

Memo



Date: April 5, 2010
To: Kevin Stewart
From: Markus Ritsch
Subject: March 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 March 1 through March 31, 2010.

II. General System Analysis Summary

A total of 337,042 ALERT data reports were analyzed from the ALERT 2 base station. Meteorological sensors account for 81 percent, water level sensors 6 percent, and rain sensors 4 percent of the total monthly records.

The system-wide radio traffic loading was 10,872 reports per day with an average hourly loading of 453 reports. The peak hourly traffic loading was 1,066 reports, which occurred on March 13, between 12:00 AM and 1:00 AM. 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
700	Toll Gate at 6th	0.37	0.41	Poor performance
1530	Bear Creek at Lowell	0.82	0.95	Large number of invalid reports
2970	Rampart Range Road	0.54	0.60	Poor performance
4330	Indian Ruins	0.71	0.88	Poor performance
4470	Little Narrows	0.82	0.78	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*
--	--	--							--	--	--
--	--	--							--	--	--
--	--	--							--	--	--
--	--	--							--	--	--
--	--	--							--	--	--
--	--	--							--	--	--

*- 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	32.54	Only the 1-mm rain sensors were included in the analysis
Median	31	Only the 1-mm rain sensors were included in the analysis
Standard deviation	14.12	Only the 1-mm rain sensors were included in the analysis
Mean plus three standard deviations	74.90	Only the 1-mm rain sensors were included in the analysis
Minimum total count	2	Numerous IDs
Maximum total count	82	ID 4040 (Martin Gulch)

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										

*-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 More than 6 in Sequential Count

Sensor Description	Sensor ID	Comment
Toll Gate at 6 th Avenue	700	Large jump occurred between 3/24
Sanderson at Xavier	1340	Large jump occurred between 3/3

D. Sensor-by-Sensor Incrementing Count Summary

The system-wide reception rate of incrementing, 1-mm tip reports for the month was approximately 86 percent. A total of 4,613 incrementing reports were received and a total of 5,336 were expected. The total loss of incrementing reports for the month was approximately 14 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*
--	--	2750							--	--	--
--	--	2930							--	--	--
--	--	2730							--	--	--
--	--	2870							--	--	--
--	--	2840							--	--	--
--	--	700							--	--	--

*-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 500 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	1,066	3/13/2010 12:00 AM
2nd Max	986	3/13/2010 1:00 AM
3rd Max	986	3/13/2010 2:00 AM
4th Max	980	3/13/2010 5:00 AM
5th Max	970	3/13/2010 7:00 AM

Each hour exceeding 500 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.

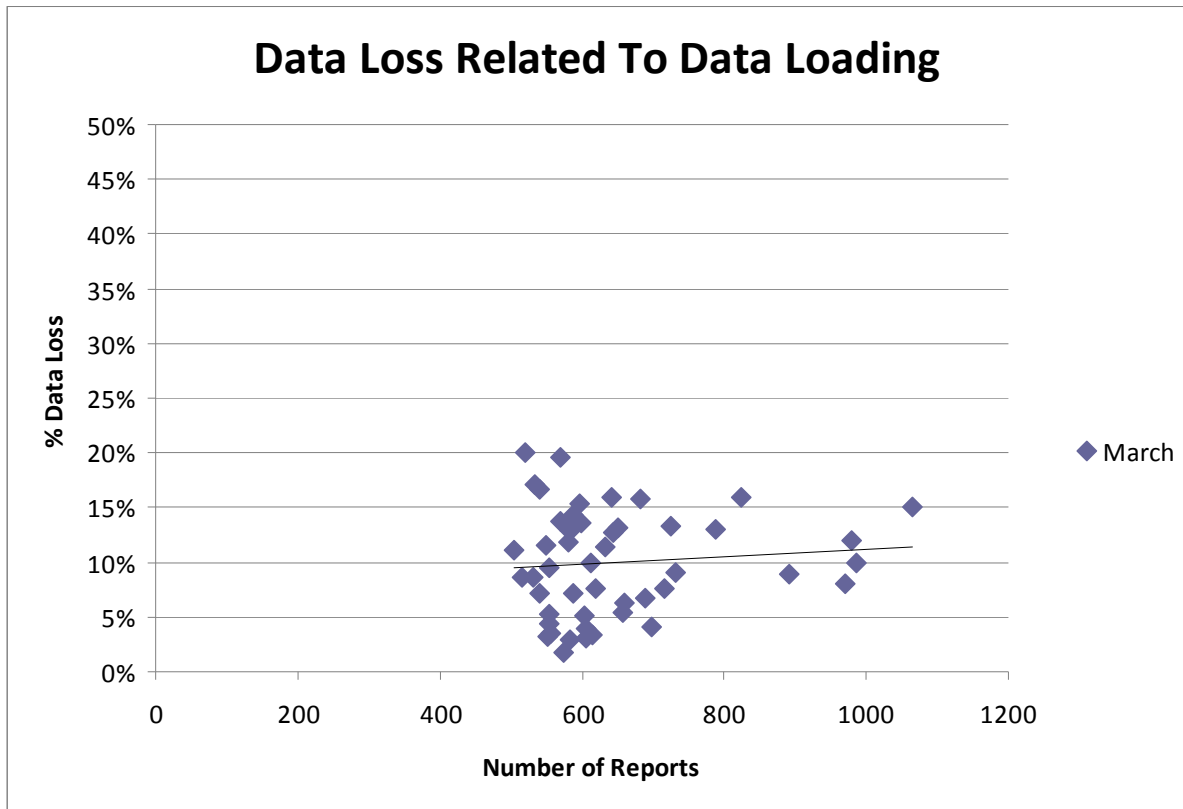


Figure 1. Data Loss vs. Data Loading

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)	435
Total reports from unknown IDs	1,276
Unknown IDs with only a single received report (potential noise)	248
Total reports from all IDs – RecData Log entire month	337,042
Unknown reports as a fraction of total reports	0.38%

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										

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	Number of Reports
1375	59
5000	41
2365	32
2841	32
1299	22
4999	22
1446	16
1423	14
1457	14
949	13
1934	13
1470	12
1478	12
2811	12
1443	11
1458	11
1528	11
1933	11
1949	11
1950	11
2768	11
1486	10
2239	10
2784	10
2808	10
152	9
208	9
1506	9
1534	9
1926	9
2714	9
1099	8
1453	8
1454	8
1502	8
1929	8
1953	8
2748	8
202	7
206	7
1162	7
1165	7
1168	7
1430	7
1449	7
1529	7
1918	7
1925	7
2705	7
2760	7
2775	7
207	6
1479	6
1487	6
1631	6
1663	6
1915	6
1951	6
1954	6
154	5
1109	5
1166	5
1501	5
1531	5

1651	5
1923	5
1938	5
2706	5
2746	5
2771	5
119	4
487	4
1038	4
1161	4
1163	4
1369	4
1511	4
1583	4
1591	4
1653	4
2716	4
2776	4
4031	4
4071	4
4479	4
4646	4
4742	4
4828	4
124	3
145	3
148	3
201	3
709	3
1019	3
1289	3
1319	3
1391	3
1447	3
1459	3
1586	3
1919	3
1959	3
2359	3
2371	3
2749	3
2753	3
2754	3
2756	3
2800	3
2847	3
2868	3
4639	3

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 Unknown Reports

Hour (AM)	Reports	Hour (PM)	Reports
0:00-00:59	103	12:00-12:59	71
1:00-1:59	101	1:00-1:59	45
2:00-2:59	61	2:00-2:59	35
3:00-3:59	48	3:00-3:59	24
4:00-4:59	69	4:00-4:59	29
5:00-5:59	46	5:00-5:59	33
6:00-6:59	37	6:00-6:59	47
7:00-7:59	52	7:00-7:59	55
8:00-8:59	48	8:00-8:59	36
9:00-9:59	45	9:00-9:59	45
10:00-10:59	28	10:00-10:59	79
11:00-11:59	60	11:00-11:59	79

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
120	West Woods	47	1						
220	Upper Leyden	2	0						
1420	Diamond Hill	2	1						
1460	Urban Farm	1	3						
1530	Bear Creek at Lowell	12	13						
1800	Sand Creek Park	--	4						
2210	Hiwan G.C.	1	0						
2310	Genesee Village	--	5						
2320	Choke Cherry Resvr	1	7						
2750	Castle Rock WX	--	4						
2970	Rampart Range Road	--	3						
4030	Red Garden	6	2						
4330	Indian Ruins	2	1						
4830	SBC at San Souci	1	0						

General System Analysis

Database Name

P:\A207-UDFCD-Data-Analysis\2010\03-2010\Novastar_extract_2010Mar.mdb

First Date in Database

3/1/10 12:00 AM

Total Days

31.0

Last Date in Database

3/31/10 11:59 PM

Total Hours

744.0

Total Records Analyzed

337042

Records by Group

Temperature	54967	16%
Relative Humidity	54544	16%
Wind Gust	52018	15%
Wind Speed Average & Azimuth	26012	8%
Barometric Pressure	25172	7%
Wind Direction	20883	6%
Wind Speed Average	20283	6%
Precipitation	14469	4%
Water Level PT-HSE	13547	4%
Solar Radiation	9603	3%
Battery Voltage HSE	7551	2%
Fuel Temperature	5469	2%
Fuel Moisture	5420	2%
Battery Voltage Digital	4407	1%
Water Level Float	3888	1%
Battery Voltage Analog	3681	1%
Water Level PT	3119	1%
Soil Moisture	3071	1%
Repeater Status Report	2974	1%
Battery	2122	1%
Unknown	1276	0%
Repeater Pass List	603	0%
Water Level	579	0%
12Hr Status Report	538	0%
Wing Gust	483	0%
Battery Voltage	254	0%
Handar 585 ALARM Status	72	0%
Solar Power	24	0%
Hayman Battery	13	0%
Total	337042	

Traffic Loading Summary

Alert Reports	337042	
Average Daily Traffic	10872	
Average Hourly Traffic	453	
Median Hourly Traffic	457	hour beginning
Peak Hourly Traffic	1066	3/13/10 12:00 AM
2nd Max	986	3/13/10 1:00 AM
3rd Max	986	3/13/10 2:00 AM
4th Max	980	3/13/10 5:00 PM
5th Max	970	3/13/10 7:00 AM

Rain Timer Performance

n Timer Performance

Analyze Rain Sensors

Rain ID	Description	Rcv	Timer	Ave Exp	83% Performance
100	Carr Street	57	12:13	62.00	92%
110	Ralston Reservoir	55	12:30	62.00	89%
120	West Woods	61	11:31	62.00	98%
140	Wx-Blue Mountain	57	12:15	62.00	92%
150	Nott Creek	58	12:15	62.00	94%
200	Leyden Reservoir	51	13:23	62.00	82%
210	Leyden Confluence	57	12:59	62.00	92%
220	Upper Leyden	57	12:01	62.00	92%
300	Van Bibber Park	59	12:12	62.00	95%
310	Guy Hill Ranch	56	12:15	62.00	90%
320	Sports Complex	57	12:44	62.00	92%
330	Van Bibber @ Hwy 93	59	12:28	62.00	95%
400	Montview Park	57	12:57	62.00	92%
420	Expo Park	59	12:26	62.00	95%
430	Utah Park	50	14:19	62.00	81%
440	Fire Station #7	59	12:41	62.00	95%
500	Havana Park	58	12:27	62.00	94%
510	Virginia Court	55	12:29	62.00	89%
520	Jewell Detention	58	12:41	62.00	94%
530	Fire Station #19	55	13:03	62.00	89%
540	Parker/Mississippi	55	13:27	62.00	89%
600	Harvard Gulch Park	54	13:00	62.00	87%
610	Harvard @ Jackson	54	12:30	62.00	87%
620	Quincy/Highline	56	12:46	62.00	90%
630	Temple Pond at DTC	60	12:27	62.00	97%
640	Goldsmith @ Eastman	58	12:00	62.00	94%
650	Iliff Pond	57	12:29	62.00	92%
700	Toll Gate @ 6th	23	0:03	62.00	37%
710	Horseshoe Park Drop	6	8:05	62.00	10%
720	Confluence Pond	57	12:13	62.00	92%
730	No Name @ Quincy	53	12:31	62.00	85%
750	Wx-Quincy Reservoir	60	11:54	62.00	97%
760	Mission Viejo Park	62	11:59	62.00	100%
800	Sable Ditch @ 18th	58	12:44	62.00	94%
810	Granby Ditch @ 6th	55	12:15	62.00	89%
820	ETG @ Buckley	58	12:44	62.00	94%
830	Side Creek Park	58	12:27	62.00	94%
840	Fire Station 12	57	12:44	62.00	92%
850	Flying J	58	11:19	62.00	94%
860	Sand Cr at Colfax	3	5:59	62.00	5%
870	Murphy Creek GC	54	12:16	62.00	87%
900	Wx-Aurora Reservoir	60	12:14	62.00	97%
920	Wx-Aurora Town Hall	64	11:13	62.00	103%
940	Sampson Gulch	49	13:11	62.00	79%
950	Piney at Liverpool	64	10:05	62.00	103%
970	Pump Sta 3	64	11:25	62.00	103%
1000	Maple Grove Resv.	57	12:32	62.00	92%
1010	Denver West	57	12:47	62.00	92%
1030	NREL/S. Table Mtn.	53	13:00	62.00	85%
1040	Lena @ U.S. Hwy 6	55	13:03	62.00	89%
1050	Jeffco Fairgrounds	60	12:26	62.00	97%
1060	Heritage Square	58	11:59	62.00	94%
1100	Louisville Rec Ctr	43	10:58	62.00	69%
1110	Gunbarrel	39	12:00	62.00	63%

1200	Broomfield 3207	38	11:59	62.00	61%
1300	Hidden Lake	80	8:30	62.00	129%
1310	LDC at 64th	52	12:47	62.00	84%
1320	SPR at 3rd Ave	53	12:16	62.00	85%
1330	Roslyn	53	12:31	62.00	85%
1340	Sanderson at Xavier	55	12:17	62.00	89%
1350	Chatfield COE	55	12:31	62.00	89%
1360	Denver Zoo	56	12:15	62.00	90%
1370	West Metro FS13	58	11:59	62.00	94%
1400	Upper Sloan Det.	53	11:59	62.00	85%
1420	Wx-Diamond Hill	58	12:15	62.00	94%
1440	Wx-Elbert	56	12:58	62.00	90%
1460	Wx-Urban Farm	59	12:14	62.00	95%
1480	Third Creek at DIA	59	12:22	62.00	95%
1500	Powers Park	60	12:13	62.00	97%
1520	Wx-Marston Lake North	59	11:47	62.00	95%
1530	Bear Creek @ Lowell	51	13:06	62.00	82%
1550	Lakewood CC	53	13:03	62.00	85%
1570	Wx-Brighton Ditch	59	12:13	62.00	95%
1600	Englewood Dam	59	11:45	62.00	95%
1620	Slaughterhouse Glch	59	12:13	62.00	95%
1640	SPR at Union Ave.	58	12:31	62.00	94%
1660	SPR at Henderson	59	12:18	62.00	95%
1700	Cherry Cr @ Champa	58	12:31	62.00	94%
1800	Sand Creek Park	40	16:38	62.00	65%
1810	Sand Creek at mouth	58	12:42	62.00	94%
1900	Niver Detention	39	12:46	62.00	63%
1920	Wx-Brighton	57	13:19	62.00	92%
2190	Wx-Squaw Mountain	59	12:25	62.00	95%
2210	Wx-Hiwan G.C.	59	12:01	62.00	95%
2230	Bear Cr below Cub	16	1:15	62.00	26%
2240	Cold Sprg Glch conf	19	16:57	62.00	31%
2250	Rosedale	27	11:57	62.00	44%
2260	Brook Forest	30	11:58	62.00	48%
2270	Cub Cr below Blue	19	14:21	62.00	31%
2280	Kinney Peak	26	13:51	62.00	42%
2310	Genesee Village	26	12:42	62.00	42%
2320	Choke Cherry Resvr	222		62.00	
2330	Morrison	57	11:59	62.00	92%
2340	El Rancho	27	13:35	62.00	44%
2350	Idledale	28	11:57	62.00	45%
2360	Indian Hills	27	11:57	62.00	44%
2370	Red Rocks Park	24	13:45	62.00	39%
2710	Wx-Highlands Ranch WTP	60	12:16	62.00	97%
2730	Wx-Salisbury Park	54	13:00	62.00	87%
2750	Wx-Castle Rock	58	12:43	62.00	94%
2810	Pine Cliff Road	54	12:54	62.00	87%
2820	Haskins Gulch Conf	21	11:59	62.00	34%
2840	Sulphur Gulch	58	12:15	62.00	94%
2850	Cherry Cr bl Bayou Glch	57	12:32	62.00	92%
2860	CC at Stroh Rd	54	13:20	62.00	87%
2870	Cottonwood (Apache)	58	12:14	62.00	94%
2900	Russelville Gulch-Douglas	60	12:01	62.00	97%
2910	East Cherry Cr-Douglas	58	12:31	62.00	94%
2920	West Cherry Head-Douglas Cnty	57	12:16	62.00	92%
2930	Wx-Spring Valley Rd-DougCnty	57	12:15	62.00	92%
2940	Willow Creek - DougCnty	54	13:33	62.00	87%
2950	DC Public Works	27	12:37	62.00	44%
2960	Indian Creek	55	12:16	62.00	89%

2970	Rampart Range Rd	34	14:30	62.00	55%
2980	Dakan Rd	55	12:51	62.00	89%
2990	Wx-Tomah Rd-DougCnty	56	12:50	62.00	90%
3020	Wx-West Creek WX	57	12:17	62.00	92%
4010	Crescent	51	14:23	62.00	82%
4020	Rio Grande	55	13:37	62.00	89%
4030	Red Garden	57	13:08	62.00	92%
4040	Martin Gulch	57	12:33	62.00	92%
4050	Walker Ranch	59	12:28	62.00	95%
4060	Lakeshore	51	13:27	62.00	82%
4070	Bear Peak	56	13:00	62.00	90%
4080	Twin Sisters	53	13:21	62.00	85%
4090	Magnolia	53	13:44	62.00	85%
4100	Filter Plant	58	12:47	62.00	94%
4110	Betasso	58	12:16	62.00	94%
4130	Swiss Peaks	54	12:56	62.00	87%
4140	Logan Mill	49	13:11	62.00	79%
4150	Gold Hill	51	14:19	62.00	82%
4160	Sunshine	58	12:31	62.00	94%
4170	Pine Brook	48	14:56	62.00	77%
4180	Gold Lake	54	13:34	62.00	87%
4190	Slaughterhouse	58	12:30	62.00	94%
4200	Lazy Acres	59	12:01	62.00	95%
4220	Fling's	49	12:59	62.00	79%
4230	Golden Age	55	13:12	62.00	89%
4240	Sunset	54	13:07	62.00	87%
4250	Geer Canyon	56	13:00	62.00	90%
4260	Taylor Mountain	59	11:59	62.00	95%
4270	Cannon Mountain	55	13:22	62.00	89%
4290	Red Hill	56	12:41	62.00	90%
4300	Big Elk Park	56	12:47	62.00	90%
4310	Johnny Park	55	13:22	62.00	89%
4330	Indian Ruins	44	16:11	62.00	71%
4340	Riverside	54	13:29	62.00	87%
4350	Conifer Hill	59	12:34	62.00	95%
4360	Justice Center	58	12:45	62.00	94%
4470	Little Narrows	51	12:17	62.00	82%
4490	Apple Valley	57	12:28	62.00	92%
4510	Pinewood Springs	48	13:31	62.00	77%
4520	Eagle Ridge	59	12:15	62.00	95%
4530	Winiger Ridge	47	14:27	62.00	76%
4550	Boulder Jail	59	12:28	62.00	95%
4570	St. Antons	49	13:28	62.00	79%
4710	Wx-Ward C-1	46	13:41	62.00	74%
4730	Wx-Sugarloaf	56	13:02	62.00	90%
4750	Wx-Louisville Lake	53	14:12	62.00	85%
4770	Wx-Cal-Wood Ranch	60	12:15	62.00	97%
4790	Wx-Button Rock	54	12:36	62.00	87%
4810	Shanahan Ridge	58	12:28	62.00	94%
4820	Doudy Draw	55	12:46	62.00	89%
4830	SBC @ San Souci	55	12:29	62.00	89%
4840	SBC@S Boulder Ditch	55	12:48	62.00	89%
4850	Porphory Mtn	52	13:13	62.00	84%
4860	Fairview Peak	48	14:08	62.00	77%

Rain Event Performance				Analyze Rain Sensors									
		Reports Received	4,613										
	Systemwide Avg	Total Tips	5,336										
	86.45%	Data Loss	13.55%										
Rain ID	Performance	1-tips	2-tips	3-tips	4-tips	5-tips	6-tips	>6-tips	Rcv	Exp	Miss	Hold	Bucket
2750	17%	9	0	0	0	0	0	1	9	52	43	0	0.0393701
2930	20%	10	1	0	0	0	0	1	11	56	45	0	0.0393701
2730	26%	6	0	0	0	0	0	1	6	23	17	0	0.0393701
2870	33%	16	0	0	0	0	0	1	16	48	32	0	0.0393701
2840	40%	11	1	0	0	0	0	1	12	30	18	0	0.0393701
700	41%	5	6	1	1	0	0	1	13	32	19	0	0.0393701
2940	44%	11	0	0	0	0	0	1	11	25	14	0	0.0393701
2850	45%	19	0	0	0	0	0	1	19	42	23	0	0.0393701
2860	47%	14	2	0	0	0	0	1	16	34	18	0	0.0393701
2910	48%	15	1	0	0	0	0	1	16	33	17	0	0.0393701
860	50%	0	1	0	0	0	0	0	1	2	1	0	0.0393701
2950	50%	15	0	0	0	0	0	1	15	30	15	0	0.0393701
2920	52%	15	0	0	0	0	0	1	15	29	14	0	0.0393701
2970	59%	13	4	4	1	0	0	0	22	37	15	0	0.0393701
2900	62%	23	0	0	0	0	0	1	23	37	14	0	0.0393701
2810	63%	31	1	0	0	0	0	1	32	51	19	0	0.0393701
4510	71%	28	4	0	2	1	0	0	35	49	14	0	0.0393701
2990	72%	38	1	0	0	0	0	1	39	54	15	0	0.0393701
2250	73%	23	3	1	2	0	0	0	29	40	11	0	0.0393701
1340	73%	37	3	0	0	0	1	1	41	56	15	0	0.0393701
140	75%	13	4	1	0	0	0	0	18	24	6	0	0.0393701
2240	75%	21	4	1	1	0	0	0	27	36	9	0	0.0393701
1660	76%	13	2	0	1	0	0	0	16	21	5	0	0.0393701
2230	76%	26	4	1	0	1	0	0	32	42	10	0	0.0393701
4470	78%	32	4	1	0	0	1	0	38	49	11	0	0.0393701
430	79%	23	2	1	1	0	0	0	27	34	7	0	0.0393701
2280	80%	16	3	1	0	0	0	0	20	25	5	0	0.0393701
1920	81%	21	3	0	1	0	0	0	25	31	6	1	0.0393701
1350	81%	17	5	0	0	0	0	0	22	27	5	0	0.0393701
1500	82%	28	0	2	1	0	0	0	31	38	7	0	0.0393701
4490	82%	19	3	1	0	0	0	0	23	28	5	0	0.0393701
4060	82%	23	4	1	0	0	0	0	28	34	6	0	0.0393701
900	83%	4	1	0	0	0	0	0	5	6	1	0	0.0393699
4010	83%	38	6	0	1	0	0	0	45	54	9	0	0.0393701
820	84%	18	2	1	0	0	0	0	21	25	4	0	0.0393701
1480	86%	15	3	0	0	0	0	0	18	21	3	0	0.0393701
4530	86%	44	6	1	0	0	0	0	51	59	8	0	0.0393701
4830	87%	39	7	0	0	0	0	0	46	53	7	0	0.0393701
320	87%	18	1	1	0	0	0	0	20	23	3	0	0.0393701
4770	87%	17	3	0	0	0	0	0	20	23	3	0	0.0393701
1460	88%	18	3	0	0	0	0	0	21	24	3	0	0.0393701
2820	88%	18	3	0	0	0	0	1	21	24	3	0	0.0393701
4030	88%	50	6	1	0	0	0	0	57	65	8	0	0.0393701
4150	88%	32	3	1	0	0	0	0	36	41	5	0	0.0393701
2350	88%	19	3	0	0	0	0	0	22	25	3	0	0.0393701
4330	89%	27	4	0	0	0	0	0	31	35	4	0	0.0393701
4090	89%	34	5	0	0	0	0	0	39	44	5	0	0.0393701
4220	89%	28	4	0	0	0	0	0	32	36	4	0	0.0393701
4040	89%	65	7	1	0	0	0	0	73	82	9	0	0.0393701
4820	89%	37	3	1	0	0	0	0	41	46	5	0	0.0393701
620	89%	22	3	0	0	0	0	0	25	28	3	0	0.0393701
4240	90%	23	3	0	0	0	0	0	26	29	3	0	0.0393701
100	90%	25	1	1	0	0	0	0	27	30	3	0	0.0393701
4110	90%	49	6	0	0	0	0	0	55	61	6	0	0.0393701
4350	90%	41	5	0	0	0	0	0	46	51	5	0	0.0393701
330	90%	25	3	0	0	0	0	0	28	31	3	0	0.0393701
1800	90%	25	3	0	0	0	0	0	28	31	3	0	0.0393701
4730	90%	26	1	1	0	0	0	0	28	31	3	0	0.0393701
4290	90%	18	0	1	0	0	0	0	19	21	2	0	0.0393701
4180	91%	44	3	1	0	0	0	0	48	53	5	0	0.0393701
4570	91%	43	5	0	0	0	0	0	48	53	5	0	0.0393701
4100	91%	26	3	0	0	0	0	0	29	32	3	0	0.0393701
4260	91%	26	3	0	0	0	0	0	29	32	3	0	0.0393701
650	91%	18	2	0	0	0	0	0	20	22	2	0	0.0393701
1360	91%	28	1	1	0	0	0	0	30	33	3	0	0.0393701
2260	91%	28	3	0	0	0	0	0	31	34	3	0	0.0393701
4080	91%	28	3	0	0	0	0	0	31	34	3	0	0.0393701
2370	91%	19	2	0	0	0	0	0	21	23	2	0	0.0393701
2960	91%	30	1	1	0	0	0	0	32	35	3	0	0.0393701
440	92%	21	0	1	0	0	0	0	22	24	2	0	0.0393701
630	92%	21	0	1	0	0	0	0	22	24	2	0	0.0393701
1520	92%	30	3	0	0	0	0	0	33	36	3	1	0.0393701
1420	92%	43	1	0	1	0	0	0	45	49	4	0	0.0393701
4190	92%	41	4	0	0	0	0	0	45	49	4	0	0.0393701

4270	92%	31	3	0	0	0	0	0	0	34	37	3	0	0.0393701
500	92%	21	2	0	0	0	0	0	0	23	25	2	0	0.0393701
1700	92%	21	2	0	0	0	0	0	0	23	25	2	0	0.0393701
4200	92%	42	4	0	0	0	0	0	0	46	50	4	0	0.0393701
4750	92%	22	0	1	0	0	0	0	0	23	25	2	0	0.0393701
1040	92%	32	3	0	0	0	0	0	0	35	38	3	0	0.0393701
800	92%	22	2	0	0	0	0	0	0	24	26	2	0	0.0393701
1600	92%	11	1	0	0	0	0	0	0	12	13	1	0	0.0393701
870	93%	23	2	0	0	0	0	0	0	25	27	2	0	0.0393701
1400	93%	23	2	0	0	0	0	0	0	25	27	2	0	0.0393701
4020	93%	47	2	1	0	0	0	0	0	50	54	4	0	0.0393701
4170	93%	23	2	0	0	0	0	0	0	25	27	2	0	0.0393701
4790	93%	35	3	0	0	0	0	0	0	38	41	3	0	0.0393701
2340	93%	12	1	0	0	0	0	0	0	13	14	1	0	0.0393701
4140	93%	48	4	0	0	0	0	0	0	52	56	4	0	0.0393701
1810	93%	26	2	0	0	0	0	0	0	28	30	2	0	0.0393701
4130	93%	39	3	0	0	0	0	0	0	42	45	3	0	0.0393701
420	94%	14	1	0	0	0	0	0	0	15	16	1	0	0.0393701
950	94%	14	1	0	0	0	0	0	0	15	16	1	0	0.0393701
1900	94%	14	1	0	0	0	0	0	0	15	16	1	0	0.0393701
2320	94%	43	3	0	0	0	0	0	0	46	49	3	0	0.0393701
2980	94%	29	2	0	0	0	0	0	0	31	33	2	0	0.0393701
4360	94%	59	2	1	0	0	0	0	0	62	66	4	0	0.0393701
750	94%	16	1	0	0	0	0	0	0	17	18	1	0	0.0393701
1330	95%	33	2	0	0	0	0	0	0	35	37	2	0	0.0393701
1530	95%	33	2	0	0	0	0	0	0	35	37	2	0	0.0393701
1050	95%	17	1	0	0	0	0	0	0	18	19	1	0	0.0393701
1320	95%	34	2	0	0	0	0	0	0	36	38	2	0	0.0393701
1110	95%	35	2	0	0	0	0	0	0	37	39	2	1	0.0393701
4340	95%	35	2	0	0	0	0	0	0	37	39	2	0	0.0393701
1030	95%	18	1	0	0	0	0	0	0	19	20	1	0	0.0393701
210	95%	20	1	0	0	0	0	0	0	21	22	1	0	0.0393701
640	95%	20	1	0	0	0	0	0	0	21	22	1	0	0.0393701
1060	95%	20	1	0	0	0	0	0	0	21	22	1	0	0.0393701
1300	95%	20	1	0	0	0	0	0	0	21	22	1	0	0.0393701
150	96%	41	2	0	0	0	0	0	0	43	45	2	0	0.0393701
600	96%	21	1	0	0	0	0	0	0	22	23	1	0	0.0393701
220	96%	22	1	0	0	0	0	0	0	23	24	1	0	0.0393701
1310	96%	22	1	0	0	0	0	0	0	23	24	1	0	0.0393701
510	96%	24	1	0	0	0	0	0	0	25	26	1	0	0.0393701
4070	96%	48	2	0	0	0	0	0	0	50	52	2	0	0.0393701
4710	96%	24	1	0	0	0	0	0	0	25	26	1	0	0.0393701
1640	96%	26	1	0	0	0	0	0	0	27	28	1	0	0.0393701
1370	97%	27	1	0	0	0	0	0	0	28	29	1	0	0.0393701
4050	97%	27	1	0	0	0	0	0	0	28	29	1	0	0.0393701
840	97%	28	1	0	0	0	0	0	0	29	30	1	0	0.0393701
2360	97%	29	1	0	0	0	0	0	0	30	31	1	0	0.0393701
4300	97%	30	1	0	0	0	0	0	0	31	32	1	0	0.0393701
4810	97%	67	2	0	0	0	0	0	0	69	71	2	0	0.0393701
1550	97%	34	1	0	0	0	0	0	0	35	36	1	0	0.0393701
2310	97%	34	1	0	0	0	0	0	0	35	36	1	0	0.0393701
4250	97%	34	1	0	0	0	0	0	0	35	36	1	0	0.0393701
2270	97%	37	1	0	0	0	0	0	0	38	39	1	0	0.0393701
4550	98%	38	1	0	0	0	0	0	0	39	40	1	0	0.0393701
610	98%	39	1	0	0	0	0	0	0	40	41	1	0	0.0393701
1000	98%	44	1	0	0	0	0	0	0	45	46	1	0	0.0393701
4310	98%	51	1	0	0	0	0	0	0	52	53	1	0	0.0393701
4840	98%	60	1	0	0	0	0	0	0	61	62	1	0	0.0393701
110	100%	16	0	0	0	0	0	0	0	16	16	0	0	0.0393701
120	100%	40	0	0	0	0	0	0	0	40	40	0	0	0.0393701
200	100%	31	0	0	0	0	0	0	0	31	31	0	0	0.0393701
300	100%	16	0	0	0	0	0	0	0	16	16	0	0	0.0393701
310	100%	17	0	0	0	0	0	0	0	17	17	0	0	0.0393701
400	100%	20	0	0	0	0	0	0	0	20	20	0	0	0.0393701
520	100%	19	0	0	0	0	0	0	0	19	19	0	0	0.0393701
530	100%	27	0	0	0	0	0	0	0	27	27	0	0	0.0393701
540	100%	21	0	0	0	0	0	0	0	21	21	0	0	0.0393701
710	100%	2	0	0	0	0	0	0	0	2	2	0	0	0.0393701
720	100%	14	0	0	0	0	0	0	0	14	14	0	0	0.0393701
730	100%	11	0	0	0	0	0	0	0	11	11	0	0	0.0393701
760	100%	21	0	0	0	0	0	0	0	21	21	0	0	0.0393701
810	100%	35	0	0	0	0	0	0	0	35	35	0	0	0.0393701
830	100%	15	0	0	0	0	0	0	0	15	15	0	0	0.0393701
850	100%	40	0	0	0	0	0	0	0	40	40	0	0	0.0393701
920	100%	9	0	0	0	0	0	0	0	9	9	0	0	0.0393701
940	100%	18	0	0	0	0	0	0	0	18	18	0	0	0.0393699
970	100%	7	0	0	0	0	0	0	0	7	7	0	0	0.0393701

1010	100%	33	0	0	0	0	0	0	33	33	0	0	0.0393701
1100	100%	29	0	0	0	0	0	0	29	29	0	0	0.0393701
1200	100%	26	0	0	0	0	0	0	26	26	0	0	0.0393701
1440	100%	7	0	0	0	0	0	0	7	7	0	1	0.0393701
1570	100%	8	0	0	0	0	0	0	8	8	0	0	0.0393701
1620	100%	21	0	0	0	0	0	0	21	21	0	0	0.0393701
2210	100%	18	0	0	0	0	0	0	18	18	0	0	0.0393701
2330	100%	41	0	0	0	0	0	0	41	41	0	1	0.0393701
2710	100%	20	0	0	0	0	0	0	20	20	0	0	0.0393701
3020	100%	31	0	0	0	0	0	0	31	31	0	0	0.0393701
4160	100%	55	0	0	0	0	0	0	55	55	0	0	0.0393701
4230	100%	19	0	0	0	0	0	0	19	19	0	0	0.0393701
4520	100%	18	0	0	0	0	0	0	18	18	0	0	0.0393701
	Total Tips	4,276	286	34	13	2	2	17	4,613	5,336	723	5	

Monthly Traffic Loading

2010 Monthly ALERT Radio Traffic Summary

