

**CITY OF SPOKANE,
WASHINGTON**

CSO FLOW MONITORING PROJECT

FLOW, FREQUENCY AND DURATION

SEWER MAINTENANCE

**Monthly Report
July 2009**

September 14, 2009
CSOMonthly2009-07.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				
2.	NW Blvd @ Kiernan	6	2	Total	5,188	35	Missing data 7/13 09:10 to 7/13 09:15
				7/6	722	10	
				7/13	4,466	25	
3.	Columbia @ Downriver	7	None				Missing data 7/15 14:30 to 7/15 14:55 Missing data 7/29 14:25 to 7/29 15:25
4.	Nettleton @ York/Buckeye	10	None				Missing data 7/13 09:15 to 7/13 09:20
5.	Nora @ Pettet	12	2	Total	22,672	200	Missing data 7/13 09:25 to 7/13 09:30
				7/6	3,766	50	
				7/12	18,906	150	
6.	Sherwood @ Summit	14	1	Total	1,393	140	Missing data 7/1 13:25 to 7/1 13:30 Missing data 7/2 13:30 to 7/2 14:05 Missing data 7/13 09:35 to 7/13 09:40
				7/13	1,393	140	
7.	Nettleton @ Ohio	15	None				Missing data 7/16 14:10 to 7/17 11:00
8.	A @ Linton	16B	None				Missing data 7/13 08:50 to 7/13 08:55
9.	7 th @ Inland Empire	19	None				Missing data 7/6 08:30 to 7/6 08:35 Missing data 7/20 08:15 to 7/20 08:20
10.	3500 High Drive	20	None				Missing data 7/6 10:10 to 7/6 10:25 Missing data 7/20 08:20 to 7/20 08:25

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
11.	Main @ Oak	22B	None				
12.	Cedar @ Ide	23	None				Missing data 7/13 09:50 to 7/13 09:55
13.	Riverside @ Cedar	24A	None				Missing data 7/13 11:00 to 7/13 11:05
14.	Riverside @ Cedar	24B	None				Missing data 7/1 09:10 to 7/1 10:55 Missing data 7/13 10:40 to 7/13 10:45
15.	Cedar @ Main	25	1	Total	227	45	Missing data 7/13 10:25 to 7/13 10:30
				7/13	227	45	
16.	Riverside @ Lincoln	26	2	Total	85,589	65	Missing data 7/13 10:00 to 7/13 10:05
				7/6	56,762	40	
				7/13	28,827	25	
17.	Arthur @ 5 th	33A	None				Missing data 7/6 09:40 to 7/6 09:45 Missing data 7/20 09:20 to 7/20 09:25
18.	Perry @ 3 rd	33B	None				
19.	Arthur @ 3 rd	33C	None				Missing data 7/6 09:35 to 7/6 09:40
20.	Arthur @ 1 st	33D	2	Total	3,916	65	Missing data 7/6 09:50 to 7/6 09:55 Missing data 7/20 09:25 to 7/20 09:30
				7/6	2,511	35	
				7/13	1,405	30	
21.	Riverside @ Napa/Crestline	34	None				Missing data 7/6 09:25 to 7/6 09:30 Missing data 7/20 09:30 to 7/20 09:35
22.	S. Riverton @ Magnolia	38	1	Total	630	40	Missing data 7/20 09:00 to 7/20 09:05
				7/16	630	40	Dry Weather Overflow; DOE Letter sent 7/23.
23.	S. Riverton @ Altamont	39	None				Missing data 7/6 09:00 to 7/6 09:05 Missing data 7/20 08:50 to 7/20 08:55
24.	S. Riverton @ Regal	40	None				Missing data 7/6 08:55 to 7/6 09:00 Missing data 7/20 08:45 to 7/20 08:50
25.	Rebecca @ Upriver	41	None				Missing data 7/2 10:15 to 7/2 10:30 Missing data 7/20 08:35 to 7/20 08:40
26.	Riverton @ Surro	42	None				Missing data 7/20 08:25 to 7/20 08:30
	Monthly Total		11		119,615	590	1 Dry Weather Overflow

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
07/01/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/02/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/03/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/04/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/05/09	0	0	0	0	0	0	0	0	0	0	0	T	0	0	0	0	0
07/06/09	0.25	0.2	0.23	0.18E	0.17	0.12	0.27	0	0.09	0.11	0.13	0.16	0	0	0.33	0	0
07/07/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/08/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/09/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/10/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/11/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/12/09	0.01	0.02	0	0.04	0.02	0.04	0.04	0	0.04	0.04	0.15	0.11	0	0	0.22	0	0
07/13/09	0.23	0.26	0.22	0.24	0.25	0.21	0.25	0	0.34	0.12	0.23P	0.14	0	0	0.27	0	0
07/14/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/15/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/16/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/17/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/18/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/19/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/20/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/21/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/22/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/23/09	0	0	0	0	0	0.02	0	0	0	0	0	0	0	0	0	0	0
07/24/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/25/09	0	0	0	0	0	0	0	0	0	0	0	T	0	0	0	0	0
07/26/09	0.03	0	0.02	0.01	0	0.02	0.04	0	0	0.04	0.02	0.03	0	0	0.08	0	0
07/27/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/28/09	0.03	0.01	0.02	0.02	0	0	0.03	0	0	0.06	0	0.04	0	0	T	0	0
07/29/09	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0
07/30/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/31/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0.55	0.49	0.49	0.49	0.44	0.41	0.64	0	0.47	0.37	0.53	0.48	0.0		0.90	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.