

PROPOSED COMMERCIAL DEVELOPMENT

PHOENIX LANE / BARROWFIELD ROAD

THURNSCOE

SOUTH YORKSHIRE

DRAINAGE STRATEGY



10 The Green York YO26 5LR 07919 031289

1. INTRODUCTION

This report determines a drainage strategy for a proposed commercial development adjacent to Phoenix Lane and Barrowfield Road, Thurnscoe, Barnsley.

2. PRE-DEVELOPMENT SITE

The pre-development site is currently open and vacant and consisting mainly of hard standing hardcore surfacing.

The site area is approximately 2500 sq m.



PRE-DEVELOPMENT PLAN

3. PUBLIC SEWERAGE

An enquiry has been made to Yorkshire Water for location of public sewers within the area and the public sewer map for this area is shown below.

Foul sewers exist within Phoenix Lane and Barrowfield Road.



No public surface water sewers are present close by.

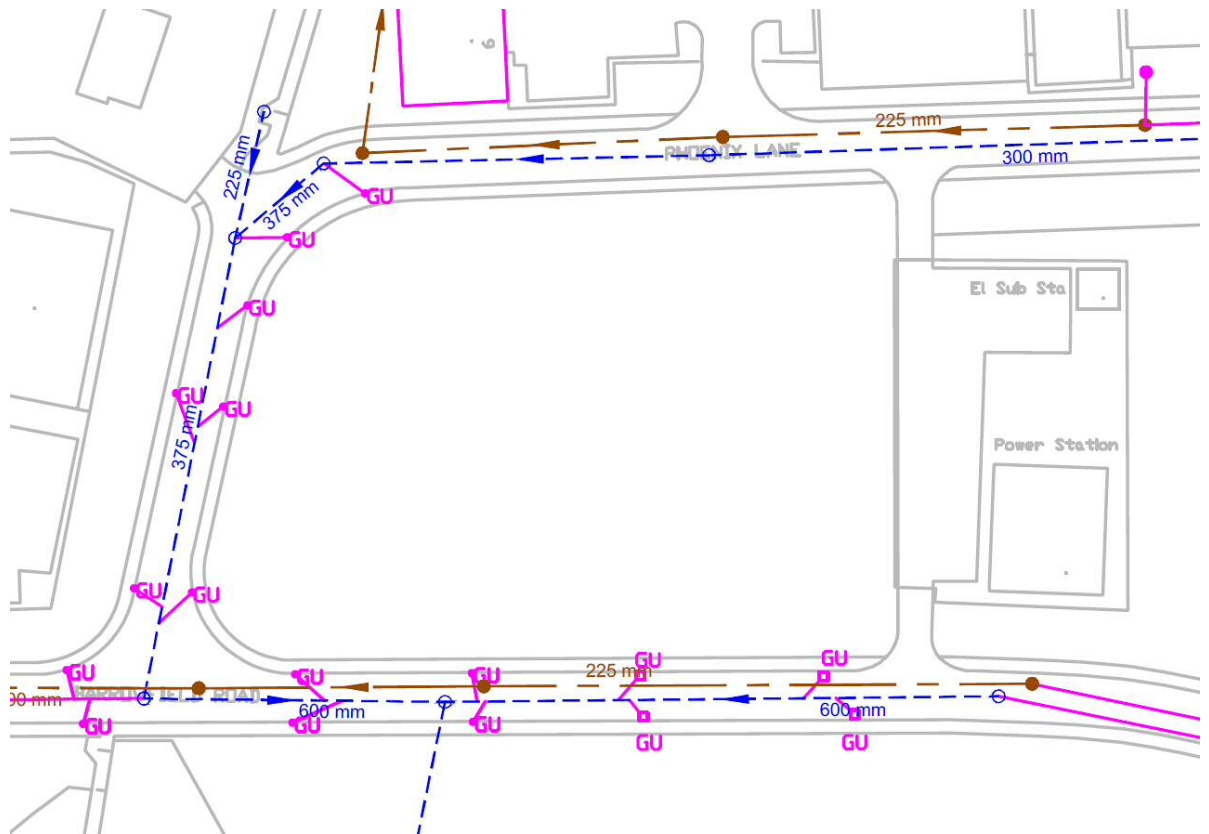


PUBLIC SEWER PLAN

4. SURFACE WATER SEWERS

Discussion with Barnsley MBC has determined that a Barnsley MBC owned surface water sewer exists within Phoenix Lane and Barrowfield Road. This sewer currently serves surface water sewerage needs in this area including Thurnscoe Business Centre, Thurnscoe Business Park and the existing adjacent development to this proposed development. The surface water sewer discharges to the southwards in to Thurnscoe Dike.

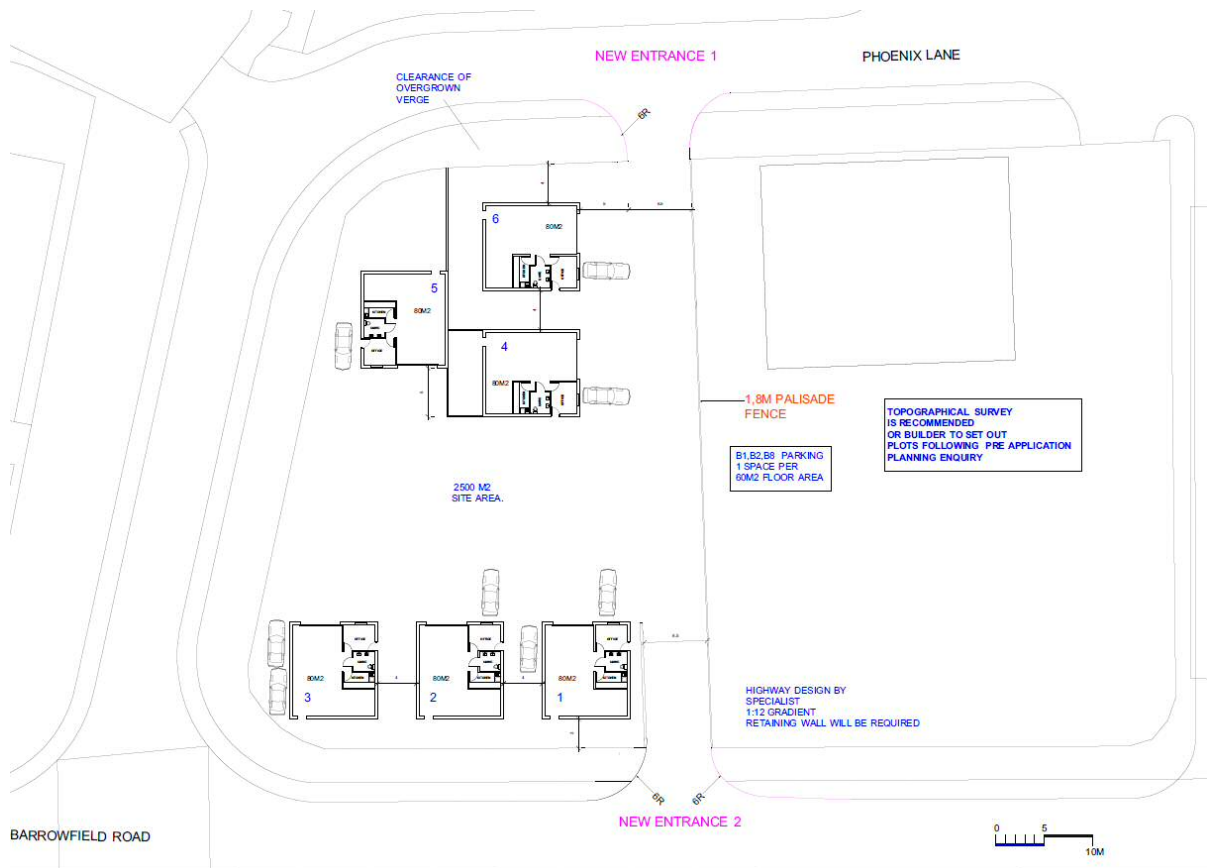
A plan of the surface water sewers are shown below.



5. POST-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 2500 sq m, all of which will be impermeable surfaces.

6. FOUL DRAINAGE DESIGN

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

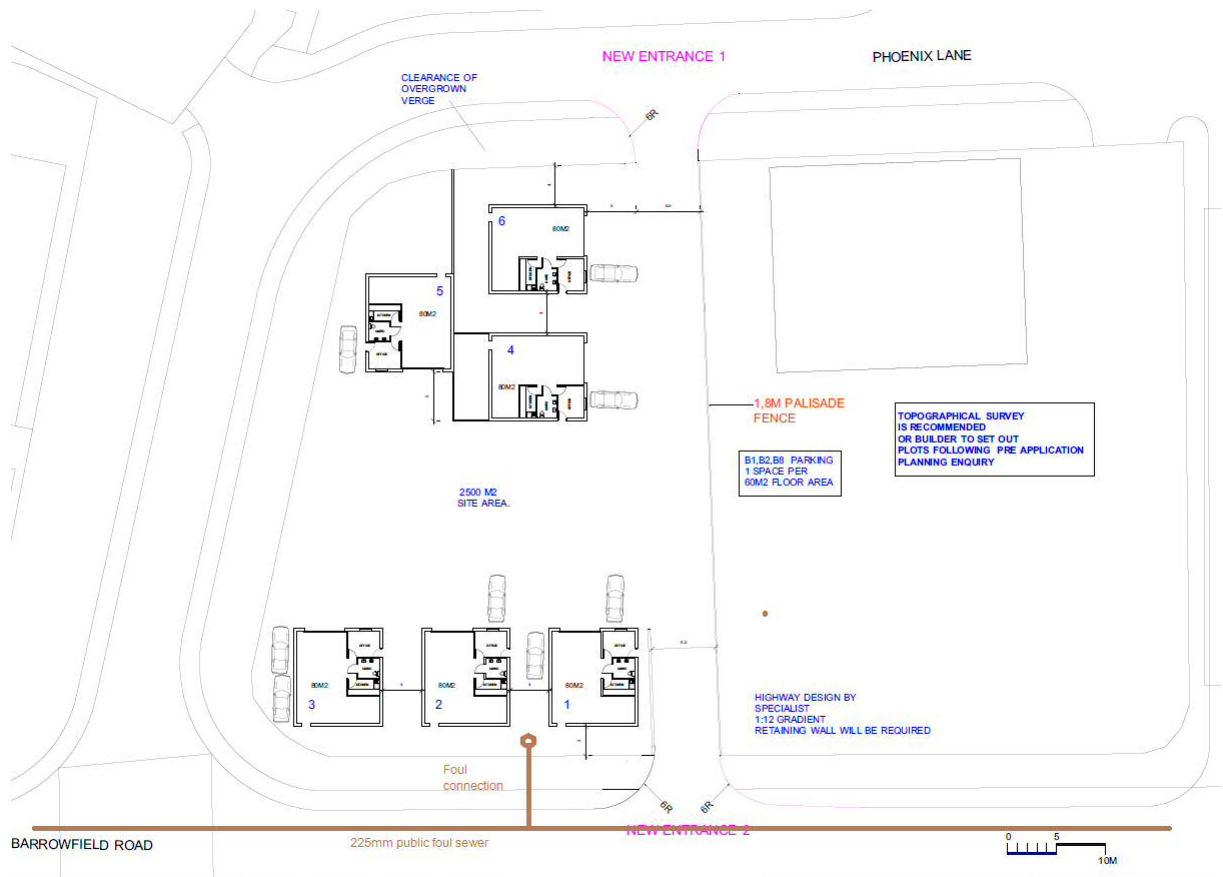
The connection route should be agreed with Yorkshire Water and care should be taken to avoid any possible utilities within or near the public highway.

A connection application to Yorkshire Water should be made. Connection should be made as a junction on the sewer, to Yorkshire Water's specification.

A plan of a possible route is shown below.



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POSSIBLE OFF-SITE FOUL SEWER CONNECTION

7. SURFACE WATER

The surface water from the development site should be disposed of strictly in accordance with the hierarchy within the building regulations. That is, by infiltration, to watercourse or to sewer, in that order.

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 should be used to dispose of the surface water from site.

Agreement with Barnsley MBC should be made for the connection to the sewer, which can be an indirect connection as a surface water drain already is present on site, serving the immediately adjacent development.



Barnsley MBC would require the surface water from the site to be attenuated to 5l/s/hectare or the lowest reasonable practical level. The site is 0.25 hectares and it is suggested that 3l/s would be the lowest practical value for the surface water discharge.

8. SURFACE WATER DRAINAGE DESIGN

The surface water design for this site will be carried out to the current standards for surface water drainage design, with a separate surface water system on site, discharging to the surface water sewer. The connection would be an indirect connection via an existing drain on site.

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 would be attenuated uses a flow control device and a hydrobrake would be recommended.

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

Impermeable Area = 2500 sq m (ie the whole site area).

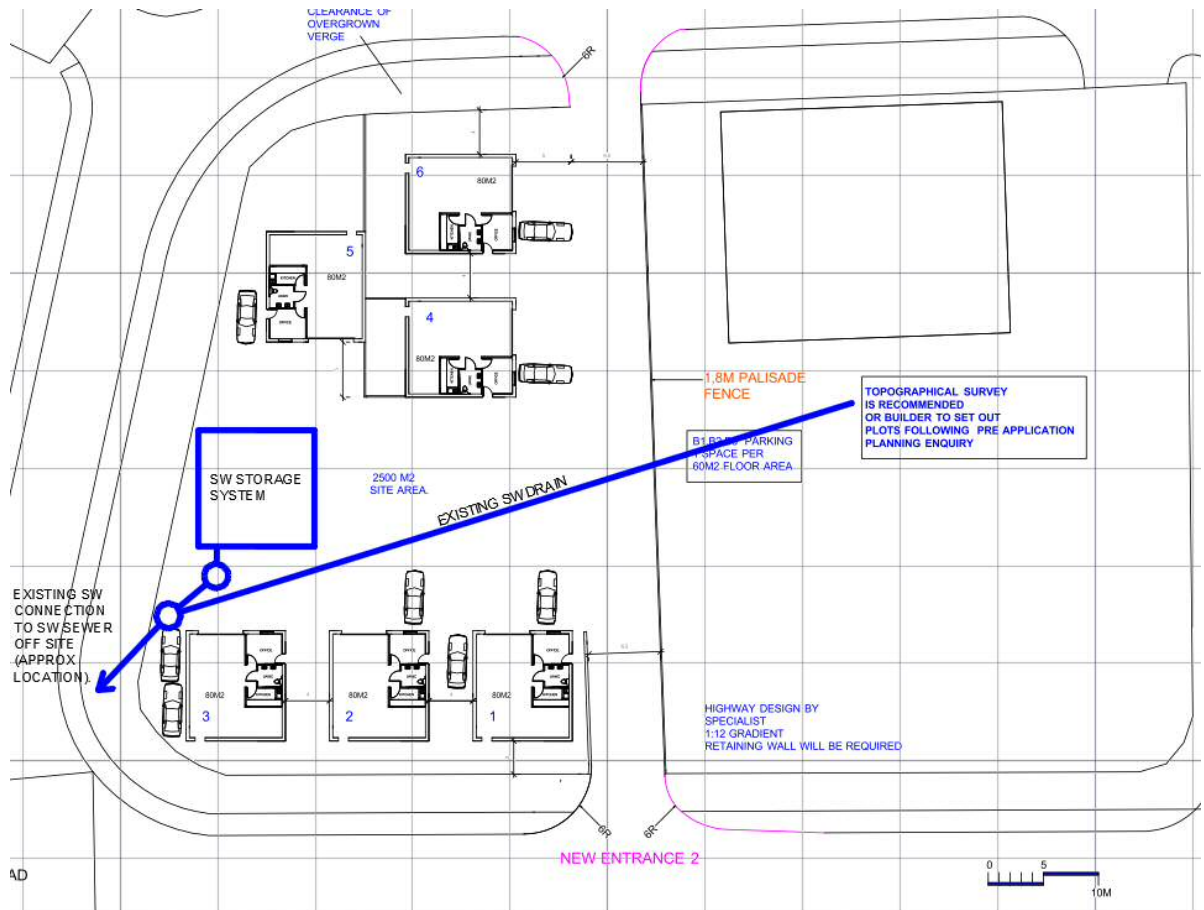
Discharge rate 3l/s

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 124 cu m of storage will be required.

The type of storage and its location will be determined during detailed design. However, a possible solution would be to use cellular storage located near the outfall from site and a detail of this is shown below.





PROPOSED SURFACE WATER STORAGE-POSSIBLE LOCATION

9. CONCLUSIONS

- This development site can be drained successfully.
- Foul water and surface water should have separate systems on site.
- Foul water flows should be connected to the foul public sewer in Barrowfield Road.
- Surface water from the development should be disposed of by connection to the surface water sewer in Phoenix Lane/Barrowfield Road via an indirect connection.
- Consent to connect to the sewers should be obtained from Yorkshire Water and Barnsley Council.
- Surface water flows should be limited to 3l/s off site and surface water storage provided on site.
- The layout of the drainage on site including the surface water storage should be determined during detailed drainage design.
- A petrol interceptor should be included within the surface water scheme for the car parking areas.

Report by

A handwritten signature in blue ink, appearing to read 'Hugh Morris', with a long horizontal stroke extending to the right.

Hugh Morris BSc CEng MICE

23/02/2017

APPENDIX

- Microdrainage storage calculations.



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BARROWFIELD ROAD

THURNSCOE

BARNSELEY

Date 20-02-17

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Checked by

Micro Drainage

Source Control 2016.1

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

Half Drain Time : 362 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control E (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	100.323	0.323	0.0	3.0	3.0	52.2	O K
30 min Summer	100.427	0.427	0.0	3.0	3.0	69.0	O K
60 min Summer	100.533	0.533	0.0	3.0	3.0	86.0	O K
120 min Summer	100.623	0.623	0.0	3.0	3.0	100.6	O K
180 min Summer	100.657	0.657	0.0	3.0	3.0	106.0	O K
240 min Summer	100.666	0.666	0.0	3.0	3.0	107.6	O K
360 min Summer	100.660	0.660	0.0	3.0	3.0	106.6	O K
480 min Summer	100.649	0.649	0.0	3.0	3.0	104.8	O K
600 min Summer	100.635	0.635	0.0	3.0	3.0	102.5	O K
720 min Summer	100.619	0.619	0.0	3.0	3.0	100.0	O K
960 min Summer	100.586	0.586	0.0	3.0	3.0	94.6	O K
1440 min Summer	100.511	0.511	0.0	3.0	3.0	82.5	O K
2160 min Summer	100.397	0.397	0.0	3.0	3.0	64.1	O K
2880 min Summer	100.306	0.306	0.0	3.0	3.0	49.4	O K
4320 min Summer	100.186	0.186	0.0	3.0	3.0	30.1	O K
5760 min Summer	100.126	0.126	0.0	2.8	2.8	20.3	O K
7200 min Summer	100.100	0.100	0.0	2.6	2.6	16.2	O K
8640 min Summer	100.087	0.087	0.0	2.3	2.3	14.1	O K
10080 min Summer	100.079	0.079	0.0	2.0	2.0	12.7	O K
15 min Winter	100.363	0.363	0.0	3.0	3.0	55.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	115.962	0.0	53.7	18
30 min Summer	77.884	0.0	72.3	33
60 min Summer	49.937	0.0	93.3	62
120 min Summer	30.926	0.0	115.6	122
180 min Summer	23.026	0.0	129.1	182
240 min Summer	18.546	0.0	138.7	240
360 min Summer	13.625	0.0	152.9	314
480 min Summer	10.946	0.0	163.7	380
600 min Summer	9.228	0.0	172.6	442
720 min Summer	8.022	0.0	180.0	510
960 min Summer	6.426	0.0	192.3	652
1440 min Summer	4.691	0.0	210.5	924
2160 min Summer	3.418	0.0	230.5	1296
2880 min Summer	2.727	0.0	245.1	1648
4320 min Summer	1.979	0.0	266.7	2336
5760 min Summer	1.575	0.0	283.3	3000
7200 min Summer	1.318	0.0	296.4	3680
8640 min Summer	1.140	0.0	307.7	4408
10080 min Summer	1.009	0.0	317.5	5136
15 min Winter	115.962	0.0	60.2	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	100.482	0.482	0.0	3.0	3.0	77.8	O K
60 min Winter	100.602	0.602	0.0	3.0	3.0	97.1	O K
120 min Winter	100.706	0.706	0.0	3.0	3.0	114.0	O K
180 min Winter	100.748	0.748	0.0	3.0	3.0	120.8	O K
240 min Winter	100.763	0.763	0.0	3.0	3.0	123.3	O K
360 min Winter	100.762	0.762	0.0	3.0	3.0	123.0	O K
480 min Winter	100.744	0.744	0.0	3.0	3.0	120.2	O K
600 min Winter	100.727	0.727	0.0	3.0	3.0	117.4	O K
720 min Winter	100.706	0.706	0.0	3.0	3.0	114.0	O K
960 min Winter	100.658	0.658	0.0	3.0	3.0	106.2	O K
1440 min Winter	100.551	0.551	0.0	3.0	3.0	89.0	O K
2160 min Winter	100.370	0.370	0.0	3.0	3.0	59.7	O K
2880 min Winter	100.242	0.242	0.0	3.0	3.0	39.1	O K
4320 min Winter	100.116	0.116	0.0	2.8	2.8	18.8	O K
5760 min Winter	100.088	0.088	0.0	2.3	2.3	14.3	O K
7200 min Winter	100.075	0.075	0.0	1.9	1.9	12.2	O K
8640 min Winter	100.067	0.067	0.0	1.7	1.7	10.9	O K
10080 min Winter	100.062	0.062	0.0	1.5	1.5	10.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	77.884	0.0	81.0	33
60 min Winter	49.937	0.0	104.5	62
120 min Winter	30.926	0.0	129.5	120
180 min Winter	23.026	0.0	144.7	178
240 min Winter	18.546	0.0	155.4	234
360 min Winter	13.625	0.0	171.2	342
480 min Winter	10.946	0.0	183.4	396
600 min Winter	9.228	0.0	193.3	468
720 min Winter	8.022	0.0	201.7	544
960 min Winter	6.426	0.0	215.4	702
1440 min Winter	4.691	0.0	235.8	1010
2160 min Winter	3.418	0.0	258.2	1384
2880 min Winter	2.727	0.0	274.6	1704
4320 min Winter	1.979	0.0	298.8	2332
5760 min Winter	1.575	0.0	317.4	2992
7200 min Winter	1.318	0.0	332.0	3672
8640 min Winter	1.140	0.0	344.6	4408
10080 min Winter	1.009	0.0	355.7	5136

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Micro Drainage Source Control 2016.1		

Model Details

Storage is Online Cover Level (m) 101.500

Cellular Storage Structure

Invert Level (m) 100.000 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	170.0	170.0	0.801	0.0	211.7
0.800	170.0	211.7			

Hydro-Brake Optimum® Outflow Control

Unit Reference MD-SHE-0085-3000-0800-3000
Design Head (m) 0.800
Design Flow (l/s) 3.0
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 85
Invert Level (m) 100.000
Minimum Outlet Pipe Diameter (mm) 100
Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	3.0
Flush-Flo™	0.239	3.0
Kick-Flo®	0.517	2.5
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	2.6	1.200	3.6	3.000	5.5	7.000	8.3
0.200	3.0	1.400	3.9	3.500	6.0	7.500	8.5
0.300	3.0	1.600	4.1	4.000	6.3	8.000	8.8
0.400	2.9	1.800	4.4	4.500	6.7	8.500	9.0
0.500	2.6	2.000	4.6	5.000	7.0	9.000	9.3
0.600	2.6	2.200	4.8	5.500	7.4	9.500	9.6
0.800	3.0	2.400	5.0	6.000	7.7		
1.000	3.3	2.600	5.2	6.500	8.0		

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