SuDS Flows and Volumes – LLFA Technical Assessment Proforma

This form identifies the information required by the LLFA to enable technical assessment of flows and volumes determined as part of drainage / SuDS calculations.

*Note : * means delete as appropriate; Numbers in brackets refer to accompanying notes.*

SITE DETAILS

1.1 Planning application reference ....4519/APP/2016/3619....

1.2 Site name ....22 NEW ROAD, HILLINGDON....

1.3 Total application site area (1) ....1000....m² ....1....ha

1.4 Is the site located in a CDA or LFRZ Y/N

1.5 Is the site located in a SPZ Y/N

VOLUME AND FLOW DESIGN INPUTS

2.1 Site area which is positively drained by SuDS (2) ....630....m²

2.2 Impermeable area drained pre development (3) ....1000....m²

2.3 Impermeable area drained post development (3) ....630....m²

2.4 Additional impermeable area (2.3 minus 2.2) ....0....m²

2.5 Predevelopment use (4) Greenfield / Brownfield / Mixed*

2.6 Method of discharge (5) Infiltration / waterbody / storm sewer / combined sewer*

2.7 Infiltration rate (where applicable) ....0.06152....m/hr

2.8 Influencing factors on infiltration .....

2.9 Depth to highest known ground water table....4.0....mAOD BGL

2.10 Coefficient of runoff (Cv) (6) ....0.84 (WINTER)....

2.11 Justification for Cv used AVERAGE Cv IN WALLINGFORD PROCEDURE IS 0.75 THE MODIFIED RATIONAL METHOD ALSO APPLIES A Cr of 1.3 WHICH EFFECTIVELY MAKES Cv = 1

2.12 FEH rainfall data used (Note that FSR is no longer the preferred rainfall calculation method) Y/N

2.13 Will storage be subject to surcharge by elevated water levels in watercourse / sewer Y/N

2.14 Invert level at outlet (invert level of final flow control) ....43.735....mAOD

2.15 Design level used for surcharge water level at point of discharge(14) ....44.735....mAOD

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CALCULATION OUTPUTS

Sections 3 and 4 refer to site where storage is provided by attenuation and / or partial infiltration. Where all flows are infiltrated to ground omit Sections 3 -5 and complete Section 6.

3.0 Defining rate of runoff from the site N/A

3.2 Max. discharge for 1 in 1 year rainfall .....l/s/ha, ...l/s for the site

3.2 Max. discharge for Q_{med} rainfall .....l/s/ha, ...l/s for the site

3.3 Max. discharge for 1 in 30 year rainfall .....l/s/ha, ...l/s for the site

3.4 Max. discharge for 1 in 100 year rainfall .....l/s/ha, ...l/s for the site

3.5 Max. discharge for 1 in 100 year plus 40%CC .....l/s/ha, ...l/s for the site

4.0 Attenuation storage to manage peak runoff rates from the site N/A

4.1 Storage - 1 in 1 year .....m^3 .....m^3/m^2 (of developed impermeable area)

4.2 Storage - 1in 30 year (7) .....m^3 .....m^3/m^2

4.3 Storage - 1in 100 year (8) .....m^3 .....m^3/m^2

4.4 Storage - 1 in 100 year plus 40%CC (9) .....m^3 .....m^3/m^2

5.0 Controlling volume of runoff from the site N/A

5.1 Pre development runoff volume(10) ..... m^3 for the site

5.2 Post development runoff volume (unmitigated) (10)..... m^3 for the site

5.3 Volume to be controlled/does not leave site (5.2 - 5.1)..... m^3 for the site

5.4 Volume control provided by
- Interception losses(11) .....m^3
- Rain harvesting(12) .....m^3
- Infiltration (even at very low rates) .....m^3
- Separate area designated as long term storage(13) .....m^3

5.5 Total volume control (sum of inputs for 5.4) .....m^3 (15)

6.0 Site storage volumes (full infiltration only)

6.1 Storage - 1in 30 year (7) 18.8 .....m^3 0.03 .....m^3/m^2 (of developed impermeable area)

6.2 Storage - 1 in 100 year plus CC (9) 43 .....m^3 0.07 .....m^3/m^2 (cc @ 40%)

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

Half Drain Time : 611 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	44.335	0.600	0.6	25.5	O K
30 min Summer	44.398	0.663	0.6	28.8	O K
60 min Summer	44.463	0.728	0.6	32.2	O K
120 min Summer	44.522	0.787	0.6	35.2	O K
180 min Summer	44.548	0.813	0.6	36.6	O K
240 min Summer	44.559	0.824	0.6	37.1	O K
360 min Summer	44.559	0.824	0.6	37.1	O K
480 min Summer	44.544	0.809	0.6	36.4	O K
600 min Summer	44.526	0.791	0.6	35.4	O K
720 min Summer	44.509	0.774	0.6	34.6	O K
960 min Summer	44.482	0.747	0.6	33.2	O K
1440 min Summer	44.430	0.695	0.6	30.4	O K
2160 min Summer	44.355	0.620	0.6	26.6	O K
2880 min Summer	44.286	0.551	0.6	23.0	O K
4320 min Summer	44.138	0.403	0.6	15.3	O K
5760 min Summer	44.034	0.299	0.6	9.9	O K
7200 min Summer	43.969	0.234	0.6	6.5	O K
8640 min Summer	43.938	0.203	0.6	4.9	O K
10080 min Summer	43.917	0.182	0.5	4.0	O K
15 min Winter	44.397	0.662	0.6	28.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	227.678	0.0	19
30 min Summer	129.558	0.0	34
60 min Summer	73.723	0.0	64
120 min Summer	41.951	0.0	122
180 min Summer	30.166	0.0	182
240 min Summer	23.872	0.0	242
360 min Summer	17.165	0.0	360
480 min Summer	13.584	0.0	468
600 min Summer	11.329	0.0	514
720 min Summer	9.768	0.0	572
960 min Summer	7.783	0.0	694
1440 min Summer	5.651	0.0	968
2160 min Summer	4.103	0.0	1368
2880 min Summer	3.270	0.0	1760
4320 min Summer	2.279	0.0	2508
5760 min Summer	1.764	0.0	3176
7200 min Summer	1.446	0.0	3816
8640 min Summer	1.229	0.0	4496
10080 min Summer	1.072	0.0	5240
15 min Winter	227.678	0.0	19

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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
30 min Winter	44.469	0.734	0.6	32.5	O K
60 min Winter	44.543	0.808	0.6	36.3	O K
120 min Winter	44.613	0.878	0.6	40.0	O K
180 min Winter	44.646	0.911	0.6	41.7	Flood Risk
240 min Winter	44.663	0.928	0.6	42.5	Flood Risk
360 min Winter	44.671	0.936	0.6	43.0	Flood Risk
480 min Winter	44.663	0.928	0.6	42.5	Flood Risk
600 min Winter	44.645	0.910	0.6	41.6	Flood Risk
720 min Winter	44.621	0.886	0.6	40.4	O K
960 min Winter	44.586	0.851	0.6	38.6	O K
1440 min Winter	44.512	0.777	0.6	34.7	O K
2160 min Winter	44.400	0.665	0.6	28.9	O K
2880 min Winter	44.294	0.559	0.6	23.4	O K
4320 min Winter	44.082	0.347	0.6	12.4	O K
5760 min Winter	43.959	0.224	0.6	6.0	O K
7200 min Winter	43.922	0.187	0.5	4.2	O K
8640 min Winter	43.896	0.161	0.4	3.1	O K
10080 min Winter	43.876	0.141	0.4	2.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
30 min Winter	129.558	0.0	33
60 min Winter	73.723	0.0	62
120 min Winter	41.951	0.0	120
180 min Winter	30.166	0.0	180
240 min Winter	23.872	0.0	238
360 min Winter	17.165	0.0	352
480 min Winter	13.584	0.0	462
600 min Winter	11.329	0.0	570
720 min Winter	9.768	0.0	666
960 min Winter	7.783	0.0	750
1440 min Winter	5.651	0.0	1054
2160 min Winter	4.103	0.0	1492
2880 min Winter	3.270	0.0	1904
4320 min Winter	2.279	0.0	2596
5760 min Winter	1.764	0.0	3168
7200 min Winter	1.446	0.0	3816
8640 min Winter	1.229	0.0	4496
10080 min Winter	1.072	0.0	5240

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Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	GB 507700 181550 TQ 07700 81550
C (1km)	-0.024
D1 (1km)	0.297
D2 (1km)	0.321
D3 (1km)	0.220
E (1km)	0.303
F (1km)	2.570
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.063

Time (mins) From:	To:	Area (ha)
0	4	0.063

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Model Details

Storage is Online Cover Level (m) 44.735

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.06152	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	17.3
Max Percolation (l/s)	48.1	Slope (1:X)	80.0
Safety Factor	5.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	43.735	Membrane Depth (m)	0

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