

Supplementary materials

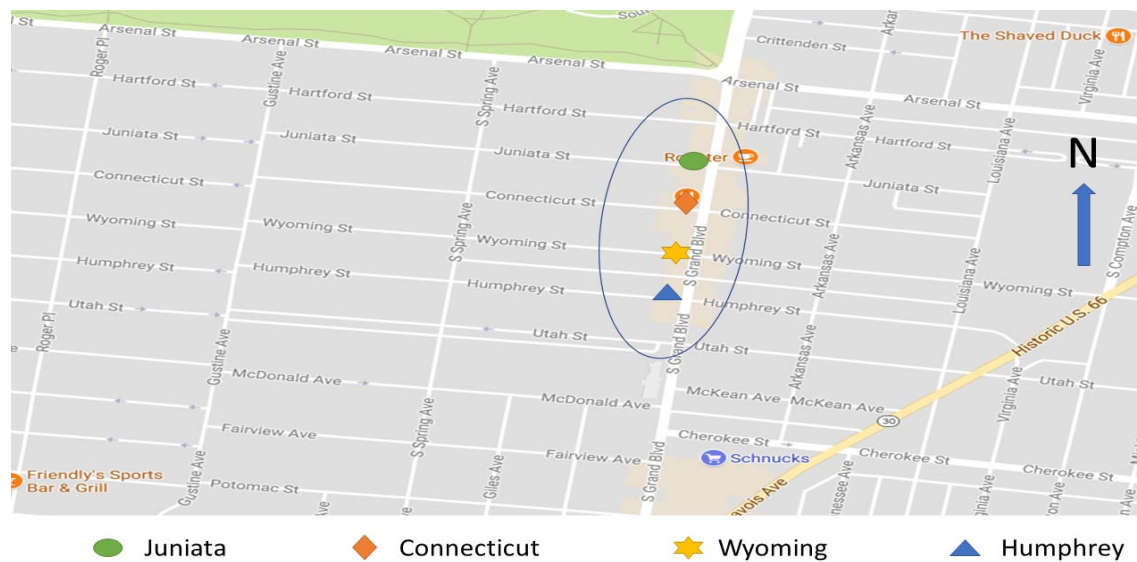


Fig. S-1 Satellite view of study site

Table S-1 Manhole where flow meters were installed, drainage area, and slope for four sites in the study

Parameters	Wyoming	Connecticut	Humphrey	Juniata
Latitude	38°35'56.9"N	38°36'00.1"N	38°35'53.6"N	38°36'3.43"N
Longitude	90°14'34.1"W	90°14'33.6"W	90°14'34.6"W	90°14'33.1"W
Manholes where flow meters were installed	MH22F4-113C	MH22F4-111C	MH22F4-152C	MH22F1-148C
Drainage area (acres)	0.73	0.78	0.41	0.76
Slope, distant point to rain garden (%)	3	1.52	2.5	2.3
Slope, rain garden to flowmeter (%)	1.12	1.25	0.5	1.2
Impervious surfaces to total drainage area (%)	93	93	90	92

Water quality results

Table S-2 Stormwater quality analysis from six sampling events for all parameters and two sampling events for chloride at the four rain garden sites in the pre-construction phase

Site	Sampling date	<i>E. coli.</i> (MPN/100 mL)	TSS (mg/L)	Chloride (mg/L)	TP (as P) (mg/L)	Zn (mg/L)	Cu (mg/L)	Hg (mg/L)	NO ₃ ⁻ (as N) (mg/L)	TKN (as N) (mg/L)	TN (as N) (mg/L)
Wyoming	11/(8–9)/2011	266	30.2	12.7	3.33	0.080	0.010	LDL	1.9	1.1	2.9
	11/(28–29)/2011	5170	5.6	6.2	0.12	0.026	0.007	LDL	0.8	2.4	3.2
	12/13/2011	663	6.0	24.0	0.51	0.020	0.009	LDL	1.4	5.1	6.5
	12/(19–20)/2011	N/A	2.5	32.0	0.42	0.015	0.008	LDL	1.8	0.3	2.1
	1/27/2012			155							
	2/16/2012			N/A							
	4/(4–5)/2012	1900	21.5	16.8	0.48	0.039	0.046	LDL	1.3	2.2	3.5
	5/7/2012	22200	14.0	5.3	0.25	0.035	0.014	LDL	0.4	4.4	4.8
Connecticut	11/(8–9)/2011	8660	43.7	9.1	0.28	0.098	0.019	LDL	0.9	2.0	3.0
	11/(28–29)/2011	1050	8.3	135	0.33	0.023	0.011	LDL	1.1	1.1	2.8
	12/13/2011	233	9.0	306	1.52	0.024	0.011	LDL	1.9	5.0	6.9
	12/(19–20)/2011	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	1/27/2012			73.2							
	2/16/2012			342							
	4/(4–5)/2012	279	86.0	117	0.69	0.146	0.037	LDL	1.9	6.7	8.6
	5/7/2012	3650	15.5	49.2	0.18	0.052	0.014	LDL	0.4	1.5	1.9
Humphrey	11/(8–9)/2011	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	11/(28–29)/2011	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	12/13/2011	41	13.3	6.9	0.02	0.038	0.012	LDL	1.3	2.1	3.4

	12/(19–20)/2011	N/A	12.0	5.4	0.09	0.057	0.011	LDL	2.0	4.8	6.8
	1/27/2012			212							
	2/16/2012			136							
	4/(4–5)/2012	3080	16.5	36.6	0.57	0.031	0.028	LDL	1.0	5.9	6.9
	5/7/2012	6490	43.0	12.1	0.33	0.076	0.020	LDL	0.4	4.7	5.1
Juniata	11/(8–9)/2011	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	11/(28–29)/2011	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	12/13/2011	1140	170.0	3.9	0.09	0.286	0.048	LDL	1.7	5.7	7.3
	12/(19–20)/2011	N/A	57.5	20.8	0.27	0.080	0.019	LDL	2.3	2.6	4.9
	1/27/2012			48.2							
	2/16/2012			156							
	4/(4–5)/2012	313	80.0	35.9	4.40	0.172	0.062	LDL	0.6	12.1	12.7
	5/7/2012	9800	15.0	5.5	0.33	0.040	0.012	LDL	0.4	3.5	3.8
Average		4100	34	76	0.75	0.070	0.021	–	1.24	3.85	5.1

Notes: LDL: Lower than Detection Limit (Hg Method Detection Limit (MDT) = 0.00018 mg/L); N/A: sample was not collected at that location on that date

Table S-3 Stormwater quality analysis from seven sampling events at the four rain garden sites in the post-construction phase

Site	Sampling date	<i>E. coli</i> (MPN/100 mL)	TSS (mg/L)	Chloride (mg/L)	TP (as P) (mg/L)	Zn (mg/L)	Cu (mg/L)	Hg (mg/L)	Nitrate (as N) (mg/L)	TKN (as N) (mg/L)	TN (as N) (mg/L)
Wyoming	2/20/2014	305	150	417	1.9	0.103	0.027	LDL	5.7	3.2	8.3
	3/12/2014	152	58	4161	4.8	0.073	0.027	LDL	6.9	3.9	10.8
	3/28/2014	N/A	39	800	0.4	0.089	0.022	LDL	2.4	3.1	5.5
	4/2/2014	75	48	319	0.2	0.077	0.020	LDL	2.9	0.0	2.9
	4/22/2014	N/A	71	1634	4.3	0.031	0.016	LDL	3.9	4.8	8.7
	5/15/2014	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	7/8/2014	N/A	64	N/A	6.1	0.045	0.009	0.0002	2.5	23.0	25.5
Connecticut	2/20/2014	420	144	196	1.4	0.151	0.033	LDL	6.7	2.9	9.6
	3/12/2014	109	86	3488	7.9	0.121	0.033	LDL	6.6	6.3	12.8
	3/28/2014	N/A	59	4973	3.3	0.114	0.023	LDL	5.2	7.8	13.0
	4/2/2014	63	57	1956	2.7	0.085	0.024	LDL	5.1	1.2	6.3
	4/22/2014	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	5/15/2014	14100	27	248	1.3	0.021	0.013	LDL	2.0	8.3	10.3
	7/8/2014	N/A	65	N/A	4.6	0.021	0.003	0.0002	2.5	16.0	18.5
Humphrey	2/20/2014	20	22	709	9.3	0.029	0.014	LDL	5.0	7.9	12.9
	3/12/2014	10	290	9792	2.9	0.145	0.045	LDL	15.9	3.7	19.6
	3/28/2014	N/A	136	1058	0.2	0.122	0.042	LDL	7.3	4.7	12.0
	4/2/2014	10	20	2128	0.3	0.040	0.018	LDL	4.9	2.8	7.7
	4/22/2014	N/A	22	149	0.2	0.037	0.016	LDL	1.1	3.0	4.1

	5/15/2014	52	2	8	0.2	0.031	0.015	LDL	3.3	1.8	5.0
	7/8/2014	N/A	2	N/A	0.2	0.010	0.005	0.0002	2.5	1.1	3.6
Juniata	2/20/2014	1050	92	70	2.0	0.107	0.027	LDL	3.2	2.6	5.9
	3/12/2014	1150	219	718	1.4	0.248	0.106	LDL	4.2	4.6	8.7
	3/28/2014	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	4/2/2014	359	27	38	0.1	0.062	0.018	LDL	3.6	4.9	8.5
	4/22/2014	N/A	24	18	0.1	0.081	0.023	LDL	2.1	1.8	3.9
	5/15/2014	4360	9	4	0.1	0.051	0.015	LDL	1.6	1.6	3.2
	7/8/2014	N/A	20	N/A	0.3	0.050	0.021	LDL	2.5	2.3	4.8
Average		1500	70	660	2.3	0.078	0.025	–	4.38	4.93	9.32

Notes: LDL: Lower than Detection Limit (Hg Method Detection Limit (MDT) = 0.00018 mg/L); N/A: sample was not collected at that location on that date

Stormwater runoff comparison

Table S-4 Rainfall events during the years 2011–2012 (pre-construction) shows the volume discharged to the sewer from Connecticut Site due to stormwater runoff

Date	Day	Days used for base flow estimation	Volume (gallon)	Base flow (gallon)	Runoff (gallon)	Rain (inch)	Runoff/rain (gallon/inch)
9/9/2011	Friday	9/8, 9/11	1095.9	935.6	160.3	0.24	667.9
9/22/2011	Thursday	9/20–21, 9–24	2055.9	1968.8	87.1	0.22	396.1
10/12/2011	Wednesday	10/11, 10/13	2602.6	2382.7	250.8	0.23	387.0
10/18/2011	Tuesday	10/14–16, 10/20	2924.1	2537.1	387.0	1.00	231.7
11/3/2011	Thursday	11/1–2, 11/4–5	2889.8	2676.6	213.2	0.92	559.9
11/8/2011	Tuesday	11/5–6, 11/10	2879.3	2688.9	190.4	0.34	983.9
11/9/2011	Wednesday	11/5–6, 11/10	2757.8	2688.9	68.9	0.07	400.7
11/22/2011	Tuesday	11/21, 11/23	3828.2	3415.5	412.7	1.03	486.9
12/3/2011	Saturday	12/2, 12/4–6	2379.2	2238.0	141.2	0.29	32.9
12/13/2011	Tuesday	12/10–12, 12/16	17.5	3.3	14.2	0.43	222.5
12/19/2011	Monday	12/18, 12/22	146.9	0.0	146.9	0.66	59.1
12/20/2011	Tuesday	12/18, 12/22	11.9	0.0	11.8	0.20	178.4
12/26/2011	Monday	12/25,12/28	112.4	8.9	103.5	0.58	8.3
12/27/2011	Tuesday	12/24–25, 12/28	8.5	5.9	2.6	0.31	62.9
1/14/2012	Saturday	1/12–13, 1/15	28.0	17.9	10.1	0.16	62.8
1/17/2012	Tuesday	1/16, 1/19–21	42.4	4.7	37.7	0.60	431.1
1/22/2012	Sunday	1/19–21, 1/23–24	43.4	13.2	30.2	0.07	193.9
1/25/2012	Wednesday	1/23–24, 1/29–30	176.7	11.8	164.8	0.85	113.3
1/26/2012	Thursday	1/23–24, 1/29–30	54.9	11.8	43.0	0.38	460.0

1/27/2012	Friday	1/23–24, 1/29–30	48.6	11.8	36.8	0.08	11.6
1/28/2012	Saturday	1/24, 1/29–30	8.7	8.1	0.6	0.05	86.5
2/3/2012	Friday	2/2, 2/5	77.9	0.0	77.9	0.90	130.4
2/4/2012	Saturday	2/2, 2/5	40.4	0.0	40.4	0.31	12.4
2/15/2012	Wednesday	2/11–12, 2/17–18	6.0	4.0	2.0	0.16	59.0
2/29/2012	Wednesday	2/26–27, 3/1	20.0	13.5	6.5	0.11	284.9
3/8/2012	Thursday	3/7, 3/9	51.3	0.0	51.3	0.18	230.8
3/11/2012	Sunday	3/11, 3/13	36.9	0.0	36.9	0.16	90.9
3/15/2012	Thursday	3/13–14, 3/18–19	27.4	5.6	21.8	0.24	75.2
3/16/2012	Friday	3/13–14, 3/18–19	24.4	5.6	18.8	0.25	35.9
3/17/2012	Saturday	3/13–14, 3/18–19	30.0	5.6	24.4	0.68	33.7
3/22/2012	Thursday	3/21, 3/25	10.4	0.0	10.4	0.31	60.2
3/29/2012	Thursday	3/28, 3/30	4.2	0.0	4.2	0.07	1090.6
4/28/2012	Saturday	4/27, 4/29	23794.5	0.0	23794.5	1.5	15863.0
Average					806	0.4	727
St. deviation					4128	0.4	2730

Notes: *The days 9/10/2011, 4/15/2012, 4/14/2012, 4/4/2012, 4/13/2012, 10/17/2011, 10/19/2011, 3/23/2012, 12/14/2011, 9/14/2011, 11/28/2011 were excluded due to the meter malfunctioning

Table S-5 Rainfall events during the year 2014 (post-construction) shows the volume discharged to the sewer from Connecticut Site due to stormwater runoff

Date	Day	Days used for base flow estimation	Volume (gallon)	Base flow (gallon)	Runoff (gallon)	Rain (inch)	Runoff/rain (gallon/inch)
2/13/2014	Thursday	2/11, 2/15	1.6	0.0	1.6	0.15	10.7
2/14/2014	Friday	2/11, 2/15	1.5	0.0	1.5	0.05	30.6
3/4/2014	Tuesday	3/1–2, 3/5–6	63.1	45.5	17.6	0.23	76.5
3/11/2014	Tuesday	3/10, 3/13	89.5	15.9	73.6	0.29	253.9
3/12/2014	Wednesday	3/10, 3/13	31.7	15.9	15.8	0.20	79.2
4/7/2014	Monday	4/6, 4/8	268.2	0.0	268.2	0.42	638.5
4/13/2014	Sunday	4/12, 4/14	159.7	6.1	153.6	0.65	236.3
4/24/2014	Thursday	4/23, 4/25	2267.4	9.7	2257.8	0.77	2932.2
4/27/2014	Sunday	4/20, 5/4	291.9	41.4	250.5	0.58	431.9
4/28/2014	Monday	4/26, 4/29	563.8	0.0	563.8	0.55	1025.1

5/11/2014	Sunday	5/10, 5/16	130.9	14.6	116.3	0.29	401.1
5/12/2014	Monday	5/10, 5/16	130.8	14.6	116.2	0.38	305.7
5/13/2014	Tuesday	5/10, 5/16	425.1	14.6	410.5	0.24	1710.3
5/14/2014	Wednesday	5/10, 5/16	1403.9	14.6	1389.3	0.70	1984.7
5/21/2014	Wednesday	5/20, 5/22	132.4	1.8	130.6	0.22	593.6
5/25/2014	Sunday	5/24, 5/27	159.3	0.0	159.3	0.12	1327.4
5/26/2014	Monday	5/24, 5/27	27.5	0.0	27.5	0.09	305.7
6/4/2014	Wednesday	6/2-3, 6/5-6	134.6	0.5	134.1	0.70	191.5
6/7/2014	Saturday	6/6, 6/8	1371.7	0.0	1371.7	1.05	1306.4
6/9/2014	Monday	6/8, 6/11	517.0	9.2	507.8	0.86	590.4
6/10/2014	Tuesday	6/8, 6/11	269.4	9.2	260.2	0.36	722.6
Average					391.8	0.4	722
St. deviation					581.0	0.3	754

Notes: *The days 1/10/2014, 2/1/2014, 2/20/2014, 3/27/2014, 4/2/2014, 4/3/2014, and 4/21/2014 were excluded due to the meter malfunctioning

Table S-6 Rainfall events during the years 2011–2012 (pre-construction) shows the volume discharged to the sewer from Humphrey Site due to stormwater runoff

Date	Day	Days used for base flow estimation	Volume (gallon)	Base flow (gallon)	Runoff (gallon)	Rain (inch)	Runoff/rain (gallon/inch)
9/3/2011	Saturday	9/2, 9/4	14.8	0.1	14.7	0.11	133.4
9/9/2011	Friday	9/8, 9/11	23.1	0.6	22.5	0.24	93.8
9/18/2011	Sunday	9/17, 9/20	418.1	0.0	418.1	1.11	376.6
9/19/2011	Monday	9/17, 9/20	31.5	0.0	31.5	0.11	286.4
9/22/2011	Thursday	9/21, 9/24–25	78.9	0.5	78.4	0.22	356.5
10/12/2011	Wednesday	10/9–11, 10/13	48.1	0.4	47.7	0.23	207.4
10/17/2011	Monday	10/16, 10/20	55.7	0.6	55.1	0.61	90.4
10/18/2011	Tuesday	10/16, 10/20	847.7	0.6	847.1	1.00	847.1
10/26/2011	Wednesday	10/23–25, 10/27–30	4.9	0.3	4.6	0.07	65.4
11/3/2011	Thursday	11/2, 11/4	208.6	0.0	208.6	0.92	226.7
11/7/2011	Monday	11/6, 11/10	169.1	0.8	168.3	0.46	365.8
11/8/2011	Tuesday	11/6, 11/10	68.5	0.8	67.7	0.34	199.2
11/9/2011	Wednesday	11/6, 11/10	7.2	0.8	6.4	0.07	91.5
11/20/2011	Sunday	11/19, 11/21	187.3	0.0	187.3	0.36	520.4
11/22/2011	Tuesday	11/21, 11/23	542.9	0.0	542.9	1.03	527.1
11/26/2011	Saturday	11/25, 11/30	75.0	0.0	75.0	0.42	178.5
11/27/2011	Sunday	11/25, 11/30	9.2	0.0	9.2	0.07	131.4
11/28/2011	Monday	11/25, 11/30	178.4	0.0	178.4	0.21	849.7
12/3/2011	Saturday	12/2, 12/5	103.0	0.0	103.0	0.29	355.1
12/4/2011	Sunday	12/2, 12/5	365.4	0.0	365.4	0.50	730.7
12/13/2011	Tuesday	12/10–12, 12/16–17	2432.0	346.2	2085.9	0.43	4850.8
12/14/2011	Wednesday	12/10–12, 12/16–17	697.0	346.2	350.8	0.77	455.6
12/19/2011	Monday	12/16–18, 12/22–25	965.7	24.8	940.9	0.66	1425.5
12/20/2011	Tuesday	12/16–18, 12/22–25	564.5	24.8	539.6	0.20	2698.2
12/26/2011	Monday	12/24–25, 12/28	696.5	38.6	657.9	0.58	1134.3
12/27/2011	Tuesday	12/24–25, 12/28	790.4	38.6	751.8	0.31	2425.2
2/3/2012	Friday	2/1–2, 2/6	283.4	22.6	260.8	0.90	289.8
2/4/2012	Saturday	2/1–2, 2/6	205.8	22.6	183.2	0.31	590.9

2/8/2012	Wednesday	2/6, 2/9	2.4	0.0	2.4	0.06	40.0
2/15/2012	Wednesday	2/12–13, 2/17–19	48.7	0.7	48.0	0.16	299.7
2/16/2012	Thursday	2/12–13, 2/17–19	18.4	0.7	17.7	0.05	353.9
2/29/2012	Wednesday	2/25–27, 3/1	580.2	178.3	401.8	0.11	3653.1
3/8/2012	Thursday	3/6–7, 3/9–10	851.4	332.9	518.4	0.18	2880.2
3/11/2012	Sunday	3/9–10, 3/13–14	677.9	398.3	279.6	0.16	1747.5
3/15/2012	Thursday	3/13–14, 3/18	574.2	301.2	273.0	0.24	1137.4
3/16/2012	Friday	3/13–14, 3/18	523.6	301.2	222.4	0.25	889.4
3/17/2012	Saturday	3/13–14, 3/18	414.9	301.2	113.7	0.68	167.2
3/22/2012	Thursday	3/21, 3/24	64.9	3.8	61.1	0.31	197.1
3/29/2012	Thursday	3/28, 3/30	24.5	0.0	24.5	0.07	349.7
4/5/2012	Thursday	4/1–2, 4/6–8	24.3	2.3	21.9	0.42	52.3
4/13/2012	Friday	4/12, 4/16–17	583.5	70.8	512.7	1.23	416.9
4/14/2012	Saturday	4/12, 4/16	1009.9	99.1	910.8	1.20	759.0
4/15/2012	Sunday	4/12, 4/16–17	531.1	70.8	460.4	1.32	348.8
4/20/2012	Friday	4/19	4.5	0.0	4.5	0.08	56.6
4/22/2012	Sunday	4/21, 4/23	1243.0	69.4	1173.6	0.15	7823.9
4/28/2012	Saturday	4/24–27, 4/29	509.0	3.5	505.5	1.50	337.0
5/1/2012	Tuesday	4/29–30, 5/2	6.4	0.3	6.1	0.33	18.5
5/7/2012	Monday	5/5–6, 5/8–9	7722.2	6974.5	747.7	0.87	859.4
5/31/2012	Thursday	5/28–29, 6/1–3	8280.3	8095.4	184.9	0.14	1320.5
6/16/2012	Saturday	6/14–15, 6/18–19	8686.5	7887.9	798.6	0.52	1535.7
7/29/2012	Sunday	7/26–28, 7/30	9518.4	9507.3	11.1	0.21	52.7
8/13/2012	Monday	8/9–12, 8/14–15	12934.8	12834.3	100.6	0.43	233.9
8/16/2012	Thursday	8/17	10503.7	10204.4	299.4	0.86	348.1
Average					318.9	0.5	875
St. deviation					386.6	0.4	1372

Notes: *The days 8/25/2012, 4/4/2012, 8/26/2012, 3/23/2012, 9/14/2011, and 6/11/2012 were excluded due to the meter malfunctioning

Table S-7 Rainfall events during the year 2014 (post-construction) shows the volume discharged to the sewer from Humphrey Site due to stormwater runoff

Date	Day	Days used for base flow estimation	Volume (gallon)	Base flow (gallon)	Runoff (gallon)	Rain (inch)	Runoff/rain (gallon/inch)
1/4/2014	Wednesday	1/1-2, 1/6-7	2.9	2.9	0.0	0.09	0.1
1/10/2014	Tuesday	1/6-8, 1/11	37.6	2.2	35.5	1.34	26.5
2/1/2014	Wednesday	1/31, 2/2	39.0	2.1	36.8	1.04	35.4
2/12/2014	Sunday	2/8-11, 2/15	12.9	10.8	2.1	0.23	8.9
2/13/2014	Monday	2/8-11, 2/15	12.0	10.8	1.1	0.15	7.5
2/14/2014	Tuesday	2/8-11, 2/15	11.8	10.8	1.0	0.05	20.2
2/16/2014	Thursday	2/18/19	7.9	6.8	1.0	0.05	20.9
3/3/2014	Friday	3/5-7	4.6	4.5	0.1	0.16	0.6
3/11/2014	Saturday	3/9-10, 3/13-14	6.6	4.3	2.3	0.29	8.0
3/27/2014	Monday	3/23-25, 3/30-31	11.2	4.2	7.0	0.31	22.7
4/3/2014	Monday	3/30-31, 4/5-6	220.0	96.7	123.3	1.61	76.6
4/7/2014	Friday	4/5-6, 4/9	1363.2	218.3	1144.9	0.42	2725.9
4/13/2014	Thursday	4/11-12, 4/15-16	754.4	285.6	468.8	0.65	721.3
4/24/2014	Monday	4/22-23, 4/25-26	929.3	102.0	827.3	0.77	1074.4
4/27/2014	Thursday	4/25-26, 4/29	1406.9	6.8	1400.2	0.58	2414.1
4/28/2014	Friday	4/25-26, 4/29	851.0	6.8	844.3	0.55	1535.0
Average					306.0	0.5	544
St. deviation					476.7	0.5	915

Notes: *The days 2/20/2014, 3/4/2014, 4/21/2014, 6/22/2014, 6/7/2014, 4/2/2014, 1/10/2014, 2/1/2014, and 4/3/2014 were excluded due the meter malfunctioning

Table S-8 Rainfall events during the year 2012 (pre-construction) shows the volume discharged to the sewer from Juniata Site due to stormwater runoff

Date	Day	Days used for base flow estimation	Volume (gallon)	Base flow (gallon)	Runoff (gallon)	Rain (inch)	Runoff/rain (gallon/inch)
1/14/2012	Saturday	1/12–13, 1/16	325.3	4.3	321.1	0.16	2006.6
1/17/2012	Tuesday	1/16, 1/18	5246.4	5.9	5240.5	0.6	8734.1
1/25/2012	Wednesday	1/24, 1/29	6019.0	0.0	6019.0	0.85	7081.2
1/26/2012	Thursday	1/24, 1/29	2523.7	0.0	2523.7	0.38	6641.3
1/27/2012	Friday	1/24, 1/29	241.1	0.0	241.1	0.08	3014.3
1/28/2012	Saturday	1/24, 1/29	287.2	0.0	287.2	0.05	5743.2
2/3/2012	Friday	2/2, 2/6	4843.0	0.0	4843.0	0.9	5381.2
2/4/2012	Saturday	2/2, 2/6	1068.5	0.0	1068.5	0.31	3446.7
2/8/2012	Wednesday	2/7, 2/9	29.4	0.0	29.4	0.06	489.8
2/15/2012	Wednesday	2/14, 2/17	318.3	0.0	318.3	0.16	1989.5
2/16/2012	Thursday	2/14, 2/17	233.8	0.0	233.8	0.05	4676.7
2/29/2012	Wednesday	2/27, 3/1	317.7	0.0	317.7	0.11	2888.3
3/8/2012	Thursday	3/7, 3/9	445.6	0.0	445.6	0.18	2475.4
3/15/2012	Thursday	3/14, 3/18	49.7	0.0	49.7	0.24	206.9
3/16/2012	Friday	3/14, 3/18	390.4	0.0	390.4	0.25	1561.7
3/17/2012	Saturday	3/14, 3/18	1618.1	0.0	1618.1	0.68	2379.6
3/23/2012	Friday	3/21, 3/25	1226.0	0.0	1226.0	0.89	1377.5
3/29/2012	Thursday	3/28, 3/30	2.2	0.0	2.2	0.07	31.5
4/4/2012	Wednesday	4/3, 4/6	1907.9	0.0	1907.9	1.27	1502.3
4/20/2012	Friday	4/19, 4/21	29.3	18.5	10.8	0.08	135.4
4/22/2012	Sunday	4/21, 4/23–25	25.5	22.4	3.1	0.15	20.6
5/7/2012	Monday	5/5–6, 5/8–9	1667.2	1034.7	632.5	0.87	727.0
5/31/2012	Thursday	5/29, 6/1	3252.8	2214.9	1037.9	0.14	7413.5
6/4/2012	Monday	6/1, 6/5	4251.0	3044.0	1206.9	0.1	12069.2
6/11/2012	Monday	6/9–10, 6/12–13	9281.2	4603.9	4677.3	1.22	3833.9
6/16/2012	Saturday	6/15, 6/17	6486.3	5130.4	1355.9	0.52	2607.5
8/4/2012	Saturday	8/2–3, 8/6–8	63867.6	62644.7	1222.9	0.4	3057.3
8/25/2012	Saturday	8/24, /28	2110.4	0.0	2110.4	0.12	17586.3
8/16/2012	Thursday	8/14–15, 8/17–18	25733.3	4871.6	20861.6	0.86	24257.7
8/26/2012	Sunday	8/24, 8/27–28	33700.2	24248.7	9451.5	0.65	14540.8
3/11/2012	Sunday	3/10, 3/13	4526.8	0.0	4526.8	0.16	28292.4
7/29/2012	Sunday	7/28, 7/30	46829.0	42251.9	4577.1	0.21	21795.7
Average					5290.6	0.4	6186
St. deviation					16735.0	0.4	7410

Notes: *The days 4/28/2012, 4/13/2012, 4/14/2012, 4/15/2012, 7/8/2012, and 8/13/2012 were excluded due to the meter malfunctioning

Table S-9 Rainfall events during the year 2014 (post-construction) shows the volume discharged to the sewer from Juniata Site due to stormwater runoff

Date	Day	Days used for base flow estimation	Volume (gallon)	Base flow (gallon)	Runoff (gallon)	Rain (inch)	Runoff/rain (gallon/inch)
2/1/2014	Sunday	1/31, 2/2	8386.1	0.0	8386.1	1.04	8063.5
2/13/2014	Friday	2/10–11, 2/15	147.9	17.0	130.8	0.15	872.2
2/14/2014	Saturday	2/10–11, 2/15	216.4	17.0	199.4	0.05	3987.8
2/20/2014	Friday	2/18–19, 2/21	5899.8	357.6	5542.2	0.41	13517.5
3/4/2014	Wednesday	3/2, 3/6	15.6	1.9	13.7	0.23	59.7
3/11/2014	Wednesday	3/10, 3/13	2721.2	0.0	2721.2	0.29	9383.3
3/12/2014	Thursday	3/10, 3/13	1116.8	0.0	1116.8	0.2	5584.1
3/27/2014	Friday	3/26, 3/29	1161.6	0.0	1161.6	0.31	3747.0
3/28/2014	Saturday	3/26, 3/29	19.6	0.0	19.6	0.06	327.0
4/1/2014	Wednesday	3/31, 4/5	55.8	0.0	55.8	0.07	797.4
4/2/2014	Thursday	3/31, 4/5	11217.4	0.0	11217.4	1.33	8434.1
4/3/2014	Friday	3/31, 4/5	12808.1	0.0	12808.1	1.61	7955.3
4/7/2014	Tuesday	4/6, 4/8	1404.3	0.0	1404.3	0.42	3343.5
4/13/2014	Monday	4/12, 4/15	1561.2	0.0	1561.2	0.65	2401.9
4/21/2014	Tuesday	4/20, 4/22	1863.3	0.0	1863.3	0.15	12421.7
4/24/2014	Friday	4/23, 4/25	6961.7	46.9	6914.7	0.77	8980.2
4/27/2014	Monday	4/25–26, 4/26	3701.8	31.3	3670.5	0.58	6328.4
4/28/2014	Tuesday	4/25–26, 4/26	4552.1	31.3	4520.9	0.55	8219.7
5/11/2014	Monday	5/10, 5/16	1778.1	0.0	1778.1	0.29	6131.5
5/12/2014	Tuesday	5/10, 5/16	1836.4	0.0	1836.4	0.38	4832.7
5/30/2014	Saturday	5/29, 6/1	3318.1	0.0	3318.1	0.69	4808.8
6/4/2014	Thursday	6/3, 6/5	3022.7	0.0	3022.7	0.7	4318.1
6/7/2014	Sunday	6/6, 6/8	5735.1	0.0	5735.1	1.05	5462.0
6/22/2014	Monday	6/21, 6/25	7385.4	0.0	7385.4	1.45	5093.4
8/5/2014	Wednesday	8/4, 8/9	3950.9	0.0	3950.9	0.36	10974.8
Average					3613.4	0.6	5842
St. deviation					3499.4	0.4	3641

Notes: *The days 6/9, 8/7, and 8/27 were excluded due to the meter malfunctioning

Table S-10 Rainfall events during the years 2011–2012 (pre-construction) shows the volume discharged to the sewer from Wyoming Site due to stormwater runoff

Date	Day	Days used for base flow estimation	Volume (gallon)	Base flow (gallon)	Runoff (gallon)	Rain (inch)	Runoff/rain (gallon/inch)
9/3/2011	Saturday	9/2, 9/4	14.8	0.1	14.7	0.11	133.4
9/9/2011	Friday	9/8, 9/11	23.1	0.6	22.5	0.24	93.8
9/18/2011	Sunday	9/17, 9/20	418.1	1.4	416.7	1.11	375.4
9/19/2011	Monday	9/17, 9/20	31.5	0.0	31.5	0.11	286.4
9/22/2011	Thursday	9/21, 9/23	78.9	0.0	78.9	0.22	358.8
10/12/2011	Wednesday	10/11, 10/13	48.1	0.0	48.1	0.23	209.1
10/17/2011	Monday	10/16/, 10/19	55.7	0.6	55.1	0.61	90.4
10/18/2011	Tuesday	10/16/, 10/19	847.7	0.6	847.1	1.0	847.1
10/26/2011	Wednesday	10/25, 10/27	4.9	0.0	4.9	0.07	70.1
11/3/2011	Thursday	11/2, 11/4	208.6	0.0	208.6	0.92	226.7
11/7/2011	Monday	11/6, 11/10	169.1	0.8	168.3	0.46	365.8
11/8/2011	Tuesday	11/6, 11/10	68.5	0.8	67.7	0.34	199.2
11/9/2011	Wednesday	11/6, 11/10	7.2	0.8	6.4	0.07	91.5
11/20/2011	Sunday	11/19, 11/21	187.3	0.0	187.3	0.36	520.4
11/22/2011	Tuesday	11/21, 11/23	542.9	46.8	496.1	1.03	481.6
11/26/2011	Saturday	11/25, 11/30	75.0	0.0	75.0	0.42	178.5
11/27/2011	Sunday	11/25, 11/30	9.2	0.0	9.2	0.07	131.4
11/28/2011	Monday	11/25, 11/30	178.4	0.0	178.4	0.21	849.7
12/3/2011	Saturday	12/2, 12/5	103.0	0.0	103.0	0.29	355.1
12/4/2011	Sunday	12/2, 12/5	365.4	0.0	365.4	0.5	730.7
12/14/2011	Wednesday	12/11–12, 12/16	697.0	492.1	204.9	0.77	266.1
12/19/2011	Monday	12/18, 12/22	965.7	19.0	946.7	0.66	1434.4
12/20/2011	Tuesday	12/18, 12/22	564.5	19.0	545.5	0.2	2727.4
12/26/2011	Monday	12/25, 12/28	696.5	55.9	640.6	0.58	1104.5
12/27/2011	Tuesday	12/25, 12/28	790.4	55.9	734.5	0.31	2369.5
2/3/2012	Friday	2/1–2, 2/6	283.4	22.6	260.8	0.9	289.8
2/4/2012	Saturday	2/1–2, 2/6	205.8	22.6	183.2	0.31	590.9
2/8/2012	Wednesday	2/6, 2/9	2.4	0.0	2.4	0.06	40.0
2/15/2012	Wednesday	2/12–13, 2/17–18	48.7	0.3	48.4	0.16	302.6
2/16/2012	Thursday	2/12–13, 2/17–18	18.4	0.3	18.2	0.05	363.1
2/29/2012	Wednesday	2/26–27, 3/1	580.2	237.8	342.4	0.11	3112.7
3/8/2012	Thursday	3/6–7, 3/9–10	851.4	332.9	518.4	0.18	2880.2
3/11/2012	Sunday	3/9–10, 3/13–14	677.9	398.3	279.6	0.16	1747.5
3/15/2012	Thursday	3/13–14, 3/18	574.2	301.2	273.0	0.24	1137.4

3/16/2012	Friday	3/13–14, 3/18	523.6	301.2	222.4	0.25	889.4
3/17/2012	Saturday	3/13–14, 3/18	414.9	301.2	113.7	0.68	167.2
3/22/2012	Thursday	3/21, 3/25	64.9	3.8	61.1	0.31	197.1
3/29/2012	Thursday	3/28, 3/30	24.5	0.0	24.5	0.07	349.7
4/5/2012	Thursday	4/4, 4/6	24.3	0.0	24.3	0.42	57.8
4/13/2012	Friday	4/11–12, 4/16–17	583.5	53.1	530.4	1.23	431.2
4/14/2012	Saturday	4/11–12, 4/16–17	1009.9	53.1	956.8	1.2	797.4
4/15/2012	Sunday	4/11–12, 4/16–17	531.1	53.1	478.1	1.32	362.2
4/20/2012	Friday	0.4/19	4.5	0.0	4.5	0.08	56.6
4/28/2012	Saturday	4/24–27, 4/29	509.0	3.5	505.5	1.5	337.0
5/1/2012	Tuesday	4/29, 5/2	6.4	0.5	6.0	0.33	18.0
6/4/2012	Monday	6/1, 6/9	6479.7	6199.4	280.2	0.1	2802.5
6/16/2012	Saturday	6/14–15, 6/18–19	8686.5	7887.9	798.6	0.52	1535.7
8/13/2012	Monday	8/9–12, 8/14	12934.8	12855.1	79.8	0.43	185.6
8/16/2012	Thursday	8/17	10503.7	10204.4	299.4	0.86	348.1
8/26/2012	Sunday	8/27–30	8509.2	7052.7	1456.5	0.7	2240.8
Average					284.5	0.5	715
St. deviation					316.5	0.4	840

Notes: *The days 7/29/2012, 4/22/2012, 8/25/2012, 9/14/2011, 4/4/2012, 6/11/2012, and 3/23/2012 were excluded due to the meter malfunctioning

Table S-11 Rainfall events during the year 2014 (post-construction) shows the volume discharged to the sewer from Wyoming Site due to stormwater runoff

Date	Day	Days used for base flow estimation	Volume (gallon)	Base flow (gallon)	Runoff (gallon)	Rain (inch)	Runoff/rain (gallon/inch)
2/1/2014	Monday	1/31, 2/2	211.4	7.0	204.4	1.04	196.5
2/12/2014	Friday	0.2/7–11	1.2	0.8	0.4	0.23	1.5
2/13/2014	Saturday	2/11, 2/15	8.5	2.3	6.2	0.15	41.1
2/14/2014	Sunday	2/11, 2/15	6.4	2.2	4.2	0.05	83.3
2/16/2014	Tuesday	2/15, 2/19	3.3	2.2	1.1	0.05	21.8
2/20/2014	Saturday	2/18–19, 2/21–22	89.3	19.4	69.9	0.41	170.5
3/3/2014	Wednesday	0.2/25–26	19.0	0	19.035	0.16	119.0
3/4/2014	Thursday	0.2/25–26	16.7	0	16.68	0.23	72.5
3/11/2014	Thursday	3/10, 3/13	60.4	4.1	56.3	0.29	194.1
3/12/2014	Friday	3/10, 3/13	47.7	4.1	43.7	0.2	218.4
3/27/2014	Saturday	3/24–25, 3/30–31	104.5	4.7	99.7	0.31	321.8
3/28/2014	Sunday	3/24–25, 3/30–31	7.2	4.7	2.4	0.06	40.4
4/1/2014	Thursday	3/30–31, 4/5–6	26.3	1.6	24.7	0.07	353.3
4/3/2014	Saturday	3/30–31, 4/5–6	194.3	1.6	192.7	1.61	119.7
4/7/2014	Wednesday	4/6, 4/9	14.2	0.3	14.0	0.42	33.2
4/13/2014	Tuesday	4/12, 4/14	78.9	3.0	76.0	0.65	116.9
4/24/2014	Saturday	4/22–23, 4/25	160.2	2.7	157.6	0.77	204.6
4/27/2014	Tuesday	4/26, 4/29	122.9	0.0	122.9	0.58	211.8
4/28/2014	Wednesday	4/26, 4/29	45.5	0.0	45.5	0.55	82.8
5/11/2014	Tuesday	5/10, 5/16	34.5	15.0	19.5	0.29	67.3
5/12/2014	Wednesday	5/10, 5/16	24.0	15.0	9.0	0.38	23.6
5/13/2014	Thursday	5/10, 5/16	59.4	15.0	44.4	0.24	185.0
5/14/2014	Friday	5/10, 5/16	136.4	15.0	121.4	0.7	173.4
5/15/2014	Saturday	5/10, 5/16	5.0	4.1	0.8	0.06	14.1
5/21/2014	Friday	5/20, 5/22	32.1	1.6	30.5	0.22	138.6
5/25/2014	Tuesday	5/24, 5/27	16.3	0.0	16.3	0.12	135.5
5/26/2014	Wednesday	5/24, 5/27	8.9	0.0	8.9	0.09	99.0
5/30/2014	Sunday	5/29, 5/31	20.5	0.8	19.8	0.69	28.7
6/4/2014	Friday	6/2–3, 6/5–6	59.1	2.6	56.5	0.7	80.8
6/9/2014	Wednesday	6/8, 6/11	83.9	8.1	75.8	0.86	88.1
6/10/2014	Thursday	6/8, 6/11	26.7	8.1	18.6	0.36	51.6

6/12/2014	Saturday	6/11, 6/13	38.0	2.6	35.4	0.13	272.1
6/20/2014	Sunday	6/19, 6/25	15.3	0.7	14.6	0.32	45.6
6/21/2014	Monday	6/19, 6/25	27.2	0.7	26.5	0.28	94.6
6/26/2014	Saturday	6/24–25, 6/28	14.0	9.9	4.1	0.09	45.5
7/8/2014	Thursday	7/6, 7/9	107.7	1.9	105.9	0.38	278.6
8/5/2014	Thursday	8/4, 8/6	64.6	0.0	64.6	0.36	179.5
8/7/2014	Saturday	8/6, 8/9	102.4	0.0	102.4	1.48	69.2
8/8/2014	Sunday	8/6, 8/9	6.7	0.0	6.7	0.08	83.8
8/16/2014	Monday	8/14, 8/18	101.6	0.0	101.6	1.26	80.6
8/20/2014	Friday	8/19, 8/21	6.9	0.0	6.9	0.26	26.5
8/25/2014	Wednesday	8/24, 8/28	4.2	0.0	4.2	0.06	70.3
8/26/2014	Thursday	8/24, 8/28	1.1	0.0	1.1	0.12	8.9
8/27/2014	Friday	8/24, 8/28	168.1	0.0	168.1	0.68	247.2
8/30/2014	Monday	8/29, 8/31	35.0	0.0	35.0	0.41	85.4
4/21/2014	Wednesday	4/20, 4/22	87.8	3.5	84.3	0.15	562.1
Average					50.9	0.4	127
St. deviation					54.2	0.4	109

Notes: *The rainfall days 1/4/2014, 4/21/2014, 6/7/2014, and 6/22/2014 were excluded due to the meter malfunctioning