

**CITY OF SPOKANE,
WASHINGTON**

CSO FLOW MONITORING PROJECT

FLOW, FREQUENCY AND DURATION

SEWER MAINTENANCE

**Monthly Report
March 2008**

May 7, 2008
CSOMonthly2008-03.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	3	Total	147,530	365	Missing data 3/10 09:10 to 3/10 09:20
				3/11	1,000	75	
				3/14	145,912	215	
				3/29	618	75	
3.	Columbia @ Downriver	7	1	Total	7,346	65	Missing data 3/10 09:05 to 3/10 09:10
				3/14	7,346	65	
4.	Nettleton @ York/Buckeye	10	1	Total	1,179	40	Missing data 3/10 09:50 to 3/10 09:55
				3/14	1,179	40	
5.	Nora @ Pettet	12	5	Total	53,111	690	Missing data 3/10 10:15 to 3/10 10:20
				3/11	12,100	110	
				3/14	32,459	110	
				3/19	406	125	
				3/23	1,251	55	
				3/28	6,895	290	
6.	Sherwood @ Summit	14	4	Total	1,502	275	Missing data 3/10 10:20 to 3/10 10:30
				3/11	475	80	
				3/14	465	60	
				3/23	268	35	
				3/29	294	100	
7.	Nettleton @ Ohio	15	1	Total	1,135	20	Missing data 3/10 10:30 to 3/10 10:35
				3/14	1,135	20	

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
8.	A @ Linton	16B	None				
9.	7 th @ Inland Empire	19	None				Missing data 3/3 09:15 to 3/3 09:20
10.	3500 High Drive	20	None				Missing data 3/3 09:25 to 3/3 09:30
11.	Main @ Oak	22B	None				Missing data 3/10 12:35 to 3/10 12:45
12.	Cedar @ Ide	23	3	Total	33,595	340	
				3/11	7,914	95	
				3/14	24,440	200	
				3/29	1,241	45	
13.	Riverside @ Cedar	24A	3	Total	72,092	155	Missing data 3/10 13:10 to 3/10 13:15
				3/11	43,727	80	
				3/14	28,208	35	
				3/29	157	40	
14.	Riverside @ Cedar	24B	None				Missing data 3/10 13:15 to 3/10 13:20
15.	Cedar @ Main	25	3	Total	13,267	205	Missing data 3/10 12:30 to 3/10 12:35
				3/11	6,216	130	
				3/14	6,298	25	
				3/19	753	50	
16.	Riverside @ Lincoln	26	4	Total	407,118	150	Missing data 3/10 11:05 to 3/10 11:10
				3/11	215,087	85	
				3/14	184,805	35	
				3/19	1,413	10	
				3/23	5,813	20	
17.	Arthur @ 5 th	33A	None				
18.	Perry @ 3 rd	33B	None				Missing data 3/3 14:00 to 3/3 14:05
19.	Arthur @ 3 rd	33C	1	Total	644	810	Missing data 3/3 14:05 to 3/3 14:10
				3/29	644	810	
20.	Arthur @ 1 st	33D	2	Total	2,653	50	
				3/11	856	30	
				3/14	1,797	20	
21.	Riverside @ Napa/Crestline	34	3	Total	88,025	190	Missing data 3/3 13:55 to 3/3 14:00
				3/11	44,398	65	
				3/14	13,797	30	
				3/29	29,830	95	

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	Location	CSO#	Freq.	Date of Event ¹	Estimated ² Total Flow (Gallons)	Event Duration (Minutes)	Comments
22.	S. Riverton @ Magnolia	38	None				Missing data 3/3 13:10 to 3/3 13:15
23.	S. Riverton @ Altamont	39	None				Missing data 3/3 13:15 to 3/3 13:20
24.	S. Riverton @ Regal	40	None				Missing data 3/3 13:25 to 3/3 13:30
25.	Rebecca @ Upriver	41	None				
26.	Riverton @ Surro	42	None				Missing data 3/13 10:05 to 3/13 11:35
	Monthly Total		34		829,197	3,355	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
03/01/08	0	0	0	X	0	0	0	0	0	0	0	T	0	T	T	T	10
03/02/08	0	0	0	X	0	0	0	0	0	0	0	0	0	T	0	0	9
03/03/08	0.01	0.01	0	X	0.02	0.03	0.01	0.01	0.03	0.02	0.02	T	T	T	0.04	0.2	7
03/04/08	0	0	0	X	0	0	0	0	0	0	0	T	T	T	0	0	7
03/05/08	0	0	0	X	0	0	0	0	0	0	0	0	0	T	0	0	6
03/06/08	0	0	0	X	0	0	0	0	0	0	0	0	0	T	0	0	5
03/07/08	0	0	0	X	0	0	0	0	0	0	0	T	0	T	0	0	5
03/08/08	0.07	0.07	0.04	X	0.05	0.08	0.06	0.05	0.04	0.04	0.08	0.08	0	0	0.1	0	4
03/09/08	0.01	0	0	X	0	0	0	0	0	0	0	0	0	T	0	0	4
03/10/08	0	0	0	X	0	0	0	0	0	0	OP	0.01	0	T	0.01	0	4
03/11/08	0.22	0.21	0.11	X	0.24	0.22	0.2	0.18	0.27	0.3	0.23	0.2	0	0	0.23	0	2
03/12/08	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0
03/13/08	0.08	0.09	0.05	X	0.1	0.09	0.08	0.07	0.16	0.12	0.09	0.08	0	0	0.11	0	0
03/14/08	0.15	0.25	0.07	X	0.22	0.14	0.28	0.13	0.14	0.23	0.2	0.23	0.3	0	0.25	0.3	0
03/15/08	0.01	0	0	X	0.02	0.02	0.03	0	0.07	0	0.02	0.03	T	T	0.03	0.1	0
03/16/08	0.01	0.02	0	X	0.05	0.06	0.12	0.03	0.12	0.03	0.07	T	T	0	0.01	T	0
03/17/08	0	0.01	0	X	0.01	0	0	0	0.02	0	0	T	T	0	0.02	0.1	T
03/18/08	0.02	0.04	0.02	X	0.01	0.01	0	0	0	0	0	0.06	0	0	0.02	0	0
03/19/08	0.02	0.03	0.01	X	0.13	0.16	0.05	0.12	0.2	0.2	0.13	0.14	0.6	0	0.13	0.9	0
03/20/08	0.18	0.15	0.09	X	0.03	0.03	0.06	0.03	0.05	0	0.02	0.01	0.2	1	0.02	0.2	1
03/21/08	0.05	0.21	0.07	X	0.22	0.17	0.16	0.15	0.25	0.22	0.17	0.11	1.8	1	0.13	1.5	1
03/22/08	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0
03/23/08	0.12	0.11	0.05	X	0.15	0.12	0.12	0.09	0.2	0.18	0.14	0.11	0	0	0.09	T	0
03/24/08	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0
03/25/08	0	0	0	X	0.02	0	0	0	0.01	0	0	T	T	0	0	0	0
03/26/08	0.06	0.12	0.04	X	0.09	0.08	0.05	0.07	0.09	0.14	0.06	0.09	0.8	T	0.08	1.3	T
03/27/08	0.05	0.12	0.06	X	0.08	0.09	0.07	0.08	0.11	0.12	0.1	0.12	1.8	0	0.05	1.1	T
03/28/08	0	0.01	0	X	0.12	0.17	0.15	0.18	0.26	0.23	0.01	0.17	3.1	3	0.23	4.7	0
03/29/08	0.04	0.14	0.08	X	0.07	0.02	0.06	0.05	0.14	0.11	0.2	0.19	1.9	4	0.09	1.7	5
03/30/08	0.22	0.24	0.03	X	0.13	0.15	0.19	0.14	0.18	0.26	0.2	0.22	4.6	2	0.21	3.8	T
03/31/08	0	0	0	X	0	0	0.03	0	0	0	0	0.01	0.7	2	T	T	3
Total	1.32	1.83	0.72	X	1.76	1.64	1.72	1.38	2.34	2.2	1.74	1.86	15.8		1.85	15.9	

- 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.