CITY OF SPOKANE, WASHINGTON

CSO FLOW MONITORING PROJECT

FLOW, FREQUENCY AND DURATION

SEWER MAINTENANCE

Monthly Report
May 2015

June 11, 2015
CSOMonthly2015-05

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	4	Total	705,210	315	Missing data 05/22 09:15 to 05/22 09:20
				05/13	74,311	100	
				05/16	42,941	60	
				05/25	367,457	90	
				05/28	220,501	65	
3	Columbia @ Downriver	7	1	Total	58,299	35	
				05/25	58,299	35	
4	Nettleton @ York/Buckeye	10	None				
5	Nora @ Pettet	12	2	Total	246,958	100	
				05/25	238,341	80	
				05/28	8,617	20	
6	Sherwood @ Summit	14	1	Total	8,129	50	
				05/25	8,129	50	
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				
12	Cedar @ Ide	23	1	Total	3,603	55	
				05/25	3,603	55	
13	Riverside @ Cedar (West)	24A	2	Total	151,647	85	
				05/16	118,401	60	
				05/25	33,246	25	
14	Riverside @ Cedar (East)	24B	1	Total	1,917	110	Missing data 05/05 09:50 to 05/05 09:55
				05/25	1,917	110	

[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.

15	Cedar @ Main	25	1	Total	25,314	30	
				05/25	25,314	30	

16	Riverside @ Lincoln	26	4	Total	362,598	205	Missing data 05/19 14:15 to 05/19 14:20
				05/13	77,100	90	Estimated due to instrument failure
				05/16	44,993	45	
				05/25	222,694	55	
				05/28	17,811	15	

17	Arthur @ 5th	33A	1	Total	3,763	25	
				05/28	3,763	25	

18	Perry @ 3rd	33B	1	Total	369,509	25	
				05/16	369,509	25	

19	Arthur @ 3rd	33C	1	Total	3,581	10	Missing data 05/01 13:40 to 05/01 13:45 Missing data 05/23 00:00 to 05/23 00:05
				05/28	3,581	10	

20	Arthur @ 1st	33D	4	Total	9,985	545	
				05/13	387	185	
				05/16	733	315	
				05/25	508	15	
				05/28	8,357	30	

21	Riverside @ Napa/Crestline	34	3	Total	742,666	195	
				05/16	411,896	120	
				05/26	252,405	45	
				05/28	78,365	30	

22	S. Riverton @ Magnolia	38	None				

23	Rebecca @ Upriver	41	2	Total	122,613	130	Missing Data 05/15 10:35 to 05/15 10:40
				05/16	111,633	95	
				05/25	10,980	35	

24	Riverton @ Surro	42	None				Missing data 05/08 14:15 to 05/08 14:20

25	RPWRF CSO-Related Bypass	N/A	None				Permit Section S13.H

	Monthly Total		**29**		**2,815,792**	**1,915**	**No Dry Weather Overflows** **No RPWRF CSO-Related Bypasses**

Table 2 – Rainfall Summary[3]

	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**
05/01/15	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	T	0.0	0	0.00	0.0	0	0.00
05/02/15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00P	0.00	0.0	0	0.00	0.0	0	0.00
05/03/15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0.00	0.0	0	0.00
05/04/15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0.00	0.0	0	0.00
05/05/15	0.00P	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0.00	0.0	0	0.00
05/06/15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0.00	0.0	0	0.00
05/07/15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0.00	0.0	0	0.00
05/08/15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0.00	0.0	0	0.00
05/09/15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0.00	0.0	0	0.00
05/10/15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0.00	0.0	0	0.00
05/11/15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0.00	0.0	0	0.00
05/12/15	0.05	0.00	0.01	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.02	0.0	0	0.05	0.0	0	T
05/13/15	0.28P	0.36	0.26	0.35	0.30	0.27	0.38	0.27	0.29	0.32	0.33P	0.26	0.0	0	0.25	0.0	0	0.30
05/14/15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0.00	0.0	0	0.00
05/15/15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	T	0.0	0	0.00	0.0	0	0.00
05/16/15	0.03	0.56	0.36	0.17	0.44	0.18	0.18	0.27	0.57	0.17	0.21	0.08	0.0	0	0.08	0.0	0	0.30
05/17/15	0.10	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.00	0.01	0.01	T	0.0	0	0.01	0.0	0	0.00
05/18/15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0.00	0.0	0	0.00
05/19/15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0.00	0.0	0	0.00
05/20/15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0.00	0.0	0	0.00
05/21/15	0.00P	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	T	0.0	0	0.00	0.0	M	T
05/22/15	0.03	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.15	0.0	0	0.01	0.0	M	T
05/23/15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0.00	0.0	M	0.00
05/24/15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00P	0.00	0.0	0	0.00	0.0	M	T
05/25/15	0.52	0.04	0.05	0.39	0.04	0.25	0.26	0.10	0.11	0.47	0.47	0.30	0.0	0	0.29	0.0	M	0.10
05/26/15	0.02	0.12	0.20	0.01	0.16	0.06	0.01	0.19	0.15	0.12	0.02	0.04	0.0	0	0.05	0.0	0	0.18
05/27/15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0.00	0.0	0	0.00
05/28/15	0.00	0.25	0.14	0.25	0.12	0.04	0.00	0.14	0.04	0.05	0.08	0.00	0.0	0	0.00	0.0	0	0.35
05/29/15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	T	0.0	0	T
05/30/15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	T	0.0	0	0.00	0.0	0	0.00
05/31/15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0	0.00	0.0	0	0.00
Total	**1.03**	**1.39**	**1.05**	**1.19**	**1.07**	**0.82**	**0.84**	**0.98**	**1.17**	**1.15**	**1.13**	**0.85**	**0.0**		**0.74**	**0.0**		**1.23**

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	23rd & 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.**