

Memo



Date: September 7, 2010
To: Kevin Stewart
From: Markus Ritsch
Subject: August 2010 ALERT Data Analysis

I. ALERT Data Source

Raw ALERT data records extracted from the Urban Drainage and Flood Control District's Nova Star 4.0 base station (ALERT 2) were analyzed for the period August 1 through August 31, 2010.

II. General System Analysis Summary

A total of 357,912 ALERT (legacy) data reports were analyzed from the ALERT 2 base station. Meteorological sensors account for 73 percent, water level sensors 9 percent, and rain sensors 5 percent of the total monthly records.

The system-wide radio traffic loading was 11,546 reports per day with an average hourly loading of 481 reports. The peak hourly traffic loading was 1,182 reports, which occurred on August 1, between 12:00 PM and 1:00 PM. A plot of monthly average and peak hourly traffic loading is provided.

A. Specific Issues Identified this Month

Performance of the following sensors (Table 1) was unacceptable this month.

Table 1. Rain Sensors with Unacceptable Performance Characteristics

Rain ID	Description	Timer	Event	Comments
310	Guy Hill Ranch	0.71	0.73	Poor performance
540	Parker/Mississippi	0.76	0.81	Poor performance
1500	Powers Park	0.90	0.47	Poor event performance, runaway event reporting
2230	Bear Cr below Blue	0.81	0.79	Large jump in count value
2270	Cub Cr below Blue	0.71	0.56	Poor performance
2280	Kinney Peak	0.65	0.68	Poor performance
2910	Pine Cliff Road	0.26	0.79	Poor performance
2930	Spring Valley Road	0.23	0.95	Poor timer performance
2980	Dakan Road	0.27	0.58	Maintenance performed in late September to address reporting problems
2990	Tomah Road	0.24	0.96	Poor timer performance
3010	EPC at Hwy 105	0.90	0.77	Poor event performance
3020	West Creek WX	0.23	0.95	Poor timer performance
4040	Martin Gulch	0.63	0.75	Poor performance
4330	Hansen	0.52	0.75	Poor performance

III. Rain Sensor Timer Reporting Summary

The following analysis assumes that each rain sensor has a 12-hour timer-reporting interval. The worst performing rain sensors for the month are summarized (Table 2).

Table 2. Monthly Summary of Sensors with Poor Timer Performance (Sensor ID)

Jan*	Feb*	Mar*	Apr	May	Jun	Jul	Aug	Sep	Oct*	Nov*	Dec*
--	--	--	2970	2970	2970	2980	2980		--	--	--
--	--	--	3010	700	1710	2930	2930		--	--	--
--	--	--	700	2240	4330	2990	2990		--	--	--
--	--	--	4860	4330	2270	3020	3020		--	--	--
--	--	--	4330	4490	2240	2810	2810		--	--	--
--	--	--	4170	4270	4470	4330	4330		--	--	--

*- Due to system start-up/shut-down, timer statistics are evaluated only when the entire network is operational between April 1 and October 15.

Sensors identified as having poor timer performance in multiple months are shaded with unique colors. A developing trend can thus be identified from the color shading as the year progresses.

IV. Rain Sensor Event Reporting Summary

A. District-Wide Total Tip/Count Statistics

The incrementing reports from all 1-mm rain sensors were analyzed to quantify the District-wide statistical total monthly tip summary (Table 3).

Table 3. District-Wide Total Tip/Count Statistical Summary

Statistical Parameter	Value	Comments
Mean	31.01	Only the 1-mm rain sensors were included in the analysis
Median	28.00	Only the 1-mm rain sensors were included in the analysis
Standard deviation	18.25	Only the 1-mm rain sensors were included in the analysis
Mean plus three standard deviations	86	Only the 1-mm rain sensors were included in the analysis
Minimum total count	4	ID 650 (Iloff Pond)
Maximum total count	114	ID 630 (Temple Pond at DTC) – influenced by irrigation

B. Monthly Average Tip/Count Summary

A monthly summary of the District-wide mean total tip/count is presented (Table 4).

Table 4. Monthly Summary of District-Wide Mean Total 1-mm Tip/Count

Year	Jan	Feb*	Mar*	Apr	May	Jun	Jul	Aug	Sep	Oct*	Nov	Dec	Ave
2006	4.62	5.92	18.39	20.47	19.44	13.75	74.03	46.89	24.17	41.13	5.04	16.45	24.19
2007	11.56	5.40	29.75	65.03	68.30	15.87	36.20	46.38	22.13	29.50	6.54	11.29	29.00
2008	4.05	7.38	12.26	20.57	54.82	26.06	16.43	90.20	37.54	19.59	2.82	9.24	25.08
2009	6.33	3.11	11.37	59.26	63.45	68.00	65.00	20.00	27.29	30.24	11.00	5.60	30.89
2010	5.97	11.90	32.54	70.57	39.63	56.04	50.23	31.01					

*-Event statistics are skewed in these months because system start-up/shut-down occurs. The rain network is operational between April 1 and October 15. Only the weather stations remain operational throughout the year.

C. Sensors with a Jump of Six or More in the Sequential Count

Several sensors experienced a large jump in the sequential tip count (Table 5).

Table 5. Sensors with a Jump of 6 or More in Sequential Count

Sensor Description	Sensor ID	Comment
Guy Hill Ranch	310	Multiple times throughout month
Bear Creek below Cub	2230	Multiple times throughout month
Horseshoe Park Drop	710	Once occurrence
Salisbury Park	2730	Once occurrence

D. Sensor-by-Sensor Incrementing Count Summary

The system-wide reception rate of incrementing, 1-mm tip reports for the month was approximately 89 percent. A total of 7,546 incrementing reports were received and a total of 8,438 were expected. The total loss of incrementing reports for the month was approximately 11 percent. Those sensors with the worst event transmission performance are summarized (Table 6).

Table 6. Monthly Summary of Sensors with the Most Missed Tips

Jan*	Feb*	Mar*	Apr	May	Jun	Jul	Aug	Sep	Oct*	Nov*	Dec*
--	--	--	2970	700	2900	870	2270		--	--	--
--	--	--	700	2280	2190	540	2980		--	--	--
--	--	--	940	2970	2930	2980	2280		--	--	--
--	--	--	430	2980	4330	2900	4090		--	--	--
--	--	--	2900	2190	2980	4330	310		--	--	--
--	--	--	4330	2240	2970	2230	4330		--	--	--

*-Event statistics are skewed in these months and therefore not computed because system start-up/shut-down occurs. The rain network is operational between April 1 and October 15.

Sensors identified as having poor event performance in multiple months are shaded with unique colors. A developing trend can thus be identified from the color shading as the year progresses.

V. Heavy Radio Traffic Analysis

Periods exceeding 600 messages per hour were analyzed independently in an attempt to quantify data loss rates from rain sensors using the sequential tip count series.

A. The Heaviest Hourly Traffic Periods This Month

The hours of highest radio traffic this month are shown (Table 7).

Table 7. Heavy Radio Traffic Periods

Peak Traffic Periods	Reports/hour	Hour Beginning
Peak Hourly Traffic	1,182	8/1 12:00 PM
2nd Max	1,160	8/1 2:00 PM
3rd Max	1,139	8/1 10:00 AM
4th Max	1,127	8/1 8:00 AM
5th Max	1,124	8/1 3:00 PM

Each hour exceeding 600 reports was analyzed to quantify the number of missing rain reports for that hour (Figure 1). The following plot shows the loss of data as a function of data loading.

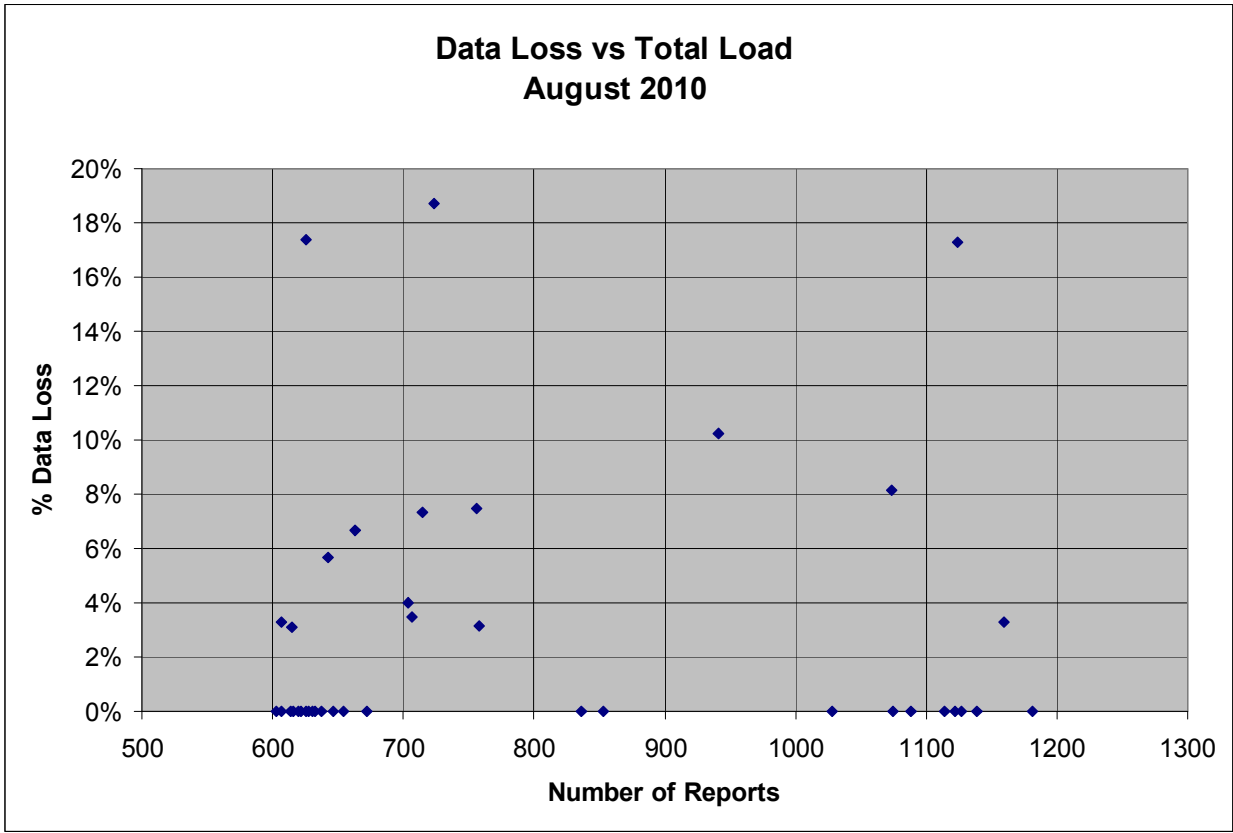


Figure 1. Data Loss vs. Data Loading

VI. Unknown Device Analysis – Received Data Log

The ALERT IDs present in the audio signal received by the decoder are compared against a list of “active” device IDs that are defined within NovaStar. Those IDs received by the decoder that are not defined within NovaStar are considered to be “unknown” and may be the result of radio noise or problems with the telemetry system. The reception of “unknown” device reports for the month is summarized (Table 8).

Table 8. Summary of Unknown IDs

Description	Quantity
Total number of unknown IDs (IDs without a device definition)	216
Total reports from unknown IDs	1,738
Unknown IDs with only a single received report (potential noise)	171
Total reports from all IDs – RecData Log entire month	357,912
Unknown reports as a fraction of total reports	0.49%

The total number of reports from unknown sensors is very small relative to the total reports received for the month. Shown below (Table 9) are the total reports received from unknown sensor IDs for each month of the year.

Table 9. Monthly Summary of Total Reports from Unknown IDs

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave
2010	1,220	1,474	1,276	1,174	721	5,707	610	1,738					

A number of “unknown” sensors had multiple reports, which may indicate the existence of a transmitter that is sending information on an ID that is not currently defined within NovaStar. The unknown IDs with multiple reports including the number of reports received by each are shown (Table 10).

Table 10. Reports Received by Unknown IDs

Unknown Sensor ID	Reports
718	453
717	383
716	339
714	161
2993	59
712	40
711	17
2239	9
741	8
709	6
2215	5
497	4
1657	4
1663	4
2221	4
2279	4
487	3
691	3
799	3
1628	3
2736	3
4063	3
4093	3
4271	3
4351	3
166	2
690	2
756	2
909	2
1009	2
1087	2
1309	2
1451	2
1582	2
1593	2
1662	2
1950	2
1996	2
2222	2
2224	2
2726	2
2862	2
2989	2
3012	2
4087	2

The “unknown” device reports are analyzed temporally to understand when they are received during the day (Table 11). The goal of this analysis is to determine a pattern of occurrence that may correspond to a source of noise in the system, such as the use of a wireless microphone nearby.

Table 11. Temporal Distribution of Received Reports

Hour (AM)	Reports	Hour (PM)	Reports
0:00-00:59	104	12:00-12:59	55
1:00-1:59	208	1:00-1:59	53
2:00-2:59	200	2:00-2:59	65
3:00-3:59	27	3:00-3:59	73
4:00-4:59	129	4:00-4:59	73
5:00-5:59	227	5:00-5:59	56
6:00-6:59	127	6:00-6:59	99
7:00-7:59	194	7:00-7:59	70
8:00-8:59	118	8:00-8:59	87
9:00-9:59	74	9:00-9:59	102
10:00-10:59	60	10:00-10:59	124
11:00-11:59	34	11:00-11:59	46

VII. Sensors with Invalid Reports

The following precipitation sensors had a large number of invalid reports (bit flip/contention errors/random decode):

Sensor ID	Description	Feb	Mar	Apr	May	June	July	Aug	Sep
700	Toll Gate @ 6th	0	0	0	0	3	0	1	
1300	Hidden Lake	0	0	0	4	0	1	0	
1460	Urban Farm	1	3	2	1	0	0	0	
1530	Bear Creek at Lowell	12	13	10	6	0	0	0	
1900	Niver Detention	0	0	0	0	0	4	0	
2320	Choke Cherry Resvr	1	7	3	4	5	0	3	
2750	Castle Rock WX	--	4	6	1	0	2	0	
2970	Rampart Range Road	--	3	0	1	0	0	0	
3010	East Plum Cr at Hwy 105	0	0	0	0	9	12	5	
4030	Red Garden	6	2	3	1	1	0	0	
4270	Cannon Mountain	--	--	--	--	--	--	3	
4330	Hansen	2	1	2	0	4	4	1	

General System Analysis

Database Name P:\A207-UDFCD-Data-Analysis\2010\08-2010\Novastar_extract_2010Au

First Date in Database	8/1/10 12:00 AM	Total Days	31.0
Last Date in Database	8/31/10 11:59 PM	Total Hours	744.0

Total Records Analyzed 357,912

Records by Group

Temperature	56,802	16%
Relative Humidity	55,663	16%
Wind Gust	54,347	15%
Barometric Pressure	22,781	6%
Wind Direction	21,775	6%
Water Level PT-HSE	21,501	6%
Wind Speed Average	21,209	6%
Wind Speed Average & Azimuth	19,501	5%
Precipitation	17,664	5%
Solar Radiation	9,873	3%
Battery Voltage HSE	8,445	2%
ALERT/A2 Testing	7,382	2%
Fuel Moisture	5,908	2%
Fuel Temperature	5,908	2%
Water Level Float	4,906	1%
Water Level PT	4,304	1%
Battery Voltage Digital	3,751	1%
Battery Voltage Analog	3,697	1%
Soil Moisture	2,936	1%
Repeater Status Report	2,485	1%
Battery	2,364	1%
Unknown IDs	1,738	0%
Wing Gust	724	0%
Repeater Pass List	613	0%
Hayman Battery	597	0%
12Hr Status Report	517	0%
Battery Voltage	233	0%
Water Level	130	0%
Hayman Stage	95	0%
Handar 585 ALARM Status	62	0%
Longmont Flow Gage	1	0%
Total	357,912	

Records by Major Group

Meteorologic Sensors	261,951	73%
Water Level Sensors	30,712	9%
Sensor Status Transmissions	19,570	5%
Rain Sensors	17,664	5%
Soil and Fuel Sensors	14,752	4%
Total	344,649	

Traffic Loading Summary

Alert Reports	357,912	
Average Daily Traffic	11,546	
Average Hourly Traffic	481	
Median Hourly Traffic	465	hour beginning
Peak Hourly Traffic	1,182	8/1/10 12:00 PM
2nd Max	1,160	8/1/10 2:00 PM
3rd Max	1,139	8/1/10 10:00 AM
4th Max	1,127	8/1/10 8:00 AM
5th Max	1,124	8/1/10 3:00 PM

Rain Timer Performance

Timer Performance

Analyze Rain Sensors

12:27

Rain Sensors	Description	Rcv	Average Timer Interval	Ave Exp	Performance
2930	Wx-Spring Valley Rd-DougCnty	14	12:55	62.00	23%
3020	Wx-West Creek WX	14	12:55	62.00	23%
2990	Wx-Tomah Rd-DougCnty	15	12:00	62.00	24%
2810	Pine Cliff Road	16	12:00	62.00	26%
2980	Dakan Rd	17	13:50	62.00	27%
4330	Hansen Rain	32	18:24	62.00	52%
4040	Martin Gulch	39	16:45	62.00	63%
2280	Kinney Peak	40	12:24	62.00	65%
2240	Cold Sprg Glch conf	41	16:40	62.00	66%
310	Guy Hill Ranch	44	12:19	62.00	71%
2270	Cub Cr below Blue	44	16:17	62.00	71%
4490	Apple Valley	46	14:39	62.00	74%
540	Parker/Mississippi	47	15:46	62.00	76%
870	Murphy Creek GC	48	13:38	62.00	77%
2250	Rosedale	48	14:10	62.00	77%
4530	Winiger Ridge	49	13:27	62.00	79%
710	Horseshoe Park Drop	50	11:58	62.00	81%
2230	Bear Cr below Cub	50	12:54	62.00	81%
4350	Conifer Hill	51	14:21	62.00	82%
1100	Louisville Rec Ctr	52	13:18	62.00	84%
1200	Broomfield 3207	52	13:47	62.00	84%
2900	Russelville Gulch-Douglas	52	13:57	62.00	84%
4470	Little Narrows	52	12:49	62.00	84%
4180	Gold Lake	53	13:23	62.00	85%
4240	Sunset	53	13:25	62.00	85%
4080	Twin Sisters	54	13:19	62.00	87%
4270	Cannon Mountain	54	13:04	62.00	87%
4510	Pinewood Springs	54	13:01	62.00	87%
4830	SBC @ San Souci	54	13:00	62.00	87%
610	Harvard @ Jackson	55	12:53	62.00	89%
620	Quincy/Highline	55	12:55	62.00	89%
640	Goldsmith @ Eastman	55	12:44	62.00	89%
1300	Hidden Lake	55	12:23	62.00	89%
1720	Cherry Cr @ Steele	55	12:55	62.00	89%
2850	Cherry Cr bl Bayou Glch	55	12:59	62.00	89%
4010	Crescent	55	12:44	62.00	89%
4110	Betasso	55	12:30	62.00	89%
4220	Fling's	55	12:46	62.00	89%
4250	Geer Canyon	55	12:42	62.00	89%
4360	Justice Center	55	12:42	62.00	89%
4710	Wx-Ward C-1	55	12:31	62.00	89%
4750	Wx-Louisville Lake	55	13:15	62.00	89%
4820	Doudy Draw	55	12:42	62.00	89%
4840	SBC@S Boulder Ditch	55	12:27	62.00	89%
600	Harvard Gulch Park	56	12:26	62.00	90%
950	Piney at Liverpool	56	12:40	62.00	90%
1420	Wx-Diamond Hill	56	12:14	62.00	90%
1500	Powers Park	56	11:58	62.00	90%
1530	Bear Creek @ Lowell	56	13:08	62.00	90%
1710	Shop Creek	56	12:57	62.00	90%
2960	Indian Creek	56	13:00	62.00	90%
3010	EPC at Hwy 105	56	12:16	62.00	90%
4030	Red Garden	56	13:00	62.00	90%
4050	Walker Ranch	56	12:41	62.00	90%

4060	Lakeshore	56	12:44	62.00	90%
4130	Swiss Peaks	56	13:02	62.00	90%
4160	Sunshine	56	12:59	62.00	90%
4230	Golden Age	56	12:42	62.00	90%
4290	Red Hill	56	12:42	62.00	90%
4790	Wx-Button Rock	56	12:00	62.00	90%
4810	Shanahan Ridge	56	12:13	62.00	90%
210	Leyden Confluence	57	12:26	62.00	92%
330	Van Bibber @ Hwy 93	57	12:27	62.00	92%
1030	NREL/S. Table Mtn.	57	12:39	62.00	92%
1360	Denver Zoo	57	12:28	62.00	92%
1810	Sand Creek at mouth	57	12:26	62.00	92%
2840	Sulphur Gulch	57	12:27	62.00	92%
2920	West Cherry Head-Douglas Cnty	57	12:48	62.00	92%
2950	DC Public Works	57	12:41	62.00	92%
2970	Rampart Range Rd	57	13:05	62.00	92%
4070	Bear Peak	57	12:29	62.00	92%
4090	Magnolia	57	12:42	62.00	92%
4150	Gold Hill	57	12:12	62.00	92%
4190	Slaughterhouse	57	12:59	62.00	92%
4200	Lazy Acres	57	12:42	62.00	92%
4550	Boulder Jail	57	12:41	62.00	92%
110	Ralston Reservoir	58	12:12	62.00	94%
320	Sports Complex	58	12:41	62.00	94%
510	Virginia Court	58	12:11	62.00	94%
800	Sable Ditch @ 18th	58	12:24	62.00	94%
840	Fire Station 12	58	12:26	62.00	94%
850	Flying J	58	12:40	62.00	94%
940	Sampson Gulch	58	12:24	62.00	94%
1110	Gunbarrel	58	12:39	62.00	94%
1520	Wx-Marston Lake North	58	12:31	62.00	94%
1600	Englewood Dam	58	12:25	62.00	94%
2360	Indian Hills	58	12:43	62.00	94%
2370	Red Rocks Park	58	12:41	62.00	94%
2750	Wx-Castle Rock	58	12:24	62.00	94%
2860	CC at Stroh Rd	58	12:27	62.00	94%
2910	East Cherry Cr-Douglas	58	12:30	62.00	94%
2940	Willow Creek - DougCnty	58	12:29	62.00	94%
4020	Rio Grande	58	12:43	62.00	94%
4140	Logan Mill	58	12:12	62.00	94%
4170	Pine Brook	58	12:38	62.00	94%
4260	Taylor Mountain	58	12:30	62.00	94%
4520	Eagle Ridge	58	12:43	62.00	94%
4570	St. Antons	58	12:15	62.00	94%
4730	Wx-Sugarloaf	58	12:30	62.00	94%
220	Upper Leyden	59	12:00	62.00	95%
530	Fire Station #19	59	12:24	62.00	95%
650	Iliff Pond	59	12:23	62.00	95%
820	ETG @ Buckley	59	12:24	62.00	95%
830	Side Creek Park	59	12:24	62.00	95%
860	Sand Cr at Colfax	59	12:12	62.00	95%
970	Pump Sta 3	59	12:27	62.00	95%
1040	Lena @ U.S. Hwy 6	59	12:11	62.00	95%
1050	Jeffco Fairgrounds	59	12:37	62.00	95%
1060	Heritage Square	59	12:11	62.00	95%
1350	Chatfield COE	59	12:27	62.00	95%
1370	West Metro FS13	59	12:27	62.00	95%
1460	Wx-Urban Farm	59	12:26	62.00	95%
1550	Lakewood CC	59	12:38	62.00	95%

1640	SPR at Union Ave.	59	12:13	62.00	95%
1660	SPR at Henderson	59	12:24	62.00	95%
1700	Cherry Cr @ Champa	59	12:13	62.00	95%
1800	Sand Creek Park	59	12:26	62.00	95%
1900	Niver Detention	59	12:11	62.00	95%
2260	Brook Forest	59	12:28	62.00	95%
2820	Haskins Gulch Conf	59	11:57	62.00	95%
4310	Johnny Park	59	12:12	62.00	95%
4340	Riverside	59	12:13	62.00	95%
140	Wx-Blue Mountain	60	12:00	62.00	97%
150	Nott Creek	60	11:57	62.00	97%
300	Van Bibber Park	60	12:11	62.00	97%
400	Montview Park	60	12:11	62.00	97%
420	Expo Park	60	12:25	62.00	97%
430	Utah Park	60	11:56	62.00	97%
520	Jewell Detention	60	12:12	62.00	97%
700	Toll Gate @ 6th	60	12:13	62.00	97%
720	Confluence Pond	60	12:11	62.00	97%
750	Wx-Quincy Reservoir	60	12:10	62.00	97%
760	Mission Viejo Park	60	11:57	62.00	97%
920	Wx-Aurora Town Hall	60	12:13	62.00	97%
1000	Maple Grove Resv.	60	12:11	62.00	97%
1310	LDC at 64th	60	12:25	62.00	97%
1320	SPR at 3rd Ave	60	12:10	62.00	97%
1330	Roslyn	60	12:00	62.00	97%
1340	Sanderson at Xavier	60	12:13	62.00	97%
1400	Upper Sloan Det.	60	12:10	62.00	97%
1440	Wx-Elbert	60	12:00	62.00	97%
1480	Third Creek at DIA	60	12:10	62.00	97%
1620	Slaughterhouse Glch	60	11:58	62.00	97%
1920	Wx-Brighton	60	12:00	62.00	97%
2190	Wx-Squaw Mountain	60	12:00	62.00	97%
2210	Wx-Hiwan G.C.	60	12:00	62.00	97%
2310	Genesee Village	60	12:12	62.00	97%
2870	Cottonwood (Apache)	60	11:57	62.00	97%
4300	Big Elk Park	60	11:57	62.00	97%
100	Carr Street	61	12:10	62.00	98%
120	West Woods	61	12:10	62.00	98%
200	Leyden Reservoir	61	11:57	62.00	98%
410	Kelly Dam	61	11:58	62.00	98%
440	Fire Station #7	61	12:10	62.00	98%
500	Havana Park	61	11:57	62.00	98%
630	Temple Pond at DTC	61	11:56	62.00	98%
730	No Name @ Quincy	61	11:57	62.00	98%
810	Granby Ditch @ 6th	61	11:58	62.00	98%
900	Wx-Aurora Reservoir	61	12:00	62.00	98%
1010	Denver West	61	12:11	62.00	98%
2330	Morrison	61	12:12	62.00	98%
2340	El Rancho	61	11:57	62.00	98%
2350	Idledale	61	11:44	62.00	98%
4100	Filter Plant	61	11:59	62.00	98%
4770	Wx-Cal-Wood Ranch	61	12:00	62.00	98%
1570	Wx-Brighton Ditch	62	11:46	62.00	100%
2710	Wx-Highlands Ranch WTP	62	11:47	62.00	100%
2730	Wx-Salisbury Park	63	11:30	62.00	102%
2320	Choke Cherry Resvr	195		62.00	
4850	Porphyry Mtn	50	13:27	62.00	81%
4860	Fairview Peak	55	13:25	62.00	89%
5720	Four Mile Creek	35	14:40	62.00	56%

5730	West Creek	58	12:15	62.00	94%
5740	Trail Creek	58	12:31	62.00	94%
5760	Cheeseman	35	15:33	62.00	56%
5770	Lazy Gulch	49	12:37	62.00	79%
5790	Flying G	54	13:12	62.00	87%
5800	Goose Creek	3		62.00	5%
5810	Stump Bump	52	12:55	62.00	84%
5820	Corral Creek	56	12:16	62.00	90%
5830	Platte Springs	58	12:15	62.00	94%
5860	Cedar Mountain	58	12:48	62.00	94%
5880	Hackett Mountain	57	12:46	62.00	92%
5930	Long Hollow	86	6:54	62.00	139%
5940	Log Jumper	33	18:00	62.00	53%

Rain Event Performance														
		Reports Received	4,730	Analyze Rain Sensors										
	Systemwide Avg	Total Tips	5,178											
	91.35%	Data Loss	8.65%											
Rain ID	Performance	1-tips	2-tips	3-tips	4-tips	5-tips	6-tips	>6-tips	Rcv	Exp	Miss	Hold	Bucket	
2270	56%	17	8	3	2	1	0	0	31	55	24	0	0.0393701	
2980	58%	13	11	3	1	0	0	0	28	48	20	0	0.0393701	
2280	68%	34	10	4	0	0	1	0	49	72	23	1	0.0393701	
4090	72%	14	6	1	0	0	0	0	21	29	8	0	0.0393701	
310	73%	26	4	0	1	0	1	3	32	44	12	0	0.0393701	
4040	75%	21	8	1	0	0	0	0	30	40	10	0	0.0393701	
4330	75%	21	5	0	0	1	0	0	27	36	9	0	0.0393701	
4820	76%	18	6	1	0	0	0	0	25	33	8	0	0.0393701	
4470	78%	20	8	0	0	0	0	0	28	36	8	0	0.0393701	
2250	78%	42	4	5	0	0	0	0	51	65	14	0	0.0393701	
2810	79%	21	3	2	0	0	0	0	26	33	7	0	0.0393701	
2340	79%	30	0	3	1	0	0	0	34	43	9	0	0.0393701	
2230	79%	19	3	0	1	0	0	0	23	29	6	0	0.0393701	
2950	80%	13	2	1	0	0	0	0	16	20	4	0	0.0393701	
4170	80%	3	1	0	0	0	0	0	4	5	1	0	0.0393701	
4290	80%	12	4	0	0	0	0	0	16	20	4	0	0.0393701	
4790	81%	31	5	2	0	0	0	0	38	47	9	0	0.0393701	
540	81%	11	1	1	0	0	0	0	13	16	3	0	0.0393701	
1110	81%	22	3	0	1	0	0	0	26	32	6	0	0.0393701	
4530	82%	36	3	3	0	0	0	0	42	51	9	0	0.0393701	
4510	82%	38	8	1	0	0	0	0	47	57	10	0	0.0393701	
2710	83%	17	1	0	1	0	0	0	19	23	4	0	0.0393701	
700	83%	21	3	1	0	0	0	0	25	30	5	0	0.0393701	
1010	83%	9	0	1	0	0	0	0	10	12	2	0	0.0393701	
400	84%	31	3	2	0	0	0	0	36	43	7	1	0.0393701	
4270	85%	29	2	2	0	0	0	0	33	39	6	0	0.0393701	
860	86%	10	2	0	0	0	0	0	12	14	2	0	0.0393701	
1700	86%	5	1	0	0	0	0	0	6	7	1	0	0.0393701	
2730	86%	16	1	1	0	0	0	1	18	21	3	0	0.0393701	
4810	86%	20	4	0	0	0	0	0	24	28	4	0	0.0393701	
4050	87%	17	3	0	0	0	0	0	20	23	3	0	0.0393701	
4830	87%	23	4	0	0	0	0	0	27	31	4	0	0.0393701	
1100	88%	25	2	1	0	0	0	0	28	32	4	0	0.0393701	
2850	88%	12	2	0	0	0	0	0	14	16	2	0	0.0393701	
2940	88%	25	2	1	0	0	0	0	28	32	4	0	0.0393701	
2920	88%	50	6	1	0	0	0	0	57	65	8	0	0.0393701	
4190	88%	20	1	1	0	0	0	0	22	25	3	0	0.0393701	
4570	88%	38	6	0	0	0	0	0	44	50	6	0	0.0393701	
1000	88%	13	2	0	0	0	0	0	15	17	2	0	0.0393701	
2820	88%	13	2	0	0	0	0	0	15	17	2	0	0.0393701	
920	89%	21	3	0	0	0	0	0	24	27	3	0	0.0393701	
1550	89%	7	1	0	0	0	0	0	8	9	1	0	0.0393701	
4770	89%	38	3	1	0	0	0	0	42	47	5	0	0.0393701	
820	89%	15	2	0	0	0	0	0	17	19	2	0	0.0393701	
2840	89%	15	2	0	0	0	0	0	17	19	2	0	0.0393701	
4710	90%	53	7	0	0	0	0	0	60	67	7	0	0.0393701	
4350	90%	39	5	0	0	0	0	0	44	49	5	0	0.0393701	
810	90%	16	2	0	0	0	0	0	18	20	2	0	0.0393701	
830	90%	25	1	1	0	0	0	0	27	30	3	0	0.0393701	
4010	90%	24	3	0	0	0	0	0	27	30	3	0	0.0393701	
4180	90%	40	5	0	0	0	0	0	45	50	5	0	0.0393701	
4730	90%	24	3	0	0	0	0	0	27	30	3	0	0.0393701	
870	91%	26	3	0	0	0	0	0	29	32	3	0	0.0393701	
110	91%	27	3	0	0	0	0	0	30	33	3	0	0.0393701	
1520	91%	9	1	0	0	0	0	0	10	11	1	0	0.0393701	
2240	91%	28	1	1	0	0	0	0	30	33	3	0	0.0393701	
4030	91%	18	2	0	0	0	0	0	20	22	2	0	0.0393701	
4060	91%	27	3	0	0	0	0	0	30	33	3	0	0.0393701	
4340	91%	46	3	1	0	0	0	0	50	55	5	0	0.0393701	
950	91%	28	3	0	0	0	0	0	31	34	3	0	0.0393701	
4100	91%	19	2	0	0	0	0	0	21	23	2	0	0.0393701	
4750	91%	19	2	0	0	0	0	0	21	23	2	0	0.0393701	
500	91%	39	4	0	0	0	0	0	43	47	4	0	0.0393701	
4220	92%	49	5	0	0	0	0	0	54	59	5	0	0.0393701	
150	92%	31	1	1	0	0	0	0	33	36	3	0	0.0393701	
600	92%	10	1	0	0	0	0	0	11	12	1	0	0.0393701	
800	92%	11	1	0	0	0	0	0	12	13	1	0	0.0393701	
1030	92%	11	1	0	0	0	0	0	12	13	1	0	0.0393701	
4070	92%	22	2	0	0	0	0	0	24	26	2	0	0.0393701	
4840	93%	34	3	0	0	0	0	0	37	40	3	1	0.0393701	
520	93%	23	2	0	0	0	0	0	25	27	2	0	0.0393701	

4020	93%	24	0	1	0	0	0	0	25	27	2	0	0.0393701
1570	93%	35	3	0	0	0	0	0	38	41	3	0	0.0393701
620	93%	12	1	0	0	0	0	0	13	14	1	0	0.0393701
4200	93%	25	2	0	0	0	0	0	27	29	2	0	0.0393701
4550	93%	25	2	0	0	0	0	0	27	29	2	1	0.0393701
2750	93%	13	1	0	0	0	0	0	14	15	1	0	0.0393701
2860	93%	13	1	0	0	0	0	0	14	15	1	0	0.0393701
4230	93%	13	1	0	0	0	0	0	14	15	1	0	0.0393701
1710	93%	40	3	0	0	0	0	0	43	46	3	1	0.0393701
2910	94%	41	3	0	0	0	0	0	44	47	3	0	0.0393701
4490	94%	15	1	0	0	0	0	0	16	17	1	0	0.0393701
4260	94%	80	3	1	0	0	0	0	84	89	5	0	0.0393701
2320	95%	33	2	0	0	0	0	0	35	37	2	0	0.0393701
1330	95%	34	2	0	0	0	0	0	36	38	2	0	0.0393701
530	95%	18	1	0	0	0	0	0	19	20	1	0	0.0393701
900	95%	18	1	0	0	0	0	0	19	20	1	0	0.0393699
1600	95%	36	2	0	0	0	0	0	38	40	2	0	0.0393701
2970	95%	54	3	0	0	0	0	0	57	60	3	0	0.0393701
3020	95%	73	4	0	0	0	0	0	77	81	4	0	0.0393701
2930	95%	56	3	0	0	0	0	0	59	62	3	0	0.0393701
1810	95%	38	2	0	0	0	0	0	40	42	2	0	0.0393701
1460	95%	20	1	0	0	0	0	0	21	22	1	0	0.0393701
420	96%	21	1	0	0	0	0	0	22	23	1	0	0.0393701
1350	96%	21	1	0	0	0	0	0	22	23	1	0	0.0393701
2310	96%	21	1	0	0	0	0	0	22	23	1	0	0.0393701
2870	96%	21	1	0	0	0	0	0	22	23	1	0	0.0393701
330	96%	43	2	0	0	0	0	0	45	47	2	0	0.0393701
100	96%	22	1	0	0	0	0	0	23	24	1	0	0.0393701
4080	96%	45	2	0	0	0	0	0	47	49	2	1	0.0393701
1370	96%	23	1	0	0	0	0	0	24	25	1	0	0.0393701
2990	96%	24	1	0	0	0	0	0	25	26	1	0	0.0393701
440	96%	26	1	0	0	0	0	0	27	28	1	1	0.0393701
430	96%	79	3	0	0	0	0	0	82	85	3	0	0.0393701
510	97%	27	1	0	0	0	0	0	28	29	1	0	0.0393701
1200	97%	27	1	0	0	0	0	0	28	29	1	0	0.0393701
1300	97%	84	0	0	1	0	0	0	85	88	3	0	0.0393701
200	97%	28	1	0	0	0	0	0	29	30	1	0	0.0393701
320	97%	28	1	0	0	0	0	0	29	30	1	1	0.0393701
300	97%	31	1	0	0	0	0	0	32	33	1	0	0.0393701
940	97%	33	1	0	0	0	0	0	34	35	1	0	0.0393699
4130	97%	33	1	0	0	0	0	0	34	35	1	0	0.0393701
1310	97%	34	1	0	0	0	0	0	35	36	1	0	0.0393701
1440	97%	34	1	0	0	0	0	0	35	36	1	0	0.0393701
630	97%	108	3	0	0	0	0	0	111	114	3	0	0.0393701
220	98%	38	1	0	0	0	0	0	39	40	1	1	0.0393701
120	98%	39	1	0	0	0	0	0	40	41	1	0	0.0393701
760	98%	40	1	0	0	0	0	0	41	42	1	0	0.0393701
4310	98%	50	1	0	0	0	0	0	51	52	1	0	0.0393701
2190	98%	58	1	0	0	0	0	0	59	60	1	0	0.0393701
4300	98%	58	1	0	0	0	0	0	59	60	1	0	0.0393701
140	100%	53	0	0	0	0	0	0	53	53	0	0	0.0393701
210	100%	43	0	0	0	0	0	0	43	43	0	0	0.0393701
410	100%	13	0	0	0	0	0	0	13	13	0	0	0.0393701
610	100%	9	0	0	0	0	0	0	9	9	0	0	0.0393701
640	100%	31	0	0	0	0	0	0	31	31	0	0	0.0393701
650	100%	4	0	0	0	0	0	0	4	4	0	0	0.0393701
710	100%	8	0	0	0	0	0	1	8	8	0	0	0.0393701
720	100%	26	0	0	0	0	0	0	26	26	0	0	0.0393701
730	100%	22	0	0	0	0	0	0	22	22	0	0	0.0393701
750	100%	22	0	0	0	0	0	0	22	22	0	0	0.0393701
840	100%	8	0	0	0	0	0	0	8	8	0	0	0.0393701
850	100%	32	0	0	0	0	0	0	32	32	0	0	0.0393701
970	100%	22	0	0	0	0	0	0	22	22	0	0	0.0393701
1040	100%	17	0	0	0	0	0	0	17	17	0	0	0.0393701
1050	100%	10	0	0	0	0	0	0	10	10	0	0	0.0393701
1060	100%	15	0	0	0	0	0	0	15	15	0	0	0.0393701
1320	100%	6	0	0	0	0	0	0	6	6	0	0	0.0393701
1340	100%	10	0	0	0	0	0	0	10	10	0	0	0.0393701
1360	100%	13	0	0	0	0	0	0	13	13	0	0	0.0393701
1400	100%	10	0	0	0	0	0	0	10	10	0	0	0.0393701
1420	100%	10	0	0	0	0	0	0	10	10	0	0	0.0393701
1480	100%	9	0	0	0	0	0	0	9	9	0	0	0.0393701
1530	100%	8	0	0	0	0	0	0	8	8	0	0	0.0393701
1620	100%	15	0	0	0	0	0	0	15	15	0	0	0.0393701

1640	100%	16	0	0	0	0	0	0	16	16	0	0	0.0393701
1660	100%	14	0	0	0	0	0	0	14	14	0	0	0.0393701
1720	100%	19	0	0	0	0	0	0	19	19	0	0	0.0393701
1800	100%	18	0	0	0	0	0	0	18	18	0	0	0.0393701
1900	100%	27	0	0	0	0	0	0	27	27	0	0	0.0393701
1920	100%	32	0	0	0	0	0	0	32	32	0	0	0.0393701
2210	100%	54	0	0	0	0	0	0	54	54	0	0	0.0393701
2260	100%	22	0	0	0	0	0	0	22	22	0	0	0.0393701
2330	100%	11	0	0	0	0	0	0	11	11	0	0	0.0393701
2350	100%	24	0	0	0	0	0	0	24	24	0	0	0.0393701
2360	100%	22	0	0	0	0	0	0	22	22	0	0	0.0393701
2370	100%	14	0	0	0	0	0	0	14	14	0	0	0.0393701
2900	100%	15	0	0	0	0	0	0	15	15	0	0	0.0393701
2960	100%	14	0	0	0	0	0	0	14	14	0	0	0.0393701
4110	100%	26	0	0	0	0	0	0	26	26	0	0	0.0393701
4140	100%	24	0	0	0	0	0	0	24	24	0	0	0.0393701
4150	100%	24	0	0	0	0	0	0	24	24	0	0	0.0393701
4160	100%	18	0	0	0	0	0	0	18	18	0	1	0.0393701
4240	100%	36	0	0	0	0	0	0	36	36	0	0	0.0393701
4250	100%	23	0	0	0	0	0	0	23	23	0	0	0.0393701
4360	100%	17	0	0	0	0	0	0	17	17	0	0	0.0393701
4520	100%	15	0	0	0	0	0	0	15	15	0	0	0.0393701
	Total Tips	4,363	305	49	9	2	2	7	4,730	5,178	448	10	
3010	77%	109	24	6	1	1	0	2	141	184	43	0	0.01
4850	84%	72	10	3	0	0	0	0	85	101	16	4	0.01
4860	84%	99	15	1	0	0	1	0	116	138	22	0	0.01
5720	63%	18	5	0	2	1	0	3	26	41	15	0	0.0393701
5730	95%	59	3	0	0	0	0	0	62	65	3	0	0.0393701
5740	91%	66	7	0	0	0	0	0	73	80	7	0	0.0393701
5760	91%	45	5	0	0	0	0	1	50	55	5	0	0.0393701
5770	96%	47	2	0	0	0	0	0	49	51	2	0	0.0393701
5780	55%	7	2	0	1	1	0	1	11	20	9	0	0.0393701
5790	91%	112	12	0	0	0	0	0	124	136	12	0	0.0393701
5800	53%	14	1	7	0	0	1	1	23	43	20	0	0.0393701
5810	90%	67	6	1	0	0	0	0	74	82	8	0	0.0393701
5820	94%	54	4	0	0	0	0	0	58	62	4	0	0.0393701
5830	100%	64	0	0	0	0	0	0	64	64	0	0	0.0393701
5860	91%	61	7	0	0	0	0	0	68	75	7	0	0.0393701
5880	92%	65	3	0	1	0	0	0	69	75	6	0	0.0393701
5930	92%	31	3	0	0	0	0	0	34	37	3	16	0.0393701
5940	89%	36	5	0	0	0	0	1	41	46	5	0	0.0393701
1500	47%	278	87	56	36	34	27	84	518	1,096	578	12	0.0393701

Monthly Traffic Loading

2010 Monthly ALERT Radio Traffic Summary

