

Supplementary Materials

Table S1

Characteristics of sub-catchments in SWMM at Case study.

No. Sub-catchment	A (ha)	I -stage 1 (%)	I -stage 2 (%)	W (m)	S (%)	N-I	N-P	D-i (mm)	D-p (mm)	Max-R (mm/h)	Min-R (mm/h)	D-c (h)	D-t (day)
1	10.78	35	35	539	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
2	6.54	10	65	327	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
3	3.97	15	60	198.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
4	2.14	80	80	107	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
5	5.83	55	55	291.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
6	2.51	78	78	125.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
7	2.79	75	75	139.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
8	5.70	55	55	285	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
9	2.73	55	55	136.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
10	6.35	55	55	317.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
11	6.39	80	80	319.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
12	4.58	10	50	229	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
13	5.07	78	78	253.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
14	2.56	67	67	128	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
15	4.49	75	75	224.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
16	6.60	55	55	330	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
17	4.10	70	70	205	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
18	6.31	70	70	315.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
19	7.32	20	50	366	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
20	6.61	20	70	330.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
21	6.38	20	50	319	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
22	4.38	66	66	219	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
23	4.32	55	55	216	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
24	4.35	50	50	217.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
25	7.63	45	45	381.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
26	15.9	30	30	795	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7

27	8.73	10	45	436.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
28	3.91	20	75	195.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
29	2.99	30	65	149.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
30	7.55	50	75	377.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
31	4.54	78	78	227	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
32	8.00	20	70	400	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
33	5.88	25	25	294	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
34	13.21	80	80	660.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
35	14.49	75	75	724.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
36	14.62	30	50	731	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
37	9.43	65	65	471.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
38	5.44	20	65	272	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
39	4.90	65	65	245	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
40	5.18	50	70	259	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
41	4.19	67	67	209.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
42	5.31	20	20	265.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
43	3.47	70	70	173.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
44	2.86	50	50	143	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
45	2.99	10	65	149.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
46	2.65	50	50	132.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
47	4.55	80	80	227.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
48	4.64	78	78	232	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
49	4.29	65	65	214.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
50	7.45	60	60	372.5	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
51	5.72	75	75	286	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7
52	9.40	67	67	470	0.5	0.024	0.15	2.1	6.51	103.81	11.44	2.75	7

Note: A: area; I: imperviousness ratio; W: width; S: slope; N-I: n-imperv: ; N-P: n-perv; D-i: dstore-imperv; D-p: dstore-perv; Max-R: maxrate; Min-R: minrate; D-c: decay constant; and D-t: drying time.

**Table S2**

Values of experiment design of permeable pavement (PP) and bioretention cells (BC) in SWMM.

Layer	Parameter	PP	BC	Layer	Parameter	PP	BC
Surface layer	Berm height (mm)	-	450	Pavement	Thickness (mm)	100	-
	Vegetation volume fraction (m <sup>3</sup> /m <sup>3</sup> )	-	0.05		Void ration (voids/solids) (m3/m3)	0.15	-
	Surface roughness (Manning's n)	0.012	0.1		Impervious surface fraction	0	-
	Surface slope (percent)	0.5	0.5		Permeability (mm/h)	500	-
Soil layer	Thickness (mm)	-	900	Storage layer	Clogging factor	0	-
	Porosity (m3/m3)	-	0.5		Thickness (mm)	300	300
	Field capacity (volume fraction) (m3/m3)	-	0.15		Void ration (voids/solids) (m3/m3)	0.4	0.67
	Wilting point (volume fraction) (m3/m3)	-	0.08		Seepage rate to native soil (mm/h)	500	500
	Conductivity (mm/h)	-	50	Underdrain layer	Clogging factor	0	0
	Conductivity slope	-	10		Flow coefficient	2.5	2.5
	Suction head (mm)	-	80		Flow exponent	0.5	0.5
					Offset height (mm)	100	150