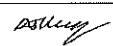
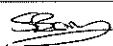
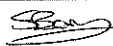




BELL MUNRO CONSULTING LTD.

**Old Market Street,
Blackley,**

**Hydraulic Calculations
December 2022**

	Initials	Signature	Date
Prepared by:	RH		12/2022
Checked by:	SB		12/2022
Approved by:	SB		12/2022

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Turing House 5 Archway Manchester M15 5RL		
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XP Solutions		

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 137 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	56.906	0.426	1.2	13.7	O K
30 min Summer	57.029	0.549	1.6	17.7	O K
60 min Summer	57.133	0.653	1.9	21.1	O K
120 min Summer	57.194	0.714	2.1	23.1	O K
180 min Summer	57.215	0.735	2.1	23.8	O K
240 min Summer	57.219	0.739	2.1	23.9	O K
360 min Summer	57.204	0.724	2.1	23.4	O K
480 min Summer	57.182	0.702	2.0	22.7	O K
600 min Summer	57.157	0.677	2.0	21.9	O K
720 min Summer	57.131	0.651	1.9	21.0	O K
960 min Summer	57.084	0.604	1.7	19.5	O K
1440 min Summer	57.006	0.526	1.5	17.0	O K
2160 min Summer	56.923	0.443	1.3	14.3	O K
2880 min Summer	56.864	0.384	1.1	12.4	O K
4320 min Summer	56.787	0.307	0.9	9.9	O K
5760 min Summer	56.737	0.257	0.7	8.3	O K
7200 min Summer	56.702	0.222	0.6	7.2	O K
8640 min Summer	56.676	0.196	0.6	6.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	118.382	0.0	18
30 min Summer	79.333	0.0	32
60 min Summer	50.812	0.0	60
120 min Summer	31.498	0.0	96
180 min Summer	23.499	0.0	128
240 min Summer	18.972	0.0	162
360 min Summer	13.913	0.0	230
480 min Summer	11.171	0.0	298
600 min Summer	9.415	0.0	364
720 min Summer	8.183	0.0	432
960 min Summer	6.552	0.0	560
1440 min Summer	4.782	0.0	810
2160 min Summer	3.483	0.0	1188
2880 min Summer	2.778	0.0	1556
4320 min Summer	2.016	0.0	2288
5760 min Summer	1.604	0.0	3000
7200 min Summer	1.343	0.0	3744
8640 min Summer	1.160	0.0	4416

Turing House

5 Archway

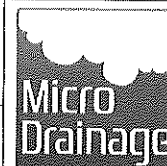
Manchester M15 5RL

Date 21/12/2022 11:41

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Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
10080 min Summer	56.657	0.177	0.5	5.7	O K
15 min Winter	56.957	0.477	1.4	15.4	O K
30 min Winter	57.097	0.617	1.8	19.9	O K
60 min Winter	57.215	0.735	2.1	23.7	O K
120 min Winter	57.283	0.803	2.3	25.9	O K
180 min Winter	57.876	1.396	2.3	26.4	Flood Risk
240 min Winter	57.721	1.241	2.3	26.3	O K
360 min Winter	57.259	0.779	2.2	25.2	O K
480 min Winter	57.219	0.739	2.1	23.9	O K
600 min Winter	57.180	0.700	2.0	22.6	O K
720 min Winter	57.143	0.663	1.9	21.4	O K
960 min Winter	57.077	0.597	1.7	19.3	O K
1440 min Winter	56.976	0.496	1.4	16.0	O K
2160 min Winter	56.877	0.397	1.1	12.8	O K
2880 min Winter	56.813	0.333	1.0	10.7	O K
4320 min Winter	56.733	0.253	0.7	8.2	O K
5760 min Winter	56.685	0.205	0.6	6.6	O K
7200 min Winter	56.654	0.174	0.5	5.6	O K
8640 min Winter	56.631	0.151	0.4	4.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
10080 min Summer	1.025	0.0	5152
15 min Winter	118.382	0.0	18
30 min Winter	79.333	0.0	32
60 min Winter	50.812	0.0	60
120 min Winter	31.498	0.0	98
180 min Winter	23.499	0.0	136
240 min Winter	18.972	0.0	174
360 min Winter	13.913	0.0	248
480 min Winter	11.171	0.0	318
600 min Winter	9.415	0.0	386
720 min Winter	8.183	0.0	456
960 min Winter	6.552	0.0	588
1440 min Winter	4.782	0.0	848
2160 min Winter	3.483	0.0	1216
2880 min Winter	2.778	0.0	1588
4320 min Winter	2.016	0.0	2332
5760 min Winter	1.604	0.0	3056
7200 min Winter	1.343	0.0	3752
8640 min Winter	1.160	0.0	4496

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Turing House 5 Archway Manchester M15 5RL		
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Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
10080 min Winter	56.614	0.134	0.4	4.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
10080 min Winter	1.025	0.0	5240

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Turing House 5 Archway Manchester M15 5RL																																
Date 21/12/2022 11:41 File BLACKKEY MD.SRCX	Designed by RobertHerring Checked by																															
XP Solutions		Source Control 2020.1.3																														
<u>Rainfall Details</u> <table> <tr> <td>Rainfall Model</td> <td>FSR</td> <td>Winter Storms</td> <td>Yes</td> </tr> <tr> <td>Return Period (years)</td> <td>100</td> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Region</td> <td>England and Wales</td> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>M5-60 (mm)</td> <td>18.000</td> <td>Shortest Storm (mins)</td> <td>15</td> </tr> <tr> <td>Ratio R</td> <td>0.358</td> <td>Longest Storm (mins)</td> <td>10080</td> </tr> <tr> <td>Summer Storms</td> <td>Yes</td> <td>Climate Change %</td> <td>+40</td> </tr> </table> <u>Time Area Diagram</u> Total Area (ha) 0.065 <table> <tr> <td>Time (mins)</td> <td>Area</td> </tr> <tr> <td>From: To: (ha)</td> <td></td> </tr> <tr> <td>0 4</td> <td>0.065</td> </tr> </table>			Rainfall Model	FSR	Winter Storms	Yes	Return Period (years)	100	Cv (Summer)	0.750	Region	England and Wales	Cv (Winter)	0.840	M5-60 (mm)	18.000	Shortest Storm (mins)	15	Ratio R	0.358	Longest Storm (mins)	10080	Summer Storms	Yes	Climate Change %	+40	Time (mins)	Area	From: To: (ha)		0 4	0.065
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