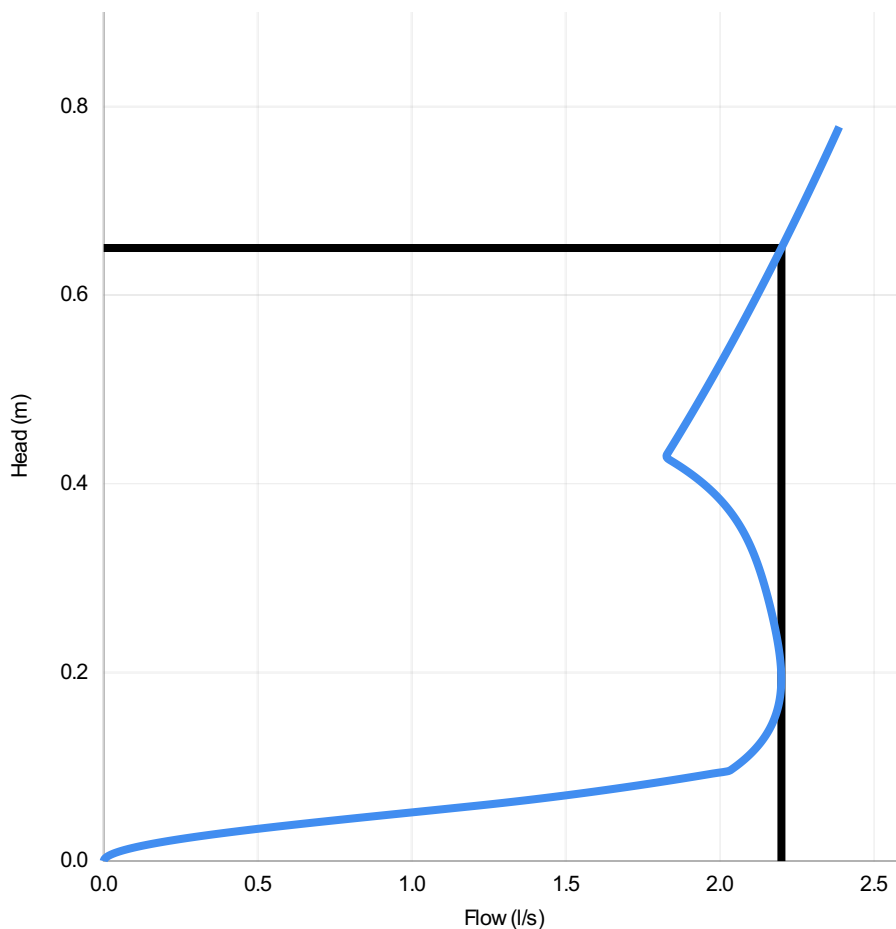
Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	0.650	2.200
Flush-Flo	0.194	2.200
Kick-Flo®	0.428	1.822
Mean Flow		1.906



PT/329/0412

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Head (m)	Flow (l/s)
0.000	0.000
0.022	0.230
0.045	0.797
0.067	1.440
0.090	1.918
0.112	2.094
0.134	2.152
0.157	2.184
0.179	2.198
0.202	2.199
0.224	2.192
0.247	2.180
0.269	2.164
0.291	2.146
0.314	2.124
0.336	2.096
0.359	2.059
0.381	2.007
0.403	1.934
0.426	1.835
0.448	1.861
0.471	1.902
0.493	1.942
0.516	1.981
0.538	2.020
0.560	2.057
0.583	2.094
0.605	2.130
0.628	2.165
0.650	2.200

DESIGN ADVICE



The head/flow characteristics of this SHE-0076-2200-0650-2200 Hydro-Brake Optimum® Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.

The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

Hydro
International

DATE 28/11/2019 15:47

Site rectory lane

DESIGNER richard bland

Ref

SHE-0076-2200-0650-2200

Hydro-Brake Optimum®

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Date 28/11/2019 15:37 File rectory 28-11-19.MDX	Designed by RAB Checked by	
XP Solutions	Network 2019.1	

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)	Section Type	Auto Design
1.000	27.490	0.370	74.3	0.021	4.00	0.0	0.600	o	100	Pipe/Conduit	
1.001	17.000	0.085	200.0	0.035	0.00	0.0	0.600	[]	-15	Pipe/Conduit	
1.002	8.850	0.080	110.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

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	50.00	4.51	32.100	0.021	0.0	0.0	1.1	0.89	7.0	4.0
1.001	50.00	4.65	31.485	0.056	0.0	0.0	3.0	2.06	2056.1	10.6
1.002	50.00	4.80	31.350	0.056	0.0	0.0	3.0	0.95	16.9	10.6

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)
1.002		33.500	31.270	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	0.000
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	0
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	Winter
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Storm Duration (mins)	15
Ratio R	0.374		

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: 3, DS/PN: 1.002, Volume (m³): 18.2

Unit Reference	MD-SHE-0076-2200-0650-2200
Design Head (m)	0.650
Design Flow (l/s)	2.2
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	76
Invert Level (m)	31.350
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.650	2.2
Flush-Flo™	0.194	2.2
Kick-Flo®	0.428	1.8
Mean Flow over Head Range	-	1.9

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	2.1	1.200	2.9	3.000	4.4	7.000	6.6
0.200	2.2	1.400	3.1	3.500	4.8	7.500	6.9
0.300	2.1	1.600	3.3	4.000	5.1	8.000	7.1
0.400	1.9	1.800	3.5	4.500	5.4	8.500	7.3
0.500	2.0	2.000	3.7	5.000	5.7	9.000	7.5
0.600	2.1	2.200	3.9	5.500	5.9	9.500	7.7
0.800	2.4	2.400	4.0	6.000	6.2		
1.000	2.7	2.600	4.2	6.500	6.4		

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Summary of Results for 15 minute 1 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia Status ON

		Water	Surcharged	Flooded		Pipe	
PN	US/MH Name	Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (l/s)	Flow (l/s)	Status
1.000	1	32.156	-0.044	0.000	0.60	4.1	OK
1.001	2	31.541	-0.444	0.000	0.01	9.4	OK
1.002	3	31.541	0.041	0.000	0.15	2.2	SURCHARGED

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Summary of Results for 30 minute 1 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia Status ON

		Water	Surcharged	Flooded		Pipe	
	US/MH	Level	Depth	Volume	Flow / Overflow	Flow	
PN	Name	(m)	(m)	(m³)	Cap. (1/s)	(1/s)	Status
1.000	1	32.147	-0.053	0.000	0.44	3.0	OK
1.001	2	31.549	-0.436	0.000	0.01	7.6	OK
1.002	3	31.549	0.049	0.000	0.15	2.2	SURCHARGED

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12 Berry Holm Close Sheffield S35 1AB	Blackstone Developments Rectory Lane Thurnscoe 60min 1year simulation	
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Summary of Results for 60 minute 1 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia Status ON

		Water	Surcharged	Flooded		Pipe	
PN	US/MH Name	Level (m)	Depth (m)	Volume (m³)	Flow / Cap. (1/s)	Overflow Flow (1/s)	Status
1.000	1	32.137	-0.063	0.000	0.30	2.0	OK
1.001	2	31.539	-0.446	0.000	0.00	5.2	OK
1.002	3	31.539	0.039	0.000	0.15	2.2	SURCHARGED

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Summary of Results for 120 minute 1 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia Status ON

		Water	Surcharged	Flooded		Pipe	
PN	US/MH Name	Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (1/s)	Flow (1/s)	Status
1.000	1	32.129	-0.071	0.000	0.19	1.3	OK
1.001	2	31.503	-0.482	0.000	0.00	3.4	OK
1.002	3	31.503	0.003	0.000	0.15	2.2	SURCHARGED

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

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia Status ON

		Water	Surcharged	Flooded		Pipe	
PN	US/MH Name	Level (m)	Depth (m)	Volume (m ³)	Flow / Overflow Cap. (1/s)	Flow (1/s)	Status
1.000	1	32.562	0.362	0.000	1.39	9.5	FLOOD RISK
1.001	2	31.740	-0.245	0.000	0.02	24.8	OK
1.002	3	31.740	0.240	0.000	0.15	2.2	SURCHARGED

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12 Berry Holm Close Sheffield S35 1AB	Blackstone Developments Rectory Lane Thurnscoe 30min 30year simulation	
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Summary of Results for 30 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia Status ON

		Water	Surcharged	Flooded		Pipe	
PN	US/MH Name	Level (m)	Depth (m)	Volume (m ³)	Flow / Overflow Cap. (1/s)	Flow (1/s)	Status
1.000	1	32.263	0.063	0.000	1.08	7.4	SURCHARGED
1.001	2	31.803	-0.182	0.000	0.01	19.2	OK
1.002	3	31.803	0.303	0.000	0.15	2.2	SURCHARGED

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

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia Status ON

		Water	Surcharged	Flooded		Pipe	
PN	US/MH Name	Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (1/s)	Flow (1/s)	Status
1.000	1	32.164	-0.036	0.000	0.72	4.9	OK
1.001	2	31.828	-0.157	0.000	0.01	12.9	OK
1.002	3	31.828	0.328	0.000	0.15	2.2	SURCHARGED

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Summary of Results for 120 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia Status ON

		Water	Surcharged	Flooded		Pipe	
PN	US/MH Name	Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (1/s)	Flow (1/s)	Status
1.000	1	32.147	-0.053	0.000	0.45	3.0	OK
1.001	2	31.804	-0.181	0.000	0.01	8.0	OK
1.002	3	31.804	0.304	0.000	0.15	2.2	SURCHARGED

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12 Berry Holm Close Sheffield S35 1AB	Blackstone Developments Rectory Lane Thurnscoe 30min 100year simulation	
Date 28/11/2019 15:43 File rectory 28-11-19.MDX	Designed by RAB Checked by	
XP Solutions	Network 2019.1	

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

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia Status ON

		Water	Surcharged	Flooded		Pipe	
PN	US/MH Name	Level (m)	Depth (m)	Volume (m ³)	Flow / Overflow Cap. (1/s)	Flow (1/s)	Status
1.000	1	32.474	0.274	0.000	1.32	9.0	FLOOD RISK
1.001	2	31.940	-0.045	0.000	0.02	23.8	OK
1.002	3	31.939	0.439	0.000	0.15	2.2	SURCHARGED

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XP Solutions	Network 2019.1	

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

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia Status ON

		Water	Surcharged	Flooded		Pipe	
PN	US/MH Name	Level (m)	Depth (m)	Volume (m³)	Flow / Cap. (l/s)	Overflow Flow (l/s)	Status
1.000	1	32.229	0.029	0.000	0.94	6.4	SURCHARGED
1.001	2	32.215	0.230	0.000	0.01	16.7	SURCHARGED
1.002	3	32.215	0.715	0.000	0.17	2.5	SURCHARGED

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XP Solutions	Network 2019.1	

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

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia Status ON

		Water	Surcharged	Flooded		Pipe	
PN	US/MH Name	Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (1/s)	Flow (1/s)	Status
1.000	1	32.155	-0.045	0.000	0.59	4.0	OK
1.001	2	32.114	0.129	0.000	0.01	10.3	SURCHARGED
1.002	3	32.114	0.614	0.000	0.16	2.4	SURCHARGED