

Memo

Date: June 6, 2016
To: Kevin Stewart
From: Markus Ritsch
Subject: May 2016 ALERT Data Analysis

I. ALERT Data Source

Raw ALERT data records extracted from the Urban Drainage and Flood Control District's NovaStar 5 base station were analyzed for the period May 1 through May 31, 2016.

II. General System Analysis Summary

The District receives data through both the legacy ALERT channel and through the ALERT2 (concentrator plus A2 self-reports) channel. The following (Table 1) quantifies the data reports received by each channel.

Table 1. Reception of Data at Diamond Hill (Legacy, ALERT2 and Concentrator Reports from Recdatalog)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Tot
Legacy	118,519	264,375	241,517	266,465	245,856								1,136,732
Concentrator	194,948	418,430	407,965	435,747	416,968								1,874,058
ALERT2	136,144	399,530	505,195	540,654	508,036								2,089,559
TOTAL	449,611	1,082,335	1,154,677	1,242,866	1,170,860	0	0	0	0	0	0	0	5,100,349
Conc/Leg	1.64	1.58	1.69	1.64	1.70	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.65
DataChron	645,913	662,847	674,426	742,749	732,116								3,458,051

The District operates two NovaStar5 base stations: the primary (ns5a) at Diamond Hill and a redundant base (ns5b) at Greenhouse Data. Additional analyses are conducted on the data received by these two base stations (Table 2). The data received by both base stations for the month are shown below.

Table 2. Comparison of Data Reception by ns5a and ns5b

NS5A (Diamond Hill)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Tot
Legacy	118,519	264,375	241,517	266,465	245,856								1,136,732
Concentrator	194,948	418,430	407,965	435,747	416,968								1,874,058
ALERT2	136,144	399,530	505,195	540,654	508,036								2,089,559
NS5B (Greenhouse)													
Legacy	118,610	264,516	263,959	266,509	264,138								1,177,732
Concentrator	194,968	418,532	446,510	435,558	447,154								1,942,722
ALERT2	136,330	399,841	552,747	540,161	544,926								2,174,005
Diff (NS5a-NS5b)													
Legacy (Digi One)	-91	-141	-22,442	-44	-18,282	0	0	0	0	0	0	0	-41,000
Concentrator (B2010)	-20	-102	-38,545	189	-30,186	0	0	0	0	0	0	0	-68,664
ALERT2 (B2010)	-186	-311	-47,552	493	-36,890	0	0	0	0	0	0	0	-84,446
Comments	Recdatalog format changed...missing 1/3 of the month		DH base was down for a period		DH server was down at the end of May								

The reception rates between Diamond Hill and Greenhouse are inconsistent this month. The Diamond Hill server was down from midnight on May 28th through June 1st due to security restrictions placed on the VM server. These issues have been resolved and the Diamond Hill server should be running normally again.

The daily ratio of total concentrator reports received versus total legacy ALERT reports received is shown (Figure 1).

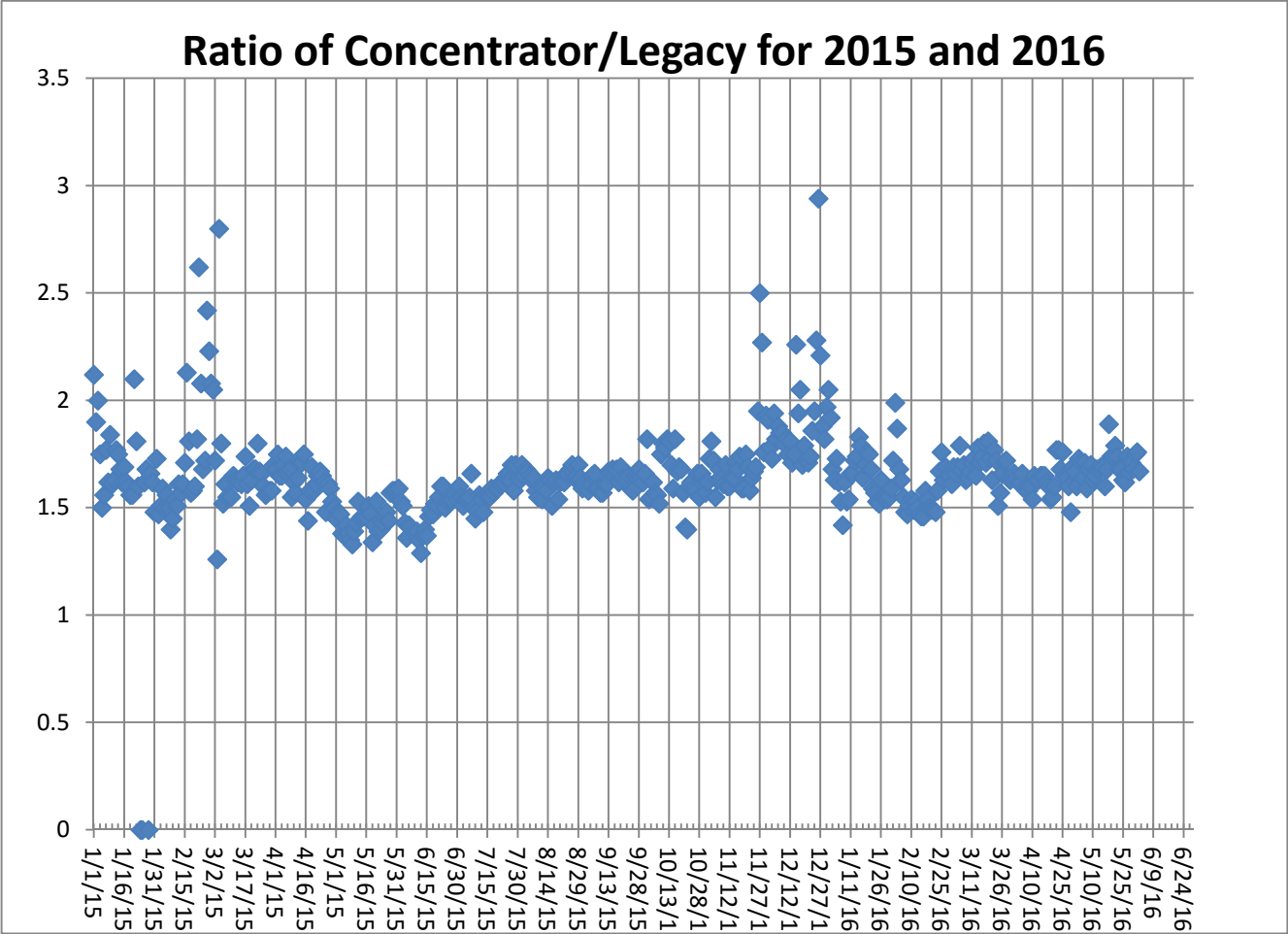


Figure 1. Daily Ratio of Concentrator Reports to Legacy Reports

The ratio becomes more volatile in the cold months as the Blue Mountain repeater has problems with legacy ALERT reporting when the temperature drops.

A. Continuous Operation of Base Receiver/Decoder

The base station was in continuous operation for the entire month. Data was collected on a continuous basis for every hour of every day for a total of 744 hours of operation. Outages of less than one hour are not identified.

B. Specific Issues Identified

Performance of the following sensors (Table 3) was questionable this month.

Table 3. Sensors with Poor Performance Characteristics

Sensor ID	Description	Comments
2790	Wx-West Cherry Cr	Poor event performance and timer
1620	Slaughterhouse Gulch	Poor timer and event reporting
2750	Castle Rock WS	Poor timer
2330	Morrison	Poor timer
4840	SBC @ S. Boulder Ditch	Second month in a row showing the lowest rain total
1570	Brighton Ditch	High monthly rain total relative to neighboring stations
4330	Hansen Rain	Poor event reporting
4470	Little Narrows	Poor event reporting
2230	Bear Cr. Below Cub Cr.	Poor event reporting
2271, 2272, 2274	Unknown IDs	Possibly coming from Cub Creek below Blue (2270)
623	Unknown ID with a large number of reports	
2283	Unknown ID with a large number of reports	

C. Performance of New A2 Sites

This section of the report will look at specific reporting characteristics of the new A2 sites by analyzing their APDUID (Application PDU Identifier). The APDUID is a cyclical, incrementing counter from 0 to 6. Tracking skipped values and restarts of the application control byte counter provides useful insight into site performance and general network health. The performance of the cyclical counter is quantified for each A2 self-reporting site and repeater path (Table 4).

Table 4. APDUID Performance of A2 Sites by Source Address

Description	ID	W. Creek (6001)	Smoky Hill (6502)	Blue Mt. (6503)	Lee Hill (6505)	Gold Hill (6506)
Newlin Gulch	3070		0.953	0.970	0.968	0.958
Heritage Regional Park	3090		0.936	0.933	0.881	0.915
Magnolia	6601		0.947	0.950	0.955	0.939
Blackstone	10010		1.00	1.00	0.911	1.00
ETG @ Hampden	10011		0.830	0.815	0.830	0.807
Carr Street (100)	10012		0.940	0.975	0.951	0.944
Maple Grove (1000)	10013		0.419	1.00	1.00	0.980
Upper Sellers	10014	n/a				
Haystack Road	10015	n/a				
Sand Cr at Colfax	10016		0.933	0.932	0.934	0.931
James Creek	10017		0.501	--	0.989	0.960
Lower Left Hand (4453)	10018		0.994	--	0.996	0.038
Murphy Creek (870)	10019		0.988	0.987	0.987	0.985
OneRain Weather	10020		0.528	0.889	0.885	0.875
S. St. Vrain at Berry Ridge	10021		--	--	0.953	0.05
Arvada/Blunn Reservoir	10022		0.974	0.974	0.968	0.953
Havana Pond	10023		0.985	0.989	0.989	0.988
Westerly Creek Dam	10024		0.985	0.985	0.985	0.962
Lena @ Nolte Pond (1023)	10025		0.994	1.00	0.997	0.965
Trumbull (Hayman)	10026	0.875				
West Creek (Hayman)	10027	0.894				
Diamond Hill (1420)	10028		0.772	0.764	0.772	0.764
Plum Creek at Sedalia	10029	0.952				
Coal Creek at McCaslin	10030		0.988	0.994	0.993	0.975
Boulder Cr. Broadway (4583)	10031		0.982	0.287	0.976	0.997
Weir Gulch	10032		0.301	0.933	0.972	0.319
Side Creek Park	10033		--	--	--	--
Not Used	10034		--	--	--	--
Sanderson Gulch (1340)	10035		0.976	0.984	0.980	0.948
Porphyry Mtn	10036		--	--	--	--

D. ALERT2 Repeater Loading

The District's ALERT2 architecture utilizes 5 repeaters with a single transmit frequency (170.300 MHz) to Diamond Hill. The repeaters utilize a 20 second frame where each repeater is allocated a slot of specific size and an offset within the frame. The slot allocated to each repeater is sized appropriately to accommodate the total number of existing and future remote sites routed through that repeater. Each repeater is shown along with its designated slot (Table 5). Currently there is no pass-listing for the ALERT2 repeaters. Any remote ALERT2 site can be received by all repeaters and re-broadcast to the base except for West Creek which has an input frequency unique to Douglas County.

Table 5. ALERT2 Repeater Architecture

Repeater	Slot Size (sec)	Slot Offset (sec)	Source Address	ALERT2 Input Frequency (MHz)	ALERT2 Output Frequency (MHz) – received at Diamond Hill
West Creek	2	0	6001	169.425	170.300
Smoky	3	2	6502	169.525	170.300
Blue Mt.	4	5	6503	169.525	170.300
Lee Hill	3	9	6505	169.525	170.300
Gold Hill	3	12	6506	169.525	170.300
Magnolia	5	15	6507		170.300
Frame Size	20				

The following tables summarize the total number of reports received through each repeater (Table 6). This helps to quantify repeater loading for the ALERT2 backbone.

Table 6. ALERT2 Reports Received through Each Repeater (Only A2 Self Reports)

Month-Yr	West Creek (6001)	Smoky (6502)	Blue Mt. (6503)	Lee Hill (6505)	Gold Hill (6506)	TOTAL
Jan-15	0	44,501	44,636	44,783	39,007	172,927
Feb-15	0	58,543	56,150	61,160	57,764	233,617
Mar-15	346	73,198	69,604	77,968	65,323	286,439
Apr-15	595	73,711	69,568	79,215	72,310	295,399
May-15	5,259	78,694	72,340	86,297	77,174	319,764
June-15	11,987	72,449	65,742	82,998	69,570	302,746
July-15	28,595	75,379	71,394	79,026	74,041	328,435
Aug-15	28,409	92,299	84,057	84,363	87,211	376,339
Sep-15	26,809	84,143	84,776	84,289	85,123	365,140
Oct-15	19,775	82,683	83,390	63,475**	84,825	334,148
Nov-15	6,438	62,615	61,477	50,888	58,004	239,422
Dec-15	9,835	72,886	72,465	73,431	47,996	276,613
Jan-16	4,034	38,348	36,826	37,168	19,768	138,160
Feb-16	11,732	93,120	99,206	96,284	99,188	399,530
Mar-16	12,533	126,123	134,329	140,226	139,536	552,747
Apr-16	13,262	128,473	130,223	135,499	133,197	540,654
May-16	27,002	125,098	124,280	138,033	130,513	544,926

** - The number of reports coming through Lee Hill declined in October

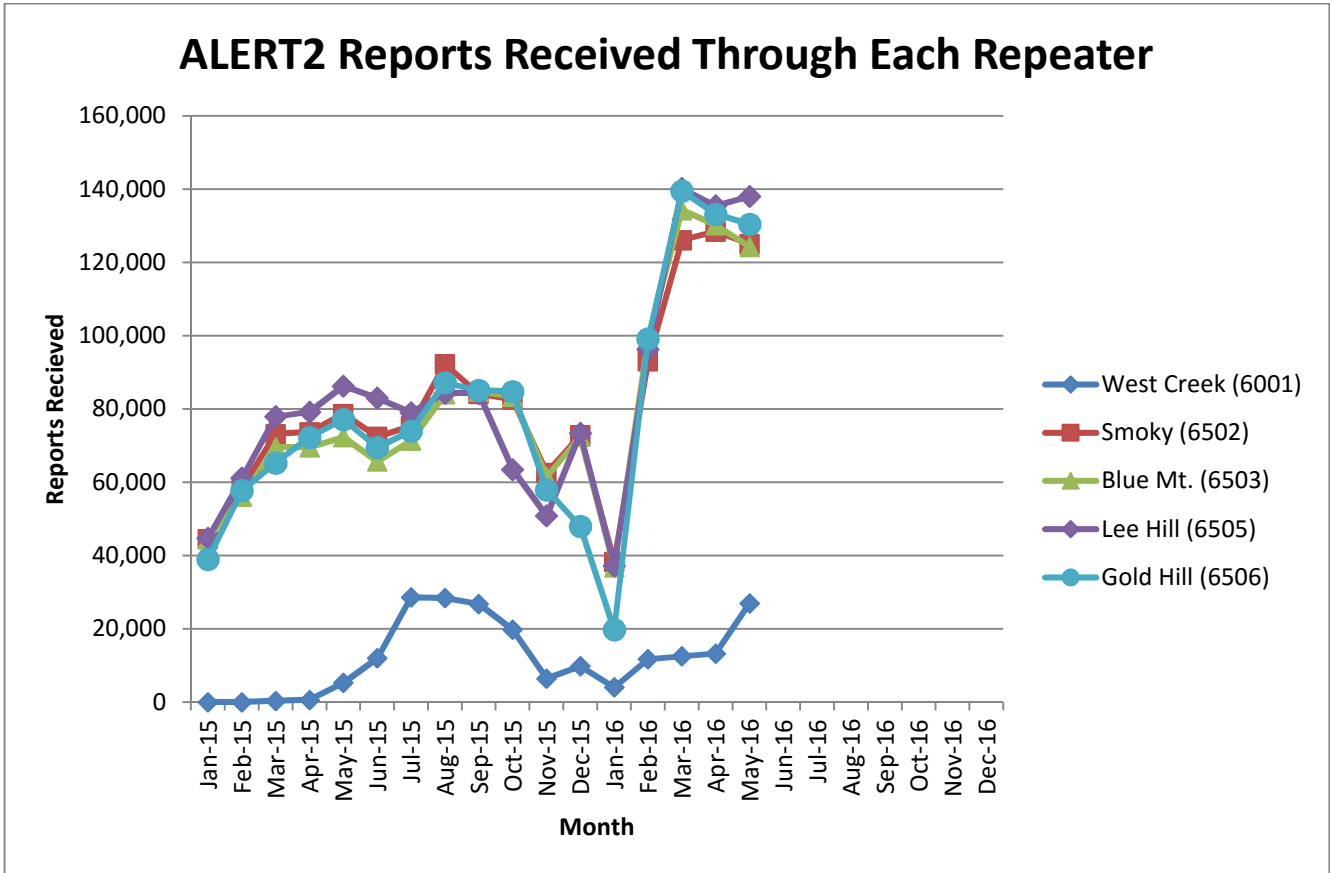


Figure 2. Reports received through each repeater (ALERT2 Only)

In general each of the primary repeaters in the District process an equivalent number of ALERT2 reports. Several months are evident where the throughput of one repeater is not consistent with the other three. The reduction of ALERT2 reports through Lee Hill in October is evident (Figure 2) as is the reduction of ALERT2 reports through Gold Hill in December. A convenient mechanism to track repeater performance throughout the year is to monitor total ALERT2 reports passed by each repeater.

The following tables summarize the system-wide latency of ALERT2 self-reports (Table 7 and Table 8).

Table 7. System-Wide Latency of ALERT2 Self-Reports (seconds)

Statistical Parameter	Value (sec)	Comments
Mean	54	The average time it took a report from the field to reach the base
Minimum	2	The minimum time it took for a report to go from the field to the base
Maximum	262	The maximum time it took for a report to go from the field to the base
Crazy	--	Exceedingly large latency

Table 8. Summary of ALERT2 System-Wide Latency (seconds)

Statistical Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	66.17	72.6	75.36	67.48	53.36							
Minimum	3	2	1	3	2							
Maximum	300	261	521	745	262							
Station with Max Latency	Magnolia WX (6602)	Magnolia WX (6607)	Sand Cr (10016)	Magnolia WX (6601)	Magnolia WX (6605)							
Station with Crazy Latency		Trumbull WX – Hayman (100260)	Magnolia WX (6607)	--								

The large latency of 262 seconds from the Magnolia WX (SA 6605) through all four repeaters occurred on May 18th. Below are the readings taken from OneRain’s Contrail system for the air temperature reading from the Magnolia WX on the date/time in question. One can see that the readings taken in the field were received at the base station approximately 4 minutes after they were read in the field.

Field Reading Date/Time = 2016-05-18 15:02:42
 Base Receive Date/Time = 2016-05-18 15:06:45
 Value = 163
 Unit = DegN
 Quality = A

This large delay was observed through each repeater and it was observed at all three base stations (Contrail, Diamond Hill and Greenhouse). It is suspected that this delay was introduced by the remote transmitter.

E. TDMA Time Slot Size

ALERT2 networks will have problems with missing timed station reports when they have transmit times at some stations that exceeded the TDMA slot size. For example, a test transmission from a site may be received when it's sent manually from the site but the timed transmissions are not received. This is a problem with the station preceding the missing station exceeding its slot size in the TDMA assignment.

A program is written for the UDFCD that checks the receive data log files looking for station reports that are too long. For example, when you look at lines with MANT TS=... the Length=# is the data packet size. It should not be more than 45 bytes. The only stations found to exceed the 45 byte limit were repeaters.....which is acceptable since their slot size is much larger than 0.5 seconds.

The following stations exceeded the allowable 0.5ms time slot.

) Magnolia WX (6601)

Currently no slot assignment has yet been made for the slot immediately following Magnolia WX.

F. Inefficient ALERT2 Packets

An inefficient ALERT2 packet contains multiple (MANT) data packets per air link packet. ALERT2 supports the composition of air link packets containing multiple data values in a single MANT packet. Using a single MANT packet for each data packet is an efficient use of the ALERT2 protocol and should be avoided. The following sites were identified as possibly being configured inefficiently:

) Newlin Gulch (3070) – Campbell Scientific – this transmitter was updated with a new EPROM that allows for MSR reporting

) OneRain Weather (10020) – Campbell Scientific

) Diamond Hill (10028) - ?

) Plum Creek at Sedalia (10029) – Campbell Scientific

G. Rain Sensor Timer Reporting Summary

The following analysis assumes that each legacy rain sensor has a 12-hour timer-reporting interval and each A2 rain sensor has a 1-hour timer-reporting interval. The worst performing rain sensors for the month are summarized (Table 9).

Table 9. Monthly Summary of Sensors with Poor Timer Performance (Sensor ID)

Jan*	Feb*	Mar*	Apr	May	Jun	Jul	Aug	Sep	Oct*	Nov*	Dec*
10026	3020	4470	4850	2790							
4550	4520	2790	2790	1620							
2330	2790	4850	2360	2750							
4270	4850	5940	1420	2330							
1660	10026	10023	4270	5860							
4330	10020	10026	4520	2360							

*- Only sensors that operate year-round (weather stations and stations in Boulder County) are included for the analysis in these months.

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.

III. 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 10). For the months of January, February, March, October, November and December only the stations that operate year-round are included in the rain event analysis. These stations include all weather stations and the stations in Boulder County.

Table 10. District-Wide Total Tip/Count Statistical Summary

Statistical Parameter	Value	Comments
Mean	49.4	Only the 1-mm rain sensors were included in the analysis
Median	47.5	Only the 1-mm rain sensors were included in the analysis
Standard deviation	17	Only the 1-mm rain sensors were included in the analysis
Mean plus three standard deviations	100	Only the 1-mm rain sensors were included in the analysis
Mean minus two standard deviations	15.4	Only the 1-mm rain sensors were included in the analysis
Minimum total count	11	SBC @ S. Boulder Ditch (4840)
Maximum total count	110	Brighton Ditch (1570)
Sensors showing NO rain for the month		Little Dry Cr. At 64 th (1310) and Plum Cr. At Sedalia (100290)
Sensors greater than 3 SD (over reporting)	1	Brighton Ditch (1570)

B. Monthly Average Tip/Count Summary

A monthly summary of the District-wide mean total tip/count is presented (Table 11).

Table 11. 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	4.18	18.31	8.30	3.31	27.67
2011	6.78	7.45	7.54	33.94	92.68	39.42	90.87	18.25	37.67	25.73	10.41	13.59	32.03
2012	4.89	13.57	2.35	30.17	38.97	19.35	73.03	11.31	48.81	22.32	2.98	4.18	22.66
2013	2.96	14.31	21.86	35.96	45.87	16.39	52.33	50.63	229.74	29.64	5.86	4.00	42.46
2014	6.88	11.86	25.91	29.30	77.30	29.16	99.73	43.59	50.96	29.26	13.36	8.11	35.45
2015	9.88	24.42	20.78	69.75	143.07	86.93	54.59	29.95	7.16	53.28	22.08	10.80	44.39
2016	4.68	9.91	32.30	52.10	49.40								

*- Only sensors that operate year-round (weather stations and stations in Boulder County) are included for the analysis in these months.

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 12).

Table 12. Sensors with a Jump of 6 or More in Sequential Count

Sensor Description	Sensor ID	Comment
Wx-West Cherry Creek	2790	Several large jumpsproblem at this site.....WET to investigate
Brighton Ditch	1570	One large jumptoward the end of the month
Martin Gulch	1440	One jump
Hansen Rain	4330	Two jumps
Four Mile	5720	One jump.....possible problem with West Creek Repeater
West Creek	5730	Four jumps.....possible problem with West Creek Repeater
Sand Creek at Colfax – A2	100160	ALERT2 site....unusual to see jumps in the count value

D. Sensor-by-Sensor Incrementing Count Summary

The system-wide reception rate of incrementing, 1-mm tip reports for the month was approximately 93 percent. A total of 8,699 incrementing reports were received and a total of 9,381 reports were expected. The total loss of incrementing reports for the month was approximately 7 percent. Those sensors with the worst event transmission performance are summarized (Table 13).

Table 13. Monthly Summary of Sensors with the Worst Performance

Jan*	Feb*	Mar*	Apr	May	Jun	Jul	Aug	Sep	Oct*	Nov*	Dec*
1530	4270	2790	2790	2790							
4550	10026	10026	5900	4330							
1640	2790	5940	4260	1620							
4180	4240	4790	950	4470							
1660	5940	4510	2330	2230							
4840	4510	4870	1480	2980							

*-Only sensors that are operational year-round (weather stations and stations in Boulder County) are included for the analysis in these months.

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.

IV. 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 14).

Table 14. Summary of Unknown IDs

Description	Concentrator	Legacy	A2
Total number of unknown IDs (IDs without a device definition)	344	344	0
Total reports from unknown IDs	1,268	1,094	0
Unknown IDs with only a single received report (potential noise)	207	242	0
Total reports from all IDs – RecData Log entire month	447,154	264,138	544,926
Unknown reports as a fraction of total reports	0.28%	0.41%	0%

The total number of reports from unknown sensors is very small relative to the total reports received for the month. Shown below (Table 15) are the total reports received from unknown sensor IDs for each month of the year.

Table 15. Monthly Summary of Total Reports from Unknown IDs (Concentrator)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	1,220	1,474	1,276	1,174	721	5,707	610	1,738	442	533	2,857	6,396
2011	1,231	2,165	3,065	1,254	2,051	439	489	456	191	683	747	861
2012	692	750	1,575	977	5,469	11,016	453	683	774	2,657	3,854	5,466
2013	4,265	994	1,100	2,589	3,623	6,973	5,230	1,070	4,429	781	13,459	1,213
2014	870	4,284	2,399	2,104	25,746	1,832	3,983	268	369	448	470	1,099
2015	542	9,137	1,524	1,007	946	699	1,179	1,860	1,153	1,063	600	619
2016	323	1,241	3,085	3,586	1,268							

The fraction of reports from unknown sensors relative to the total number of reports is shown below (Table 16).

Table 16. Monthly Percent of Unknown Sensor Reports (Concentrator)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	0.42%	0.56%	0.38%	0.32%	0.20%	1.61%	0.17%	0.49%	0.13%	0.16%	0.93%	1.88%
2011	0.39%	0.73%	0.90%	0.37%	0.58%	0.12%	0.12%	0.05%	0.12%	0.18%	0.22%	0.26%
2012	0.30%	0.25%	0.43%	0.26%	1.37%	2.74%	0.11%	0.18%	0.20%	0.72%	1.15%	1.62%
2013	1.40%	0.31%	0.29%	0.60%	0.37%	0.61%	0.82%	0.21%	0.96%	0.31%	5.37%	0.23%
2014	0.14%	0.94%	0.40%	0.34%	3.95%	0.34%	0.66%	0.03%	0.03%	0.07%	0.11%	0.26%
2015	0.15%	2.25%	0.34%	0.22%	0.19%	0.14%	0.26%	0.42%	0.29%	0.24%	0.15%	0.15%
2016	0.10%	0.30%	0.69%	0.82%	0.28%							

Any month shaded in yellow has an excessive number of reports from unknown sensors.

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 17).

Table 17. Reports Received by Unknown IDs

Concentrator		Legacy ALERT		Comment
Unknown ID	Reports	Unknown ID	Reports	
2283	111	2283	110	
623	98	623	95	
443	62	443	61	
2274	58	2	77	
2271	57	2271	56	From Cub Creek below Blue (2270)
2272	56	2272	55	From Cub Creek below Blue (2270)

V. Sensors with Invalid Reports

The sensors below (Table 18 and Table 19) have the largest number of invalid decodes as determined by the validation process defined at the District NovaStar5 base station. These invalid reports may indicate poor radio paths (bit flip/contention errors/random decode) or validation criteria that do not match the physical installation at the site.

Table 18. Rain Sensors with the Most Invalid Reports

Sensor ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1530-Bear Cr. At Lowell	8	5	10	3	1							
2810-Pine Cliff Rd.	--	18	11	8	9							
2750-Wx-Castle Rock	10	24	0	0	1							
2790-Ws-W. Cherry Creek	--	--	--	--	8							
2980-Dakan Road	--	--	--	8	9							
2990-Tomah Rd.	--	12	2	2	2							
3010-Wx-EPC @ 105	--	--	8	10	11							
3020-Wx-West Creek	9	103	96	111	149							
3050-E/W Trailhead	--	--	8	7	7							
3070-Newlin Gulch	10	52	5	0	0							
4030-Red Garden	23	41	3	4	2							
4330-Hansen Rain	--	--	--	--	5							
5730-West Creek	--	--	--	--	22							

The antenna system at the West Creek repeater is experiencing radio interference and will require a filter as soon as WET can travel up to the repeater this spring. The likely cause of the poor performance of many Douglas County sites is the local radio interference at the West Creek repeater.

Table 19. Level Sensors with the Most Invalid Reports

Sensor ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
203-Leyden Res	11	22	37	15	1							
653-GG at Iliff Pond	--	--	--	15	1							
713-Horseshoe Park Drop	--	--	--	12	0							
853-Flying J	--	36	57	58	58							
1323-SPR at 3 rd Ave	--	--	--	78	1							
1383-Ferril Lake	747	703	686	714	683							
1623-Slaughterhouse Gulch	--	--	--	--	13							
1663-SPR at Henderson	--	--	--	--	9							
2813-Pine Cliff Road	--	--	--	--	1,172*							
2873-Cottonwood	--	--	85	2,807*	2,764*							
3013-EPC@Hwy 105	7	19	11	4	2							
3043-CC@Russelville	--	--	22	5	0							
4563-Lyons Diversion	--	13	13	10	3							

*These stations are out-of-service for the month

VI. Rainfall Alarms and Intensity Analysis

The following rainfall rate alarms from the Urban Drainage and Flood Control District NovaStar 5.0 Web Server were identified this month.

ID	Description	Alarm Type	Date/Time
840	Aurora Fire Station 12 Precipitation-AD	Plains 10 minute rainfall	5/3/2016 11:13
840	Aurora Fire Station 12 Precipitation-AD	Tweet Aurora Heavy Rain 0.5"-10min	5/3/2016 11:13
1570	Brighton ETO Precipitation-WE	Plains 10 minute rainfall	5/8/2016 16:46
1570	Brighton ETO Precipitation-WE	Plains 1 hour rainfall	5/8/2016 16:55
1570	Brighton ETO Precipitation-WE	Plains 10 minute rainfall	5/10/2016 14:50
4570	St. Antons Precipitation-BO	Boulder County 10 minute rainfall	5/18/2016 13:35
4570	St. Antons Precipitation-BO	Tweet Boulder County Heavy Rain 0.5"-10min	5/18/2016 13:35

General System Analysis

Database Name P:\A207-UDFCD-Data-Analysis\2016\05-2016\Novastar_extract_2016May.mdb

First Date in Database	4/30/16 11:59 PM	Total Days	31.0
Last Date in Database	5/31/16 11:59 PM	Total Hours	744.0

Summarize

Total Records Analyzed 447,154

Records by Group	Concentrator	Percent	Legacy	Percent	ALERT2	Percent
Wind Data	168,378	37.66%	91,350	34.58%	153,221	28.12%
Temperature	71,688	16.03%	36,943	13.99%	83,493	15.32%
Relative Humidity	62,907	14.07%	36,451	13.80%	81,454	14.95%
Barometric Pressure	34,224	7.65%	20,772	7.86%	1,063	0.20%
Battery Voltage	29,409	6.58%	14,097	5.34%	64,929	11.92%
Water Level	26,875	6.01%	18,288	6.92%	54,982	10.09%
Precipitation	19,915	4.45%	14,917	5.65%	39,355	7.22%
Solar Radiation	11,104	2.48%	10,741	4.07%	0	0.00%
Fuel Moisture	6,375	1.43%	5,863	2.22%	0	0.00%
Fuel Temperature	6,246	1.40%	5,887	2.23%	0	0.00%
Soil Moisture	2,950	0.66%	2,929	1.11%	0	0.00%
Repeater Status Report	2,167	0.48%	2,658	1.01%	0	0.00%
Unknown	1,268	0.28%	1,094	0.41%	0	0.00%
Wind Direction	1,056	0.24%	2	0.00%	11,023	2.02%
ET-Hourly	740	0.17%	719	0.27%	0	0.00%
Hayman Battery	671	0.15%	0	0.00%	0	0.00%
12Hr Status Report	332	0.07%	319	0.12%	2,941	0.54%
Not Used	299	0.07%	275	0.10%	742	0.14%
GPS Lock	255	0.06%	126	0.05%	26,250	4.82%
Water Temp	124	0.03%	54	0.02%	0	0.00%
Repeater Pass List	66	0.01%	553	0.21%	0	0.00%
Handar 585 ALARM Status	64	0.01%	62	0.02%	0	0.00%
ET-Daily	31	0.01%	30	0.01%	0	0.00%
Solar Power	6	0.00%	6	0.00%	0	0.00%
ALERT/A2 Testing	4	0.00%	2	0.00%	0	0.00%
Dew Point Temperature	0	0.00%	0	0.00%	8,859	1.63%
Wind Chill	0	0.00%	0	0.00%	8,859	1.63%
Flasher Status	0	0.00%	0	0.00%	7,755	1.42%
Total	447,154	100.00%	264,138	100.00%	544,926	100.00%

Traffic Loading Summary	Concentrator		Legacy		ALERT2	
Alert Reports	447,154		264,138		544,926	
Average Daily Traffic	13,974		8,521		17,029	
Average Hourly Traffic	582		355		710	
Median Hourly Traffic	588	hour beginning	350	hour beginning	729	hour beginning
Peak Hourly Traffic	1,116	May 7, 1:00 PM	783	May 16, 2:00 PM	1,014	May 16, 1:00 PM
2nd Max	1,103	May 16, 1:00 PM	760	May 7, 1:00 PM	1,000	May 26, 2:00 PM
3rd Max	1,093	May 16, 2:00 PM	740	May 16, 1:00 PM	940	
4th Max	1,011	May 24, 2:00 PM	633	May 7, 12:00 PM	925	May 7, 1:00 PM
5th Max	982	May 26, 2:00 PM	630	May 24, 2:00 PM	883	May 7, 12:00 PM

Rain Timer Performance

Analyze Rain Sensors

Rain Sensors	Description	Rcv	Timer	Exp	Performance
2790	Wx-W. Cherry Creek	3	12:00	64	5%
1620	Slaughterhouse Glch	30	20:47	64	47%
2750	Wx-Castle Rock	34	11:41	64	53%
2330	Morrison	35	18:39	64	55%
5860	Cedar Mountain	35	12:27	64	55%
2360	Indian Hills	37	17:31	64	58%
4330	Hansen Rain	38	14:42	64	59%
4850	Porphyry Mtn	438		685	64%
4270	Cannon Mountain	41	13:57	64	64%
100270	Wx-A2-WestCreek (Hayman) - Precip	446		685	65%
2280	Kinney Peak	43	13:03	64	67%
5730	West Creek	43	12:00	64	67%
1710	Shop Creek	44	16:44	64	69%
2980	Dakan Rd	45	14:10	64	70%
4470	Little Narrows	45	14:42	64	70%
5720	Four Mile Creek	45	12:56	64	70%
3010	WX-EPC at Hwy 105	46	13:01	64	72%
940	Aurora Regional Pond	47	15:12	64	73%
2880	Happy Canyon at N Surrey Dr	47	13:56	64	73%
4510	Pinewood Springs	47	13:27	64	73%
4870	SBC @ SB Road	47	13:20	64	73%
100260	Wx-A2-Trumbull (Hayman) - Precip	506		685	74%
2230	Bear Cr below Cub	48	13:48	64	75%
4180	Gold Lake	48	15:32	64	75%
5940	Log Jumper	48	13:53	64	75%
2320	Choke Cherry Resvr	49	15:09	64	77%
310	Guy Hill Ranch	50	12:57	64	78%
1660	SPR at Henderson	50	14:00	64	78%
2270	Cub Cr below Blue	50	12:16	64	78%
2840	Sulphur Gulch	50	14:13	64	78%
5880	Hackett Mountain	50	13:30	64	78%
620	Quincy/Highline	51	13:57	64	80%
800	Sable Ditch @ 18th	51	12:33	64	80%
1030	NREL/S. Table Mtn.	51	14:24	64	80%
1500	Powers Park	51	14:13	64	80%
1920	Wx-Brighton	51	12:20	64	80%
2850	Cherry Cr bl Bayou Glch	51	12:34	64	80%
2940	Willow Creek - DougCnty	51	14:06	64	80%
4790	Wx-Button Rock	51	12:00	64	80%
1300	Hidden Lake	52	13:23	64	81%
1530	Bear Creek @ Lowell	52	12:29	64	81%
2710	Wx-Highlands Ranch WTP	52	12:16	64	81%
2730	Wx-Salisbury Park	52	14:30	64	81%
2820	Haskins Gulch Conf	52	12:36	64	81%
3050	East/West Trailhead	52	12:34	64	81%
4030	Red Garden	52	14:16	64	81%
4310	Johnny Park	52	12:16	64	81%
4710	Wx-Ward C-1	52	12:00	64	81%
5740	Trail Creek	52	13:15	64	81%
120	West Woods	53	12:31	64	83%
210	Leyden Confluence	53	12:13	64	83%
220	Upper Leyden	53	12:16	64	83%
330	Van Bibber @ Hwy 93	53	11:58	64	83%
410	Kelly Dam	53	12:13	64	83%

420	Expo Park	53	12:15	64	83%
500	Havana Park	53	12:32	64	83%
520	Jewell Detention	53	14:00	64	83%
700	Toll Gate @ 6th	53	12:17	64	83%
760	Mission Viejo Park	53	13:29	64	83%
840	Fire Station 12	53	12:36	64	83%
900	Wx-Aurora Reservoir	53	13:18	64	83%
1400	Upper Sloan Det.	53	13:49	64	83%
2250	Rosedale	53	12:50	64	83%
2310	Genesee Village	53	13:38	64	83%
2350	Idledale	53	11:57	64	83%
2890	Spruce Mt - Douglas	53	12:52	64	83%
2950	DC Public Works	53	13:42	64	83%
2960	Indian Creek	53	13:57	64	83%
3030	WX-Bingham Lake Park	53	14:02	64	83%
4490	Apple Valley	53	12:15	64	83%
4570	St. Antons	53	13:48	64	83%
4860	Fairview Peak	53	12:00	64	83%
5810	Stump Bump	53	12:17	64	83%
110	Ralston Reservoir	54	11:58	64	84%
200	Leyden Reservoir	54	13:28	64	84%
440	Fire Station #7	54	13:19	64	84%
540	Parker/Mississippi	54	13:35	64	84%
610	Harvard @ Jackson	54	13:18	64	84%
750	Wx-Quincy Reservoir	54	13:43	64	84%
850	Flying J	54	12:00	64	84%
1100	Louisville Rec Ctr	54	13:49	64	84%
1320	SPR at 3rd Ave	54	13:17	64	84%
1360	Denver Zoo	54	13:23	64	84%
1370	West Metro FS13	54	12:13	64	84%
1550	Lakewood CC	54	11:57	64	84%
1900	Niver Detention	54	12:14	64	84%
2340	El Rancho	54	14:18	64	84%
2860	CC at Stroh Rd	54	13:49	64	84%
2870	Cottonwood (Apache)	54	13:15	64	84%
2910	East Cherry Cr-Douglas	54	12:00	64	84%
2990	Wx-Tomah Rd-DougCnty	54	12:00	64	84%
3040	CC @ Russelville Road Precip	54	13:54	64	84%
3060	Fire Sta 47	54	12:34	64	84%
4010	Crescent	54	11:58	64	84%
4070	Bear Peak	54	13:25	64	84%
4080	Twin Sisters	54	13:45	64	84%
4160	Sunshine	54	13:27	64	84%
4350	Conifer Hill	54	11:53	64	84%
4530	Winiger Ridge	54	11:57	64	84%
4550	Boulder Jail	54	12:14	64	84%
4770	Wx-Cal-Wood Ranch	54	12:00	64	84%
4810	Shanahan Ridge	54	13:33	64	84%
430	Utah Park	55	13:19	64	86%
510	Virginia Court	55	13:19	64	86%
530	Fire Station #19	55	13:17	64	86%
600	Harvard Gulch Park	55	11:58	64	86%
810	Granby Ditch @ 6th	55	11:57	64	86%
970	Pump Sta 3	55	12:00	64	86%
1040	Lena @ U.S. Hwy 6	55	13:29	64	86%
1050	Jeffco Fairgrounds	55	13:27	64	86%
1060	Heritage Square	55	13:21	64	86%
1200	Broomfield 3207	55	13:31	64	86%
1310	LDC at 64th	55	13:17	64	86%

1440	Wx-Elbert	55	12:16	64	86%
1480	Third Creek at DIA	55	12:23	64	86%
1520	Wx-Marston Lake North	55	13:15	64	86%
1570	Wx-Brighton Ditch	55	12:00	64	86%
1640	SPR at Union Ave.	55	13:35	64	86%
2210	Wx-Hiwan G.C.	55	12:00	64	86%
2240	Cold Sprg Glch conf	55	11:41	64	86%
2370	Red Rocks Park	55	13:31	64	86%
2810	Pine Cliff Road	55	13:20	64	86%
4020	Rio Grande	55	11:58	64	86%
4040	Martin Gulch	55	12:32	64	86%
4050	Walker Ranch	55	13:17	64	86%
4060	Lakeshore	55	13:42	64	86%
4110	Betasso	55	11:58	64	86%
4190	Slaughterhouse	55	13:26	64	86%
4200	Lazy Acres	55	13:34	64	86%
4250	Geer Canyon	55	11:57	64	86%
4260	Taylor Mountain	55	13:32	64	86%
4290	Red Hill	55	13:50	64	86%
4300	Big Elk Park	55	13:45	64	86%
4340	Riverside	55	13:51	64	86%
4360	Justice Center	55	11:57	64	86%
4520	Eagle Ridge	55	12:00	64	86%
100110	A2-ETG @ Hampden Precip	55	13:15	64	86%
100200	Wx-A2-OneRain Weather - Precipitation	55	12:17	64	86%
150	Nott Creek	56	11:41	64	88%
320	Sports Complex	56	13:14	64	88%
730	No Name @ Quincy	56	13:11	64	88%
820	ETG @ Buckley	56	13:27	64	88%
920	Wx-Aurora Town Hall	56	11:43	64	88%
1110	Gunbarrel	56	13:14	64	88%
1700	Cherry Cr @ Champa	56	12:58	64	88%
1720	Cherry Cr @ Steele	56	13:15	64	88%
2260	Brook Forest	56	13:01	64	88%
2900	Russelville Gulch-Douglas	56	13:42	64	88%
2920	West Cherry Head-Douglas Cnty	56	13:06	64	88%
2930	Wx-Spring Valley Rd-DougCnty	56	12:00	64	88%
3080	Tallman Gulch	56	13:38	64	88%
4090	Magnolia	56	13:25	64	88%
4100	Filter Plant	56	13:23	64	88%
4130	Swiss Peaks	56	13:36	64	88%
4170	Pine Brook	56	13:27	64	88%
4230	Golden Age	56	13:24	64	88%
4320	Lee Hill Rain 2012	56	13:25	64	88%
4750	Wx-Louisville Lake	56	13:16	64	88%
4840	SBC@S Boulder Ditch	56	11:44	64	88%
4880	Whispering Pines	56	13:23	64	88%
100100	A2-Blackstone Precip	56	13:15	64	88%
140	Wx-Blue Mountain	57	11:32	64	89%
300	Van Bibber Park	57	13:12	64	89%
630	Temple Pond at DTC	57	13:21	64	89%
650	Iliff Pond	57	13:14	64	89%
710	Horseshoe Park Drop	57	13:08	64	89%
950	Piney at Liverpool	57	13:14	64	89%
1010	Denver West	57	12:57	64	89%
1350	Chatfield COE	57	12:00	64	89%
1420	Wx-A2-Diamond Hill	57	13:12	64	89%
1460	Wx-Urban Farm	57	13:04	64	89%
1800	Sand Creek Park	57	11:58	64	89%

4220	Fling's	57	13:11	64	89%
4240	Sunset	57	13:23	64	89%
4730	Wx-Sugarloaf	57	13:08	64	89%
4820	Doudy Draw	57	13:16	64	89%
3090	A2-Highland Heritage Park	619		685	90%
640	Goldsmith @ Eastman	58	12:43	64	91%
720	Confluence Pond	58	12:52	64	91%
4140	Logan Mill	58	13:04	64	91%
4150	Gold Hill	58	13:04	64	91%
4830	SBC @ San Souci	58	12:57	64	91%
1600	Englewood Dam	59	12:41	64	92%
100290	Wx-A2-PlumCr at Sedalia - Precip	661		685	96%
100320	A2-Weir Gulch - Precip	680		685	99%
100160	A2-Sand Creek at Colfax Precip	683		685	100%
3070	A2-Newlin Gulch Precip	684		685	100%
100300	A2-CoalCreek at McCaslin - Precip	684		685	100%
6601	Wx-A2-Magnolia WX-Precip	84	8:56	84	100%
100	A2-Carr Street	685	0:00	685	100%
870	A2-Murphy Creek GC	685		685	100%
1000	A2-Maple Grove Resv.	685		685	100%
1340	Sanderson at Xavier	685		685	100%
2970	Rampart Range Rd-Satellite	256		256	100%
5900	Horse Creek-Satellite	4672		4672	100%
100230	A2-Havana Pond Precip	685		685	100%
100240	A2-Westerly Cr Dam Precip	685		685	100%

Rain Event Performance																
	Reports Received	Reports Received	8,699		Analyze Rain Sensors					0	<<show stations with zero rain (1-yes, 0-no)					
	Systemwide Avg	Total Tips	9,381													
	92.73%	Data Loss	7.27%													
Description	Sensor	Performance	1-tips	2-tips	3-tips	4-tips	5-tips	6-tips	>6-tips	Rcv	Exp	Miss	Hold	Bucket		
Wx-W. Cherry Creek	2790	19%	0	3	1	1	0	0	0	3	13	67	54	0	0.03937	
Hansen Rain	4330	58%	39	9	4	2	0	0	2	54	93	39	0	0.03937	Mean	49.4
Slaughterhouse GIch	1620	61%	12	2	1	1	1	0	0	17	28	11	0	0.03937	Median	47.5
Little Narrows	4470	67%	32	3	4	2	1	0	0	42	63	21	0	0.03937	St. Dev	17
Bear Cr below Cub	2230	68%	15	3	2	1	0	0	0	21	31	10	0	0.03937	Mean plus 3 SD	100
Dakan Rd	2980	74%	36	11	2	1	0	0	0	50	68	18	0	0.03937	Min	11
Cannon Mountain	4270	75%	30	11	0	1	0	0	0	42	56	14	0	0.03937	Max	110
Wx-Button Rock	4790	77%	41	3	1	3	0	0	0	48	62	14	0	0.03937		
Wx-Highlands Ranch WTP	2710	79%	14	5	0	0	0	0	0	19	24	5	0	0.03937		
Indian Hills	2360	80%	29	5	0	0	1	0	0	35	44	9	0	0.03937		
Choke Cherry Resvr	2320	80%	33	1	1	2	0	0	0	37	46	9	0	0.03937		
Four Mile Creek	5720	81%	44	0	2	0	0	0	1	46	57	11	0	0.03937		
Guy Hill Ranch	310	82%	31	4	0	0	1	0	0	36	44	8	0	0.03937		
SBC@S Boulder Ditch	4840	82%	7	2	0	0	0	0	0	9	11	2	0	0.03937		
Denver Zoo	1360	83%	39	8	1	0	0	0	0	48	58	10	0	0.03937		
A2-Sand Creek at Colfax Precip	100160	84%	61	0	1	0	0	0	1	62	74	8	1	0.03937		
West Creek	5730	85%	47	0	0	0	0	0	4	47	55	8	0	0.03937		
Log Jumper	5940	85%	47	3	3	0	0	0	0	53	62	9	0	0.03937		
Ralston Reservoir	110	86%	20	4	0	0	0	0	0	24	28	4	0	0.03937		
SPR at Union Ave.	1640	86%	21	2	1	0	0	0	0	24	28	4	0	0.03937		
St. Antons	4570	86%	70	2	1	0	2	0	0	75	87	12	1	0.03937		
Morrison	2330	86%	16	3	0	0	0	0	0	19	22	3	0	0.03937		
Red Rocks Park	2370	86%	28	3	1	0	0	0	0	32	37	5	0	0.03937		
Wx-Blue Mountain	140	87%	41	3	0	0	1	0	0	45	52	7	1	0.03937		
Wx-Marston Lake North	1520	87%	23	2	1	0	0	0	0	26	30	4	0	0.03937		
SBC @ SB Road	4870	87%	34	6	0	0	0	0	0	40	46	6	0	0.03937		
Logan Mill	4140	87%	51	2	1	0	1	0	0	55	63	8	1	0.03937		
Pinewood Springs	4510	87%	69	4	2	1	0	0	0	76	87	11	0	0.03937		
Shop Creek	1710	88%	26	1	0	1	0	0	0	28	32	4	0	0.03937		
Cherry Cr @ Champa	1700	88%	25	4	0	0	0	0	0	29	33	4	0	0.03937		
Nott Creek	150	88%	39	4	1	0	0	0	0	44	50	6	0	0.03937		
Upper Sloan Det.	1400	88%	27	2	1	0	0	0	0	30	34	4	0	0.03937		
Fire Station 12	840	88%	76	6	0	0	0	1	0	83	94	11	5	0.03937		
Martin Gulch	4040	88%	49	4	0	0	0	0	1	53	60	7	0	0.03937		
Justice Center	4360	89%	36	2	0	1	0	0	0	39	44	5	0	0.03937		
Hidden Lake	1300	89%	22	1	1	0	0	0	0	24	27	3	0	0.03937		
SPR at Henderson	1660	89%	38	1	2	0	0	0	0	41	46	5	0	0.03937		
Louisville Rec Ctr	1100	89%	22	3	0	0	0	0	0	25	28	3	0	0.03937		
SBC @ San Souci	4830	89%	30	4	0	0	0	0	0	34	38	4	0	0.03937		
East/West Trailhead	3050	90%	38	5	0	0	0	0	0	43	48	5	0	0.03937		
Cherry Cr bl Bayou GIch	2850	90%	65	4	2	0	0	0	0	71	79	8	0	0.03937		
Wx-Brighton Ditch	1570	90%	96	3	0	0	0	0	1	99	110	11	10	0.03937		
Tallman Gulch	3080	90%	65	6	1	0	0	0	0	72	80	8	0	0.03937		
Crescent	4010	90%	49	4	1	0	0	0	0	54	60	6	0	0.03937		
Third Creek at DIA	1480	90%	52	4	1	0	0	0	0	57	63	6	0	0.03937		
Doudy Draw	4820	91%	35	4	0	0	0	0	0	39	43	4	0	0.03937		
Cub Cr below Blue	2270	91%	47	0	1	1	0	0	0	49	54	5	0	0.03937		
Upper Leyden	220	91%	28	1	1	0	0	0	0	30	33	3	0	0.03937		
Englewood Dam	1600	91%	38	1	0	1	0	0	0	40	44	4	0	0.03937		
Expo Park	420	91%	28	3	0	0	0	0	0	31	34	3	0	0.03937		

Conifer Hill	4350	91%	60	2	2	0	0	0	0	64	70	6	0	0.03937
Bear Creek @ Lowell	1530	92%	30	3	0	0	0	0	0	33	36	3	0	0.03937
Big Elk Park	4300	92%	51	3	1	0	0	0	0	55	60	5	0	0.03937
Powers Park	1500	92%	42	2	1	0	0	0	0	45	49	4	0	0.03937
West Woods	120	92%	31	3	0	0	0	0	0	34	37	3	0	0.03937
CC @ Russelville Road Precip	3040	92%	52	5	0	0	0	0	0	57	62	5	0	0.03937
Sunset	4240	92%	55	1	0	0	1	0	0	57	62	5	0	0.03937
Wx-Elbert	1440	92%	43	2	1	0	0	0	0	46	50	4	0	0.03937
Geer Canyon	4250	92%	54	3	1	0	0	0	0	58	63	5	0	0.03937
Cottonwood (Apache)	2870	92%	44	4	0	0	0	0	0	48	52	4	0	0.03937
Eagle Ridge	4520	92%	45	4	0	0	0	0	0	49	53	4	0	0.03937
A2-Weir Gulch - Precip	100320	93%	35	1	1	0	0	0	0	37	40	3	2	0.03937
Leyden Confluence	210	93%	23	2	0	0	0	0	0	25	27	2	0	0.03937
Lazy Acres	4200	93%	58	5	0	0	0	0	0	63	68	5	0	0.03937
Denver West	1010	93%	24	2	0	0	0	0	0	26	28	2	0	0.03937
West Metro FS13	1370	93%	25	0	1	0	0	0	0	26	28	2	0	0.03937
Niver Detention	1900	93%	24	2	0	0	0	0	0	26	28	2	0	0.03937
Haskins Gulch Conf	2820	93%	48	4	0	0	0	0	0	52	56	4	0	0.03937
Goldsmith @ Eastman	640	93%	25	2	0	0	0	0	0	27	29	2	0	0.03937
Van Bibber @ Hwy 93	330	93%	26	2	0	0	0	0	0	28	30	2	0	0.03937
Iliff Pond	650	93%	26	2	0	0	0	0	0	28	30	2	0	0.03937
Toll Gate @ 6th	700	93%	39	3	0	0	0	0	0	42	45	3	0	0.03937
Bear Peak	4070	93%	53	4	0	0	0	0	0	57	61	4	0	0.03937
Parker/Mississippi	540	94%	27	2	0	0	0	0	0	29	31	2	0	0.03937
Rio Grande	4020	94%	55	2	1	0	0	0	0	58	62	4	0	0.03937
Fling's	4220	94%	56	1	0	1	0	0	0	58	62	4	0	0.03937
Johnny Park	4310	94%	86	1	0	0	0	1	0	88	94	6	0	0.03937
Lakewood CC	1550	94%	29	2	0	0	0	0	0	31	33	2	0	0.03937
Harvard Gulch Park	600	94%	31	2	0	0	0	0	0	33	35	2	0	0.03937
Broomfield 3207	1200	94%	31	2	0	0	0	0	0	33	35	2	0	0.03937
Wx-Quincy Reservoir	750	94%	47	3	0	0	0	0	0	50	53	3	0	0.03937
Havana Park	500	94%	32	2	0	0	0	0	0	34	36	2	0	0.03937
SPR at 3rd Ave	1320	94%	32	2	0	0	0	0	0	34	36	2	0	0.03937
Kinney Peak	2280	94%	32	2	0	0	0	0	0	34	36	2	0	0.03937
Russelville Gulch-Douglas	2900	94%	65	2	1	0	0	0	0	68	72	4	0	0.03937
Wx-A2-Trumbull (Hayman) - Precip	100260	94%	32	2	0	0	0	0	0	34	36	2	0	0.03937
Idledale	2350	95%	33	2	0	0	0	0	0	35	37	2	0	0.03937
Fire Sta 47	3060	95%	67	4	0	0	0	0	0	71	75	4	0	0.03937
Wx-Ward C-1	4710	95%	69	4	0	0	0	0	0	73	77	4	0	0.03937
Betasso	4110	95%	52	3	0	0	0	0	0	55	58	3	0	0.03937
Rosedale	2250	95%	35	2	0	0	0	0	0	37	39	2	0	0.03937
Flying J	850	95%	53	3	0	0	0	0	0	56	59	3	1	0.03937
Sand Creek Park	1800	95%	36	2	0	0	0	0	0	38	40	2	0	0.03937
Genesee Village	2310	95%	36	2	0	0	0	0	0	38	40	2	0	0.03937
WX-Bingham Lake Park	3030	95%	72	4	0	0	0	0	0	76	80	4	0	0.03937
Red Garden	4030	95%	55	1	1	0	0	0	0	57	60	3	0	0.03937
Slaughterhouse	4190	95%	54	3	0	0	0	0	0	57	60	3	0	0.03937
Heritage Square	1060	95%	38	0	1	0	0	0	0	39	41	2	0	0.03937
Mission Viejo Park	760	95%	59	1	1	0	0	0	0	61	64	3	0	0.03937
Fire Station #7	440	95%	39	2	0	0	0	0	0	41	43	2	0	0.03937
Horseshoe Park Drop	710	95%	39	2	0	0	0	0	0	41	43	2	0	0.03937
CC at Stroh Rd	2860	95%	59	3	0	0	0	0	0	62	65	3	0	0.03937
Van Bibber Park	300	95%	20	1	0	0	0	0	0	21	22	1	0	0.03937
Sports Complex	320	95%	20	1	0	0	0	0	0	21	22	1	0	0.03937
Cold Sprg Glich conf	2240	96%	42	2	0	0	0	0	0	44	46	2	0	0.03937

Spruce Mt - Douglas	2890	96%	42	2	0	0	0	0	0	44	46	2	0	0.03937
Horse Creek-Satellite	5900	96%	44	0	1	0	0	0	0	45	47	2	0	0.03937
Brook Forest	2260	96%	44	2	0	0	0	0	0	46	48	2	0	0.03937
East Cherry Cr-Douglas	2910	96%	68	3	0	0	0	0	0	71	74	3	0	0.03937
Wx-Castle Rock	2750	96%	46	2	0	0	0	0	0	48	50	2	0	0.03937
Confluence Pond	720	96%	48	2	0	0	0	0	0	50	52	2	0	0.03937
Aurora Regional Pond	940	96%	49	2	0	0	0	0	0	51	53	2	0	0.03937
Lena @ U.S. Hwy 6	1040	96%	25	1	0	0	0	0	0	26	27	1	0	0.03937
Kelly Dam	410	96%	26	1	0	0	0	0	0	27	28	1	0	0.03937
Jeffco Fairgrounds	1050	96%	26	1	0	0	0	0	0	27	28	1	0	0.03937
Sanderson at Xavier	1340	96%	26	1	0	0	0	0	0	27	28	1	0	0.03937
Twin Sisters	4080	96%	53	2	0	0	0	0	0	55	57	2	0	0.03937
Wx-Spring Valley Rd-DougCnty	2930	97%	81	3	0	0	0	0	0	84	87	3	0	0.03937
DC Public Works	2950	97%	55	2	0	0	0	0	0	57	59	2	0	0.03937
Gunbarrel	1110	97%	28	1	0	0	0	0	0	29	30	1	0	0.03937
Leyden Reservoir	200	97%	29	1	0	0	0	0	0	30	31	1	0	0.03937
Fire Station #19	530	97%	29	1	0	0	0	0	0	30	31	1	0	0.03937
Chatfield COE	1350	97%	29	1	0	0	0	0	0	30	31	1	0	0.03937
Quincy/Highline	620	97%	31	1	0	0	0	0	0	32	33	1	0	0.03937
Sulphur Gulch	2840	97%	62	2	0	0	0	0	0	64	66	2	0	0.03937
Indian Creek	2960	97%	32	1	0	0	0	0	0	33	34	1	0	0.03937
Red Hill	4290	97%	64	2	0	0	0	0	0	66	68	2	0	0.03937
A2-CoalCreek at McCaslin - Precip	100300	97%	33	1	0	0	0	0	0	34	35	1	0	0.03937
Harvard @ Jackson	610	97%	34	1	0	0	0	0	0	35	36	1	0	0.03937
Gold Lake	4180	97%	68	2	0	0	0	0	0	70	72	2	0	0.03937
Willow Creek - DougCnty	2940	97%	69	2	0	0	0	0	0	71	73	2	0	0.03937
Wx-Aurora Reservoir	900	97%	35	1	0	0	0	0	0	36	37	1	0	0.03937
No Name @ Quincy	730	97%	37	1	0	0	0	0	0	38	39	1	0	0.03937
Hackett Mountain	5880	98%	39	1	0	0	0	0	0	40	41	1	0	0.03937
Piney at Liverpool	950	98%	42	1	0	0	0	0	0	43	44	1	0	0.03937
Happy Canyon at N Surrey Dr	2880	98%	44	1	0	0	0	0	0	45	46	1	0	0.03937
Wx-Tomah Rd-DougCnty	2990	98%	89	2	0	0	0	0	0	91	93	2	0	0.03937
Virginia Court	510	98%	45	1	0	0	0	0	0	46	47	1	0	0.03937
Lakeshore	4060	98%	50	1	0	0	0	0	0	51	52	1	0	0.03937
Sable Ditch @ 18th	800	98%	51	1	0	0	0	0	0	52	53	1	0	0.03937
Shanahan Ridge	4810	98%	51	1	0	0	0	0	0	52	53	1	0	0.03937
Stump Bump	5810	98%	52	1	0	0	0	0	0	53	54	1	0	0.03937
ETG @ Buckley	820	98%	53	1	0	0	0	0	0	54	55	1	0	0.03937
Pump Sta 3	970	98%	54	1	0	0	0	0	0	55	56	1	0	0.03937
Wx-Salisbury Park	2730	98%	56	1	0	0	0	0	0	57	58	1	0	0.03937
Taylor Mountain	4260	98%	56	1	0	0	0	0	0	57	58	1	0	0.03937
Pine Cliff Road	2810	98%	58	1	0	0	0	0	0	59	60	1	0	0.03937
Winiger Ridge	4530	98%	58	1	0	0	0	0	0	59	60	1	0	0.03937
Utah Park	430	98%	59	1	0	0	0	0	0	60	61	1	0	0.03937
Sunshine	4160	98%	61	1	0	0	0	0	0	62	63	1	0	0.03937
Wx-Aurora Town Hall	920	98%	62	1	0	0	0	0	0	63	64	1	0	0.03937
Gold Hill	4150	98%	62	1	0	0	0	0	0	63	64	1	0	0.03937
West Cherry Head-Douglas Cnty	2920	98%	63	1	0	0	0	0	0	64	65	1	0	0.03937
Rampart Range Rd-Satellite	2970	98%	63	1	0	0	0	0	0	64	65	1	0	0.03937
Magnolia	4090	98%	64	1	0	0	0	0	0	65	66	1	0	0.03937
Riverside	4340	99%	65	1	0	0	0	0	0	66	67	1	0	0.03937
Wx-Cal-Wood Ranch	4770	99%	69	1	0	0	0	0	0	70	71	1	0	0.03937
A2-Carr Street	100	100%	34	0	0	0	0	0	0	34	34	0	0	0.03937
Jewell Detention	520	100%	41	0	0	0	0	0	0	41	41	0	0	0.03937
Temple Pond at DTC	630	100%	40	0	0	0	0	0	0	40	40	0	0	0.03937

Granby Ditch @ 6th	810	100%	55	0	0	0	0	0	0	55	55	0	0	0.03937
A2-Murphy Creek GC	870	100%	51	0	0	0	0	0	0	51	51	0	0	0.03937
A2-Maple Grove Resv.	1000	100%	25	0	0	0	0	0	0	25	25	0	0	0.03937
NREL/S. Table Mtn.	1030	100%	26	0	0	0	0	0	0	26	26	0	0	0.03937
Wx-A2-Diamond Hill	1420	100%	33	0	0	0	0	0	0	33	33	0	0	0.03937
Wx-Urban Farm	1460	100%	45	0	0	0	0	0	0	45	45	0	0	0.03937
Cherry Cr @ Steele	1720	100%	31	0	0	0	0	0	0	31	31	0	0	0.03937
Wx-Brighton	1920	100%	51	0	0	0	0	0	0	51	51	0	0	0.03937
Wx-Hiwan G.C.	2210	100%	42	0	0	0	0	0	0	42	42	0	0	0.03937
El Rancho	2340	100%	34	0	0	0	0	0	0	34	34	0	0	0.03937
A2-Newlin Gulch Precip	3070	100%	61	0	0	0	0	0	0	61	61	0	0	0.03937
A2-Highland Heritage Park	3090	100%	39	0	0	0	0	0	0	39	39	0	0	0.03937
Walker Ranch	4050	100%	42	0	0	0	0	0	0	42	42	0	0	0.03937
Filter Plant	4100	100%	50	0	0	0	0	0	0	50	50	0	0	0.03937
Swiss Peaks	4130	100%	64	0	0	0	0	0	0	64	64	0	0	0.03937
Pine Brook	4170	100%	55	0	0	0	0	0	0	55	55	0	0	0.03937
Golden Age	4230	100%	46	0	0	0	0	0	0	46	46	0	0	0.03937
Lee Hill Rain 2012	4320	100%	55	0	0	0	0	0	0	55	55	0	0	0.03937
Apple Valley	4490	100%	48	0	0	0	0	0	0	48	48	0	0	0.03937
Boulder Jail	4550	100%	38	0	0	0	0	0	0	38	38	0	0	0.03937
Wx-Sugarloaf	4730	100%	58	0	0	0	0	0	0	58	58	0	0	0.03937
Wx-Louisville Lake	4750	100%	34	0	0	0	0	0	0	34	34	0	0	0.03937
Whispering Pines	4880	100%	52	0	0	0	0	0	0	52	52	0	0	0.03937
Trail Creek	5740	100%	56	0	0	0	0	0	0	56	56	0	0	0.03937
Cedar Mountain	5860	100%	47	0	0	0	0	0	0	47	47	0	0	0.03937
A2-Blackstone Precip	100100	100%	43	0	0	0	0	0	0	43	43	0	0	0.03937
A2-ETG @ Hampden Precip	100110	100%	45	0	0	0	0	0	0	45	45	0	1	0.03937
A2-Havana Pond Precip	100230	100%	44	0	0	0	0	0	0	44	44	0	0	0.03937
A2-Westerly Cr Dam Precip	100240	100%	28	0	0	0	0	0	0	28	28	0	0	0.03937
Wx-A2-WestCreek (Hayman) - Precip	100270	100%	39	0	0	0	0	0	0	39	39	0	0	0.03937
		Total Tips	8238	366	56	20	9	2	13	8699	9381	678	23	
WX-EPC at Hwy 105	3010	86%	154	16	5	1	0	0	0	176	205	29	0	0.01
Porphory Mtn	4850	85%	168	12	3	2	0	2	2	187	221	34	0	0.01
Fairview Peak	4860	94%	268	12	2	1	0	0	0	283	302	19	0	0.01
Wx-A2-Magnolia WX-Precip	6601	100%	254	0	0	0	0	0	0	254	254	0	0	0.01
Wx-A2-OneRain Weather - Precipitation	100200	93%	155	7	1	0	1	0	0	164	177	13	3	0.01

2016 Monthly Peak Hour ALERT Radio Traffic Summary

