

**CITY OF SPOKANE,
WASHINGTON**

CSO FLOW MONITORING PROJECT

FLOW, FREQUENCY AND DURATION

SEWER MAINTENANCE

**Monthly Report
August 2009**

October 14, 2009
CSOMonthly2009-08.doc

OVERFLOW EVENTS

Table 1 – Flow-Frequency-Duration, provides a summary of the flow volume calculated for the overflow pipes at each site for each event recorded. The flow calculations are based on flow monitor recorded level and velocity measurements. See Attachment A for a summary of the precipitation volumes.

Table 1 – Flow-Frequency-Duration

	Location	CSO#	Freq.	Date of Event ¹	Estimated ² Total Flow (Gallons)	Event Duration (Minutes)	Comments
1.	AL Parkway Storage (West)	2	None				Missing data 8/6 01:05 to 8/14 11:30 Missing data 8/15 01:00 to 8/17 11:30 Missing data 8/18 13:55 to 8/18 15:20 Due to troubleshooting equipment malfunctions; problems have been resolved
2.	NW Blvd @ Kiernan	6	3	Total	1,019,076	200	Missing data 8/10 08:40 to 8/10 08:45 Missing data 8/12 07:35 to 8/12 07:40 Missing data 8/31 10:05 to 8/31 15:10
				8/6	104,927	50	
				8/12	791,678	125	
				8/21	122,471	25	
3.	Columbia @ Downriver	7	2	Total	251,463	70	
				8/6	223,720	50	
				8/12	27,743	20	
4.	Nettleton @ York/Buckeye	10	1	Total	1,171	35	Missing data 8/6 03:05 to 8/7 09:50
				8/12	1,171	35	
5.	Nora @ Pettet	12	3	Total	252,155	275	Missing data 8/10 09:00 to 8/10 09:05 Missing data 8/20 11:10 to 8/20 15:25
				8/6	178,472	85	
				8/12	49,777	150	
				8/21	23,906	40	

¹ Designation as an event means that both a level and velocity reading were recorded concurrently. Not all level and velocity readings that were coincident are included in this report, however. The level and velocity readings that appear to be “background noise” from the electronic equipment are not included in the table.

² The flows presented in this column are calculated from measurements of velocity and depth of flow by electronic devices inserted in the water stream. These measurements are subject to singular and possibly cumulative errors. These errors result from limitations inherent in the measuring devices and from the introduction of a measuring device in to the physical flow stream. Also, error in velocity and depth measurements may be and typically are introduced by the physical conditions of each site. The flow numbers presented in this table are estimates only.

	Location	CSO#	Freq.	Date of Event ¹	Estimated ² Total Flow (Gallons)	Event Duration (Minutes)	Comments
6.	Sherwood @ Summit	14	3	Total	5,667	215	Missing data 8/10 09:10 to 8/10 09:15 Missing data 8/17 14:10 to 9/10 09:55 Due to construction of weir modification
				8/6	2,711	50	
				8/12	2,571	120	
				8/15	385	45	
7.	Nettleton @ Ohio	15	1	Total	23,183	55	Missing data 8/13 09:05 to 8/13 09:40
				8/6	23,183	55	
8.	A @ Linton	16B	None				Missing data 8/10 10:45 to 8/10 10:50
9.	7 th @ Inland Empire	19	None				Missing data 8/4 09:40 to 8/4 09:45
10.	3500 High Drive	20	None				Missing data 8/4 09:45 to 8/4 09:50
11.	Main @ Oak	22B	None				Missing data 8/10 10:40 to 8/10 10:45
12.	Cedar @ Ide	23	3	Total	93,558	145	Missing data 8/10 09:30 to 8/10 09:40
				8/6	56,921	55	
				8/12	32,180	70	
				8/21	4,457	20	
13.	Riverside @ Cedar	24A	1	Total	3,982	35	Missing data 8/11 11:25 to 8/13 10:10 Missing data 8/24 09:30 to 9/4 14:00
				8/21	3,982	35	
14.	Riverside @ Cedar	24B	2	Total	1,224	35	Missing data 8/10 10:50 to 8/10 10:55
				8/6	661	20	
				8/21	563	15	
15.	Cedar @ Main	25	3	Total	94,897	100	
				8/6	45,603	45	
				8/12	25,666	25	
				8/21	23,628	30	
16.	Riverside @ Lincoln	26	3	Total	971,198	145	Missing data 8/10 09:40 to 8/10 09:45
				8/6	531,834	60	
				8/12	317,910	60	
				8/21	121,454	25	
17.	Arthur @ 5 th	33A	2	Total	1,566	45	Missing data 8/4 11:05 to 8/4 11:10
				8/6	297	25	
				8/12	1,269	20	

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	Location	CSO#	Freq.	Date of Event ¹	Estimated ² Total Flow (Gallons)	Event Duration (Minutes)	Comments
18.	Perry @ 3 rd	33B	None				
19.	Arthur @ 3 rd	33C	2	Total	918	25	
				8/6	344	10	
				8/12	574	15	
20.	Arthur @ 1 st	33D	2	Total	24,812	120	Missing data 8/4 11:10 to 8/4 11:15
				8/6	18,109	60	
				8/12	6,703	60	
21.	Riverside @ Napa/Crestline	34	2	Total	509,976	90	Missing data 8/4 10:45 to 8/4 10:50
				8/6	64,890	30	
				8/12	445,086	60	
22.	S. Riverton @ Magnolia	38	2	Total	307	145	
				8/6	188	85	
				8/12	119	60	
23.	S. Riverton @ Altamont	39	None				
24.	S. Riverton @ Regal	40	1	Total	247	15	Missing data 8/4 10:30 to 8/4 10:35
				8/6	247	15	
25.	Rebecca @ Upriver	41	3	Total	26,991	80	Missing data 8/4 09:55 to 8/4 10:00
				8/6	24,664	40	
				8/12	1,460	30	
				8/21	867	10	
26.	Riverton @ Surro	42	None				Missing data 8/4 09:50 to 8/4 09:55
	Monthly Total		39		3,282,391	1,830	No Dry Weather Overflows

Table 2 – Rainfall Summary³

Date	1004 Rain	343 Rain	344 Rain	Shadle Rain	Hartson Rain	CityHall Rain	Joe_Albi Rain	RkwdVsta Rain	Station8 Rain	W_Drive Rain	Nora&Pet Rain	GEG Rain	Snow	Dpth	NWS Rain	Snow	Dpth
08/01/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08/02/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08/03/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08/04/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08/05/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	T	0	0
08/06/09	0.16	0.13	0.13	0.34	0.2	0.36	0.18	0.16	0.32	0.42	0.41	0.24	0	0	0.1	0	0
08/07/09	0.02	0.01	0	0	0.01	0	0	0	0	0	0	0.01	0	0	0.09	0	0
08/08/09	0.08	0	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0	0
08/09/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08/10/09	0	0	0	0	0	0	0	0	0	0	0P	0	0	0	0	0	0
08/11/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08/12/09	0.36	0.51	0.39	0.36	0.35	0.37	0.36	0.31	0.35	0.36	0.38	0.2	0	0	0.42	0	0
08/13/09	0	0.01	E	0	0	0.01	0	0	0	0	0	T	0	0	T	0	0
08/14/09	0	0	0	0	0	0	0.01	0	0	0	0	T	0	0	T	0	0
08/15/09	0.2	0.04	0.11	0.06	0.07	0.02	0.02	0.03	0.05	0.16	0.03	0.18	0	0	0.13	0	0
08/16/09	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0	0.01	0	0
08/17/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08/18/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08/19/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08/20/09	0	0	0	0	0	0	0	0	0	0	0P	0	0	0	0.04	0	0
08/21/09	0.06	0.08	0.08	0.07	0.1	0.13	0.1	0.07	0.33	0.19	0	0.09	0	0	0.17	0	0
08/22/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08/23/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08/24/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08/25/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08/26/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08/27/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08/28/09	0	0	0	0	0	0	0	0	0	0	0	T	0	0	T	0	0
08/29/09	0.02	0.01	0.02	0.01	0.02	0.02	0.01	0.02	0.02	0.04	0	0.02	0	0	0.07	0	0
08/30/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08/31/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0.9	0.79	0.73	0.84	0.75	0.91	0.69	0.59	1.07	1.17	0.82	0.74	0.0		1.04	0.0	

- E - Erroneous data
- M - Missing data
- P - Partial missing data
- T - Trace of rain/snow
- X - Out of Service

Table 3 – Rain Gauges

1004	Airway Heights
343	23 rd & Ray
344	Division & Manito
Shadle	Shadle Water Tower (was 345)
Hartson	Ray & Hartson (was 346)
CityHall	City Hall (was 347)
Joe_Albi	Joe Albi Stadium
RkwdVsta	Rockwood Vista
Station8	Fire Station 8, Rebecca & Mission
W_Drive	West Drive Reservoir
Nora&Pet	Nora & Pettet
GEG	Spokane Airport
NWS	National Weather Service – Spokane

³ Some rain gauges are heated. Consequently they will tend to record snow melt immediately as rain. The rain gauges that are not heated will typically register snow melt when it actually melts.