

PROPOSED COMMERCIAL DEVELOPMENT

PHOENIX LANE / BARROWFIELD ROAD

THURNSCOE

SOUTH YORKSHIRE

DRAINAGE REPORT



10 The Green York YO26 5LR 07919 031289

1. INTRODUCTION

This report provides the background details and hydraulic calculations for the drainage design for this development site.

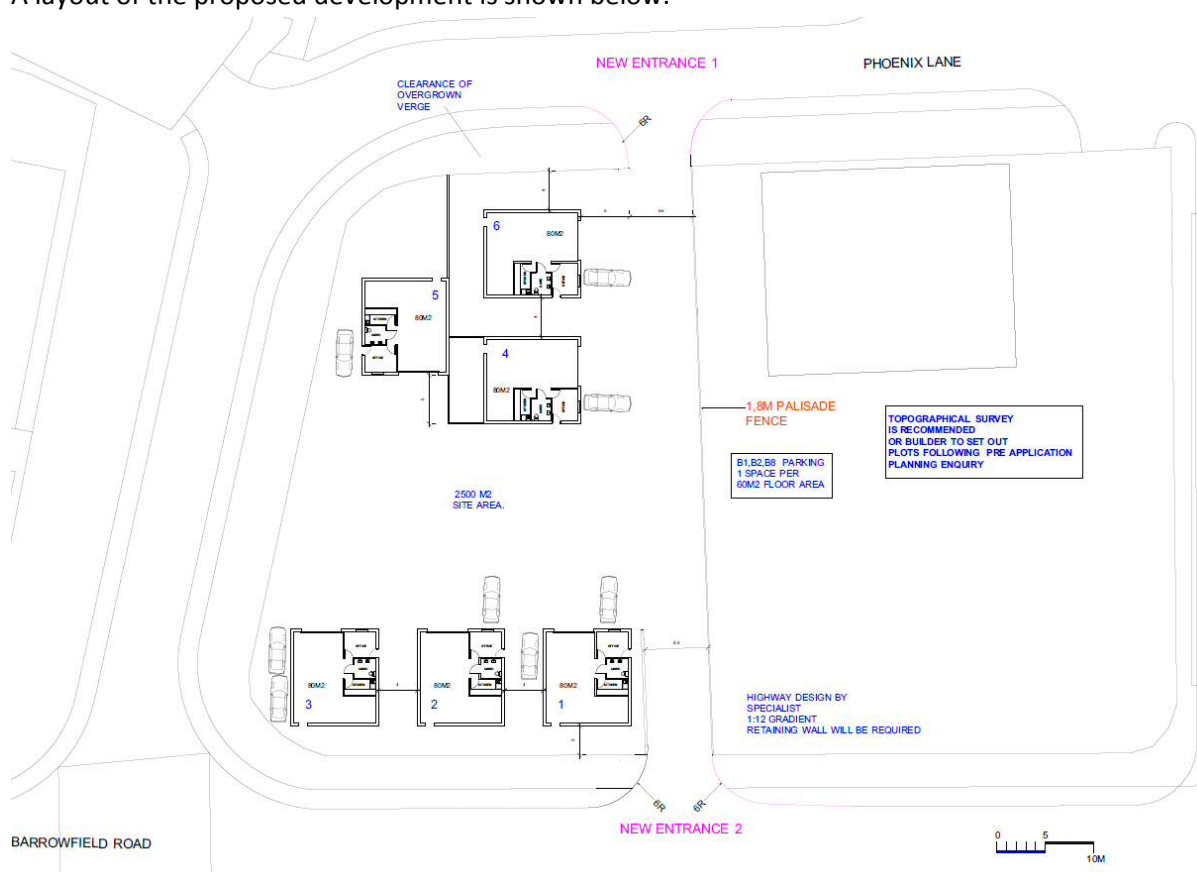
It follows the principles of design as stated within Drainage Strategy Report, provided at planning stage.

The report should be read with HM Design drawing YH501/DD/1 Drainage Design Drawing.

2. OST-DEVELOPMENT SITE

The post -development site will consist of 6 new commercial units

A layout of the proposed development is shown below.



PROPOSED POST DEVELOPMENT PLAN

The areas of the post-development site are 2480 sq m, all of which will be impermeable surfaces



3. FOUL SEWERAGE

The development is drained by a separate system of foul drainage. The outfall for the foul system is the existing 225mm foul sewer in Barrowfield Road.

4. SURFACE WATER

Discussions with Barnsley MBC as Lead Local Flood Authority has concluded that the site will not be able to use infiltration due to the unsuitable soil conditions within this area.

Therefore, a connection to Thurnscoe Dike, via the surface water sewer within Phoenix Lane should be used to dispose of the surface water from site.

The adjacent development drains through this proposed site and so the existing outfall drain can be used for this development.

It was also agreed that 3l/s would be the lowest practical value for the surface water discharge and acceptable for this development.

5. SURFACE WATER DRAINAGE DESIGN

The system being designed to not flood on site within the 1 in 30 year storm event and no flooding of any building or any water going off-site in the 1 in 100 year storm event plus an allowance of +30% for climate change.

The discharge from site is attenuated by a flow control device (Hydrobrake).

The attenuated flow will require some surface water storage on site. The volume of this storage has been calculated using the Microdrainage program and the following parameters.

Impermeable Area = 2480 sq m (ie the whole site area).

Discharge rate 3l/s

Design standard 1 in 100 year storm + 30% climate change.

The Microdrainage calculations are appended to the rear of this report. The calculations show that 115 cu m of storage will be required.

The storage is to be cellular storage under the car parking areas.



6. CONCLUSIONS

- This development site can be drained successfully.
- Foul water and surface water have separate systems on site.
- Foul water flows connect to the foul public sewer in Barrowfield Road.
- Surface water from the development is disposed of by connection to the surface water sewer in Phoenix Lane/Barrowfield Road via an indirect connection already available, draining the adjacent site.
- Surface water flows are limited to 3l/s off site and surface water storage provided on site.
- A petrol interceptor is included within the surface water scheme for the car parking areas.

Report by



Hugh Morris BSc CEng MICE

09/10/2017

APPENDIX

- Microdrainage storage calculations.



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BARROWFIELD ROAD

THURNSCOE

BARNSELEY

Date 09/10/2017 15:00

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Micro Drainage

Source Control 2017.1

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Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 337 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	46.649	0.349	0.0	3.0	3.0	50.7	O K
30 min Summer	46.760	0.460	0.0	3.0	3.0	66.9	O K
60 min Summer	46.868	0.568	0.0	3.0	3.0	82.5	O K
120 min Summer	46.952	0.652	0.0	3.0	3.0	94.8	O K
180 min Summer	46.976	0.676	0.0	3.0	3.0	98.3	O K
240 min Summer	46.974	0.674	0.0	3.0	3.0	98.0	O K
360 min Summer	46.947	0.647	0.0	3.0	3.0	94.0	O K
480 min Summer	46.926	0.626	0.0	3.0	3.0	91.0	O K
600 min Summer	46.906	0.606	0.0	3.0	3.0	88.1	O K
720 min Summer	46.887	0.587	0.0	3.0	3.0	85.4	O K
960 min Summer	46.849	0.549	0.0	3.0	3.0	79.8	O K
1440 min Summer	46.763	0.463	0.0	3.0	3.0	67.3	O K
2160 min Summer	46.631	0.331	0.0	3.0	3.0	48.2	O K
2880 min Summer	46.527	0.227	0.0	3.0	3.0	33.0	O K
4320 min Summer	46.390	0.090	0.0	3.0	3.0	13.1	O K
5760 min Summer	46.322	0.022	0.0	2.8	2.8	3.2	O K
7200 min Summer	46.300	0.000	0.0	2.7	2.7	0.0	O K
8640 min Summer	46.300	0.000	0.0	2.3	2.3	0.0	O K
10080 min Summer	46.300	0.000	0.0	2.0	2.0	0.0	O K
15 min Winter	46.694	0.394	0.0	3.0	3.0	57.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	115.962	0.0	53.8	18
30 min Summer	77.884	0.0	72.3	33
60 min Summer	49.937	0.0	92.8	62
120 min Summer	30.926	0.0	115.0	122
180 min Summer	23.026	0.0	128.6	182
240 min Summer	18.546	0.0	137.8	240
360 min Summer	13.625	0.0	151.9	316
480 min Summer	10.946	0.0	162.8	380
600 min Summer	9.228	0.0	171.5	446
720 min Summer	8.022	0.0	179.0	512
960 min Summer	6.426	0.0	191.1	654
1440 min Summer	4.691	0.0	209.3	924
2160 min Summer	3.418	0.0	228.8	1296
2880 min Summer	2.727	0.0	243.4	1648
4320 min Summer	1.979	0.0	265.0	2332
5760 min Summer	1.575	0.0	281.3	2992
7200 min Summer	1.318	0.0	294.2	0
8640 min Summer	1.140	0.0	305.5	0
10080 min Summer	1.009	0.0	315.4	0
15 min Winter	115.962	0.0	60.3	18

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Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	46.822	0.522	0.0	3.0	3.0	75.8	O K
60 min Winter	46.946	0.646	0.0	3.0	3.0	93.9	O K
120 min Winter	47.049	0.749	0.0	3.0	3.0	108.8	O K
180 min Winter	47.085	0.785	0.0	3.0	3.0	114.0	O K
240 min Winter	47.091	0.791	0.0	3.0	3.0	118.0	O K
360 min Winter	47.071	0.771	0.0	3.0	3.0	112.1	O K
480 min Winter	47.036	0.736	0.0	3.0	3.0	106.9	O K
600 min Winter	47.011	0.711	0.0	3.0	3.0	103.3	O K
720 min Winter	46.985	0.685	0.0	3.0	3.0	99.5	O K
960 min Winter	46.929	0.629	0.0	3.0	3.0	91.4	O K
1440 min Winter	46.804	0.504	0.0	3.0	3.0	73.3	O K
2160 min Winter	46.595	0.295	0.0	3.0	3.0	42.8	O K
2880 min Winter	46.449	0.149	0.0	3.0	3.0	21.7	O K
4320 min Winter	46.307	0.007	0.0	2.8	2.8	1.0	O K
5760 min Winter	46.300	0.000	0.0	2.3	2.3	0.0	O K
7200 min Winter	46.300	0.000	0.0	1.9	1.9	0.0	O K
8640 min Winter	46.300	0.000	0.0	1.7	1.7	0.0	O K
10080 min Winter	46.300	0.000	0.0	1.5	1.5	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	77.864	0.0	81.0	33
60 min Winter	49.937	0.0	104.0	62
120 min Winter	30.926	0.0	128.7	120
180 min Winter	23.026	0.0	143.7	178
240 min Winter	18.546	0.0	154.4	234
360 min Winter	13.625	0.0	170.3	342
480 min Winter	10.946	0.0	182.4	402
600 min Winter	9.228	0.0	192.2	470
720 min Winter	8.022	0.0	200.4	548
960 min Winter	6.426	0.0	214.1	704
1440 min Winter	4.691	0.0	234.4	1010
2160 min Winter	3.418	0.0	256.2	1380
2880 min Winter	2.727	0.0	272.7	1704
4320 min Winter	1.979	0.0	296.8	2288
5760 min Winter	1.575	0.0	315.0	0
7200 min Winter	1.318	0.0	329.5	0
8640 min Winter	1.140	0.0	342.1	0
10080 min Winter	1.009	0.0	353.3	0

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Model Details

Storage is Online Cover Level (m) 48.000

Cellular Storage Structure

Invert Level (m) 46.300 Safety Factor 1.0
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	153.0	153.0	0.801	0.0	192.6
0.800	153.0	192.6			

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0082-3000-1000-3000
Design Head (m) 1.000
Design Flow (l/s) 3.0
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 82
Invert Level (m) 46.150
Minimum Outlet Pipe Diameter (mm) 100
Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	3.0
Flush-Flo™	0.297	3.0
Kick-Flo®	0.623	2.4
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	2.4	1.200	3.3	3.000	5.0	7.000	7.4
0.200	2.9	1.400	3.5	3.500	5.4	7.500	7.7
0.300	3.0	1.600	3.7	4.000	5.7	8.000	7.9
0.400	2.9	1.800	3.9	4.500	6.0	8.500	8.2
0.500	2.6	2.000	4.1	5.000	6.3	9.000	8.4
0.600	2.5	2.200	4.3	5.500	6.6	9.500	8.6
0.800	2.7	2.400	4.5	6.000	6.9		
1.000	3.0	2.600	4.7	6.500	7.2		

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Technical Specification

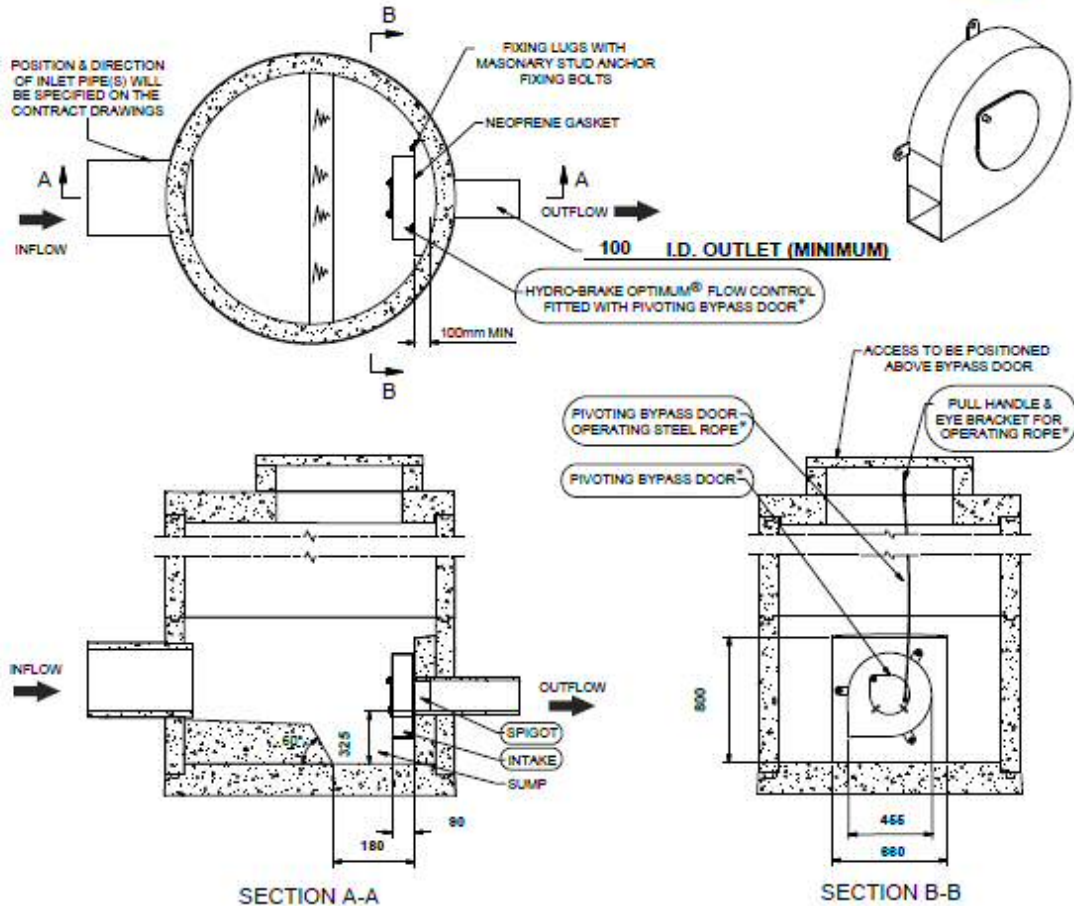
Control Point	Head (m)	Flow (l/s)
Primary Design	1.000	3.000
Flush-Flo™	0.297	2.994
Kick-Flo®	0.623	2.418
Mean Flow		2.624

Hydro-Brake Optimum® Flow Control including:

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



PT/329/0412



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-0082-3000-1000-3000 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

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DESIGNER	Hugh Morris
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SHE-0082-3000-1000-3000
Hydro-Brake Optimum®

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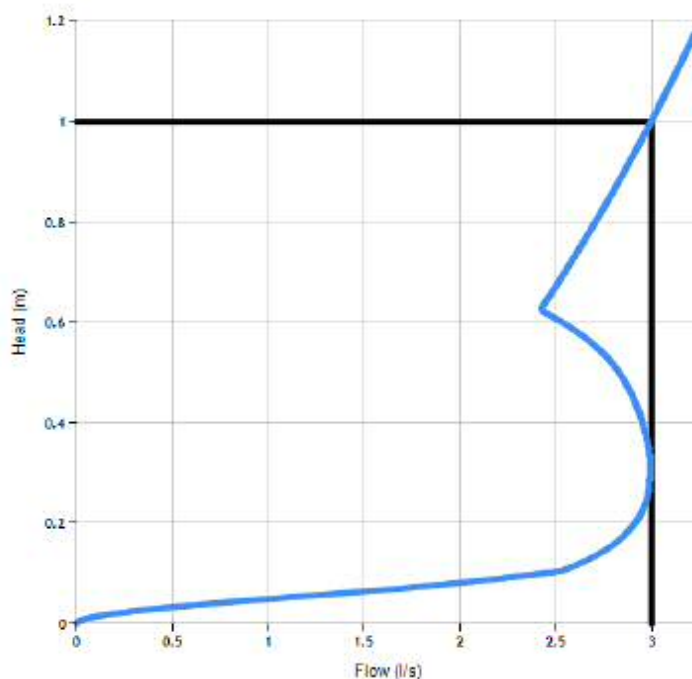
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Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	1.000	3.000
Flush-Flo™	0.297	2.994
Kick-Flo®	0.623	2.418
Mean Flow		2.624



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Head (m)	Flow (l/s)
0.000	0.000
0.034	0.539
0.069	1.659
0.103	2.498
0.138	2.720
0.172	2.848
0.207	2.928
0.241	2.972
0.276	2.991
0.310	2.993
0.345	2.983
0.379	2.965
0.414	2.938
0.448	2.904
0.483	2.857
0.517	2.795
0.552	2.709
0.586	2.592
0.621	2.436
0.655	2.474
0.690	2.532
0.724	2.589
0.759	2.644
0.793	2.698
0.828	2.751
0.862	2.803
0.897	2.853
0.931	2.903
0.966	2.952
1.000	3.000

DESIGN ADVICE !

The head/flow characteristics of this SHE-0082-3000-1000-3000 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.

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Hydro-Brake Optimum®

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