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Summer</td><td>29.218</td><td>1.018</td><td>0.0</td><td>4.5</td><td>4.5</td><td>89.9</td><td>O K</td></tr><tr><td>360 min Summer</td><td>29.176</td><td>0.976</td><td>0.0</td><td>4.5</td><td>4.5</td><td>86.2</td><td>O K</td></tr><tr><td>480 min Summer</td><td>29.131</td><td>0.931</td><td>0.0</td><td>4.5</td><td>4.5</td><td>82.3</td><td>O K</td></tr><tr><td>600 min Summer</td><td>29.083</td><td>0.883</td><td>0.0</td><td>4.5</td><td>4.5</td><td>78.0</td><td>O K</td></tr><tr><td>720 min Summer</td><td>29.028</td><td>0.828</td><td>0.0</td><td>4.5</td><td>4.5</td><td>73.1</td><td>O K</td></tr><tr><td>960 min Summer</td><td>28.918</td><td>0.718</td><td>0.0</td><td>4.5</td><td>4.5</td><td>63.4</td><td>O K</td></tr><tr><td>1440 min Summer</td><td>28.736</td><td>0.536</td><td>0.0</td><td>4.5</td><td>4.5</td><td>47.4</td><td>O K</td></tr><tr><td>2160 min Summer</td><td>28.546</td><td>0.346</td><td>0.0</td><td>4.5</td><td>4.5</td><td>30.5</td><td>O K</td></tr><tr><td>2880 min Summer</td><td>28.434</td><td>0.234</td><td>0.0</td><td>4.3</td><td>4.3</td><td>20.7</td><td>O K</td></tr><tr><td>4320 min Summer</td><td>28.331</td><td>0.131</td><td>0.0</td><td>3.7</td><td>3.7</td><td>11.6</td><td>O K</td></tr><tr><td>5760 min Summer</td><td>28.301</td><td>0.101</td><td>0.0</td><td>3.1</td><td>3.1</td><td>9.0</td><td>O K</td></tr><tr><td>7200 min Summer</td><td>28.286</td><td>0.086</td><td>0.0</td><td>2.6</td><td>2.6</td><td>7.6</td><td>O K</td></tr><tr><td>8640 min Summer</td><td>28.277</td><td>0.077</td><td>0.0</td><td>2.3</td><td>2.3</td><td>6.8</td><td>O K</td></tr><tr><td>10080 min Summer</td><td>28.270</td><td>0.070</td><td>0.0</td><td>2.0</td><td>2.0</td><td>6.2</td><td>O K</td></tr><tr><td>15 min Winter</td><td>28.822</td><td>0.622</td><td>0.0</td><td>4.5</td><td>4.5</td><td>54.9</td><td>O K</td></tr></table> <table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Discharge Volume (m³)</th><th>Time-Peak (mins)</th></tr><tr><td>15 min Summer</td><td>123.479</td><td>0.0</td><td>53.1</td><td>25</td></tr><tr><td>30 min Summer</td><td>82.705</td><td>0.0</td><td>71.1</td><td>38</td></tr><tr><td>60 min Summer</td><td>52.935</td><td>0.0</td><td>91.2</td><td>66</td></tr><tr><td>120 min Summer</td><td>32.787</td><td>0.0</td><td>113.0</td><td>124</td></tr><tr><td>180 min Summer</td><td>24.447</td><td>0.0</td><td>126.4</td><td>180</td></tr><tr><td>240 min Summer</td><td>19.729</td><td>0.0</td><td>136.1</td><td>208</td></tr><tr><td>360 min Summer</td><td>14.463</td><td>0.0</td><td>149.6</td><td>272</td></tr><tr><td>480 min Summer</td><td>11.610</td><td>0.0</td><td>160.1</td><td>340</td></tr><tr><td>600 min Summer</td><td>9.783</td><td>0.0</td><td>168.7</td><td>410</td></tr><tr><td>720 min Summer</td><td>8.502</td><td>0.0</td><td>175.9</td><td>478</td></tr><tr><td>960 min Summer</td><td>6.806</td><td>0.0</td><td>187.7</td><td>604</td></tr><tr><td>1440 min Summer</td><td>4.966</td><td>0.0</td><td>205.4</td><td>850</td></tr><tr><td>2160 min Summer</td><td>3.616</td><td>0.0</td><td>224.5</td><td>1196</td></tr><tr><td>2880 min Summer</td><td>2.883</td><td>0.0</td><td>238.7</td><td>1536</td></tr><tr><td>4320 min Summer</td><td>2.092</td><td>0.0</td><td>259.7</td><td>2212</td></tr><tr><td>5760 min Summer</td><td>1.664</td><td>0.0</td><td>275.6</td><td>2936</td></tr><tr><td>7200 min Summer</td><td>1.393</td><td>0.0</td><td>288.3</td><td>3672</td></tr><tr><td>8640 min Summer</td><td>1.204</td><td>0.0</td><td>298.9</td><td>4392</td></tr><tr><td>10080 min Summer</td><td>1.064</td><td>0.0</td><td>308.1</td><td>5048</td></tr><tr><td>15 min Winter</td><td>123.479</td><td>0.0</td><td>59.5</td><td>25</td></tr></table>				Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status	15 min Summer	28.750	0.550	0.0	4.5	4.5	48.6	O K	30 min Summer	28.926	0.726	0.0	4.5	4.5	64.1	O K	60 min Summer	29.093	0.893	0.0	4.5	4.5	78.9	O K	120 min Summer	29.209	1.009	0.0	4.5	4.5	89.1	O K	180 min Summer	29.229	1.029	0.0	4.5	4.5	90.9	O K	240 min Summer	29.218	1.018	0.0	4.5	4.5	89.9	O K	360 min Summer	29.176	0.976	0.0	4.5	4.5	86.2	O K	480 min Summer	29.131	0.931	0.0	4.5	4.5	82.3	O K	600 min Summer	29.083	0.883	0.0	4.5	4.5	78.0	O K	720 min Summer	29.028	0.828	0.0	4.5	4.5	73.1	O K	960 min Summer	28.918	0.718	0.0	4.5	4.5	63.4	O K	1440 min Summer	28.736	0.536	0.0	4.5	4.5	47.4	O K	2160 min Summer	28.546	0.346	0.0	4.5	4.5	30.5	O K	2880 min Summer	28.434	0.234	0.0	4.3	4.3	20.7	O K	4320 min Summer	28.331	0.131	0.0	3.7	3.7	11.6	O K	5760 min Summer	28.301	0.101	0.0	3.1	3.1	9.0	O K	7200 min Summer	28.286	0.086	0.0	2.6	2.6	7.6	O K	8640 min Summer	28.277	0.077	0.0	2.3	2.3	6.8	O K	10080 min Summer	28.270	0.070	0.0	2.0	2.0	6.2	O K	15 min Winter	28.822	0.622	0.0	4.5	4.5	54.9	O K	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	15 min Summer	123.479	0.0	53.1	25	30 min Summer	82.705	0.0	71.1	38	60 min Summer	52.935	0.0	91.2	66	120 min Summer	32.787	0.0	113.0	124	180 min Summer	24.447	0.0	126.4	180	240 min Summer	19.729	0.0	136.1	208	360 min Summer	14.463	0.0	149.6	272	480 min Summer	11.610	0.0	160.1	340	600 min Summer	9.783	0.0	168.7	410	720 min Summer	8.502	0.0	175.9	478	960 min Summer	6.806	0.0	187.7	604	1440 min Summer	4.966	0.0	205.4	850	2160 min Summer	3.616	0.0	224.5	1196	2880 min Summer	2.883	0.0	238.7	1536	4320 min Summer	2.092	0.0	259.7	2212	5760 min Summer	1.664	0.0	275.6	2936	7200 min Summer	1.393	0.0	288.3	3672	8640 min Summer	1.204	0.0	298.9	4392	10080 min Summer	1.064	0.0	308.1	5048	15 min Winter	123.479	0.0	59.5	25
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Date 31/03/2023 16:34	Designed by UKJEB008	
File	Checked by	
XP Solutions		Source Control 2019.1

Model Details

Storage is Online Cover Level (m) 31.000

Cellular Storage Structure

Invert Level (m) 28.200 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	93.0	0.0	2.600	0.0	0.0
0.200	93.0	0.0	2.800	0.0	0.0
0.400	93.0	0.0	3.000	0.0	0.0
0.600	93.0	0.0	3.200	0.0	0.0
0.800	93.0	0.0	3.400	0.0	0.0
1.000	93.0	0.0	3.600	0.0	0.0
1.200	93.0	0.0	3.800	0.0	0.0
1.400	93.0	0.0	4.000	0.0	0.0
1.600	93.0	0.0	4.200	0.0	0.0
1.800	93.0	0.0	4.400	0.0	0.0
2.000	0.0	0.0	4.600	0.0	0.0
2.200	0.0	0.0	4.800	0.0	0.0
2.400	0.0	0.0	5.000	0.0	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0095-5100-1800-5100
Design Head (m) 1.800
Design Flow (l/s) 5.1
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 95
Invert Level (m) 28.200
Minimum Outlet Pipe Diameter (mm) 150
Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.800	5.1
Flush-Flo™	0.413	4.5
Kick-Flo®	0.846	3.6
Mean Flow over Head Range	-	4.2

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

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Summer</td><td>30.860</td><td>1.160</td><td>0.0</td><td>11.9</td><td>11.9</td><td>205.0</td><td>O K</td></tr><tr><td>360 min Summer</td><td>30.797</td><td>1.097</td><td>0.0</td><td>11.9</td><td>11.9</td><td>193.9</td><td>O K</td></tr><tr><td>480 min Summer</td><td>30.726</td><td>1.026</td><td>0.0</td><td>11.9</td><td>11.9</td><td>181.2</td><td>O K</td></tr><tr><td>600 min Summer</td><td>30.655</td><td>0.955</td><td>0.0</td><td>11.9</td><td>11.9</td><td>168.8</td><td>O K</td></tr><tr><td>720 min Summer</td><td>30.587</td><td>0.887</td><td>0.0</td><td>11.9</td><td>11.9</td><td>156.8</td><td>O K</td></tr><tr><td>960 min Summer</td><td>30.461</td><td>0.761</td><td>0.0</td><td>11.9</td><td>11.9</td><td>134.4</td><td>O K</td></tr><tr><td>1440 min Summer</td><td>30.251</td><td>0.551</td><td>0.0</td><td>11.9</td><td>11.9</td><td>97.4</td><td>O K</td></tr><tr><td>2160 min Summer</td><td>30.048</td><td>0.348</td><td>0.0</td><td>11.6</td><td>11.6</td><td>61.5</td><td>O K</td></tr><tr><td>2880 min Summer</td><td>29.938</td><td>0.238</td><td>0.0</td><td>10.7</td><td>10.7</td><td>42.0</td><td>O K</td></tr><tr><td>4320 min Summer</td><td>29.854</td><td>0.154</td><td>0.0</td><td>9.0</td><td>9.0</td><td>27.2</td><td>O K</td></tr><tr><td>5760 min Summer</td><td>29.826</td><td>0.126</td><td>0.0</td><td>7.3</td><td>7.3</td><td>22.3</td><td>O K</td></tr><tr><td>7200 min Summer</td><td>29.811</td><td>0.111</td><td>0.0</td><td>6.1</td><td>6.1</td><td>19.6</td><td>O K</td></tr><tr><td>8640 min Summer</td><td>29.801</td><td>0.101</td><td>0.0</td><td>5.3</td><td>5.3</td><td>17.8</td><td>O K</td></tr><tr><td>10080 min Summer</td><td>29.793</td><td>0.093</td><td>0.0</td><td>4.7</td><td>4.7</td><td>16.4</td><td>O K</td></tr><tr><td>15 min Winter</td><td>30.424</td><td>0.724</td><td>0.0</td><td>11.9</td><td>11.9</td><td>127.9</td><td>O K</td></tr></table> <table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Discharge Volume (m³)</th><th>Time-Peak 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Summer</td><td>4.966</td><td>0.0</td><td>482.2</td><td>830</td></tr><tr><td>2160 min Summer</td><td>3.616</td><td>0.0</td><td>527.0</td><td>1172</td></tr><tr><td>2880 min Summer</td><td>2.883</td><td>0.0</td><td>560.3</td><td>1508</td></tr><tr><td>4320 min Summer</td><td>2.092</td><td>0.0</td><td>609.6</td><td>2208</td></tr><tr><td>5760 min Summer</td><td>1.664</td><td>0.0</td><td>647.0</td><td>2936</td></tr><tr><td>7200 min Summer</td><td>1.393</td><td>0.0</td><td>676.8</td><td>3672</td></tr><tr><td>8640 min Summer</td><td>1.204</td><td>0.0</td><td>701.7</td><td>4368</td></tr><tr><td>10080 min Summer</td><td>1.064</td><td>0.0</td><td>723.2</td><td>5104</td></tr><tr><td>15 min Winter</td><td>123.479</td><td>0.0</td><td>139.5</td><td>24</td></tr></table>									Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status	15 min Summer	30.341	0.641	0.0	11.9	11.9	113.2	O K	30 min Summer	30.543	0.843	0.0	11.9	11.9	148.9	O K	60 min Summer	30.729	1.029	0.0	11.9	11.9	181.9	O K	120 min Summer	30.861	1.161	0.0	11.9	11.9	205.2	O K	180 min Summer	30.876	1.176	0.0	11.9	11.9	207.9	O K	240 min Summer	30.860	1.160	0.0	11.9	11.9	205.0	O K	360 min Summer	30.797	1.097	0.0	11.9	11.9	193.9	O K	480 min Summer	30.726	1.026	0.0	11.9	11.9	181.2	O K	600 min Summer	30.655	0.955	0.0	11.9	11.9	168.8	O K	720 min Summer	30.587	0.887	0.0	11.9	11.9	156.8	O K	960 min Summer	30.461	0.761	0.0	11.9	11.9	134.4	O K	1440 min Summer	30.251	0.551	0.0	11.9	11.9	97.4	O K	2160 min Summer	30.048	0.348	0.0	11.6	11.6	61.5	O K	2880 min Summer	29.938	0.238	0.0	10.7	10.7	42.0	O K	4320 min Summer	29.854	0.154	0.0	9.0	9.0	27.2	O K	5760 min Summer	29.826	0.126	0.0	7.3	7.3	22.3	O K	7200 min Summer	29.811	0.111	0.0	6.1	6.1	19.6	O K	8640 min Summer	29.801	0.101	0.0	5.3	5.3	17.8	O K	10080 min Summer	29.793	0.093	0.0	4.7	4.7	16.4	O K	15 min Winter	30.424	0.724	0.0	11.9	11.9	127.9	O K	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	15 min Summer	123.479	0.0	124.5	24	30 min Summer	82.705	0.0	166.9	38	60 min Summer	52.935	0.0	214.1	66	120 min Summer	32.787	0.0	265.3	122	180 min Summer	24.447	0.0	296.7	174	240 min Summer	19.729	0.0	319.3	202	360 min Summer	14.463	0.0	351.1	268	480 min Summer	11.610	0.0	375.9	330	600 min Summer	9.783	0.0	395.9	394	720 min Summer	8.502	0.0	412.8	460	960 min Summer	6.806	0.0	440.7	588	1440 min Summer	4.966	0.0	482.2	830	2160 min Summer	3.616	0.0	527.0	1172	2880 min Summer	2.883	0.0	560.3	1508	4320 min Summer	2.092	0.0	609.6	2208	5760 min Summer	1.664	0.0	647.0	2936	7200 min Summer	1.393	0.0	676.8	3672	8640 min Summer	1.204	0.0	701.7	4368	10080 min Summer	1.064	0.0	723.2	5104	15 min Winter	123.479	0.0	139.5	24
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Date 31/03/2023 16:33	Designed by UKJEB008	
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XP Solutions		Source Control 2019.1

Model Details

Storage is Online Cover Level (m) 32.500

Cellular Storage Structure

Invert Level (m) 29.700 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	186.0	0.0	2.600	0.0	0.0
0.200	186.0	0.0	2.800	0.0	0.0
0.400	186.0	0.0	3.000	0.0	0.0
0.600	186.0	0.0	3.200	0.0	0.0
0.800	186.0	0.0	3.400	0.0	0.0
1.000	186.0	0.0	3.600	0.0	0.0
1.200	186.0	0.0	3.800	0.0	0.0
1.400	186.0	0.0	4.000	0.0	0.0
1.600	186.0	0.0	4.200	0.0	0.0
1.800	186.0	0.0	4.400	0.0	0.0
2.000	0.0	0.0	4.600	0.0	0.0
2.200	0.0	0.0	4.800	0.0	0.0
2.400	0.0	0.0	5.000	0.0	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0146-1190-1800-1190
Design Head (m) 1.800
Design Flow (l/s) 11.9
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 146
Invert Level (m) 29.700
Minimum Outlet Pipe Diameter (mm) 225
Suggested Manhole Diameter (mm) 1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.800	11.9
Flush-Flo™	0.525	11.9
Kick-Flo®	1.100	9.4
Mean Flow over Head Range	-	10.4

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

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Date 31/03/2023 16:40

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Source Control 2019.1

Micro Drainage

Summary of Results for 100 year Return Period (+45%)

Half Drain Time : 180 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	31.205	0.655	0.0	13.9	13.9	132.0	O K
30 min Summer	31.412	0.862	0.0	13.9	13.9	173.7	O K
60 min Summer	31.605	1.055	0.0	13.9	13.9	212.4	O K
120 min Summer	31.739	1.189	0.0	13.9	13.9	239.6	O K
180 min Summer	31.755	1.205	0.0	13.9	13.9	242.7	O K
240 min Summer	31.739	1.189	0.0	13.9	13.9	239.5	O K
360 min Summer	31.678	1.128	0.0	13.9	13.9	227.2	O K
480 min Summer	31.606	1.056	0.0	13.9	13.9	212.6	O K
600 min Summer	31.533	0.983	0.0	13.9	13.9	197.9	O K
720 min Summer	31.463	0.913	0.0	13.9	13.9	183.9	O K
960 min Summer	31.333	0.783	0.0	13.9	13.9	157.7	O K
1440 min Summer	31.117	0.567	0.0	13.9	13.9	114.2	O K
2160 min Summer	30.908	0.358	0.0	13.5	13.5	72.0	O K
2880 min Summer	30.794	0.244	0.0	12.6	12.6	49.2	O K
4320 min Summer	30.710	0.160	0.0	10.5	10.5	32.3	O K
5760 min Summer	30.682	0.132	0.0	8.5	8.5	26.7	O K
7200 min Summer	30.667	0.117	0.0	7.2	7.2	23.5	O K
8640 min Summer	30.656	0.106	0.0	6.2	6.2	21.4	O K
10080 min Summer	30.648	0.098	0.0	5.5	5.5	19.8	O K
15 min Winter	31.290	0.740	0.0	13.9	13.9	149.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	123.358	0.0	145.0	24
30 min Summer	82.663	0.0	194.5	38
60 min Summer	52.935	0.0	249.8	66
120 min Summer	32.803	0.0	309.6	122
180 min Summer	24.465	0.0	346.4	172
240 min Summer	19.746	0.0	372.8	202
360 min Summer	14.479	0.0	410.1	266
480 min Summer	11.625	0.0	439.0	330
600 min Summer	9.797	0.0	462.5	394
720 min Summer	8.514	0.0	482.3	460
960 min Summer	6.817	0.0	514.9	588
1440 min Summer	4.975	0.0	563.6	830
2160 min Summer	3.623	0.0	616.1	1172
2880 min Summer	2.890	0.0	655.1	1508
4320 min Summer	2.097	0.0	712.9	2208
5760 min Summer	1.669	0.0	756.7	2936
7200 min Summer	1.396	0.0	791.6	3672
8640 min Summer	1.207	0.0	820.8	4360
10080 min Summer	1.067	0.0	846.1	5136
15 min Winter	123.358	0.0	162.5	24

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XP Solutions	Source Control 2019.1	

Model Details

Storage is Online Cover Level (m) 33.350

Cellular Storage Structure

Invert Level (m) 30.550 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	212.0	0.0	2.600	0.0	0.0
0.200	212.0	0.0	2.800	0.0	0.0
0.400	212.0	0.0	3.000	0.0	0.0
0.600	212.0	0.0	3.200	0.0	0.0
0.800	212.0	0.0	3.400	0.0	0.0
1.000	212.0	0.0	3.600	0.0	0.0
1.200	212.0	0.0	3.800	0.0	0.0
1.400	212.0	0.0	4.000	0.0	0.0
1.600	212.0	0.0	4.200	0.0	0.0
1.800	212.0	0.0	4.400	0.0	0.0
2.000	0.0	0.0	4.600	0.0	0.0
2.200	0.0	0.0	4.800	0.0	0.0
2.400	0.0	0.0	5.000	0.0	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0157-1390-1800-1390
Design Head (m)	1.800
Design Flow (l/s)	13.9
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	157
Invert Level (m)	30.550
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.800	13.9
Flush-Flo™	0.529	13.9
Kick-Flo®	1.111	11.1
Mean Flow over Head Range	-	12.1

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

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