

CITY OF SPOKANE, WASHINGTON

CSO FLOW MONITORING PROJECT

FLOW, FREQUENCY AND DURATION

SEWER MAINTENANCE

**Monthly Report
October 2016**

November 10, 2016
CSOMonthly2016-10.docx

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.

Table 1 – Flow-Frequency-Duration

Line No.	Regulator Location	CSO No.	Freq.	Date of event ¹	Estimated Total Flow (Gallons) ²	Event Duration (Min. of Overflow)	Comments
1	AL Parkway Storage (West)	2	None				
2	NW Blvd @ Kiernan	6	1	Total	1,242,896	415	
				10/30	1,242,896	415	
3	Columbia @ Downriver	7	1	Total	3,489	10	
				10/20	3,489	10	
4	Nettleton @ York/Buckeye	10	None				Missing Data 10/31 09:55 to 10/31 10:00
5	Nora @ Pettet	12	4	Total	1,733,272	995	
				10/07	80,459	95	
				10/15	159,628	200	
				10/20	312,071	150	
				10/26	1,181,114	550	
6	Sherwood @ Summit	14	2	Total	39,734	220	Missing data 10/07 08:20 to 10/07 08:25
				10/20	11,739	40	
				10/30	27,995	180	
7	Nettleton @ Ohio	15	None				
8	A @ Linton	16B	None				
9	7th @ Inland Empire	19	None				
10	3500 High Drive	20	None				
11	Main @ Oak	22B	None				Missing Data 10/04 08:40 to 10/04 08:45
12	Cedar @ Ide	23	2	Total	47,097	340	
				10/20	9,914	65	
				10/30	37,183	275	
13	Riverside @ Cedar (West)	24A	4	Total	17,610,714	2,720	
				10/07	1,107,779	585	
				10/13	1,172,789	710	
				10/20	2,423,272	215	
				10/26	12,906,874	1,210	

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.

Line No.	Regulator Location	CSO No.	Freq.	Date of event ¹	Estimated Total Flow (Gallons) ²	Event Duration (Min. of Overflow)	Comments
14	Riverside @ Cedar (East)	24B	1	Total	4,074	55	
				10/30	4,074	55	
15	Cedar @ Main	25	4	Total	204,561	575	
				10/05	7,732	60	
				10/15	2,770	15	
				10/20	31,689	65	
				10/30	162,370	435	
16	Riverside @ Lincoln	26	4	Total	16,294,849	3,025	
				10/04	1,813,193	640	
				10/13	2,516,448	1,115	
				10/20	2,258,702	190	
				10/26	9,706,506	1,080	
17	Arthur @ 5th	33A	4	Total	28,810	335	
				10/10	210	5	
				10/18	518	10	
				10/20	7,079	55	
				10/30	21,003	265	
18	Perry @ 3rd	33B	2	Total	6,114,170	475	
				10/20	884,913	80	
				10/30	5,229,257	395	
19	Arthur @ 3rd	33C	4	Total	83,360	460	
				10/10	285	10	
				10/18	3,804	25	
				10/20	9,768	60	
				10/30	69,503	365	
20	Arthur @ 1st	33D	1	Total	333,187	350	
				10/30	333,187	350	
21	Riverside @ Napa/Crestline	34	4	Total	1,256,971	705	
				10/10	3,326	35	
				10/15	75,510	170	
				10/20	566,078	170	
				10/26	612,057	330	
22	S. Riverton @ Magnolia	38	None				
23	Rebecca @ Upriver	41	4	Total	317,783	900	
				10/07	7,988	65	
				10/15	8,350	100	
				10/20	65,497	155	
				10/26	235,948	580	
24	Riverton @ Surro	42	None				
25	RPWRF CSO-Related Bypass	N/A	1	Total	114,000	56	Permit Section S13.H
				10/31	114,000	56	
	Monthly Total		43		45,428,967	11,636	No Dry Weather Overflows 1 RPWRF CSO-Related Bypasses

Table 2 – Rainfall Summary³

	1004	343	344	Shadle	Hartson	CityHall	Joe_Albi	RkwdVsta	Station8	W_Drive	Nora&Pet	GEG			NWS			SFF	
Date	Rain	Rain	Rain	Rain	Rain	Rain	Rain	Rain	Rain	Rain	Rain	Rain	Snow	Dpth	Rain	Snow	Dpth	Rain	
10/01/16	0.11	0.14	0.13	0.17	0.12	0.12	0.11	0.18	0.12	0.18	0.16	0.11	M	-	0.13	-	-	0.14	
10/02/16	-	-	-	-	-	-	-	-	-	-	OP	-	-	-	-	-	-	-	
10/03/16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M	T	
10/04/16	0.19	0.25	0.26	0.14	0.26	0.18	0.20	0.36	0.19	0.21	0.16	0.20	M	-	0.17	-	M	0.26	
10/05/16	0.02	0.05	0.06	0.04	0.01	0.07	0.01	0.01	0.16	0.02	-	0.02	M	-	0.01	-	M	0.16	
10/06/16	0.11P	0.06	0.17	0.06	0.03	0.06	0.10	0.11	0.02	0.05	0.03	0.10	M	-	0.16	-	M	0.02	
10/07/16	0.36	0.34	0.30	0.32	0.31	0.31	0.34	0.49	0.28	0.32	0.30	0.34	M	-	0.37	-	M	0.26	
10/08/16	0.18	0.17	0.17	0.16	0.14	0.17	0.16	0.29	0.17	0.18	0.16	0.18	M	-	0.20	-	M	0.19	
10/09/16	0.22	0.19	0.19	0.17	0.18	0.19	0.22	0.28	0.23	0.22	0.25	0.25	-	-	0.30	-	-	0.26	
10/10/16	0.50	0.43	0.40	0.46	0.41	0.43	0.40	0.60	0.34	0.48	0.41	0.36	-	-	0.41	-	-	0.35	
10/11/16	-	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
10/12/16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
10/13/16	0.93	0.83	0.79	0.82	0.75	0.78	0.94	1.32	0.82	0.92	0.91	0.94	M	-	1.03	-	-	0.79	
10/14/16	0.38	0.24	0.25	0.15	0.25	0.22	0.11	0.43	0.15	0.24	0.16P	0.13	-	-	0.13	-	-	0.14	
10/15/16	0.18P	0.25	0.22	0.18	0.24	0.23	0.16	0.28	0.23	0.22	0.19	0.21	-	-	0.14	-	-	0.22	
10/16/16	0.04	0.04	0.03	0.03	0.02	0.02	0.15	0.03	0.08	0.05	0.11	0.10	-	-	0.15	-	-	0.11	
10/17/16	0.32	0.32	0.29	0.33	0.31	0.28	0.23	0.44	0.21	0.28	0.22	0.19	M	-	0.17	-	-	0.18	
10/18/16	0.19	0.31	0.14	0.25	0.26	0.30	0.24	0.34	0.25	0.18	0.31	0.15	-	-	0.43	-	-	0.23	
10/19/16	-	-	-	-	-	-	0.01	-	-	-	-	T	-	-	T	-	-	-	
10/20/16	0.59	0.65	0.63	0.59	0.58	0.56	0.62	0.92	0.55	0.58	0.61	0.55	-	-	0.64	-	-	0.58	
10/21/16	0.01	0.01	0.01	-	0.02	-	-	0.01	-	0.01	-	T	M	-	0.01	-	-	T	
10/22/16	0.01	0.01	0.01	0.01	0.01	-	0.01	-	0.01	-	0.01	T	-	-	T	-	M	T	
10/23/16	OP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M	-
10/24/16	-	-	-	-	-	-	0.05	-	0.01	-	0.04	0.07	M	-	0.09	-	M	0.03	
10/25/16	0.25	0.13	0.11	0.12	0.12	0.10	0.08	0.14	0.14	0.13	0.07P	0.09	-	-	0.15	-	M	0.15	
10/26/16	0.48	0.45	0.43	0.47	0.42	0.46	0.46	0.68	0.48	0.48	0.47	0.43	M	-	0.50	-	M	0.47	
10/27/16	0.45	0.54	0.46	0.38	0.44	0.40	0.38	0.66	0.46	0.44	0.39	0.44	-	-	0.45	-	-	0.44	
10/28/16	-	0.01	0.02	0.01	0.01	0.01	-	0.01	0.01	0.01	-	T	-	-	T	-	-	0.01	
10/29/16	0.07	0.08	0.07	0.06	0.06	0.06	0.07	0.11	0.05	0.08	0.07	0.08	-	-	0.07	-	-	0.07	
10/30/16	0.66	0.72	0.93	0.75	0.75	0.83	0.79	1.36	1.02	0.89	0.96	0.91	-	-	0.77	-	-	0.75	
10/31/16	0.68	0.67	0.61	0.56	0.64	0.60	0.44	0.80	0.46	0.60	0.43	0.38	-	-	0.44	-	-	0.41	
Total	6.93	6.90	6.69	6.23	6.34	6.38	6.28	9.05E	6.44	6.77	6.42	6.23	0.00		6.92	0.00		6.22	

- 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
SFF	Spokane Felts Field

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.