

## ABBAY LANE, PRESTON, HULL

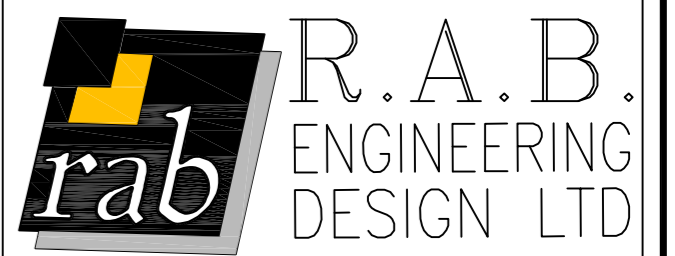
### MICRODRAINAGE ANALYSIS

The onsite network is a traditional gravity system which also includes cellular storage and a surface water pump station. Flow from the majority of the site will be restricted to 3.5 l/s the storage contained in 8.0x8.0x2.0m Polystorm crates and a flow control located in S9. Between S9 and the pump station (S10) we have included a dummy manhole (S99) in order to add the remaining site impermeable area. The pump station discharge rate will be set at 3.6 l/s. The analysis has a second dummy length downstream of S10 to replicate the discharge limit of 3.6 l/s pumping rate. The pump will discharge to S50 where it will gravitate to the D300mm surface water sewer in Staiths Road.

We have attempted to limit the discharge to a little as possible (3.5 l/s), the flow control in S9 is 75mm this minimum recommended. The pumping rate is slightly higher than S9 set at 3.6 l/s so as not to overwhelm the pumping chamber.

WE have added 40% for climate change.





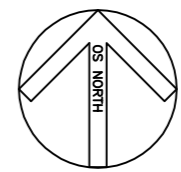
21 BURN CROSS DRIVE  
SHEFFIELD S35 1DJ  
TEL.(0114)2570576

Garry Hurd  
Abbey Lane, Preston, Hull  
Engineering layout  
Impermeable areas  
DRAWN BY rab  
SCALE 1:250 (A1) DATE May 21  
DRAWING No 1137-1-1-IMP REV B

LEVELS ARE RELATED TO O.D. (NEWLYN).

CO-ORDINATES ARE RELATED TO NATIONAL GRID DERIVED VIA GPS - OSGB36 SYSTEM.

PREVIOUS SURVEY INFORMATION TAKEN FROM LSTC SURVEY CONDUCTED OCTOBER 2016.



No 81 Wyton Road public sewer MH6704

- Surface water gravity system
- Surface water rising main
- FW section 106 connections
- Existing SW sewer / drain
- Existing FW sewer / drain
- Existing FW rising main

A. Further detail added 13-5-21  
B. Full redesign, further detail added for submission 12-5-22

ALL ROADS AND DRAINAGE INCLUDING SW PUMP STATION WILL REMAIN PRIVATE

Whilst the road and sewers are to remain private the main sewer runs should be designed and constructed to Sewers for Adoption as well as Yorkshire Water policy / guidance.

A01. These notes are intended to augment drawings and specifications. Where conflict of requirements exists the order of precedence shall be as shown in the specification. Otherwise the strictest provision shall govern.

A02. This drawing to be read in conjunction with all other relevant engineers and architects drawings.

A03. Drawings not to be scaled. All dimensions to be checked on site by the contractor. Any discrepancies to be notified to the Engineer and further instructions obtained before work is commenced.

No part of this drawing may be reproduced, stored in a retrieval system or transmitted in any form or by any means without prior permission in writing from RAB Engineering Ltd.

Manhole construction - refer to CPA technical bulletin Sept 2001 outlining changes to relevant British Product Standards BS5911-200:1994. All precast concrete products are to be kitemarked or they will be rejected as part of an adoptable system.

Manhole covers to have a clear opening of 600 x 600mm and shall be class D400 to BS EN124 with 150mm deep frames in highways. Filled ground must be filled and consolidated under the supervision of YW before any sewer works are carried out.

Plastic channels are not acceptable. All custom built ironwork to be hot dipped galvanised prior to final fitting. Adoptable sewer pipes to be laid in max 3m lengths unless there is a specific operational need to lay longer lengths.

Yorkshire water are not obliged to accept filter drain / land drainage runoff into the public sewer network or adoptable drainage network (directly or indirectly). An alternative method of disposal of land drainage runoff will therefore be required and you will have to liaise with the Local Authority, Land Drainage Section with regard to the disposal of the filter drain/land drainage run-off.

Cover slabs must carry the BSI Kitemark or will be rejected by Yorkshire Water Inspector. Where the clear opening of the Kitemarked product is different to that of the cover and frame, a loading bearing slab should be fitted above the cover slab to bring the size down to 600mm x 600mm for the Yorkshire Water specified cover size.

Sulphate resistant cement (C20-C22) and precast concrete products must be used or a laboratory report provided proving that such precautions are not necessary.

Sewers must have 5 metres clearance from trees and hedges (please also refer to Figure 2.3 on page 33 in 'Sewers for Adoption' 6th Edition for restrictions on tree planting adjacent to sewers).

Sewers to be laid in class S bedding (150mm granular bed and surround. Where depth of cover is less than 1.2m in highways and verges (or less than 900mm in non vehicle access areas) then a concrete slab should be provided above the granular bed and surround.

The chamber size of manholes with more than one connection in them may need to be increased one increment to accommodate the connection and bends.

Yorkshire Water policy is not to accept type C brick manholes and 1050mm diameter manhole rings. Instead it is preferred to use a type B manhole construction with a 1200 or 1500mm cover slab with the opening sited over the channel where the depth of cover to pipe soffit is 1.0-1.5m.

Contractors should be aware of significantly large diameter pipes and manhole chamber rings proposed in this design and precautions should be taken in movement and placing of such items. Also to be considered is the depth of excavation of the drainage works especially the large diameter components up to 8m deep excavations.

All adoptable sewer works and materials to be in accordance with Sewers for Adoption 6th edition. The relevant British / European and Yorkshire Water standards / requirements / addendum & Kitemarked.

The adoptable sewers shall be a min 1.0m and manholes 0.5m from the curb and service margins.

Sewers must have 5m clearance from trees and hedges see SIA6 for restrictions on tree planting / types.

Bedding and backfill material to conform with the Water Industry Specification 4-08-02 (table A2).

Where a B125 cover and frame has been approved this MUST NOT be coated in plastic and must have lifting eyes suitably sized to accommodate standard lifting keys, screw down covers not acceptable.

There should be enough clearance to accommodate the bedding for both pipes approx 300mm. If the crossover is near the rocker then clearance may be increased.

EXISTING FOUL DRAINAGE  
Site investigation has proven the connection from 5701 to 5702. Inspection of the pump station shows 5702 being the 'wet well' or storage connecting to a metal box from which it is pumped to manhole 5601.

There is only one connection into the metal box and only two incoming pipes into 5702 as shown. This raises the question where does the pipe from manhole 5703 connect to the foul sewer and also where does the trade effluent pipe connect.

Further investigation will CCTV 5701-5702 to establish any junction connections. CCTV 5703-5701/5702 to locate route and any buried manholes.

Trial hole investigation to be carried out to confirm location and invert of existing rising main. This should be done at every pipe point and intermediate locations.

Extreme care to be taken carrying out this work, information shown on this drawing is for guidance only.

EXISTING SURFACE WATER DRAINAGE  
Site investigation has proven the manhole 6704 (sewer records) located in 81 Wyton Road connects to a manhole in the front garden of No 4 Abbey Lane.

Examination of this manhole reveals a D300 Pipe assumed running south to north. This is assumed to be a culvert. Extensive investigation has proven unsuccessful in proving its outfall due to pipe damage and route intrusion. It seems the IDB have little power in forcing the riparian owner to rectify the pipe line.

PROPOSED SURFACE WATER DRAINAGE  
Soakaway testing has failed on this site therefore a positive outfall is required.

AS discussed above the existing D300mm culvert is inoperable therefore further investigation has shown an existing D300mm surface water sewer in Staithes Road to which we intend to connect the site.

The majority of the site will connect with a Polycrate storage system designed to give access for CCTV and cleaning. flow from this will be restricted by a 75mm flow control in S9. The remainder of the site will connect to S9-S10, S10 being a pre-packaged pump station

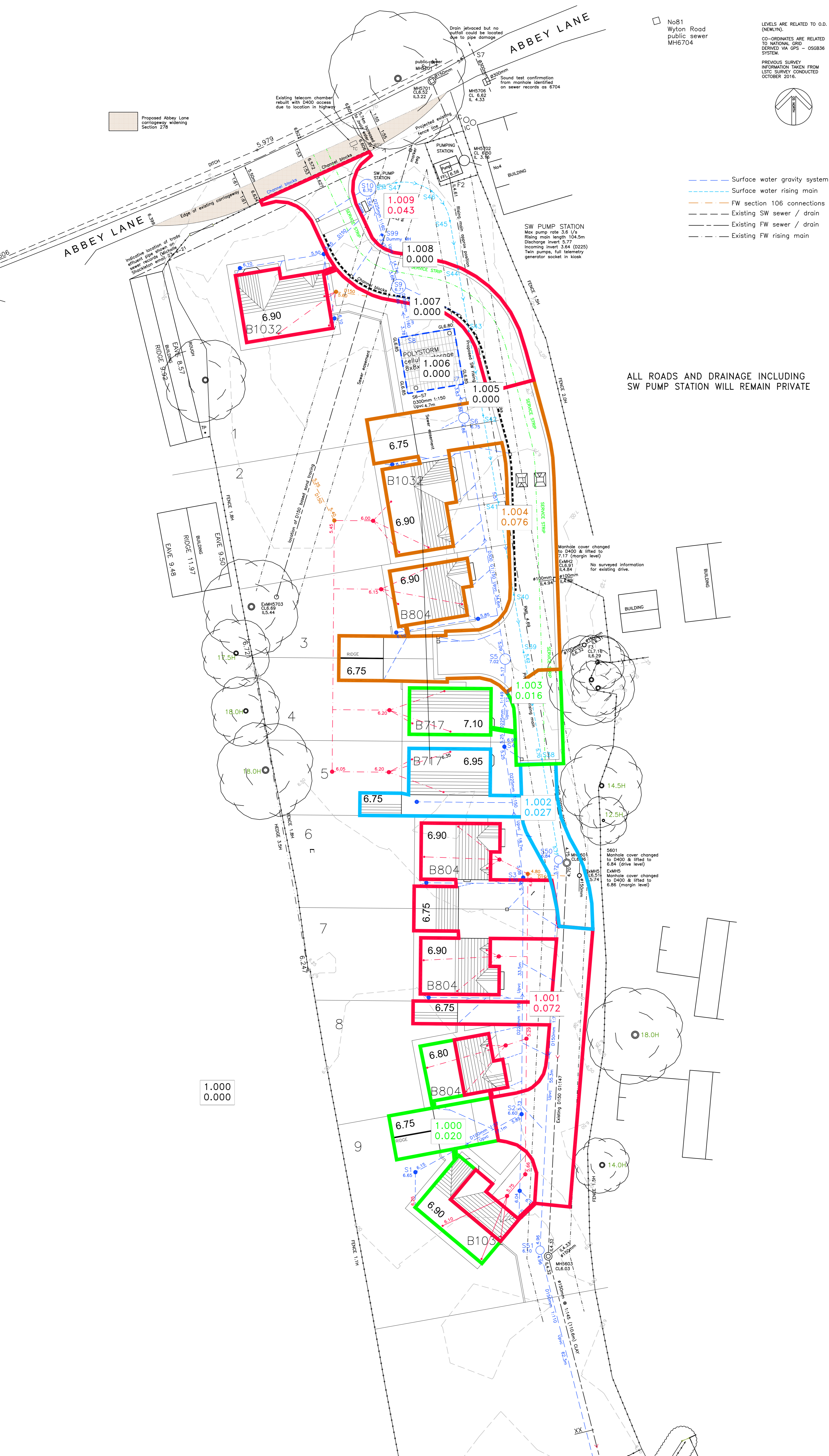
The prepackaged pump station will be fitted with twin pumps, telemetry and emergency generator socket.

The pump will discharge to S50 at 3.6 l/sec from where it will connect to a D150mm gravity drain discharging to the Staithes Road sewer

In addition there will be a high level D150mm overflow from the pump station to S6. The outlet into S6 will be fitted with a double hung flap valve to prevent back flow from the culvert and into the pump station.

Floor levels are preliminary and subject to Part M and drainage check. May be subject to planning condition

ACO channel or similar



1.000  
0.000

SCALE 1:250 (A1)



## Technical Specification

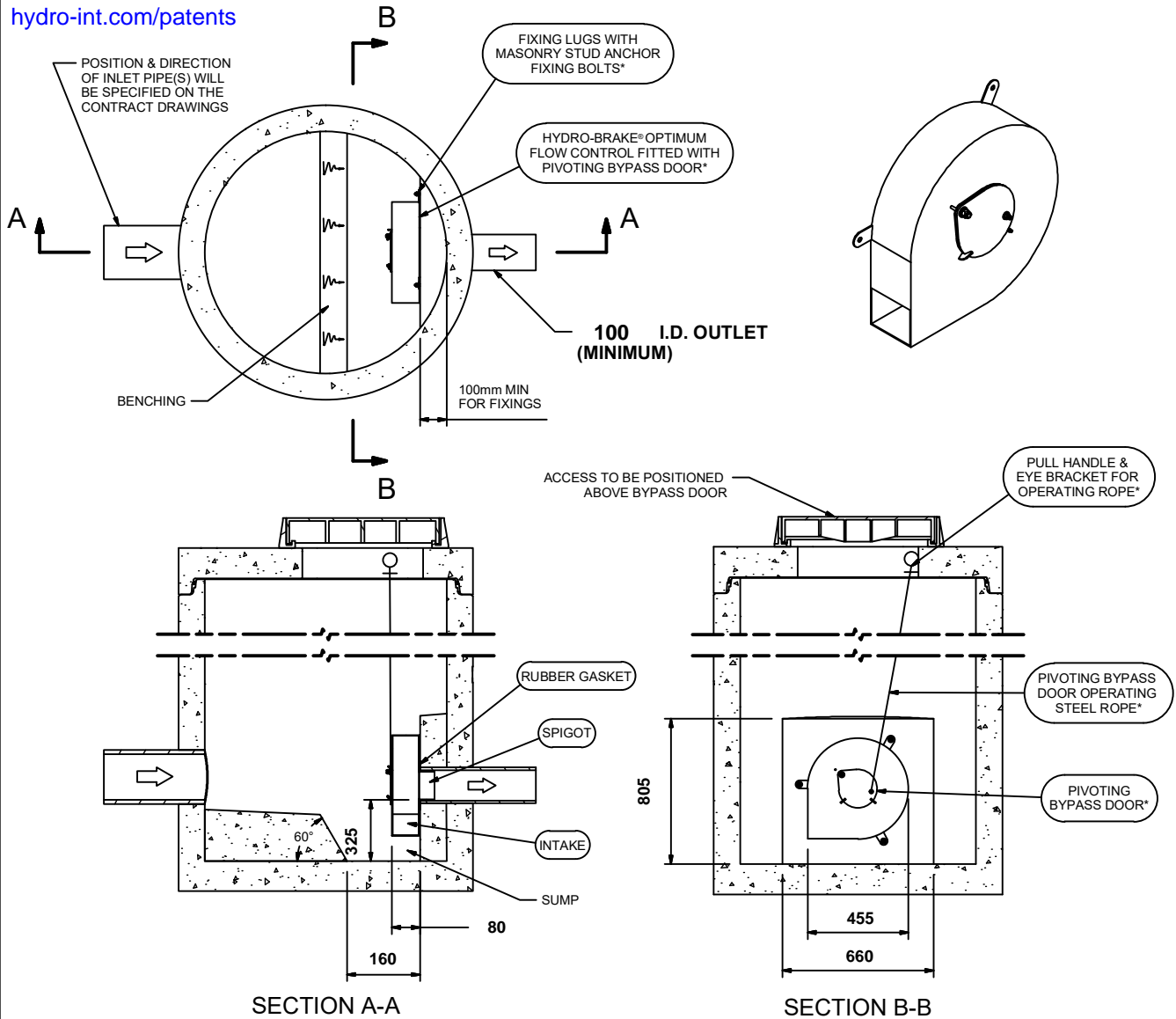
Control Point	Head (m)	Flow (l/s)
Primary Design	2.000	3.400
Flush-Flo™	0.330	2.555
Kick-Flo®	0.671	2.060
Mean Flow		2.595

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
- Indicative Weight: 97 kg



[hydro-int.com/patents](http://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-0075-3400-2000-3400 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 5/13/2022 9:44 AM

SITE

DESIGNER richard bland

REF abbey lane hull

SHE-0075-3400-2000-3400

Hydro-Brake® Optimum

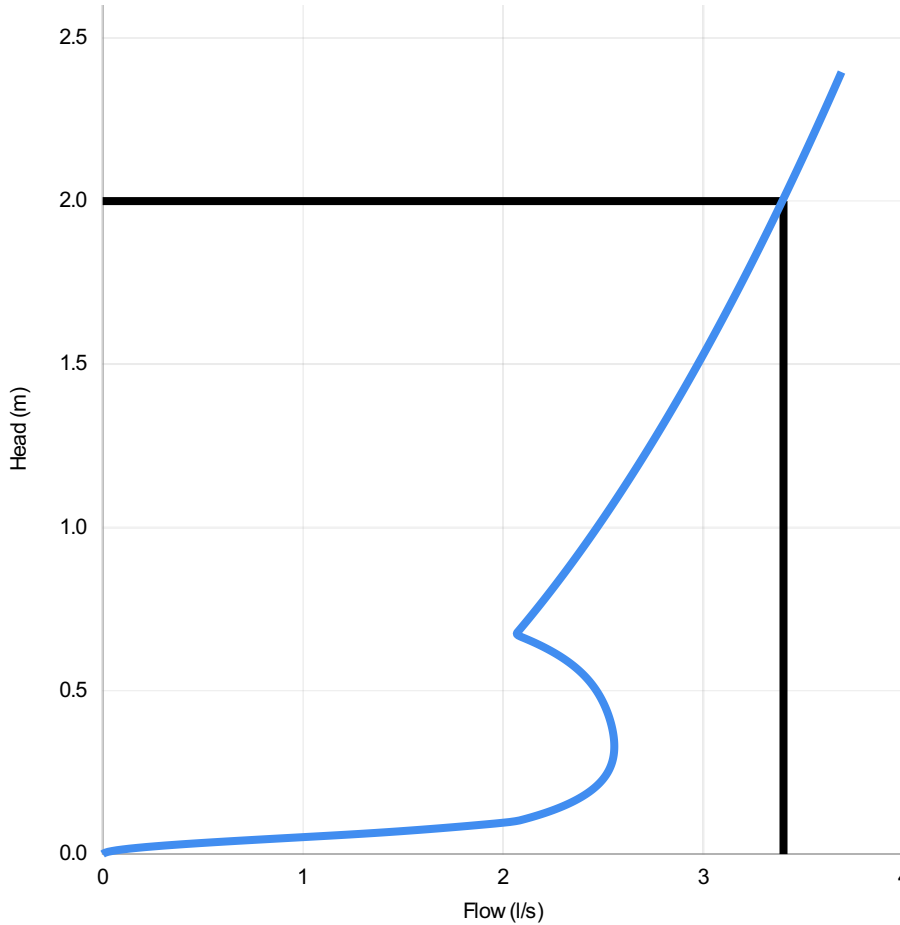
## Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	2.000	3.400
Flush-Flo	0.330	2.555
Kick-Flo®	0.671	2.060
Mean Flow		2.595



PT/329/0412

[hydro-int.com/patents](http://hydro-int.com/patents)



Head (m)	Flow (l/s)
0.000	0.000
0.069	1.461
0.138	2.263
0.207	2.463
0.276	2.541
0.345	2.554
0.414	2.532
0.483	2.484
0.552	2.397
0.621	2.244
0.690	2.085
0.759	2.177
0.828	2.265
0.897	2.349
0.966	2.429
1.034	2.507
1.103	2.582
1.172	2.655
1.241	2.725
1.310	2.793
1.379	2.860
1.448	2.925
1.517	2.988
1.586	3.050
1.655	3.110
1.724	3.169
1.793	3.227
1.862	3.284
1.931	3.339
2.000	3.394

### DESIGN ADVICE

The head/flow characteristics of this SHE-0075-3400-2000-3400 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.**



DATE 13/05/2022 09:44


Site

DESIGNER richard bland

Ref abbey lane hull

SHE-0075-3400-2000-3400

Hydro-Brake Optimum®

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for PRESTON 10-5-22 SW.SWS

Pipe Sizes PRESTON 10-5-22 SW Manhole Sizes PRESTON 10-5-22 SW

FSR Rainfall Model - England and Wales			
Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	18.300	Add Flow / Climate Change (%)	40
Ratio R	0.386	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for PRESTON 10-5-22 SW.SWS





Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.171	4-8	0.083

Total Area Contributing (ha) = 0.254

Total Pipe Volume (m<sup>3</sup>) = 135.557


Network Design Table for PRESTON 10-5-22 SW.SWS

# - Indicates pipe length does not match coordinates  
« - Indicates pipe capacity < flow








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	17.146	0.300	57.2	0.020	5.00	0.0	0.600	o	100	Pipe/Conduit		
1.001	33.477	0.350	95.6	0.072	0.00	0.0	0.600	o	225	Pipe/Conduit		
1.002	18.711	0.125	149.7	0.027	0.00	0.0	0.600	o	225	Pipe/Conduit		
1.003	12.402	0.083	149.4	0.016	0.00	0.0	0.600	o	225	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	5.28	6.150	0.020	0.0	0.0	1.1	1.02	8.0	3.8
1.001	50.00	5.70	5.725	0.092	0.0	0.0	5.0	1.34	53.2	17.4
1.002	50.00	5.99	5.375	0.119	0.0	0.0	6.4	1.07	42.4	22.6
1.003	50.00	6.18	5.250	0.135	0.0	0.0	7.3	1.07	42.4	25.6

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Network Design Table for PRESTON 10-5-22 SW.SWS

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
1.004	34.642	0.231	150.0	0.076	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.005	4.738	0.032	150.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.006	8.000#	0.053	150.9	0.000	0.00	0.0	0.600	[ ]	-1	Pipe/Conduit	
1.007	7.180	0.045	159.6	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.008	7.641	0.048	159.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.009	7.027	0.044	159.7	0.043	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.010	8.678	0.054	160.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table


PN	Rain (mm/hr)	T.C. (mins)	US/IL Σ (m)	I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.004	50.00	6.63	5.092	0.211	0.0	0.0	11.4	1.28	90.6	40.0
1.005	50.00	6.70	4.861	0.211	0.0	0.0	11.4	1.28	90.6	40.0
1.006	50.00	6.72	3.830	0.211	0.0	0.0	11.4	5.53	88431.7	40.0
1.007	50.00	6.79	3.777	0.211	0.0	0.0	11.4	1.61	255.6	40.0
1.008	50.00	6.92	3.657	0.211	0.0	0.0	11.4	1.03	41.1	40.0
1.009	50.00	7.03	3.609	0.254	0.0	0.0	13.8	1.03	41.0«	48.2
1.010	50.00	7.17	3.565	0.254	0.0	0.0	13.8	1.03	40.9«	48.2

Simulation Criteria for PRESTON 10-5-22 SW.SWS

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m <sup>3</sup> /ha Storage	1.000
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	2	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)	18.300	Storm Duration (mins)	15
Ratio R	0.386		

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Online Controls for PRESTON 10-5-22 SW.SWS

Hydro-Brake® Optimum Manhole: 9, DS/PN: 1.008, Volume (m³): 4.4

Unit Reference	MD-SHE-0075-3400-2000-3400
Design Head (m)	2.000
Design Flow (l/s)	3.4
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	75
Invert Level (m)	3.657
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	3.4
Flush-Flo™	0.330	2.6
Kick-Flo®	0.671	2.1
Mean Flow over Head Range	-	2.6


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	2.7	3.000	4.1	7.000	6.1
0.200	2.4	1.400	2.9	3.500	4.4	7.500	6.3
0.300	2.6	1.600	3.1	4.000	4.7	8.000	6.5
0.400	2.5	1.800	3.2	4.500	5.0	8.500	6.7
0.500	2.5	2.000	3.4	5.000	5.2	9.000	6.9
0.600	2.3	2.200	3.5	5.500	5.4	9.500	7.0
0.800	2.2	2.400	3.7	6.000	5.7		
1.000	2.5	2.600	3.8	6.500	5.9		

Depth/Flow Relationship Manhole: 10, DS/PN: 1.010, Volume (m³): 11.1

Invert Level (m) 3.565

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.200	3.6000	1.800	3.6000	3.400	3.6000	5.000	3.6000
0.400	3.6000	2.000	3.6000	3.600	3.6000	5.200	3.6000
0.600	3.6000	2.200	3.6000	3.800	3.6000	5.400	3.6000
0.800	3.6000	2.400	3.6000	4.000	3.6000	5.600	3.6000
1.000	3.6000	2.600	3.6000	4.200	3.6000	5.800	3.6000
1.200	3.6000	2.800	3.6000	4.400	3.6000	6.000	3.6000
1.400	3.6000	3.000	3.6000	4.600	3.6000		
1.600	3.6000	3.200	3.6000	4.800	3.6000		


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Summary of Results for 15 minute 1 year Winter (PRESTON 10-5-22 SW.SWS)

Margin for Flood Risk Warning (mm) 200.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water		Surcharged		Flooded		Pipe Flow (1/s)	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (1/s)			
1.000	1	6.198	-0.052	0.000	0.45		3.5	OK	
1.001	2	5.807	-0.143	0.000	0.28		14.1	OK	
1.002	3	5.484	-0.116	0.000	0.47		18.1	OK	
1.003	4	5.371	-0.104	0.000	0.56		20.3	OK	
1.004	5	5.220	-0.172	0.000	0.37		30.9	OK	
1.005	6	5.016	-0.145	0.000	0.53		31.1	OK	
1.006	7	4.202	-1.628	0.000	0.00		30.9	OK	
1.007	8	4.202	-0.025	0.000	0.03		5.5	OK	
1.008	9	4.215	0.333	0.000	0.08		2.5	SURCHARGED	
1.009	99	4.009	0.175	0.000	0.22		6.5	SURCHARGED	
1.010	10	4.005	0.215	0.000	0.11		3.6	SURCHARGED	




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Summary of Results for 30 minute 1 year Winter (PRESTON 10-5-22 SW.SWS)

Margin for Flood Risk Warning (mm) 200.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF


PN	US/MH Name	Water		Surcharged		Flooded		Pipe Flow (l/s)	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)			
1.000	1	6.191	-0.059	0.000	0.36		2.7	OK	
1.001	2	5.799	-0.151	0.000	0.24		11.8	OK	
1.002	3	5.474	-0.126	0.000	0.40		15.2	OK	
1.003	4	5.359	-0.116	0.000	0.47		17.2	OK	
1.004	5	5.208	-0.184	0.000	0.32		26.6	OK	
1.005	6	5.002	-0.159	0.000	0.45		26.6	OK	
1.006	7	4.268	-1.562	0.000	0.00		26.5	OK	
1.007	8	4.269	0.042	0.000	0.05		7.3	SURCHARGED	
1.008	9	4.392	0.510	0.000	0.08		2.5	SURCHARGED	
1.009	99	4.091	0.257	0.000	0.20		6.1	SURCHARGED	
1.010	10	4.088	0.298	0.000	0.11		3.6	SURCHARGED	

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Summary of Results for 60 minute 1 year Winter (PRESTON 10-5-22 SW.SWS)

Margin for Flood Risk Warning (mm) 200.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF


PN	US/MH Name	Water		Surcharged		Flooded		Pipe Flow (1/s)	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (1/s)			
1.000	1	6.183	-0.067	0.000	0.24		1.8	OK	
1.001	2	5.786	-0.164	0.000	0.17		8.3	OK	
1.002	3	5.456	-0.144	0.000	0.28		10.7	OK	
1.003	4	5.339	-0.136	0.000	0.33		12.2	OK	
1.004	5	5.189	-0.203	0.000	0.23		18.9	OK	
1.005	6	4.978	-0.184	0.000	0.32		18.8	OK	
1.006	7	4.310	-1.520	0.000	0.00		18.7	OK	
1.007	8	4.310	0.083	0.000	0.04		6.1	SURCHARGED	
1.008	9	4.463	0.581	0.000	0.08		2.5	SURCHARGED	
1.009	99	4.111	0.277	0.000	0.17		5.2	SURCHARGED	
1.010	10	4.108	0.318	0.000	0.11		3.6	SURCHARGED	

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Summary of Results for 120 minute 1 year Winter (PRESTON 10-5-22 SW.SWS)

Margin for Flood Risk Warning (mm) 200.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water		Surcharged		Flooded		Pipe Flow (l/s)	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap. (l/s)	Overflow (l/s)			
1.000	1	6.176	-0.074	0.000	0.15		1.2	OK	
1.001	2	5.774	-0.176	0.000	0.11		5.4	OK	
1.002	3	5.440	-0.160	0.000	0.18		6.9	OK	
1.003	4	5.321	-0.154	0.000	0.22		7.9	OK	
1.004	5	5.169	-0.223	0.000	0.15		12.3	OK	
1.005	6	4.954	-0.207	0.000	0.21		12.2	OK	
1.006	7	4.306	-1.524	0.000	0.00		12.2	OK	
1.007	8	4.306	0.079	0.000	0.03		4.3	SURCHARGED	
1.008	9	4.471	0.589	0.000	0.08		2.6	SURCHARGED	
1.009	99	4.062	0.228	0.000	0.15		4.4	SURCHARGED	
1.010	10	4.058	0.268	0.000	0.11		3.6	SURCHARGED	


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Summary of Results for 15 minute 30 year Winter (PRESTON 10-5-22 SW.SWS)

Margin for Flood Risk Warning (mm) 200.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water	Surcharged	Flooded	Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Flow (l/s)	
1.000	1	6.325	0.075	0.000	1.05	8.1	SURCHARGED
1.001	2	6.001	0.051	0.000	0.77	38.5	SURCHARGED
1.002	3	5.817	0.217	0.000	1.24	47.2	SURCHARGED
1.003	4	5.629	0.154	0.000	1.45	52.8	SURCHARGED
1.004	5	5.454	0.062	0.000	0.98	81.9	SURCHARGED
1.005	6	5.222	0.061	0.000	1.38	81.5	SURCHARGED
1.006	7	4.655	-1.175	0.000	0.00	81.3	OK
1.007	8	4.655	0.428	0.000	0.06	9.6	SURCHARGED
1.008	9	4.917	1.035	0.000	0.08	2.5	SURCHARGED
1.009	99	4.596	0.762	0.000	0.47	13.9	SURCHARGED
1.010	10	4.592	0.802	0.000	0.11	3.6	SURCHARGED




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Summary of Results for 30 minute 30 year Winter (PRESTON 10-5-22 SW.SWS)

Margin for Flood Risk Warning (mm) 200.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF


PN	US/MH Name	Water	Surcharged	Flooded	Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (1/s)	
1.000	1	6.223	-0.027	0.000	0.88	6.7	OK
1.001	2	5.856	-0.094	0.000	0.63	31.3	OK
1.002	3	5.644	0.044	0.000	1.04	39.5	SURCHARGED
1.003	4	5.508	0.033	0.000	1.23	44.8	SURCHARGED
1.004	5	5.342	-0.050	0.000	0.81	67.6	OK
1.005	6	5.188	0.027	0.000	1.14	67.5	SURCHARGED
1.006	7	4.859	-0.971	0.000	0.00	67.3	OK
1.007	8	4.859	0.632	0.000	0.06	9.6	SURCHARGED
1.008	9	5.035	1.153	0.000	0.08	2.5	SURCHARGED
1.009	99	4.779	0.945	0.000	0.34	10.2	SURCHARGED
1.010	10	4.776	0.986	0.000	0.11	3.6	SURCHARGED

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Summary of Results for 60 minute 30 year Winter (PRESTON 10-5-22 SW.SWS)

Margin for Flood Risk Warning (mm) 200.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF


PN	US/MH Name	Water			Surcharged		Flooded		Pipe Flow (1/s)	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (1/s)				
1.000	1	6.205	-0.045	0.000	0.58			4.4	OK	
1.001	2	5.826	-0.124	0.000	0.41			20.6	OK	
1.002	3	5.515	-0.085	0.000	0.69			26.5	OK	
1.003	4	5.408	-0.067	0.000	0.83			30.2	OK	
1.004	5	5.255	-0.137	0.000	0.57			47.1	OK	
1.005	6	5.065	-0.097	0.000	0.80			47.2	OK	
1.006	7	5.021	-0.809	0.000	0.00			47.0	OK	
1.007	8	5.021	0.794	0.000	0.03			5.1	SURCHARGED	
1.008	9	5.203	1.321	0.000	0.08			2.5	SURCHARGED	
1.009	99	4.828	0.994	0.000	0.24			7.2	SURCHARGED	
1.010	10	4.825	1.035	0.000	0.11			3.6	SURCHARGED	

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Summary of Results for 120 minute 30 year Winter (PRESTON 10-5-22 SW.SWS)

Margin for Flood Risk Warning (mm) 200.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water		Surcharged		Flooded		Pipe Flow (1/s)	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (1/s)			
1.000	1	6.191	-0.059	0.000	0.36		2.8	OK	
1.001	2	5.802	-0.148	0.000	0.26		12.8	OK	
1.002	3	5.478	-0.122	0.000	0.43		16.5	OK	
1.003	4	5.364	-0.111	0.000	0.51		18.8	OK	
1.004	5	5.215	-0.177	0.000	0.35		29.3	OK	
1.005	6	5.123	-0.038	0.000	0.50		29.3	OK	
1.006	7	5.125	-0.705	0.000	0.00		29.2	OK	
1.007	8	5.125	0.898	0.000	0.03		4.6	SURCHARGED	
1.008	9	5.307	1.425	0.000	0.09		2.7	SURCHARGED	
1.009	99	4.800	0.966	0.000	0.19		5.6	SURCHARGED	
1.010	10	4.796	1.006	0.000	0.11		3.6	SURCHARGED	


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Summary of Results for 180 minute 30 year Winter (PRESTON 10-5-22 SW.SWS)

Margin for Flood Risk Warning (mm) 200.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Pipe	Status
						Flow (l/s)	
1.000	1	6.185	-0.065	0.000	0.27	2.1	OK
1.001	2	5.792	-0.158	0.000	0.19	9.6	OK
1.002	3	5.463	-0.137	0.000	0.33	12.4	OK
1.003	4	5.347	-0.128	0.000	0.39	14.1	OK
1.004	5	5.196	-0.196	0.000	0.26	22.0	OK
1.005	6	5.135	-0.027	0.000	0.37	22.0	OK
1.006	7	5.143	-0.687	0.000	0.00	21.9	OK
1.007	8	5.143	0.916	0.000	0.02	4.0	SURCHARGED
1.008	9	5.302	1.420	0.000	0.09	2.7	SURCHARGED
1.009	99	4.774	0.940	0.000	0.17	5.0	SURCHARGED
1.010	10	4.770	0.980	0.000	0.11	3.6	SURCHARGED




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Summary of Results for 240 minute 30 year Winter (PRESTON 10-5-22 SW.SWS)

Margin for Flood Risk Warning (mm) 200.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF


PN	US/MH Name	Water		Surcharged		Flooded		Pipe Flow (1/s)	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (1/s)			
1.000	1	6.182	-0.068	0.000	0.22		1.7	OK	
1.001	2	5.784	-0.166	0.000	0.16		7.7	OK	
1.002	3	5.453	-0.147	0.000	0.26		10.0	OK	
1.003	4	5.336	-0.139	0.000	0.31		11.4	OK	
1.004	5	5.186	-0.206	0.000	0.21		17.8	OK	
1.005	6	5.115	-0.047	0.000	0.30		17.8	OK	
1.006	7	5.120	-0.710	0.000	0.00		17.7	OK	
1.007	8	5.120	0.893	0.000	0.03		4.6	SURCHARGED	
1.008	9	5.300	1.418	0.000	0.09		2.7	SURCHARGED	
1.009	99	4.731	0.897	0.000	0.16		4.7	SURCHARGED	
1.010	10	4.727	0.937	0.000	0.11		3.6	SURCHARGED	

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Summary of Results for 15 minute 100 year Winter (PRESTON 10-5-22 SW.SWS)

Margin for Flood Risk Warning (mm) 200.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF


PN	US/MH Name	Water	Surcharged	Flooded	Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (1/s)	
1.000	1	6.601	0.351	0.575	1.46	11.2	FLOOD
1.001	2	6.490	0.540	0.000	0.87	43.4	FLOOD RISK
1.002	3	6.215	0.615	0.000	1.50	57.3	SURCHARGED
1.003	4	5.928	0.453	0.000	1.79	65.4	SURCHARGED
1.004	5	5.659	0.267	0.000	1.25	103.9	SURCHARGED
1.005	6	5.288	0.126	0.000	1.73	102.4	SURCHARGED
1.006	7	4.872	-0.958	0.000	0.00	102.5	OK
1.007	8	4.872	0.645	0.000	0.06	9.6	SURCHARGED
1.008	9	5.095	1.213	0.000	0.08	2.5	SURCHARGED
1.009	99	4.965	1.131	0.000	0.55	16.4	SURCHARGED
1.010	10	4.962	1.172	0.000	0.11	3.6	SURCHARGED

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Summary of Results for 30 minute 100 year Winter (PRESTON 10-5-22 SW.SWS)

Margin for Flood Risk Warning (mm) 200.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water	Surcharged	Flooded	Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (1/s)	
1.000	1	6.400	0.150	0.000	1.08	8.3	FLOOD RISK
1.001	2	6.070	0.120	0.000	0.75	37.7	SURCHARGED
1.002	3	5.867	0.267	0.000	1.27	48.5	SURCHARGED
1.003	4	5.669	0.194	0.000	1.50	54.8	SURCHARGED
1.004	5	5.482	0.090	0.000	1.03	85.8	SURCHARGED
1.005	6	5.231	0.070	0.000	1.45	85.4	SURCHARGED
1.006	7	5.135	-0.695	0.000	0.00	85.0	OK
1.007	8	5.135	0.908	0.000	0.06	10.2	SURCHARGED
1.008	9	5.299	1.417	0.000	0.08	2.5	SURCHARGED
1.009	99	5.198	1.364	0.000	0.41	12.2	SURCHARGED
1.010	10	5.193	1.403	0.000	0.11	3.6	SURCHARGED


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Summary of Results for 60 minute 100 year Winter (PRESTON 10-5-22 SW.SWS)

Margin for Flood Risk Warning (mm) 200.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water		Surcharged		Flooded		Pipe Flow (1/s)	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (1/s)			
1.000	1	6.216	-0.034	0.000	0.76	5.8	OK		
1.001	2	5.844	-0.106	0.000	0.54	27.0	OK		
1.002	3	5.585	-0.015	0.000	0.91	34.8	OK		
1.003	4	5.479	0.004	0.000	1.08	39.5	SURCHARGED		
1.004	5	5.366	-0.026	0.000	0.74	61.4	OK		
1.005	6	5.365	0.204	0.000	1.00	59.1	SURCHARGED		
1.006	7	5.365	-0.465	0.000	0.00	58.9	OK		
1.007	8	5.365	1.138	0.000	0.04	6.0	SURCHARGED		
1.008	9	5.523	1.641	0.000	0.08	2.5	SURCHARGED		
1.009	99	5.296	1.462	0.000	0.30	8.8	SURCHARGED		
1.010	10	5.291	1.501	0.000	0.11	3.6	SURCHARGED		




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Summary of Results for 120 minute 100 year Winter (PRESTON 10-5-22 SW.SWS)

Margin for Flood Risk Warning (mm) 200.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF


PN	US/MH Name	Water			Surcharged		Flooded		Pipe Flow (1/s)	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (1/s)				
1.000	1	6.199	-0.051	0.000	0.48			3.7	OK	
1.001	2	5.815	-0.135	0.000	0.34			16.8	OK	
1.002	3	5.552	-0.048	0.000	0.57			21.7	OK	
1.003	4	5.549	0.074	0.000	0.68			24.7	SURCHARGED	
1.004	5	5.548	0.156	0.000	0.46			38.6	SURCHARGED	
1.005	6	5.541	0.380	0.000	0.65			38.5	SURCHARGED	
1.006	7	5.539	-0.291	0.000	0.00			38.3	OK	
1.007	8	5.539	1.312	0.000	0.03			4.8	SURCHARGED	
1.008	9	5.706	1.824	0.000	0.09			2.9	SURCHARGED	
1.009	99	5.232	1.398	0.000	0.21			6.2	SURCHARGED	
1.010	10	5.227	1.437	0.000	0.11			3.6	SURCHARGED	

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Summary of Results for 180 minute 100 year Winter (PRESTON 10-5-22 SW.SWS)

Margin for Flood Risk Warning (mm) 200.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF


PN	US/MH Name	Water		Surcharged		Flooded		Pipe Flow (1/s)	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (1/s)			
1.000	1	6.191	-0.059	0.000	0.36			2.7	OK
1.001	2	5.801	-0.149	0.000	0.25			12.6	OK
1.002	3	5.601	0.001	0.000	0.43			16.3	SURCHARGED
1.003	4	5.595	0.120	0.000	0.51			18.5	SURCHARGED
1.004	5	5.592	0.200	0.000	0.35			28.9	SURCHARGED
1.005	6	5.595	0.434	0.000	0.49			28.8	SURCHARGED
1.006	7	5.595	-0.235	0.000	0.00			28.7	OK
1.007	8	5.595	1.368	0.000	0.03			4.6	SURCHARGED
1.008	9	5.774	1.892	0.000	0.10			3.0	SURCHARGED
1.009	99	5.216	1.382	0.000	0.18			5.3	SURCHARGED
1.010	10	5.212	1.422	0.000	0.11			3.6	SURCHARGED

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Summary of Results for 240 minute 100 year Winter (PRESTON 10-5-22 SW.SWS)

Margin for Flood Risk Warning (mm) 200.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water		Surcharged		Flooded		Pipe Flow (1/s)	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (1/s)			
1.000	1	6.186	-0.064	0.000	0.29		2.2	OK	
1.001	2	5.793	-0.157	0.000	0.20		10.2	OK	
1.002	3	5.599	-0.001	0.000	0.34		13.1	OK	
1.003	4	5.599	0.124	0.000	0.41		14.9	SURCHARGED	
1.004	5	5.597	0.205	0.000	0.28		23.3	SURCHARGED	
1.005	6	5.595	0.434	0.000	0.39		23.3	SURCHARGED	
1.006	7	5.594	-0.236	0.000	0.00		23.1	OK	
1.007	8	5.594	1.367	0.000	0.03		4.9	SURCHARGED	
1.008	9	5.770	1.888	0.000	0.10		3.0	SURCHARGED	
1.009	99	5.191	1.357	0.000	0.17		4.9	SURCHARGED	
1.010	10	5.187	1.397	0.000	0.11		3.6	SURCHARGED	

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Summary of Results for 360 minute 100 year Winter (PRESTON 10-5-22 SW.SWS)

Margin for Flood Risk Warning (mm) 200.0  
 Analysis Timestep 2.5 Second Increment (Extended)  
 DTS Status ON  
 DVD Status OFF  
 Inertia Status OFF

PN	US/MH Name	Water		Surcharged		Flooded		Pipe Flow (1/s)	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (1/s)			
1.000	1	6.181	-0.069	0.000	0.21			1.6	OK
1.001	2	5.782	-0.168	0.000	0.15			7.4	OK
1.002	3	5.530	-0.070	0.000	0.25			9.6	OK
1.003	4	5.530	0.055	0.000	0.30			10.9	SURCHARGED
1.004	5	5.527	0.135	0.000	0.20			17.0	SURCHARGED
1.005	6	5.527	0.366	0.000	0.29			17.0	SURCHARGED
1.006	7	5.528	-0.302	0.000	0.00			16.9	OK
1.007	8	5.528	1.301	0.000	0.03			4.2	SURCHARGED
1.008	9	5.689	1.807	0.000	0.10			3.0	SURCHARGED
1.009	99	5.100	1.266	0.000	0.15			4.5	SURCHARGED
1.010	10	5.097	1.307	0.000	0.11			3.6	SURCHARGED