

Memo

Date: August 7, 2018
To: Kevin Stewart
From: Markus Ritsch
Subject: July 2018 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 July 1 through July 31, 2018.

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 quantifies the data reports received by each channel at Diamond Hill (Table 1).

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 ALERT (line 1)	208,189	170,938	214,572	224,711	215,631	215,515	228,428						1,477,984
DHill Conc (line 2)	369,547	328,399	383,229	359,855	327,392	365,225	380,878						2,514,525
DHill ALERT2 (line 4)	608,216	474,112	513,779	511,112	563,921	562,145	578,579						3,811,864
Westy ALERT2 (line 8)		472,878	513,257	549,423	601,462	560,429	524,276						3,221,725
Westy Conc (line 6)		327,438	382,812	386,882	382,751	364,046	343,901						2,187,830
TOTAL	1,185,952	1,773,765	2,007,649	2,031,983	2,091,157	2,067,360	2,056,062	0	0	0	0	0	13,213,928
Con/Leg	1.78	1.92	1.79	1.60	1.52	1.69	1.67	0.00	0.00	0.00	0.00	0.00	1.70
DataChr	713,367	590,020	715,298	743,578	765,183	735,108	747,353						5,009,907

A new ALERT2 receiver/decoder was installed in Westy, Colorado in January of 2018. This redundant data feed was added to NovaStar5 in late January. The new data feeds (lines 6 and 8) were added to both the Diamond Hill base station and to the Greenhouse base station for backup. Data from this new source will be quantified as part of this report.

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.

The battery charger powering the ALERT2 decoder at Diamond Hill failed on April 22, 2018. The charger was replaced by OneRain on April 26, 2018. The number of ALERT2 and concentrator reports through Diamond Hill is decreased in April due to the failure of the battery charger. The ratio between legacy reports and concentrator reports is also decreased for these four days.

Network issues were present that degraded data collection on the Greenhouse server between July 2 and July 9, 2018. An uninterruptible power supply (UPS) malfunctioned around July 2 which caused a network switch to go down at Diamond Hill. The network was fully restored on July 9.

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	208,189	170,938	214,572	224,711	215,631	215,515	228,428						1,477,984
Concentrator	369,547	328,399	383,229	359,855	327,392	365,225	380,878						2,514,525
ALERT2	608,216	474,112	513,779	511,112	563,921	562,145	578,579						3,811,864
Westy (Conc)		327,438	382,812	386,882	382,751	364,046	343,901						2,187,830
Westy (A2)		472,878	513,257	549,423	601,462	560,429	524,276						3,221,725
NS5B (Greenhouse)													
Legacy	207,991	167,936	176,780	223,474	212,628	213,434	226,850						1,429,093
Concentrator	369,370	297,198	289,542	357,805	322,706	361,904	367,354						2,365,879
ALERT2	608,348	437,957	389,787	510,718	557,093	557,214	559,618						3,620,735
Westy (Conc)		304,809	292,048	386,008	382,805	361,518	367,720						2,094,908
Westy (A2)		446,873	398,421	548,228	601,760	556,688	560,820						3,112,790
Diff (NS5a-NS5b)													
Legacy (Digi One)	198	3,002	37,792	1,237	3,003	2,081	1,578	0	0	0	0	0	48,891
Concentrator (B2010)	177	31,201	93,687	2,050	4,686	3,321	13,524	0	0	0	0	0	148,646
ALERT2 (B2010)	-132	36,155	123,992	394	6,828	4,931	18,961	0	0	0	0	0	191,129
Westy (Conc)	0	22,629	90,764	874	-54	2,528	-23,819	0	0	0	0	0	92,922
Westy (A2)	0	26,005	114,836	1,195	-298	3,741	-36,544	0	0	0	0	0	108,935
Comments		Network issues experienced this month at DH	New line numbers were assigned at GH	Data script updated									

The daily ratio of concentrator to legacy reports is shown (Figure 1).

In March, the system configuration for data reception at Greenhouse was changed so that unique line numbers could be used to quantify data reports received uniquely at each base station. The automated script used to quantify reports was not updated until April. That's why the large discrepancy in reporting was quantified in March between Diamond Hill and Greenhouse. The new line numbering convention is as follows:

Primary Node Diamond Hill Base Station

-) Line 1 = Legacy ALERT
-) Line 2 = Concentrator from Diamond Hill Decoder
-) Line 4 = ALERT2 from Diamond Hill Decoder
-) Line 6 = Concentrator from Westminster Decoder
-) Line 8 = ALERT2 at Westminster Decoder

Backup Node Greenhouse Base Station

-) Line 1 = Legacy ALERT
-) Line 3 = Concentrator from Diamond Hill Decoder
-) Line 5 = ALERT2 from Diamond Hill Decoder
-) Line 7 = Concentrator from Westminster Decoder
-) Line 9 = ALERT2 at Westminster Decoder

Ratio of Concentrator/Legacy for 2015, 2016, 2017, 2018

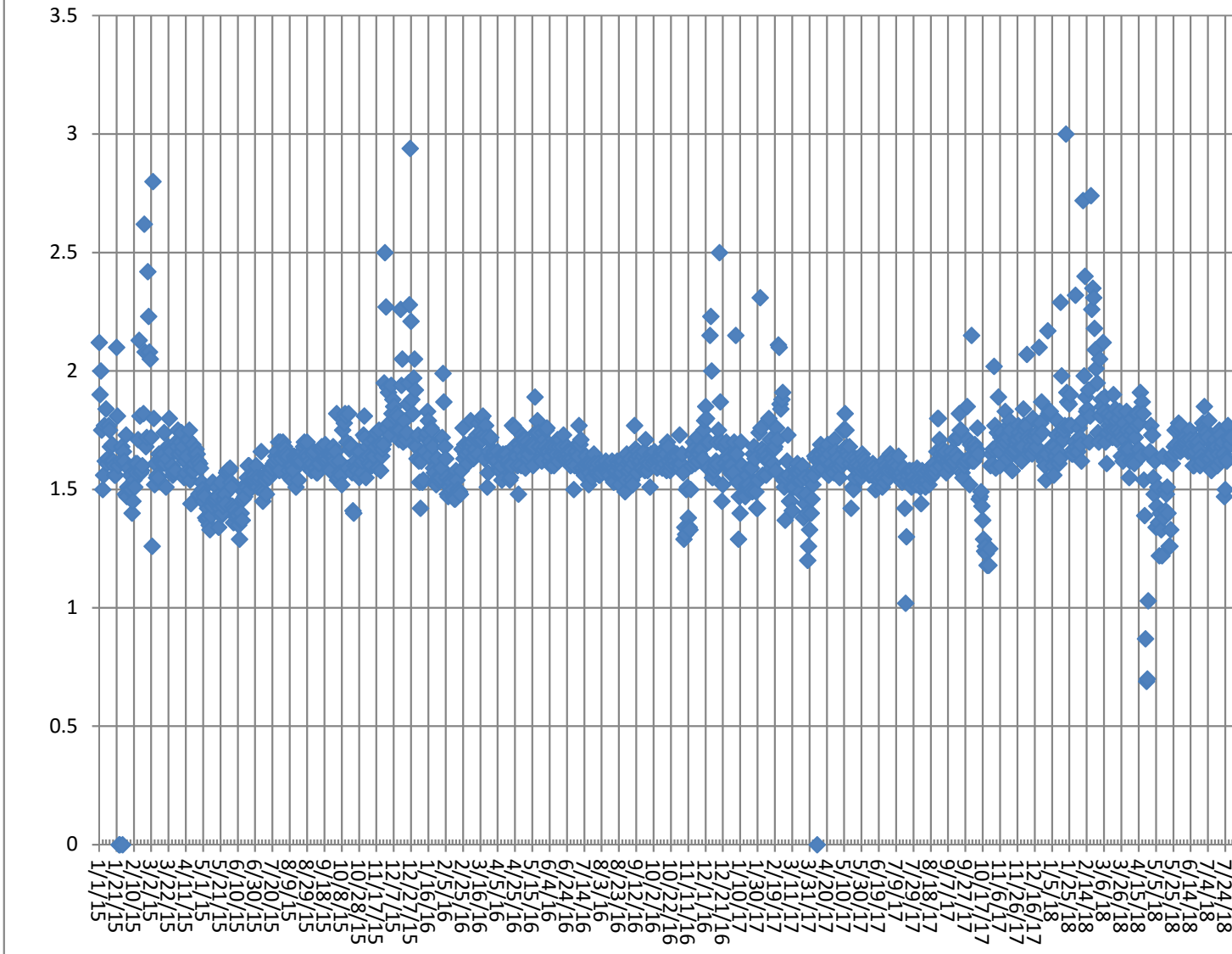


Figure 1. Daily Ratio of Concentrator Reports to Legacy Reports

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

The ratio on January 21, 2018 was very high with a value of 3. The system experienced a significant decrease in legacy ALERT reports on this day. The loss of ALERT legacy reports on January 21, 2018 are from Blue Mountain, Elbert, Urban Farm, and Marston Lake North. The most likely explanation is that the legacy ALERT output from the Blue Mountain repeater was down due to the cold weather experienced on both January 21 and January 15.

A cold spell in February likely contributed to the higher than expected ratio of concentration to legacy reporting.

The failure of the battery charger at the Diamond Hill ALERT2/Concentrator decoder for the period April 22 through April 26 is evident in the decreased ratios for these days.

A. Continuous Operation of Base Receiver/Decoder

Data was collected on a continuous basis for a total of 720 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
2101	Unknown	Concentrator received 912 reports from this ID
2330	Morrison	Consistently poor timer and event performance
2340	El Rancho	Consistently poor timer and event performance
2360	Indian Hills	Poor timer and event performance
0, 1, 2	Unknown	Unknown IDS transmitted on legacy ALERT

C. 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 4). 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 4. 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 5). This helps to quantify repeater loading for the ALERT2 backbone.

Table 5. 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
Jun-15	11,987	72,449	65,742	82,998	69,570	302,746
Jul-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
Jun-16	30,405	117,877	111,309	133,036	122,798	515,425
Jul-16	37,492	108,334	102,335	115,028	110,577	473,766
Aug-16	48,323	130,666	123,827	136,746	131,957	571,519
Sep-16	49,555	122,625	115,898	129,454	127,606	545,138
Oct-16	51,170	111,105	110,038	116,087	116,489	504,889
Nov-2016	47,039	72,761	92,941	100,083	99,508	412,332
Dec-2016	48,946	102,329	97,321	79,274	102,097	429,967
Jan-2017	47,286	50,748	27,307	97,947	104,689	327,977
Feb-2017	45,366	96,629	94,065	88,239	98,411	422,710
Mar-2017	53,021	87,160	33,983	121,578	126,722	422,464
Apr-2017	49,833	110,418	116,486	122,506	120,727	519,970
May-2017	54,375	128,362	128,310	118,908	134,173	564,128
Jun-2017	60,671	131,745	124,019	146,333	138,056	600,824
Jul-2017	58,442	137,750	130,136	146,134	139,778	612,240
Aug-2017	60,322	136,739	128,716	145,280	139,257	610,314
Sep-2017	58,388	146,759	135,632	157,248	150,762	648,789
Oct-2017	48,644	148,071	149,899	159,639	157,788	664,041
Nov-2017	39,868	123,026	134,197	141,153	140,478	578,722
Dec-2017	38,801	138,219	137,672	142,389	141,303	598,384
Jan-2018	45,373	140,341	139,290	141,045	142,167	608,216
Feb-2018	30,490	110,604	109,467	111,922	111,629	474,112
Mar-2018	72,863	110,844	106,466	112,417	111,189	513,779
Apr-2018	71,726	120,656	114,768	125,831	116,442	549,423
May-2018	44,674	132,258	125,752	144,129	117,108	563,921
Jun-2018	95,030	115,819	110,643	124,698	115,955	562,145
Jul-2018	101,000	119,381	112,276	127,372	118,550	578,579

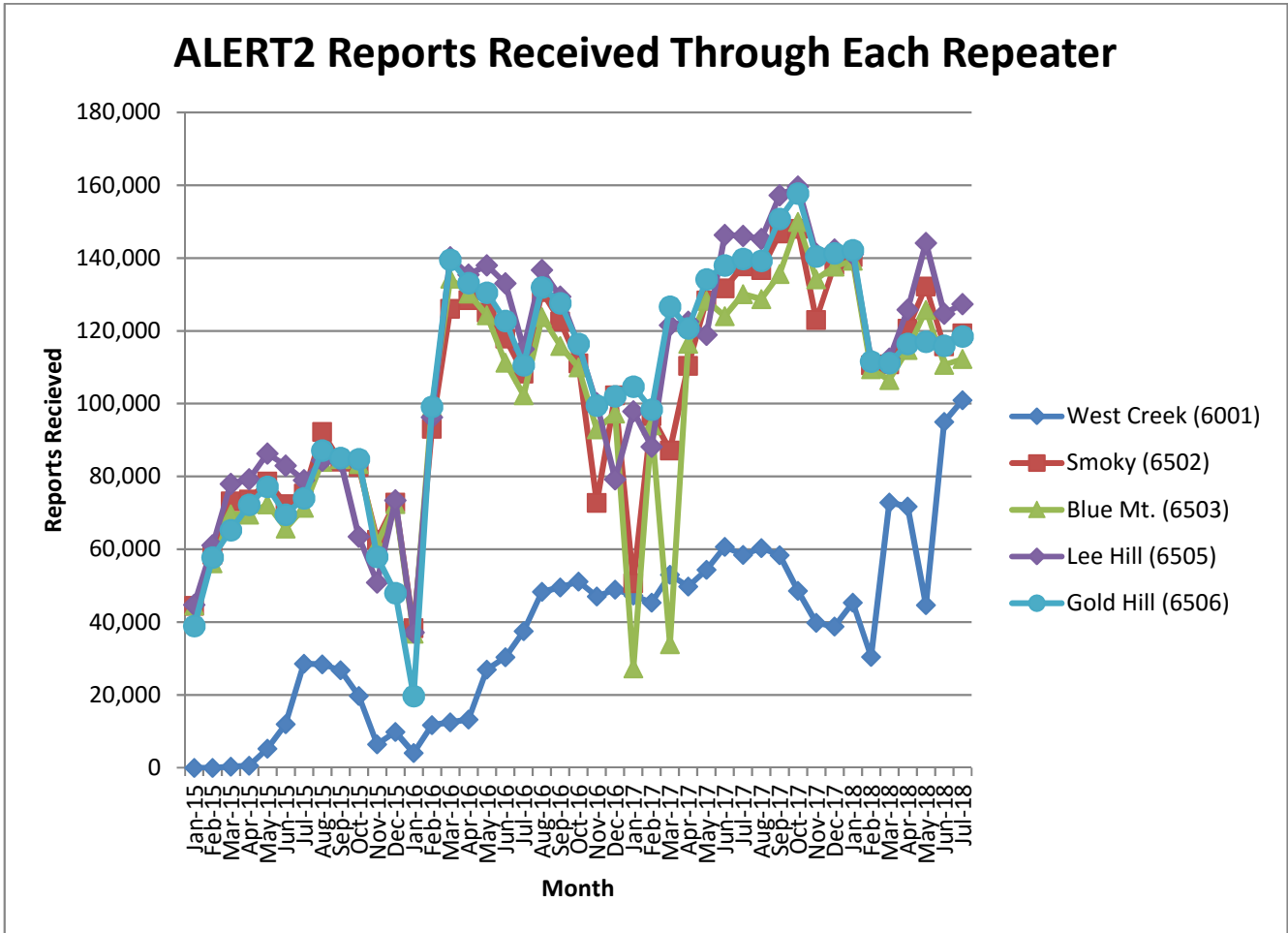


Figure 2. Reports received through each repeater (ALERT2 Only)

A convenient mechanism to track repeater performance throughout the year is to monitor total ALERT2 reports passed by each repeater. In general, each of the primary repeaters in the District process an equivalent number of ALERT2 reports because pass/block filtering is not being used. Several months are evident where the throughput of one repeater is not consistent with the other three.

Network outages were experienced on February 22 and February 23 which decreased the reception of data at the base station from all repeaters.

The throughput at the West Creek repeater increased in June and July as the Hayman Burn stations came on-line and additional sites are converted to ALERT2.

The following tables summarize the system-wide latency of ALERT2 self-reports (Table 6 and Table 7).

Table 6. System-Wide Latency of ALERT2 Self-Reports (seconds)

Statistical Parameter	Value (sec)	Comments
Mean	323.46	The average time it took a report from the field to reach the base
Minimum	-3	The minimum time it took for a report to go from the field to the base
Maximum	43,280	The maximum time it took for a report to go from the field to the base

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

Statistical Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	48.79	51.82	60.96	75.43	117.33	63.90	323.46					
Minimum	-34	-23	-23	-963	-23	-46	-3					
Maximum	37,677	33,597	30,677	42,277	36,100	43,300	43,280					
Station with Minimum Latency	West Creek WX	West Creek WX	West Creek WX	West Creek WX	West Creek WX	West Creek WX	East Cherry Creek at Russellville	OneRain Weather				
Station with Maximum Latency	West Creek WX	West Creek WX	West Creek WX	West Creek WX	West Creek WX	West Creek WX	Happy Canyon at North Surrey Drive	Pine Cliff Road				

Large positive and negative latencies were observed from the station West Creek WX. A new ALERT2 board was installed in mid May 2018 at this station which resolved the issue.

D. 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 8).

Table 8. Monthly Summary of Sensors with Poor Timer Performance (Sensor ID)

Jan*	Feb*	Mar*	Apr	May	Jun	Jul	Aug	Sep	Oct*	Nov*	Dec*
2790	2790	2340	2790	700	420	2360					
4550	3020	2360	2240	2330	2330	2340					
1660	1110	2230	2340	2340	4870	330					
2330	3010	2250	2330	2850	330	2330					
2980	1660	2270	3020	1620	940	2320					
5940	4550	2350	5720	4870	1660	2350					

*- 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 9). 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 9. District-Wide Total Tip/Count Statistical Summary

Statistical Parameter	Value	Comments
Mean	58.05	Only the 1-mm rain sensors were included in the analysis
Median	51	Only the 1-mm rain sensors were included in the analysis
Standard deviation	28.20	Only the 1-mm rain sensors were included in the analysis
Mean plus three standard deviations	142.65	Only the 1-mm rain sensors were included in the analysis
Mean minus two standard deviations	1.65	Only the 1-mm rain sensors were included in the analysis
Minimum total count	1	SBC @ SB Road (4870)
Maximum total count	177	Temple Pond at DTC (630)
Sensors showing NO rain for the month		None
Sensors greater than 3 SD (over reporting)	2	Temple Pond at DTC (630), Powers Park (1500)

B. Monthly Average Tip/Count Summary

A monthly summary of the District-wide mean total tip/count is presented (Table 10).

Table 10. 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	40.50	24.20	31.00	8.86	7.51	8.56	8.74	23.23
2017	13.3	5.84	27.70	39.10	99.60	15.33	40.80	44.58	40.74	31.88	7.38	5.35	31.13
2018	4.70	8.34	29.1	24.53	64.17	30.76	58.05						
Ave	6.66	9.95	20.91	42.37	65.90	35.20	56.58	35.68	41.48	26.03	8.03	7.74	28.32

*- 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

No sensors experienced a large jump in the sequential tip count (Table 11).

Table 11. Sensors with a Jump of 6 or More in Sequential Count

Sensor Description	Sensor ID	Comment
Utah Park	430	All >6 tips were breaks in data
SPR at Union Ave.	1640	All >6 tips were breaks in data
Tomah Road-WX	2990	Missed 7 tips on 6/17
Trumbull-WX	100260	All >6 tips were breaks in data

D. Sensor-by-Sensor Incrementing Count Summary

The system-wide reception rate of incrementing, 1-mm tip reports for the month was approximately 94 percent. A total of 10,876 incrementing reports were received and a total of 11,660 reports were expected. The total loss of incrementing reports for the month was approximately 6 percent. Those sensors with the worst event transmission performance are summarized (Table 12).

Table 12. Monthly Summary of Sensors with the Worst Performance

Jan*	Feb*	Mar*	Apr	May	Jun	Jul	Aug	Sep	Oct*	Nov*	Dec*
1700	2810	2270	2270	4470	3090	2360					
2980	1110	2230	1620	2340	2340	2340					
4790	540	4870	1710	2330	100260	940					
4320	2330	940	2240	4270	2330	100260					
3010	4330	100140	4270	1620	3010	2280					
3030	3020	1530	4870	100420	4040	2970					

*-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 13).

Table 13. Summary of Unknown IDs

Description	Concentrator	Legacy	A2
Total number of unknown IDs (IDs without a device definition)	180	159	0
Total reports from unknown IDs	1,349	528	0
Unknown IDs with only a single received report (potential noise)	136	132	0
Total reports from all IDs – RecData Log entire month	380,878	228,428	578,579
Unknown reports as a fraction of total reports	0.35%	0.23%	0.00%

The total number of reports from unknown sensors is very small relative to the total reports received for the month. Shown below (Table 14) are the total reports received from unknown sensor IDs for each month of the year.

Table 14. 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	945	1,408	2,029	1,413	753	617	879
2017	11,875	844	1,207	3,700	2,693	642	610	6,678	780	5,097	3,532	3,282
2018	788	771	1,178	936	749	484	1,349					

The fraction of reports from unknown sensors relative to the total number of reports is shown below (Table 15).

Table 15. 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%	0.22%	0.33%	0.50%	0.36%	0.18%	0.17%	0.22%
2017	3.29%	0.23%	0.31%	0.97%	0.58%	0.16%	0.16%	1.16%	0.21%	1.40%	0.96%	0.87%
2018	0.21%	0.23%	0.31%	0.26%	0.23%	0.13%	0.35%					

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 16).

Table 16. Reports Received by Unknown IDs

Concentrator		Legacy ALERT		Comment
Unknown ID	Reports	Unknown ID	Reports	
2101	912			Large amount of invalid data from this ID
		0,1,2	60,60,102	Legacy reports for IDs 0,1,2 only
2272	61	2272	60	Cub Creek Below Blue Crk possibly sending invalid ID
2271	61	2271	59	Cub Creek Below Blue Crk possibly sending invalid ID
3047	23			East Cherry Crk at Russellville Rd possibly sending invalid ID

V. Sensors with Invalid Reports

The sensors below (Table 17 and Table 18) 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 17. 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	10	5	3	4	1	--	1					
2810-Pine Cliff Rd.	14	10	10	6	6	3	2					
2880-Happy Canyon	--	--	47*	--	77*	--	--					
3010-Wx-EPC @ 105	3	5	7	5	1	4	4					
3050-E/W Trailhead	7	12	3	9	--	3	4					
4030-Red Garden	--	3	3	--	--	7	1					
4330-Hansen	--	3	--	--	1	3	4					
4240-Sunset	1	4	2	1	1	--	--					
4790-Wx-Button Rock	--	--	--	1	2	--	1					

*-Happy Canyon (2880) All invalid data points are because this station went through maintenance to upgrade to ALERT2.

Table 18. Level Sensors with the Most Invalid Reports

Sensor ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
413-Kelly Dam	--	--	5	--	12	3	6					
403-Montview Park	1171**	766**	411**	--	--	--	--					
213-Leyden Confluence	--	--	3	--	--	--	2					
723-WTG above Conf Pond	--	--	3	--	2	--	--					
1523-Marston Lake North	9	7	10	8	4	2	1					
1649-SPR at 19 th Street	--	--	1	4	--	--	1					
2223-Evergreen Lake	--	--	2	2	--	3	2					
2273-Cub Cr below Blue	--	--	3	--	--	2	3					
2803-Columbine Open Space	--	--	--	1	3	--	--					
2813-Pine Cliff Road	15	13	9	10	3	--	5					
3013-EPC@Hwy 105	18	20	8	10	9	13	4					
4383-Eldorado Springs	--	4	1	--	1	3	--					

**-Montview Park (403) All data values are marked as questionable data values because they exceeded an allowable upper boundary. Kate Malers developed a new rating for this site which needs to be incorporated into both NovaStar5 and Contrail in 2018.

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.

Point Numid	Point Name	Trigger Name	Alarm Time
5720	Four Mile Creek Precipitation-DG	Hayman 30 minute rainfall	7/5/2018 16:16
5720	Four Mile Creek Precipitation-DG	Hayman 1 hour rainfall	7/5/2018 16:22
5720	Four Mile Creek Precipitation-DG	Hayman 30 minute rainfall	7/5/2018 16:27
5720	Four Mile Creek Precipitation-DG	Hayman 90 minute rainfall	7/5/2018 16:28
2960	Indian Creek Precipitation-DG	Douglas County 10 minute rainfall	7/5/2018 16:33
100270	Westcreek Fire Station Wx Precipitation	Hayman 30 minute rainfall	7/5/2018 16:36
100270	Westcreek Fire Station Wx Precipitation	Douglas County 10 minute rainfall	7/5/2018 16:38
5720	Four Mile Creek Precipitation-DG	Hayman 30 minute rainfall	7/5/2018 16:40
100270	Westcreek Fire Station Wx Precipitation	Hayman 1 hour rainfall	7/5/2018 16:40
5810	Stump Bump Precipitation-TL	Hayman 30 minute rainfall	7/5/2018 16:42
100270	Westcreek Fire Station Wx Precipitation	Douglas County 1 hour-1 Inch rainfall	7/5/2018 16:44
100270	Westcreek Fire Station Wx Precipitation	Hayman 90 minute rainfall	7/5/2018 16:44
100270	Westcreek Fire Station Wx Precipitation	Hayman 30 minute rainfall	7/5/2018 16:48
5730	West Creek Teller Precipitation-TL	Hayman 30 minute rainfall	7/5/2018 16:50
2960	Indian Creek Precipitation-DG	Douglas County 1 hour-1 Inch rainfall	7/5/2018 16:50
5720	Four Mile Creek Precipitation-DG	Hayman 30 minute rainfall	7/5/2018 16:53
100270	Westcreek Fire Station Wx Precipitation	Hayman 30 minute rainfall	7/5/2018 17:02
5730	West Creek Teller Precipitation-TL	Hayman 30 minute rainfall	7/5/2018 17:07
2800	East Plum Creek at Columbine Open Space Precip-DG	Douglas County 1 hour-1 Inch rainfall	7/5/2018 17:15
100260	Trumbull Fire Station Wx Precipitation	Douglas County 10 minute rainfall	7/12/2018 11:44
2890	Spruce Mountain Open Space Precip-DG	Douglas County 10 minute rainfall	7/12/2018 16:01
5880	Hackett Mountain Precipitation-TL	Hayman 30 minute rainfall	7/15/2018 14:25
840	Aurora Fire Station 12 Precipitation-AD	Plains 10 minute rainfall	7/15/2018 14:50
840	Aurora Fire Station 12 Precipitation-AD	UDFCD 10 minute rainfall	7/15/2018 14:50
840	Aurora Fire Station 12 Precipitation-AD	Plains 1 hour rainfall	7/15/2018 15:08
840	Aurora Fire Station 12 Precipitation-AD	UDFCD 1 hour rainfall	7/15/2018 15:08
2870	Cherry Creek at Cottonwood Park Precipitation-DG	Douglas County 1 hour-1 Inch rainfall	7/15/2018 15:43
760	Mission Viejo Park Precipitation-AR	Plains 1 hour rainfall	7/15/2018 19:10
760	Mission Viejo Park Precipitation-AR	UDFCD 1 hour rainfall	7/15/2018 19:10
1710	Shop Creek Precipitation-AR	Plains 1 hour rainfall	7/15/2018 19:14
1710	Shop Creek Precipitation-AR	UDFCD 1 hour rainfall	7/15/2018 19:14
750	Quincy Reservoir Precipitation	Plains 1 hour rainfall	7/15/2018 19:28
750	Quincy Reservoir Precipitation	UDFCD 1 hour rainfall	7/15/2018 19:28
950	Piney at Liverpool Precipitation-AR	Plains 10 minute rainfall	7/16/2018 19:09
950	Piney at Liverpool Precipitation-AR	UDFCD 10 minute rainfall	7/16/2018 19:09
950	Piney at Liverpool Precipitation-AR	Plains 1 hour rainfall	7/16/2018 19:13
950	Piney at Liverpool Precipitation-AR	UDFCD 1 hour rainfall	7/16/2018 19:13
2870	Cherry Creek at Cottonwood Park Precipitation-DG	Douglas County 10 minute rainfall	7/16/2018 19:34
2820	East Plum Creek at Haskins Gulch Precipitation-DG	Douglas County 10 minute rainfall	7/16/2018 19:59
2260	Brook Forest Precipitation-JF	Jefferson County 10 minute rainfall	7/17/2018 15:50
100260	Trumbull Fire Station Wx Precipitation	Douglas County 10 minute rainfall	7/17/2018 16:38
5940	Log Jumper Precipitation-DG	Hayman 30 minute rainfall	7/17/2018 16:40
2950	DC Public Works Precipitation-DG	Douglas County 10 minute rainfall	7/17/2018 16:40
5940	Log Jumper Precipitation-DG	Hayman 1 hour rainfall	7/17/2018 16:44
2950	DC Public Works Precipitation-DG	Douglas County 1 hour-1 Inch rainfall	7/17/2018 16:48
5940	Log Jumper Precipitation-DG	Hayman 90 minute rainfall	7/17/2018 16:49
2950	DC Public Works Precipitation-DG	Douglas County 10 minute rainfall	7/17/2018 16:51
5940	Log Jumper Precipitation-DG	Hayman 30 minute rainfall	7/17/2018 16:52
3030	Bingham Lake Park Precipitation-DG	Douglas County 10 minute rainfall	7/17/2018 17:00
5940	Log Jumper Precipitation-DG	Hayman 30 minute rainfall	7/17/2018 17:04
2980	Dakan Road Precipitation-DG	Douglas County 10 minute rainfall	7/17/2018 17:06

2980	Dakan Road Precipitation-DG	Douglas County 1 hour-1 Inch rainfall	7/17/2018 17:16
2990	Tomah Road Precipitation-DG	Douglas County 1 hour-1 Inch rainfall	7/20/2018 12:17
2990	Tomah Road Precipitation-DG	Douglas County 10 minute rainfall	7/20/2018 12:17
2990	Tomah Road Precipitation-DG	Douglas County 2 hour rainfall	7/20/2018 12:17
2990	Tomah Road Precipitation-DG	Douglas County 24 hour rainfall	7/20/2018 12:17
2990	Tomah Road Precipitation-DG	Douglas County 6 hour rainfall	7/20/2018 12:17
2990	Tomah Road Precipitation-DG	Douglas County 72 hour rainfall	7/20/2018 12:17
5720	Four Mile Creek Precipitation-DG	Hayman 30 minute rainfall	7/21/2018 15:14
220	Upper Leyden Precipitation-JF	Jefferson County 10 minute rainfall	7/22/2018 14:38
220	Upper Leyden Precipitation-JF	UDFCD 10 minute rainfall	7/22/2018 14:38
5880	Hackett Mountain Precipitation-TL	Hayman 30 minute rainfall	7/23/2018 14:38
5880	Hackett Mountain Precipitation-TL	Hayman 1 hour rainfall	7/23/2018 14:48
100270	Westcreek Fire Station Wx Precipitation	Douglas County 10 minute rainfall	7/23/2018 14:50
5810	Stump Bump Precipitation-TL	Hayman 30 minute rainfall	7/23/2018 14:50
100270	Westcreek Fire Station Wx Precipitation	Hayman 30 minute rainfall	7/23/2018 14:50
5880	Hackett Mountain Precipitation-TL	Hayman 30 minute rainfall	7/23/2018 14:50
5810	Stump Bump Precipitation-TL	Hayman 1 hour rainfall	7/23/2018 14:54
5810	Stump Bump Precipitation-TL	Hayman 90 minute rainfall	7/23/2018 14:56
100270	Westcreek Fire Station Wx Precipitation	Hayman 1 hour rainfall	7/23/2018 14:58
5880	Hackett Mountain Precipitation-TL	Hayman 90 minute rainfall	7/23/2018 14:58
5900	Horse Creek Precipitation-DG	Hayman 30 minute rainfall	7/23/2018 15:00
4750	Louisville Lake Precipitation-BO	Boulder County 10 minute rainfall	7/23/2018 15:00
5880	Hackett Mountain Precipitation-TL	Hayman 30 minute rainfall	7/23/2018 15:01
5810	Stump Bump Precipitation-TL	Hayman 30 minute rainfall	7/23/2018 15:02
100270	Westcreek Fire Station Wx Precipitation	Hayman 30 minute rainfall	7/23/2018 15:02
5740	Trail Creek Precipitation-TL	Hayman 30 minute rainfall	7/23/2018 15:16
5740	Trail Creek Precipitation-TL	Hayman 1 hour rainfall	7/23/2018 15:17
100270	Westcreek Fire Station Wx Precipitation	Hayman 30 minute rainfall	7/23/2018 15:18
5810	Stump Bump Precipitation-TL	Hayman 30 minute rainfall	7/23/2018 15:19
4110	Betasso Precipitation-BO	FMC-BA 0.50" in 30 Min Rainfall	7/23/2018 15:24
100270	Westcreek Fire Station Wx Precipitation	Douglas County 1 hour-1 Inch rainfall	7/23/2018 15:30
100270	Westcreek Fire Station Wx Precipitation	Hayman 90 minute rainfall	7/23/2018 15:30
1040	Lena @ U.S. Highway 6 Precipitation-JF	Jefferson County 10 minute rainfall	7/23/2018 15:41
1050	Jeffco Fairgrounds Precipitation-JF	Jefferson County 10 minute rainfall	7/23/2018 15:44
1660	SPR at Henderson Precipitation	Plains 10 minute rainfall	7/23/2018 15:51
1660	SPR at Henderson Precipitation	Plains 1 hour rainfall	7/23/2018 15:55
1340	Sanderson at Xavier Precipitation-DN	Plains 10 minute rainfall	7/23/2018 15:55
1340	Sanderson at Xavier Precipitation-DN	UDFCD 10 minute rainfall	7/23/2018 15:55
1570	Brighton ETO Precipitation-WE	Plains 10 minute rainfall	7/23/2018 15:56
1570	Brighton ETO Precipitation-WE	Plains 1 hour rainfall	7/23/2018 15:59
1660	SPR at Henderson Precipitation	Plains 10 minute rainfall	7/23/2018 16:02
1350	Chatfield COE Precipitation-JF	Jefferson County 10 minute rainfall	7/23/2018 16:03
100230	Havana Pond Precipitation	Plains 10 minute rainfall	7/23/2018 16:06
1920	Brighton Precipitation	Plains 10 minute rainfall	7/23/2018 16:10
100230	Havana Pond Precipitation	Plains 1 hour rainfall	7/23/2018 16:12
1800	Sand Creek Park Precipitation-AD	Plains 10 minute rainfall	7/23/2018 16:20
1800	Sand Creek Park Precipitation-AD	UDFCD 10 minute rainfall	7/23/2018 16:20
850	Flying J Truck Plaza Precipitation-AD	Plains 10 minute rainfall	7/23/2018 16:21
850	Flying J Truck Plaza Precipitation-AD	UDFCD 10 minute rainfall	7/23/2018 16:21
840	Aurora Fire Station 12 Precipitation-AD	Plains 10 minute rainfall	7/23/2018 16:21
840	Aurora Fire Station 12 Precipitation-AD	UDFCD 10 minute rainfall	7/23/2018 16:21
800	Sable Ditch @ Colfax Precipitation-AD	Plains 10 minute rainfall	7/23/2018 16:25
800	Sable Ditch @ Colfax Precipitation-AD	UDFCD 10 minute rainfall	7/23/2018 16:25
840	Aurora Fire Station 12 Precipitation-AD	Plains 1 hour rainfall	7/23/2018 16:25
840	Aurora Fire Station 12 Precipitation-AD	UDFCD 1 hour rainfall	7/23/2018 16:25
700	Toll Gate @ 6th Precipitation-AR	Plains 10 minute rainfall	7/23/2018 16:27
700	Toll Gate @ 6th Precipitation-AR	UDFCD 10 minute rainfall	7/23/2018 16:27
850	Flying J Truck Plaza Precipitation-AD	Plains 1 hour rainfall	7/23/2018 16:27
850	Flying J Truck Plaza Precipitation-AD	UDFCD 1 hour rainfall	7/23/2018 16:27

100160	Sand Creek at Colfax Precipitation-AD	Plains 10 minute rainfall	7/23/2018 16:27
100160	Sand Creek at Colfax Precipitation-AD	UDFCD 10 minute rainfall	7/23/2018 16:27
810	Granby Ditch @ 6th Precipitation-AR	Plains 10 minute rainfall	7/23/2018 16:27
810	Granby Ditch @ 6th Precipitation-AR	UDFCD 10 minute rainfall	7/23/2018 16:27
1800	Sand Creek Park Precipitation-AD	Plains 1 hour rainfall	7/23/2018 16:27
1800	Sand Creek Park Precipitation-AD	UDFCD 1 hour rainfall	7/23/2018 16:27
820	East Toll Gate @ Buckley Precipitation-AR	Plains 10 minute rainfall	7/23/2018 16:30
820	East Toll Gate @ Buckley Precipitation-AR	UDFCD 10 minute rainfall	7/23/2018 16:30
800	Sable Ditch @ Colfax Precipitation-AD	Plains 1 hour rainfall	7/23/2018 16:30
800	Sable Ditch @ Colfax Precipitation-AD	UDFCD 1 hour rainfall	7/23/2018 16:30
810	Granby Ditch @ 6th Precipitation-AR	Plains 1 hour rainfall	7/23/2018 16:30
810	Granby Ditch @ 6th Precipitation-AR	UDFCD 1 hour rainfall	7/23/2018 16:30
100160	Sand Creek at Colfax Precipitation-AD	Plains 1 hour rainfall	7/23/2018 16:31
100160	Sand Creek at Colfax Precipitation-AD	UDFCD 1 hour rainfall	7/23/2018 16:31
840	Aurora Fire Station 12 Precipitation-AD	Plains 10 minute rainfall	7/23/2018 16:32
840	Aurora Fire Station 12 Precipitation-AD	UDFCD 10 minute rainfall	7/23/2018 16:32
850	Flying J Truck Plaza Precipitation-AD	Plains 10 minute rainfall	7/23/2018 16:33
850	Flying J Truck Plaza Precipitation-AD	UDFCD 10 minute rainfall	7/23/2018 16:33
820	East Toll Gate @ Buckley Precipitation-AR	Plains 1 hour rainfall	7/23/2018 16:35
820	East Toll Gate @ Buckley Precipitation-AR	UDFCD 1 hour rainfall	7/23/2018 16:35
970	Pump Station 3 Precipitation-AR	Plains 10 minute rainfall	7/23/2018 16:35
970	Pump Station 3 Precipitation-AR	UDFCD 10 minute rainfall	7/23/2018 16:35
810	Granby Ditch @ 6th Precipitation-AR	Plains 10 minute rainfall	7/23/2018 16:38
810	Granby Ditch @ 6th Precipitation-AR	UDFCD 10 minute rainfall	7/23/2018 16:38
820	East Toll Gate @ Buckley Precipitation-AR	Plains 10 minute rainfall	7/23/2018 16:41
820	East Toll Gate @ Buckley Precipitation-AR	UDFCD 10 minute rainfall	7/23/2018 16:41
830	Side Creek Park Precipitation	Plains 10 minute rainfall	7/23/2018 16:42
830	Side Creek Park Precipitation	UDFCD 10 minute rainfall	7/23/2018 16:42
870	Murphy Creek Golf Course Precipitation-AR	Plains 10 minute rainfall	7/23/2018 16:45
870	Murphy Creek Golf Course Precipitation-AR	UDFCD 10 minute rainfall	7/23/2018 16:45
970	Pump Station 3 Precipitation-AR	Plains 1 hour rainfall	7/23/2018 16:47
970	Pump Station 3 Precipitation-AR	UDFCD 1 hour rainfall	7/23/2018 16:47
730	No Name @ Quincy Precipitation-AR	Plains 10 minute rainfall	7/23/2018 16:48
730	No Name @ Quincy Precipitation-AR	UDFCD 10 minute rainfall	7/23/2018 16:48
830	Side Creek Park Precipitation	Plains 1 hour rainfall	7/23/2018 16:48
830	Side Creek Park Precipitation	UDFCD 1 hour rainfall	7/23/2018 16:48
870	Murphy Creek Golf Course Precipitation-AR	Plains 1 hour rainfall	7/23/2018 16:49
870	Murphy Creek Golf Course Precipitation-AR	UDFCD 1 hour rainfall	7/23/2018 16:49
730	No Name @ Quincy Precipitation-AR	Plains 1 hour rainfall	7/23/2018 16:52
730	No Name @ Quincy Precipitation-AR	UDFCD 1 hour rainfall	7/23/2018 16:52
100110	ETG @ Hampden Precipitation	Plains 10 minute rainfall	7/23/2018 16:52
100110	ETG @ Hampden Precipitation	UDFCD 10 minute rainfall	7/23/2018 16:52
870	Murphy Creek Golf Course Precipitation-AR	Plains 10 minute rainfall	7/23/2018 16:57
870	Murphy Creek Golf Course Precipitation-AR	UDFCD 10 minute rainfall	7/23/2018 16:57
100110	ETG @ Hampden Precipitation	Plains 1 hour rainfall	7/23/2018 16:58
100110	ETG @ Hampden Precipitation	UDFCD 1 hour rainfall	7/23/2018 16:58
730	No Name @ Quincy Precipitation-AR	Plains 10 minute rainfall	7/23/2018 16:59
730	No Name @ Quincy Precipitation-AR	UDFCD 10 minute rainfall	7/23/2018 16:59
700	Toll Gate @ 6th Precipitation-AR	Plains 1 hour rainfall	7/23/2018 17:02
700	Toll Gate @ 6th Precipitation-AR	UDFCD 1 hour rainfall	7/23/2018 17:02
100110	ETG @ Hampden Precipitation	Plains 10 minute rainfall	7/23/2018 17:04
100110	ETG @ Hampden Precipitation	UDFCD 10 minute rainfall	7/23/2018 17:04
940	Sampson Gulch Precipitation-AR	Plains 10 minute rainfall	7/23/2018 17:06
940	Sampson Gulch Precipitation-AR	UDFCD 10 minute rainfall	7/23/2018 17:06
100150	Sellers Gulch @ Haystack Precipitation	Douglas County 10 minute rainfall	7/23/2018 17:07
920	Aurora Town Hall Precipitation-AR	Plains 1 hour rainfall	7/23/2018 17:08
920	Aurora Town Hall Precipitation-AR	Plains 10 minute rainfall	7/23/2018 17:08
920	Aurora Town Hall Precipitation-AR	UDFCD 1 hour rainfall	7/23/2018 17:08
920	Aurora Town Hall Precipitation-AR	UDFCD 10 minute rainfall	7/23/2018 17:08

4190	Slaughterhouse Precipitation-BO	FMC-BA 0.50" in 30 Min Rainfall	7/23/2018 17:09
940	Sampson Gulch Precipitation-AR	Plains 1 hour rainfall	7/23/2018 17:12
940	Sampson Gulch Precipitation-AR	UDFCD 1 hour rainfall	7/23/2018 17:12
4200	Lazy Acres Precipitation-BO	FMC-BA 0.50" in 30 Min Rainfall	7/23/2018 17:12
100140	Upper Sellers Gulch Precipitation	Douglas County 10 minute rainfall	7/23/2018 17:13
4850	Porphyry Mountain Precipitation-BO	FMC-BA 0.50" in 30 Min Rainfall	7/23/2018 17:13
3060	Fire Station #47 Precipitation-DG	Douglas County 10 minute rainfall	7/23/2018 17:17
3060	Fire Station #47 Precipitation-DG	Douglas County 1 hour-1 Inch rainfall	7/23/2018 17:21
3060	Fire Station #47 Precipitation-DG	Douglas County 10 minute rainfall	7/23/2018 17:43
2210	Hiwan Golf Club Precipitation	Jefferson County 10 minute rainfall	7/23/2018 19:15
2350	Idledale Precipitation-JF	Jefferson County 10 minute rainfall	7/23/2018 19:25
2330	Bear Creek at Morrison Precipitation-JF	Jefferson County 10 minute rainfall	7/23/2018 19:30
2370	Red Rocks Park Precipitation-JF	Jefferson County 10 minute rainfall	7/23/2018 19:32
2370	Red Rocks Park Precipitation-JF	Jefferson County 1 hour rainfall	7/23/2018 19:39
1050	Jeffco Fairgrounds Precipitation-JF	Jefferson County 10 minute rainfall	7/23/2018 19:41
1050	Jeffco Fairgrounds Precipitation-JF	Jefferson County 1 hour rainfall	7/23/2018 19:47
1550	Lakewood CC Precipitation-JF	Jefferson County 10 minute rainfall	7/23/2018 19:56
100320	Weir Gulch at Julian Street Precipitation-DN	Plains 10 minute rainfall	7/23/2018 19:58
100320	Weir Gulch at Julian Street Precipitation-DN	UDFCD 10 minute rainfall	7/23/2018 19:58
1320	SPR at 3rd Avenue Precipitation-DN	Plains 10 minute rainfall	7/23/2018 19:59
1320	SPR at 3rd Avenue Precipitation-DN	UDFCD 10 minute rainfall	7/23/2018 19:59
1550	Lakewood CC Precipitation-JF	Jefferson County 1 hour rainfall	7/23/2018 20:01
1720	Cherry Creek @ Steele Precipitation-DN	Plains 10 minute rainfall	7/23/2018 20:09
1720	Cherry Creek @ Steele Precipitation-DN	UDFCD 10 minute rainfall	7/23/2018 20:09
2970	Rampart Range Road Precipitation-DG	Rampart Range Road 0.2" in 30 Minutes Rainfall	7/23/2018 20:15
4140	Logan Mill Precipitation-BO	FMC-BA 0.25" in 10 Min Rainfall	7/23/2018 20:35
1520	Marston Lake North Precipitation	Plains 10 minute rainfall	7/24/2018 18:20
1530	Bear Creek at Lowell Precipitation-AR	Plains 10 minute rainfall	7/24/2018 18:20
1530	Bear Creek at Lowell Precipitation-AR	UDFCD 10 minute rainfall	7/24/2018 18:20
1500	Powers Park Precipitation-AR	Plains 10 minute rainfall	7/24/2018 18:22
1500	Powers Park Precipitation-AR	UDFCD 10 minute rainfall	7/24/2018 18:22
1620	Slaughterhouse Gulch Precipitation-AR	Plains 10 minute rainfall	7/24/2018 18:23
1620	Slaughterhouse Gulch Precipitation-AR	UDFCD 10 minute rainfall	7/24/2018 18:23
1500	Powers Park Precipitation-AR	Plains 1 hour rainfall	7/24/2018 18:26
1500	Powers Park Precipitation-AR	UDFCD 1 hour rainfall	7/24/2018 18:26
1620	Slaughterhouse Gulch Precipitation-AR	Plains 1 hour rainfall	7/24/2018 18:29
1620	Slaughterhouse Gulch Precipitation-AR	UDFCD 1 hour rainfall	7/24/2018 18:29
600	Harvard Gulch Park Precipitation-DN	Plains 10 minute rainfall	7/24/2018 18:32
600	Harvard Gulch Park Precipitation-DN	UDFCD 10 minute rainfall	7/24/2018 18:32
1500	Powers Park Precipitation-AR	Plains 10 minute rainfall	7/24/2018 18:33
1500	Powers Park Precipitation-AR	UDFCD 10 minute rainfall	7/24/2018 18:33
620	Quincy/Highline Precipitation-AR	Plains 10 minute rainfall	7/24/2018 18:39
620	Quincy/Highline Precipitation-AR	UDFCD 10 minute rainfall	7/24/2018 18:39
1520	Marston Lake North Precipitation	Plains 1 hour rainfall	7/24/2018 18:43
430	Utah Park Precipitation-AR	Plains 10 minute rainfall	7/24/2018 18:43
430	Utah Park Precipitation-AR	UDFCD 10 minute rainfall	7/24/2018 18:43
440	Fire Station #7 Precipitation-AR	Plains 10 minute rainfall	7/24/2018 18:45
440	Fire Station #7 Precipitation-AR	UDFCD 10 minute rainfall	7/24/2018 18:45
1530	Bear Creek at Lowell Precipitation-AR	Plains 1 hour rainfall	7/24/2018 18:45
1530	Bear Creek at Lowell Precipitation-AR	UDFCD 1 hour rainfall	7/24/2018 18:45
750	Quincy Reservoir Precipitation	Plains 10 minute rainfall	7/24/2018 18:56
750	Quincy Reservoir Precipitation	UDFCD 10 minute rainfall	7/24/2018 18:56
730	No Name @ Quincy Precipitation-AR	Plains 10 minute rainfall	7/24/2018 19:00
730	No Name @ Quincy Precipitation-AR	UDFCD 10 minute rainfall	7/24/2018 19:00
840	Aurora Fire Station 12 Precipitation-AD	Plains 10 minute rainfall	7/25/2018 19:35
840	Aurora Fire Station 12 Precipitation-AD	UDFCD 10 minute rainfall	7/25/2018 19:35
850	Flying J Truck Plaza Precipitation-AD	Plains 10 minute rainfall	7/25/2018 19:39
850	Flying J Truck Plaza Precipitation-AD	UDFCD 10 minute rainfall	7/25/2018 19:39
2880	Happy Canyon at North Surrey Drive Precip-DG	Douglas County 10 minute rainfall	7/25/2018 19:49

2860	Cherry Creek at Stroh Precipitation-DG	Douglas County 10 minute rainfall	7/25/2018 19:53
2860	Cherry Creek at Stroh Precipitation-DG	Douglas County 1 hour-1 Inch rainfall	7/25/2018 20:03
3030	Bingham Lake Park Precipitation-DG	Douglas County 10 minute rainfall	7/25/2018 20:03
2850	CC blw Bayou Gulch Precipitation-DG	Douglas County 10 minute rainfall	7/25/2018 20:05
2900	Russellville Gulch Precipitation-DG	Douglas County 10 minute rainfall	7/25/2018 20:16
2900	Russellville Gulch Precipitation-DG	Douglas County 1 hour-1 Inch rainfall	7/25/2018 20:24
3040	East Cherry Creek at Russellville Road Precip-DG	Douglas County 10 minute rainfall	7/25/2018 20:24
2900	Russellville Gulch Precipitation-DG	Douglas County 10 minute rainfall	7/25/2018 20:27
3040	East Cherry Creek at Russellville Road Precip-DG	Douglas County 1 hour-1 Inch rainfall	7/25/2018 20:30
3040	East Cherry Creek at Russellville Road Precip-DG	Douglas County 10 minute rainfall	7/25/2018 20:36
1440	Elbert Precipitation	Douglas County 10 minute rainfall	7/26/2018 15:04
100270	Westcreek Fire Station Wx Precipitation	Douglas County 10 minute rainfall	7/27/2018 18:44
100270	Westcreek Fire Station Wx Precipitation	Hayman 30 minute rainfall	7/27/2018 18:44
2980	Dakan Road Precipitation-DG	Douglas County 10 minute rainfall	7/27/2018 18:51
3010	EPC at Hwy 105 Precipitation-DG	Douglas County 10 minute rainfall	7/27/2018 19:05

General System Analysis

Database Name P:\A207-UDFCD-Data-Analysis\2018\07-2018\2018Jul.mdb

Summarize

First Date in Database	7/1/18 12:00 AM	Total Days	31.0
Last Date in Database	8/1/18 12:00 AM	Total Hours	744.0

Total Records Analyzed 1,187,885

Records by Group	Legacy	%	Concentrator	%	ALERT	%
Wind Data	67,993	30%	136,428	36%	139,771	24%
Temperature	34,553	15%	63,894	17%	79,098	14%
Relative Humidity	33,834	15%	56,342	15%	60,037	10%
Water Level	24,822	11%	26,516	7%	73,906	13%
Barometric Pressure	15,638	7%	26,143	7%	1,285	0%
Precipitation	14,972	7%	19,728	5%	67,271	12%
Battery Voltage	12,003	5%	27,130	7%	88,356	15%
Fuel Temperature	5,789	3%	5,796	2%	0	0%
Fuel Moisture	5,778	3%	5,786	2%	0	0%
Solar Radiation	5,173	2%	5,155	1%	20,696	4%
Soil Moisture	2,957	1%	2,908	1%	0	0%
Repeater Status Report	2,283	1%	1,827	0%	0	0%
ET-Hourly	729	0%	735	0%	0	0%
Repeater Pass List	555	0%	62	0%	0	0%
Unknown	528	0%	1,349	0%	0	0%
12Hr Status Report	328	0%	341	0%	2,337	0%
Not Used	284	0%	299	0%	0	0%
Water Temp	119	0%	121	0%	0	0%
Handar 585 ALARM Status	60	0%	60	0%	0	0%
ET-Daily	30	0%	30	0%	0	0%
GPS Lock	0	0%	228	0%	38,798	7%
Flasher Status	0	0%	0	0%	7,024	1%
Total	228,428		380,878		578,579	

Traffic Loading Summary	Legacy	%	Concentrator	%	ALERT	%
Alert Reports	228,428		380,878		578,579	
Average Daily Traffic	7,369		12,286		18,664	
Average Hourly Traffic	307		512		778	
Median Hourly Traffic	294	hour beginning	493	hour beginning	762	hour beginning
Peak Hourly Traffic	1,014	Jul 23, 4:00 PM	1,340	Jul 23, 4:00 PM	2,430	Jul 23, 4:00 PM
2nd Max	961	Jul 23, 5:00 PM	1,250	Jul 23, 5:00 PM	1,671	Jul 23, 5:00 PM
3rd Max	942		1,206		1,426	
4th Max	851	Jul 24, 6:00 PM	1,157	Jul 24, 6:00 PM	1,255	Jul 23, 3:00 PM
5th Max	757	Jul 23, 7:00 PM	1,008	Jul 23, 7:00 PM	1,170	Jul 25, 7:00 PM

Rain Timer Performance

Analyze Rain Sensors

0.50

0.931

Rain Sensors	Description	Rcv	Timer	Exp	Performance
2360	Indian Hills	31	19:08	62	50%
2340	El Rancho	35	14:26	62	56%
330	Van Bibber @ Hwy 93	38	17:09	62	61%
2330	Morrison	39	17:26	62	63%
2320	Choke Cherry Resvr	43	13:53	62	69%
2350	Idledale	43	13:45	62	69%
4330	Hansen Rain	43	13:45	62	69%
100260	Wx-A2-Trumbull (Hayman) - Precip	520	1:00	744	70%
1620	Slaughterhouse Glch	45	13:58	62	73%
2990	Wx-Tomah Rd-DougCnty	45	13:40	62	73%
4290	Red Hill	48	13:29	62	77%
4510	Pinewood Springs	48	15:05	62	77%
3010	WX-EPC at Hwy 105	49	13:45	62	79%
4470	Little Narrows	49	14:59	62	79%
920	Wx-Aurora Town Hall	50	11:20	62	81%
1710	Shop Creek	50	14:06	62	81%
2270	Cub Cr below Blue	51	13:36	62	82%
2900	Russelville Gulch-Douglas	51	13:56	62	82%
2710	Wx-Highlands Ranch WTP	52	12:16	62	84%
2850	Cherry Cr bl Bayou Glch	52	12:51	62	84%
2980	Dakan Rd	52	13:19	62	84%
2280	Kinney Peak	53	12:20	62	85%
2950	DC Public Works	53	13:56	62	85%
940	Aurora Regional Pond	54	12:32	62	87%
1660	SPR at Henderson	54	13:47	62	87%
4270	Cannon Mountain	54	13:23	62	87%
5720	Four Mile Creek	54	11:41	62	87%
5940	Log Jumper	54	12:58	62	87%
100150	A2-Sellers Gulch at Haystack Precip	658	1:00	744	88%
310	Guy Hill Ranch	55	12:29	62	89%
3080	Tallman Gulch	55	12:45	62	89%
4040	Martin Gulch	55	12:44	62	89%
4790	Wx-Button Rock	55	13:24	62	89%
4870	SBC @ SB Road	55	13:13	62	89%
540	Parker/Mississippi	56	12:13	62	90%
810	Granby Ditch @ 6th	56	12:29	62	90%
1800	Sand Creek Park	56	12:29	62	90%
2230	Bear Cr below Cub	56	11:58	62	90%
2240	Cold Sprg Glch conf	56	12:46	62	90%
2750	Wx-Castle Rock	56	13:04	62	90%
2840	Sulphur Gulch	56	12:15	62	90%
2890	Spruce Mt - Douglas	56	12:52	62	90%
4010	Cresent	56	12:44	62	90%
4340	Riverside	56	12:56	62	90%
500	Havana Park	57	11:57	62	92%
750	Wx-Quincy Reservoir	57	12:00	62	92%
850	Flying J	57	12:00	62	92%
1520	Wx-Marston Lake North	57	12:29	62	92%
1530	Bear Creek @ Lowell	57	12:26	62	92%
2210	Wx-Hiwan G.C.	57	12:32	62	92%
2260	Brook Forest	57	13:04	62	92%
2820	Haskins Gulch Conf	57	12:32	62	92%
2860	CC at Stroh Rd	57	12:30	62	92%
2910	East Cherry Cr-Douglas	57	12:18	62	92%

2920	West Cherry Head-Douglas Cnty	57	12:00	62	92%
2960	Indian Creek	57	12:46	62	92%
4100	Filter Plant	57	12:00	62	92%
4220	Fling's	57	12:30	62	92%
4230	Golden Age	57	12:42	62	92%
4860	Fairview Peak	57	13:08	62	92%
6601	Wx-A2-Magnolia WX-Precip	173	4:00	186	93%
530	Fire Station #19	58	12:12	62	94%
710	Horseshoe Park Drop	58	11:41	62	94%
1030	NREL/S. Table Mtn.	58	12:54	62	94%
1060	Heritage Square	58	12:26	62	94%
1200	Broomfield 3207	58	12:42	62	94%
2370	Red Rocks Park	58	12:12	62	94%
2730	Wx-Salisbury Park	58	12:00	62	94%
2870	Cottonwood (Apache)	58	12:15	62	94%
3030	WX-Bingham Lake Park	58	12:30	62	94%
4060	Lakeshore	58	12:29	62	94%
4180	Gold Lake	58	12:45	62	94%
4190	Slaughterhouse	58	12:27	62	94%
4260	Taylor Mountain	58	11:58	62	94%
4310	Johnny Park	58	12:12	62	94%
5860	Cedar Mountain	58	12:00	62	94%
100110	A2-ETG @ Hampden Precip	58	12:00	62	94%
100200	Wx-A2-OneRain Weather - Precipitation	58	12:30	62	94%
2800	Columbine Open Space	701	1:00	744	94%
100290	A2-PlumCr at Sedalia - Precip	702	1:00	744	94%
2810	Pine Cliff Road	706	1:00	744	95%
3050	East/West Trailhead	706	1:00	744	95%
150	Nott Creek	59	12:12	62	95%
200	Leyden Reservoir	59	12:39	62	95%
400	Montview Park	59	12:28	62	95%
420	Expo Park	59	11:13	62	95%
620	Quincy/Highline	59	11:41	62	95%
650	Iliff Pond	59	11:44	62	95%
800	Sable Ditch @ 18th	59	11:43	62	95%
830	Side Creek Park	59	11:59	62	95%
1010	Denver West	59	12:26	62	95%
1370	West Metro FS13	59	11:41	62	95%
1420	Wx-A2-Diamond Hill	59	12:00	62	95%
1460	Wx-Urban Farm	59	12:14	62	95%
1550	Lakewood CC	59	11:57	62	95%
1720	Cherry Cr @ Steele	59	12:11	62	95%
2250	Rosedale	59	12:12	62	95%
2930	Wx-Spring Valley Rd-DougCnty	59	12:32	62	95%
2940	Willow Creek - DougCnty	59	12:32	62	95%
4020	Rio Grande	59	12:27	62	95%
4030	Red Garden	59	12:28	62	95%
4050	Walker Ranch	59	12:27	62	95%
4070	Bear Peak	59	11:58	62	95%
4110	Betasso	59	12:26	62	95%
4300	Big Elk Park	59	11:57	62	95%
4320	Lee Hill Rain 2012	59	12:44	62	95%
4490	Apple Valley	59	11:57	62	95%
4770	Wx-Cal-Wood Ranch	59	12:28	62	95%
4810	Shanahan Ridge	59	11:57	62	95%
5880	Hackett Mountain	59	12:00	62	95%
100100	A2-Blackstone Precip	59	12:29	62	95%
100270	Wx-A2-WestCreek (Hayman) - Precip	710	1:00	744	95%
100420	A2-Thorncreek - Precip	712	1:00	744	96%

100140	A2-Upper Sellers Gulch Precip	714	1:00	744	96%
100160	A2-Sand Creek at Colfax Precip	715	1:00	744	96%
1000	A2-Maple Grove Resv.	716	1:00	744	96%
1310	LDC at 64th	716	1:00	744	96%
3060	Fire Sta 47	716	1:00	744	96%
100240	A2-Westerly Cr Dam Precip	716	1:00	744	96%
100300	A2-CoalCreek at McCaslin - Precip	716	1:00	744	96%
100320	A2-Weir Gulch - Precip	716	1:00	744	96%
100	A2-Carr Street	717	1:00	744	96%
870	A2-Murphy Creek GC	717	1:00	744	96%
4850	Porphory Mtn	717	1:00	744	96%
100230	A2-Havana Pond Precip	717	1:00	744	96%
100410	A2-Brantner Gulch - Precip	717	1:00	744	96%
100490	Coal Creek at Twin Spruce Rd - Precipitation	717	1:00	744	96%
1340	Sanderson at Xavier	718	1:00	744	97%
3040	CC @ Russelville Road Precip	718	1:00	744	97%
3070	A2-Newlin Gulch Precip	718	1:00	744	97%
100500	Upper Coal Creek at Camp Eden Rd - Precipitation	718	1:00	744	97%
3090	A2-Highland Heritage Park	719	1:00	744	97%
110	Ralston Reservoir	60	11:58	62	97%
120	West Woods	60	12:11	62	97%
210	Leyden Confluence	60	12:12	62	97%
300	Van Bibber Park	60	12:11	62	97%
320	Sports Complex	60	11:58	62	97%
520	Jewell Detention	60	11:15	62	97%
600	Harvard Gulch Park	60	12:16	62	97%
630	Temple Pond at DTC	60	10:45	62	97%
700	Toll Gate @ 6th	60	11:31	62	97%
840	Fire Station 12	60	11:15	62	97%
1100	Louisville Rec Ctr	60	12:14	62	97%
1110	Gunbarrel	60	12:11	62	97%
1400	Upper Sloan Det.	60	11:15	62	97%
1570	Wx-Brighton Ditch	60	12:14	62	97%
2310	Genesee Village	60	11:58	62	97%
4090	Magnolia	60	12:11	62	97%
4140	Logan Mill	60	12:12	62	97%
4150	Gold Hill	60	12:13	62	97%
4160	Sunshine	60	12:00	62	97%
4170	Pine Brook	60	12:11	62	97%
4250	Geer Canyon	60	12:10	62	97%
4530	Winiger Ridge	60	12:12	62	97%
4750	Wx-Louisville Lake	60	12:14	62	97%
5730	West Creek	60	12:32	62	97%
5740	Trail Creek	60	12:20	62	97%
2880	Happy Canyon at N Surrey Dr	721	1:00	744	97%
3020	Wx-West Creek WX	721	1:00	744	97%
140	Wx-Blue Mountain	61	12:00	62	98%
220	Upper Leyden	61	12:00	62	98%
410	Kelly Dam	61	11:58	62	98%
640	Goldsmith @ Eastman	61	11:20	62	98%
730	No Name @ Quincy	61	11:15	62	98%
820	ETG @ Buckley	61	11:16	62	98%
970	Pump Sta 3	61	11:19	62	98%
1040	Lena @ U.S. Hwy 6	61	11:44	62	98%
1320	SPR at 3rd Ave	61	11:58	62	98%
1480	Third Creek at DIA	61	11:59	62	98%
1600	Englewood Dam	61	11:28	62	98%
1640	SPR at Union Ave.	61	11:15	62	98%
1700	Cherry Cr @ Champa	61	11:32	62	98%

4080	Twin Sisters	61	11:57	62	98%
4360	Justice Center	61	12:05	62	98%
4570	St. Antons	61	11:59	62	98%
4730	Wx-Sugarloaf	61	12:00	62	98%
440	Fire Station #7	62	12:05	62	100%
610	Harvard @ Jackson	62	11:13	62	100%
720	Confluence Pond	62	11:43	62	100%
760	Mission Viejo Park	62	11:09	62	100%
1050	Jeffco Fairgrounds	62	11:49	62	100%
1360	Denver Zoo	62	11:58	62	100%
4130	Swiss Peaks	62	11:57	62	100%
4240	Sunset	62	11:43	62	100%
4520	Eagle Ridge	62	11:45	62	100%
4550	Boulder Jail	62	11:44	62	100%
4710	Wx-Ward C-1	62	12:12	62	100%
4820	Doudy Draw	62	12:13	62	100%
4840	SBC@S Boulder Ditch	62	11:46	62	100%
5810	Stump Bump	62	12:15	62	100%
1440	Wx-Elbert	63	12:05	62	100%
1920	Wx-Brighton	63	11:57	62	100%
4350	Conifer Hill	63	11:44	62	100%
4880	Whispering Pines	63	11:30	62	100%
4200	Lazy Acres	64	11:33	62	100%
4830	SBC @ San Souci	64	11:20	62	100%
430	Utah Park	65	10:37	62	100%
510	Virginia Court	65	11:07	62	100%
950	Piney at Liverpool	65	11:01	62	100%
1300	Hidden Lake	65	10:44	62	100%
1900	Niver Detention	65	11:14	62	100%
1500	Powers Park	66	10:39	62	100%
1350	Chatfield COE	67	11:16	62	100%
2970	Rampart Range Rd-Satellite	220		220	100%
5900	Horse Creek-Satellite	1286		1286	100%

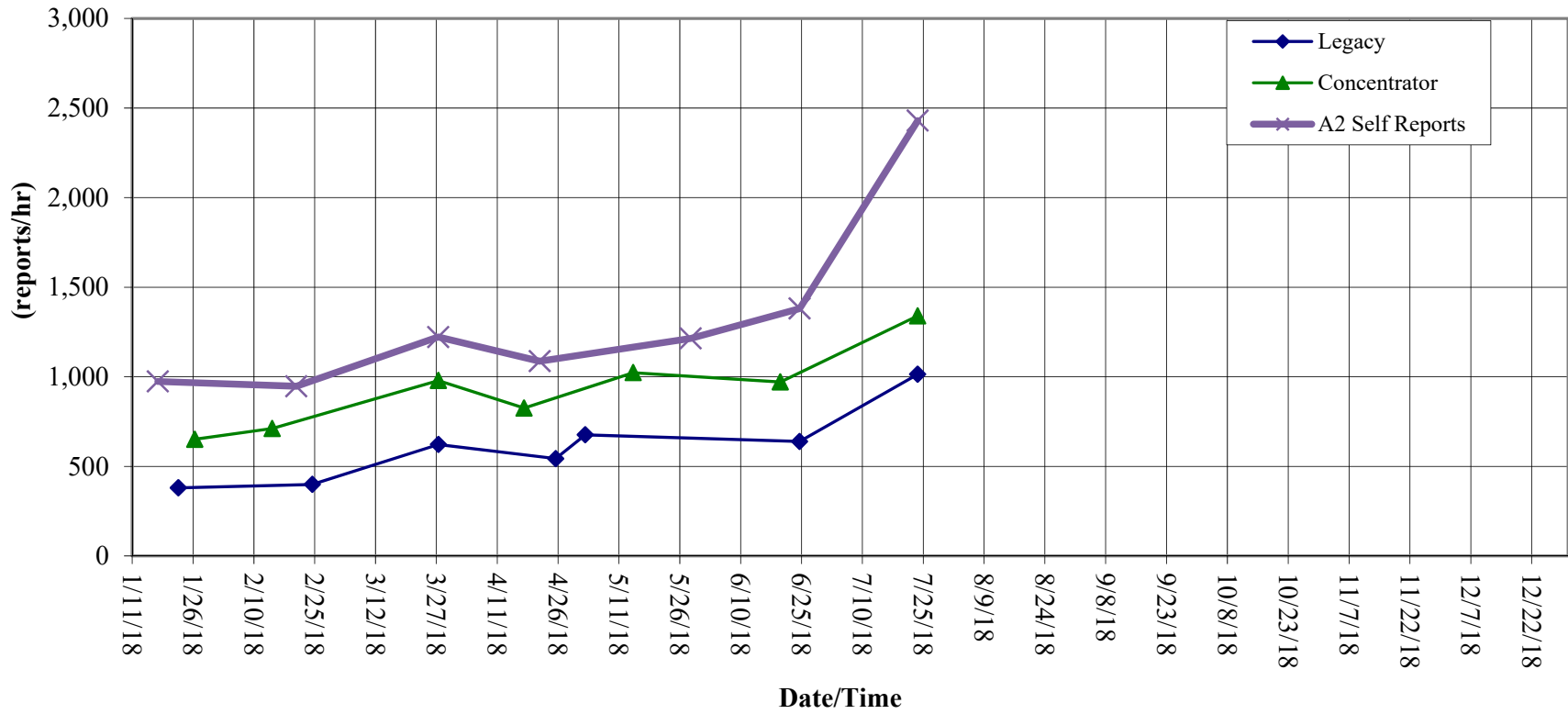
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	
1	Rain Event Performance				Analyze Rain Sensors					0	<<show stations with zero rain (1=yes, 0=no)							
2		Reports Received	Reports Received	10,876														
3		Systemwide Avg	Total Tips	11,660														
4		93.63%	Data Loss	6.72%														
5	Description	Sensor	Performance	1-tips	2-tips	3-tips	4-tips	5-tips	6-tips	>6-tips	Rcv	Exp	Miss	Hold	Bucket			
6	Indian Hills	2360	60%	13	5	1	1	1	0	0	21	35	14	0	0.0393701			
7	El Rancho	2340	61%	5	5	1	0	0	0	1	11	18	7	0	0.0393701 Mean		58.05	
8	Aurora Regional Pond	940	68%	46	14	4	0	1	1	0	66	97	31	0	0.0393701 Median		51	
9	Wx-A2-Trumbull (Hayman) - Precip	100260	70%	66	21	4	1	0	0	1	92	132	40	0	0.0393701 St. Dev		28.2	
10	Kinney Peak	2280	73%	28	6	1	2	0	0	0	37	51	14	0	0.0393701 Mean plus 3 SD		142.6	
11	Rampart Range Rd-Satellite	2970	75%	21	1	1	0	0	1	0	24	32	8	0	0.0393701 Mean minus 2 SD		1.651	
12	WX-EPC at Hwy 105	3010	75%	48	10	4	1	0	0	0	63	84	21	0	0.0393701 Min		1	
13	Choke Cherry Resvr	2320	77%	29	4	2	1	0	0	0	36	47	11	1	0.0393701 Max		177	
14	Little Narrows	4470	77%	7	3	0	0	0	0	0	10	13	3	0	0.0393701			
15	SPR at Union Ave.	1640	79%	33	2	2	0	1	0	2	38	48	10	0	0.0393701			
16	Hansen Rain	4330	80%	20	2	2	0	0	0	0	24	30	6	0	0.0393701			
17	SPR at Henderson	1660	80%	54	6	2	2	0	0	0	64	80	16	0	0.0393701			
18	Morrison	2330	80%	34	11	0	0	0	0	0	45	56	11	0	0.0393701			
19	Red Hill	4290	80%	32	8	1	0	0	0	0	41	51	10	0	0.0393701			
20	Dakan Rd	2980	81%	53	7	4	0	0	0	0	64	79	15	0	0.0393701			
21	liff Pond	650	82%	32	3	0	0	0	1	0	36	44	8	0	0.0393701			
22	Flying J	850	83%	80	0	0	0	3	1	0	84	101	17	10	0.0393701			
23	Idledale	2350	83%	36	1	2	1	0	0	0	40	48	8	1	0.0393701			
24	Apple Valley	4490	83%	38	5	2	0	0	0	0	45	54	9	0	0.0393701			
25	Granby Ditch @ 6th	810	85%	62	8	1	1	0	0	1	72	85	13	1	0.0393701			
26	Bear Creek @ Lowell	1530	85%	53	7	2	0	0	0	0	62	73	11	0	0.0393701			
27	Quincy/Highline	620	85%	45	5	2	0	0	0	0	52	61	9	0	0.0393701			
28	Lazy Acres	4200	85%	25	3	1	0	0	0	0	29	34	5	0	0.0393701			
29	Fire Station #7	440	85%	42	3	1	1	0	0	0	47	55	8	0	0.0393701			
30	A2-Thorncreek - Precip	100420	86%	54	10	0	0	0	0	0	64	74	10	0	0.0393701			
31	Fire Station 12	840	87%	96	8	0	1	0	1	0	106	122	16	15	0.0393701			
32	Shop Creek	1710	87%	45	8	0	0	0	0	0	53	61	8	1	0.0393701			
33	DC Public Works	2950	87%	85	9	1	1	0	0	0	96	110	14	0	0.0393701			
34	Lakewood CC	1550	87%	53	9	0	0	0	0	0	62	71	9	0	0.0393701			
35	Toll Gate @ 6th	700	88%	50	6	1	0	0	0	1	57	65	8	1	0.0393701			
36	Pinewood Springs	4510	88%	44	5	1	0	0	0	0	50	57	7	0	0.0393701			
37	Haskins Gulch Conf	2820	88%	76	10	1	0	0	0	0	87	99	12	1	0.0393701			
38	Russelville Gulch-Douglas	2900	88%	73	7	0	0	1	0	0	81	92	11	0	0.0393701			
39	Slaughterhouse Glch	1620	88%	46	7	0	0	0	0	1	53	60	7	0	0.0393701			
40	SBC @ San Souci	4830	88%	22	0	0	1	0	0	0	23	26	3	0	0.0393701			
41	Wx-A2-WestCreek (Hayman) - Precip	100270	89%	106	8	1	0	0	1	0	116	131	15	2	0.0393701			
42	Sand Creek Park	1800	89%	56	6	1	0	0	0	0	63	71	8	0	0.0393701			
43	Cannon Mountain	4270	89%	37	1	2	0	0	0	0	40	45	5	0	0.0393701			
44	Red Rocks Park	2370	89%	58	6	1	0	0	0	0	65	73	8	0	0.0393701			
45	Wx-Aurora Town Hall	920	89%	58	8	0	0	0	0	1	66	74	8	0	0.0393701			
46	Horseshoe Park Drop	710	89%	30	2	1	0	0	0	0	33	37	4	0	0.0393701			
47	Jeffco Fairgrounds	1050	89%	82	11	0	0	0	0	0	93	104	11	1	0.0393701			
48	Willow Creek - DougCnty	2940	90%	62	8	0	0	0	0	0	70	78	8	0	0.0393701			
49	WX-Bingham Lake Park	3030	90%	59	7	0	0	0	0	0	66	73	7	0	0.0393701			
50	Lena @ U.S. Hwy 6	1040	91%	71	4	2	0	0	0	0	77	85	8	0	0.0393701			
51	Mission Viejo Park	760	91%	63	4	0	1	0	0	0	68	75	7	0	0.0393701			
52	Confluence Pond	720	91%	54	4	1	0	0	0	0	59	65	6	0	0.0393701			
53	Log Jumper	5940	91%	74	6	1	0	0	0	0	81	89	8	0	0.0393701			
54	ETG @ Buckley	820	91%	76	8	0	0	0	0	1	84	92	8	1	0.0393701			
55	Cherry Cr bl Bayou Glch	2850	91%	58	4	1	0	0	0	0	63	69	6	0	0.0393701			
56	Expo Park	420	92%	50	3	1	0	0	0	0	54	59	5	0	0.0393701			
57	No Name @ Quincy	730	92%	99	10	0	0	0	0	1	109	119	10	1	0.0393701			
58	Pump Sta 3	970	92%	72	4	0	1	0	0	0	77	84	7	0	0.0393701			
59	Martin Gulch	4040	92%	30	3	0	0	0	0	0	33	36	3	0	0.0393701			
60	Eagle Ridge	4520	92%	63	4	1	0	0	0	0	68	74	6	3	0.0393701			
61	LDC at 64th	1310	92%	22	0	1	0	0	0	1	23	25	2	0	0.0393701			
62	West Metro FS13	1370	92%	63	6	0	0	0	0	0	69	75	6	0	0.0393701			

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
63	A2-Sellers Gulch at Haystack Precip	100150	92%	65	3	0	1	0	0	0	0	69	75	6	1	0.0393701	
64	Spruce Mt - Douglas	2890	92%	88	5	0	1	0	0	0	0	94	102	8	0	0.0393701	
65	Harvard @ Jackson	610	92%	47	0	0	0	1	0	0	0	48	52	4	0	0.0393701	
66	Betasso	4110	92%	44	4	0	0	0	0	0	0	48	52	4	0	0.0393701	
67	Conifer Hill	4350	92%	22	2	0	0	0	0	0	0	24	26	2	0	0.0393701	
68	Wx-Button Rock	4790	92%	11	1	0	0	0	0	0	0	12	13	1	0	0.0393701	
69	Cub Cr below Blue	2270	92%	46	2	1	0	0	0	0	0	49	53	4	0	0.0393701	
70	Pine Cliff Road	2810	93%	72	1	0	0	0	1	0	0	74	80	6	0	0.0393701	
71	Lee Hill Rain 2012	4320	93%	35	1	1	0	0	0	0	0	37	40	3	0	0.0393701	
72	Doudy Draw	4820	93%	23	2	0	0	0	0	0	0	25	27	2	0	0.0393701	
73	Van Bibber @ Hwy 93	330	93%	25	0	1	0	0	0	0	0	26	28	2	0	0.0393701	
74	Brook Forest	2260	93%	84	7	0	0	0	0	0	0	91	98	7	0	0.0393701	
75	Tallman Gulch	3080	93%	36	3	0	0	0	0	0	0	39	42	3	0	0.0393701	
76	Fire Sta 47	3060	93%	86	5	1	0	0	0	0	0	92	99	7	4	0.0393701	
77	Goldsmith @ Eastman	640	93%	37	3	0	0	0	0	1	0	40	43	3	0	0.0393701	
78	Wx-A2-Diamond Hill	1420	93%	26	0	1	0	0	0	0	0	27	29	2	0	0.0393701	
79	SPR at 3rd Ave	1320	94%	54	4	0	0	0	0	0	0	58	62	4	0	0.0393701	
80	Chatfield COE	1350	94%	69	5	0	0	0	0	1	0	74	79	5	1	0.0393701	
81	Jewell Detention	520	94%	28	2	0	0	0	0	0	0	30	32	2	0	0.0393701	
82	Wx-Hiwan G.C.	2210	94%	44	3	0	0	0	0	0	0	47	50	3	2	0.0393701	
83	Denver Zoo	1360	94%	31	2	0	0	0	0	0	0	33	35	2	0	0.0393701	
84	Riverside	4340	94%	31	2	0	0	0	0	0	0	33	35	2	0	0.0393701	
85	Powers Park	1500	94%	129	6	1	0	0	0	1	0	136	144	8	0	0.0393701	
86	Wx-Highlands Ranch WTP	2710	94%	64	4	0	0	0	0	1	0	68	72	4	0	0.0393701	
87	Third Creek at DIA	1480	94%	32	2	0	0	0	0	0	0	34	36	2	0	0.0393701	
88	Ralston Reservoir	110	95%	33	2	0	0	0	0	0	0	35	37	2	0	0.0393701	
89	West Cherry Head-Douglas Cnty	2920	95%	68	2	1	0	0	0	0	0	71	75	4	0	0.0393701	
90	Leyden Reservoir	200	95%	17	1	0	0	0	0	0	0	18	19	1	0	0.0393701	
91	Cherry Cr @ Champa	1700	95%	37	2	0	0	0	0	0	0	39	41	2	0	0.0393701	
92	Virginia Court	510	95%	57	3	0	0	0	0	0	0	60	63	3	0	0.0393701	
93	Fire Station #19	530	95%	39	2	0	0	0	0	0	0	41	43	2	0	0.0393701	
94	Justice Center	4360	95%	39	2	0	0	0	0	0	0	41	43	2	0	0.0393701	
95	Leyden Confluence	210	95%	20	1	0	0	0	0	0	0	21	22	1	0	0.0393701	
96	Hidden Lake	1300	95%	40	2	0	0	0	0	0	0	42	44	2	0	0.0393701	
97	Utah Park	430	96%	103	5	0	0	0	0	2	0	108	113	5	1	0.0393701	
98	Wx-Castle Rock	2750	96%	62	3	0	0	0	0	0	0	65	68	3	0	0.0393701	
99	Sable Ditch @ 18th	800	96%	63	3	0	0	0	0	1	0	66	69	3	0	0.0393701	
100	Cherry Cr @ Steele	1720	96%	42	2	0	0	0	0	0	0	44	46	2	0	0.0393701	
101	Rosedale	2250	96%	63	3	0	0	0	0	0	0	66	69	3	0	0.0393701	
102	Genesee Village	2310	96%	42	2	0	0	0	0	0	0	44	46	2	0	0.0393701	
103	Slaughterhouse	4190	96%	42	2	0	0	0	0	0	0	44	46	2	0	0.0393701	
104	Golden Age	4230	96%	21	1	0	0	0	0	0	0	22	23	1	0	0.0393701	
105	Johnny Park	4310	96%	42	2	0	0	0	0	0	0	44	46	2	0	0.0393701	
106	Wx-Marston Lake North	1520	96%	64	3	0	0	0	0	0	0	67	70	3	0	0.0393701	
107	A2-Upper Sellers Gulch Precip	100140	96%	90	2	1	0	0	0	0	0	93	97	4	0	0.0393701	
108	Wx-Brighton	1920	96%	45	2	0	0	0	0	0	0	47	49	2	0	0.0393701	
109	Upper Sloan Det.	1400	96%	23	1	0	0	0	0	0	0	24	25	1	0	0.0393701	
110	Denver West	1010	96%	48	2	0	0	0	0	0	0	50	52	2	0	0.0393701	
111	Fling's	4220	96%	51	0	1	0	0	0	0	0	52	54	2	0	0.0393701	
112	Cedar Mountain	5860	96%	78	1	1	0	0	0	0	0	80	83	3	0	0.0393701	
113	Wx-Quincy Reservoir	750	96%	81	0	0	1	0	0	0	0	82	85	3	7	0.0393701	
114	Bear Peak	4070	97%	27	1	0	0	0	0	0	0	28	29	1	0	0.0393701	
115	Wx-Cal-Wood Ranch	4770	97%	27	1	0	0	0	0	0	0	28	29	1	0	0.0393701	
116	A2-Sand Creek at Colfax Precip	100160	97%	82	1	1	0	0	0	0	0	84	87	3	14	0.0393701	
117	A2-Weir Gulch - Precip	100320	97%	57	0	1	0	0	0	0	0	58	60	2	5	0.0393701	
118	Four Mile Creek	5720	97%	113	4	0	0	0	0	0	0	117	121	4	0	0.0393701	
119	Upper Leyden	220	97%	29	1	0	0	0	0	0	0	30	31	1	0	0.0393701	
120	Sports Complex	320	97%	29	1	0	0	0	0	0	0	30	31	1	0	0.0393701	
121	Englewood Dam	1600	97%	30	1	0	0	0	0	0	0	31	32	1	0	0.0393701	
122	Walker Ranch	4050	97%	30	1	0	0	0	0	0	0	31	32	1	1	0.0393701	
123	Nott Creek	150	97%	31	1	0	0	0	0	0	0	32	33	1	0	0.0393701	
124	Parker/Mississippi	540	97%	32	1	0	0	0	0	0	0	33	34	1	1	0.0393701	
125	Broomfield 3207	1200	97%	32	1	0	0	0	0	0	0	33	34	1	0	0.0393701	

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
126	Coal Creek at Twin Spruce Rd - Precipitation	100490	97%	32	1	0	0	0	0	0	0	33	34	1	0	0.0393701	
127	Lakeshore	4060	97%	33	1	0	0	0	0	0	0	34	35	1	0	0.0393701	
128	Wx-Elbert	1440	97%	67	2	0	0	0	0	0	0	69	71	2	0	0.0393701	
129	Wx-Urban Farm	1460	97%	35	1	0	0	0	0	0	0	36	37	1	0	0.0393701	
130	Cold Sprg Glich conf	2240	97%	35	1	0	0	0	0	0	0	36	37	1	0	0.0393701	
131	Red Garden	4030	97%	36	1	0	0	0	0	0	0	37	38	1	0	0.0393701	
132	Twin Sisters	4080	97%	36	1	0	0	0	0	0	0	37	38	1	0	0.0393701	
133	Guy Hill Ranch	310	97%	37	1	0	0	0	0	0	0	38	39	1	0	0.0393701	
134	Wx-Sugarloaf	4730	97%	37	1	0	0	0	0	0	0	38	39	1	0	0.0393701	
135	West Creek	5730	97%	74	2	0	0	0	0	0	0	76	78	2	0	0.0393701	
136	Horse Creek-Satellite	5900	97%	76	0	1	0	0	0	0	0	77	79	2	0	0.0393701	
137	Big Elk Park	4300	98%	38	1	0	0	0	0	0	0	39	40	1	0	0.0393701	
138	A2-Westerly Cr Dam Precip	100240	98%	38	1	0	0	0	0	0	0	39	40	1	0	0.0393701	
139	Wx-Blue Mountain	140	98%	39	1	0	0	0	0	0	0	40	41	1	1	0.0393701	
140	A2-Brantner Gulch - Precip	100410	98%	79	2	0	0	0	0	0	0	81	83	2	0	0.0393701	
141	Havana Park	500	98%	40	1	0	0	0	0	0	0	41	42	1	0	0.0393701	
142	East/West Trailhead	3050	98%	83	0	1	0	0	0	0	0	84	86	2	0	0.0393701	
143	Rio Grande	4020	98%	42	1	0	0	0	0	0	0	43	44	1	0	0.0393701	
144	Gunbarrel	1110	98%	44	1	0	0	0	0	0	0	45	46	1	0	0.0393701	
145	Crescent	4010	98%	44	1	0	0	0	0	0	0	45	46	1	0	0.0393701	
146	St. Antons	4570	98%	44	1	0	0	0	0	0	0	45	46	1	0	0.0393701	
147	Sulphur Gulch	2840	98%	45	1	0	0	0	0	0	0	46	47	1	0	0.0393701	
148	Columbine Open Space	2800	98%	93	0	1	0	0	0	0	0	94	96	2	0	0.0393701	
149	Cottonwood (Apache)	2870	98%	93	2	0	0	0	0	0	0	95	97	2	0	0.0393701	
150	Wx-Spring Valley Rd-DougCnty	2930	98%	48	1	0	0	0	0	0	0	49	50	1	0	0.0393701	
151	Wx-Louisville Lake	4750	98%	49	1	0	0	0	0	0	0	50	51	1	0	0.0393701	
152	Wx-West Creek WX	3020	98%	101	0	1	0	0	0	0	0	102	104	2	0	0.0393701	
153	Stump Bump	5810	98%	109	2	0	0	0	0	0	0	111	113	2	0	0.0393701	
154	Harvard Gulch Park	600	98%	111	2	0	0	0	0	0	0	113	115	2	0	0.0393701	
155	Wx-Brighton Ditch	1570	98%	56	1	0	0	0	0	0	0	57	58	1	0	0.0393701	
156	Temple Pond at DTC	630	98%	172	1	1	0	0	0	1	174	177	3	0	0.0393701		
157	Gold Lake	4180	98%	57	1	0	0	0	0	0	0	58	59	1	0	0.0393701	
158	Wx-Salisbury Park	2730	98%	60	1	0	0	0	0	0	0	61	62	1	0	0.0393701	
159	East Cherry Cr-Douglas	2910	99%	65	1	0	0	0	0	1	66	67	1	0	0.0393701		
160	Wx-Ward C-1	4710	99%	69	1	0	0	0	0	0	0	70	71	1	0	0.0393701	
161	Wx-Tomah Rd-DougCnty	2990	99%	80	1	0	0	0	0	2	81	82	1	0	0.0393701		
162	Happy Canyon at N Surrey Dr	2880	99%	81	1	0	0	0	0	0	0	82	83	1	4	0.0393701	
163	Hackett Mountain	5880	99%	84	1	0	0	0	0	0	0	85	86	1	0	0.0393701	
164	SBC @ SB Road	4870	100%	1	0	0	0	0	0	0	0	1	1	0	0	0.0393701	
165	A2-ETG @ Hampden Precip	100110	100%	94	0	0	0	0	0	0	0	94	94	0	8	0.0393701	
166	A2-Carr Street	100	100%	28	0	0	0	0	0	0	0	28	28	0	0	0.0393701	
167	West Woods	120	100%	19	0	0	0	0	0	0	0	19	19	0	0	0.0393701	
168	Van Bibber Park	300	100%	31	0	0	0	0	0	0	0	31	31	0	0	0.0393701	
169	Montview Park	400	100%	26	0	0	0	0	0	0	0	26	26	0	0	0.0393701	
170	Kelly Dam	410	100%	34	0	0	0	0	0	0	0	34	34	0	0	0.0393701	
171	Side Creek Park	830	100%	60	0	0	0	0	0	0	0	60	60	0	1	0.0393701	
172	A2-Murphy Creek GC	870	100%	86	0	0	0	0	0	0	0	86	86	0	11	0.0393701	
173	Piney at Liverpool	950	100%	97	0	0	0	0	0	0	0	97	97	0	0	0.0393701	
174	A2-Maple Grove Resv.	1000	100%	29	0	0	0	0	0	0	0	29	29	0	0	0.0393701	
175	NREL/S. Table Mtn.	1030	100%	8	0	0	0	0	0	0	0	8	8	0	2	0.0393701	
176	Heritage Square	1060	100%	22	0	0	0	0	0	0	0	22	22	0	0	0.0393701	
177	Louisville Rec Ctr	1100	100%	48	0	0	0	0	0	0	0	48	48	0	0	0.0393701	
178	Sanderson at Xavier	1340	100%	80	0	0	0	0	0	0	0	80	80	0	0	0.0393701	
179	Niver Detention	1900	100%	33	0	0	0	0	0	0	0	33	33	0	0	0.0393701	
180	Bear Cr below Cub	2230	100%	48	0	0	0	0	0	0	0	48	48	0	0	0.0393701	
181	CC at Stroh Rd	2860	100%	70	0	0	0	0	0	0	0	70	70	0	1	0.0393701	
182	Indian Creek	2960	100%	64	0	0	0	0	0	0	0	64	64	0	0	0.0393701	
183	CC @ Russelville Road Precip	3040	100%	86	0	0	0	0	0	0	0	86	86	0	13	0.0393701	
184	A2-Newlin Gulch Precip	3070	100%	79	0	0	0	0	0	0	0	79	79	0	0	0.0393701	
185	A2-Highland Heritage Park	3090	100%	52	0	0	0	0	0	0	0	52	52	0	0	0.0393701	
186	Magnolia	4090	100%	38	0	0	0	0	0	0	0	38	38	0	0	0.0393701	
187	Filter Plant	4100	100%	35	0	0	0	0	0	0	0	35	35	0	0	0.0393701	
188	Swiss Peaks	4130	100%	42	0	0	0	0	0	0	0	42	42	0	0	0.0393701	

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
189	Logan Mill	4140	100%	53	0	0	0	0	0	0	0	53	53	0	0		0.0393701
190	Gold Hill	4150	100%	55	0	0	0	0	0	0	0	55	55	0	0		0.0393701
191	Sunshine	4160	100%	46	0	0	0	0	0	0	0	46	46	0	0		0.0393701
192	Pine Brook	4170	100%	32	0	0	0	0	0	0	0	32	32	0	0		0.0393701
193	Sunset	4240	100%	41	0	0	0	0	0	0	0	41	41	0	0		0.0393701
194	Geer Canyon	4250	100%	42	0	0	0	0	0	0	0	42	42	0	0		0.0393701
195	Taylor Mountain	4260	100%	37	0	0	0	0	0	0	0	37	37	0	0		0.0393701
196	Winiger Ridge	4530	100%	30	0	0	0	0	0	0	0	30	30	0	0		0.0393701
197	Boulder Jail	4550	100%	39	0	0	0	0	0	0	0	39	39	0	0		0.0393701
198	Shanahan Ridge	4810	100%	31	0	0	0	0	0	0	0	31	31	0	0		0.0393701
199	SBC@S Boulder Ditch	4840	100%	34	0	0	0	0	0	0	0	34	34	0	0		0.0393701
200	Whispering Pines	4880	100%	38	0	0	0	0	0	0	0	38	38	0	0		0.0393701
201	Trail Creek	5740	100%	57	0	0	0	0	0	0	0	57	57	0	0		0.0393701
202	A2-Blackstone Precip	100100	100%	50	0	0	0	0	0	0	0	50	50	0	0		0.0393701
203	A2-Havana Pond Precip	100230	100%	50	0	0	0	0	0	0	0	50	50	0	10		0.0393701
204	A2-PlumCr at Sedalia - Precip	100290	100%	35	0	0	0	0	0	0	0	35	35	0	0		0.0393701
205	A2-CoalCreek at McCaslin - Precip	100300	100%	27	0	0	0	0	0	0	0	27	27	0	0		0.0393701
206	Upper Coal Creek at Camp Eden Rd - Precipitation	100500	100%	41	0	0	0	0	0	0	0	41	41	0	0		0.0393701
207			Total Tips	10257	510	75	19	8	7								
208																	
209	Porphory Mtn	4850	94%	158	7	2	0	0	0	0	0	167	178	11	11		0.01
210	Fairview Peak	4860	98%	129	2	0	0	0	0	0	0	131	133	2	6		0.01
211	Wx-A2-Magnolia WX-Precip	6601	93%	162	2	0	0	0	2	1	0	166	178	12	13		0.01
212	Wx-A2-OneRain Weather - Precipitation	100200	88%	134	13	1	0	0	1	0	0	149	169	20	8		0.01

2018 Monthly Peak Hour ALERT Radio Traffic Summary



ALERT2 Performance Analysis - July 2018

