

**NULL METER ERROR REPORT****FINAL**

Reconcile?	N
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Safety Issue?	N
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Thesis Report No.	
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**1. EXECUTIVE SUMMARY**

SITE NAME	HOLMES CHAPEL	
LDZ	NW	
START DATE (actual)		
LAST GOOD DATE	29 <sup>th</sup> June 2018	
END DATE	24 <sup>th</sup> June 2019	
SIZE OF ERROR (No reconciliation required if under 0.1%)	Overread, (error in original metered volume -0.05113%)	
ESTIMATE – Y/N?	N	
ROOT CAUSE	Probable ADC drift	
ANALYSIS	Recalculation of flowrates following adjustment to pressure, HRDP and LRDP.	
METER TYPE	Orifice	
AUTHOR	Will van Woerden	
CHECKED BY	Piers Eldridge	
ACCEPTED BY CADENT NETWORK		
RECONCILIATION	Distribution	Transportation

The calculation for the total error is taken as the error in volume caused by the error in ADC conversion for pressure, LRDP and HRDP, divided by the total flowrate as measured by the station (calculated as the Station 24hr Volume Flow value at the end of the analysis period minus Station 24hr Volume Flow value at the start of the analysis period).

The overall error calculated is an overread in volume of 0.05116% for the period analysed. The percentage error in relation to original billed volume is - 0.05113%. The error does not require reconciliation.

**2. BACKGROUND**

Gas is supplied to part of the Cadent network at the Holmes Chapel FWACV offtake. The site meter system comprises of a single stream orifice plate meter site.

During a routine validation at the site between the dates of 24<sup>th</sup> to the 26<sup>th</sup> of June 2019, validation checks CP4a, CP4b, CP4c and CP4d failed on first iteration (Checks correspond to ADC Check (4-20mA) for Pressure, LRDP, HRDP and SBDP respectively). In all four cases, adjustments were made and checks were passed on second test. Results for CP4a, CP4b and CP4c are included in Figures 1, 2 and 3 respectively.

CP4d failed on first test, however, this is not included in this analysis because the error in ADC for the standby differential pressure transmitter does not impact volume measurement.

CP4a - ADC Check (4-20mA Input) Pressure (bar.g)						
Equipment Under Test					Status	AF
Tolerance	0.03	% INPUT SPAN				
Site	HOLMES CHAPEL MTA	Equipment	FLOW COMPUTER 1 62852			
Start Date	26/06/2019	Completion Date	26/06/2019			
<b>Results</b>						
Lower Range Value	0	bar.g	Upper Range Value	80	bar.g	
<b>Input Current (mA)</b>	<b>Expected Pressure (bar.g)</b>	<b>Displayed Pressure (bar.g)</b>	<b>Error % Span</b>			
4	0	.026	0.0325			
8	20	20.032	0.04			
12	40	40.033	0.04125			
16	60	60.04	0.05			
20	80	80.036	0.045			
<b>Test equipment</b>						
Equipment Number	Equipment Description	Manufacturer	Model	Serial Number	Calibration Due Date	
TEQ0376NW	Digital multimeter			6900264	2020-04-28	
<b>SIGNATURES</b>						
Equipment Reinstated?	Yes					
Tested By	Mark Fenton	and	Matthew Campbell			

Figure 1 CP4a - ADC Check Pressure Error from ME/2

CP4b - ADC Check (4-20mA Input) Low Differential Pressure						
<b>Equipment Under Test</b>					Status	AF
Tolerance	0.03	% INPUT SPAN				
Site	HOLMES CHAPEL MTA	Equipment	FLOW COMPUTER 1 62852			
Start Date	26/06/2019	Completion Date	26/06/2019			
<b>Results</b>						
Lower Range Value	0	mbar	Upper Range Value	50	mbar	
Input Current (mA)	Expected Pressure (mbar)	Displayed Pressure (mbar)	Error % Span			
4	0	0.0132	0.0264			
8	12.5	12.5169	0.0338			
12	25	25.0237	0.0474			
16	37.5	37.5274	0.0548			
20	50	50.0279	0.0558			
<b>Test equipment</b>						
Equipment Number	Equipment Description	Manufacturer	Model	Serial Number	Calibration Due Date	
TEQ0376NW	Digital multimeter			6900264	2020-04-28	
<b>SIGNATURES</b>						
Equipment Reinstated?	Yes					
Tested By	Mark Fenton	and	Matthew Campbell			

Figure 2 CP4b - ADC Check Low Range Differential Pressure from ME/2

CP4c - ADC Check (4-20mA Input) High Differential Pressure						
<b>Equipment Under Test</b>					Status	AF
Tolerance	0.03	% INPUT SPAN				
Site	HOLMES CHAPEL MTA	Equipment	FLOW COMPUTER 1 62852			
Start Date	26/06/2019	Completion Date	26/06/2019			
<b>Results</b>						
Lower Range Value	0	mbar	Upper Range Value	500	mbar	
Input Current (mA)	Expected Pressure (mbar)	Displayed Pressure (mbar)	Error % Span			
4	0	.0688	0.01376			
8	125	125.1687	0.03374			
12	250	250.2686	0.05372			
16	375	375.3370	0.0674			
20	500	500.4055	0.0811			
<b>Test equipment</b>						
Equipment Number	Equipment Description	Manufacturer	Model	Serial Number	Calibration Due Date	
TEQ0376NW	Digital multimeter			6900264	2020-04-28	
<b>SIGNATURES</b>						
Equipment Reinstated?	Yes					
Tested By	Mark Fenton	and	Matthew Campbell			

Figure 3 CP4c - ADC Check High Range Differential Pressure from ME/2

### 3. ERROR QUANTIFICATION AND IMPACT

Flow and conditions data for the year prior to the validation were requested, data from 25<sup>th</sup> June 2018 to 25<sup>th</sup> June 2019 was provided. Data was not available for the period between 15/12/2018 04:57 and 17/12/2018 12:52, because of this, no correction factor can be calculated for gas days 15/12/2018 or 16/12/2018.

For each data cycle, occurring every 4 minutes, the flowrate has been recalculated using adjusted values for LRDP or HRDP as appropriate and the pressure. Adjustments for the error in each case are made using a linear interpolation between known data points as determined from the errors found in the ME/2.

The difference between the uncorrected and corrected flowrates for the stream are added to the station flowrate. A correction factor is also calculated and applied to the difference between subsequent volumetric integrator readings to determine the volume error. Gas day correction factors are summarised in Table 1.

The exact start date of the error is not known. Therefore, the calculated error is halved and applied across the period in accordance with Offtakes Arrangements Document. Daily correction factors to apply this half error are calculated and included within the appendix.

### 4. CAUSES

The cause of the error is unknown but the analogue to digital conversion done by the OMNI flow computer type A I/O module is known to drift.

### 5. RECOMMENDATIONS AND LEARNING

ADC failures of this type will occur occasionally, if the same checks fail regularly then it suggests a fundamental problem with the equipment being tested and repairs or replacements should be made.

### REFERENCES

1. Holmes Chapel MER final.xlsx

### VERSION HISTORY

<i>Version</i>	<i>Changes</i>	<i>Author</i>	<i>Date</i>
1	<i>First issue</i>	W van Woerden	27/07/2020
2	<i>Cadent comments included</i>		14/09/2020

**APPENDIX**

The table below gives the daily correction factors which should be used to reconcile the error.

Where there is a short period of missing data a correction has been applied equal to the mean correction factor for the previous and subsequent days. This applies for Gas Days where fewer than 320 data points were recorded. Because the error is not similarly distributed across the data period, the default correction factor as detailed in MER guidance is not used.

**Table 1 Daily Correction Factors**

Gas Day	Daily Volume	Volume Error	Volume Error (Halved)	Daily Correction Factor (Full)	Daily Correction Factor (Halved Error)
30/06/2018	422565	-331.89593	-165.94796	0.999215	0.999607
01/07/2018	409550	-321.46172	-160.73086	0.999215	0.999608
02/07/2018	417682	-306.77737	-153.38869	0.999266	0.999633
03/07/2018	390177	-353.81636	-176.90818	0.999093	0.999547
04/07/2018	387650	-322.68230	-161.34115	0.999168	0.999584
05/07/2018	474623	-377.89952	-188.94976	0.999204	0.999602
06/07/2018	421829	-354.22214	-177.11107	0.999160	0.999580
07/07/2018	389436	-288.90168	-144.45084	0.999258	0.999629
08/07/2018	382653	-310.38941	-155.19471	0.999189	0.999594
09/07/2018	407997	-320.63921	-160.31961	0.999214	0.999607
10/07/2018	427888	-332.28926	-166.14463	0.999223	0.999612
11/07/2018	462508	-370.29166	-185.14583	0.999199	0.999600
12/07/2018	435489	-348.81353	-174.40677	0.999199	0.999600
13/07/2018	423273	-344.05774	-172.02887	0.999187	0.999594
14/07/2018	398059	-328.86003	-164.43002	0.999174	0.999587
15/07/2018	405941	-337.91293	-168.95647	0.999168	0.999584
16/07/2018	436850	-369.47352	-184.73676	0.999154	0.999577
17/07/2018	422603	-350.97896	-175.48948	0.999169	0.999585
18/07/2018	452901	-422.20004	-211.10002	0.999068	0.999534
19/07/2018	439485	-347.90744	-173.95372	0.999208	0.999604
20/07/2018	453647	-356.02718	-178.01359	0.999215	0.999608
21/07/2018	403593	-325.81969	-162.90984	0.999193	0.999596
22/07/2018	421613	-338.37344	-169.18672	0.999197	0.999599
23/07/2018	446190	-354.93981	-177.46991	0.999205	0.999602
24/07/2018	406906	-352.87881	-176.43940	0.999133	0.999566
25/07/2018	417807	-355.44521	-177.72261	0.999149	0.999575
26/07/2018	431302	-375.38116	-187.69058	0.999130	0.999565
27/07/2018	407954	-348.13567	-174.06784	0.999147	0.999573
28/07/2018	385559	-326.87162	-163.43581	0.999152	0.999576
29/07/2018	440996	-359.66652	-179.83326	0.999184	0.999592

30/07/2018	428371	-364.59726	-182.29863	0.999149	0.999574
31/07/2018	430499	-348.86426	-174.43213	0.999190	0.999595
01/08/2018	451512	-355.19364	-177.59682	0.999213	0.999607
02/08/2018	443518	-347.91446	-173.95723	0.999216	0.999608
03/08/2018	362685	-308.12738	-154.06369	0.999150	0.999575
04/08/2018	402025	-328.23953	-164.11976	0.999184	0.999592
05/08/2018	397533	-324.18323	-162.09162	0.999185	0.999592
06/08/2018	407077	-338.92091	-169.46045	0.999167	0.999584
07/08/2018	419282	-346.43819	-173.21910	0.999174	0.999587
08/08/2018	443527	-366.23441	-183.11720	0.999174	0.999587
09/08/2018	446152	-366.93985	-183.46993	0.999178	0.999589
10/08/2018	457195	-351.35985	-175.67993	0.999231	0.999616
11/08/2018	427013	-312.68864	-156.34432	0.999268	0.999634
12/08/2018	392517	-298.72937	-149.36469	0.999239	0.999619
13/08/2018	487833	-379.12712	-189.56356	0.999223	0.999611
14/08/2018	460687	-371.19139	-185.59569	0.999194	0.999597
15/08/2018	486305	-382.91315	-191.45657	0.999213	0.999606
16/08/2018	449387	-367.88489	-183.94245	0.999181	0.999591
17/08/2018	489395	-407.01151	-203.50576	0.999168	0.999584
18/08/2018	426741	-349.37667	-174.68833	0.999181	0.999591
19/08/2018	409683	-336.26478	-168.13239	0.999179	0.999590
20/08/2018	412689	-372.50903	-186.25451	0.999097	0.999549
21/08/2018	421783	-324.67738	-162.33869	0.999230	0.999615
22/08/2018	409620	-331.12253	-165.56126	0.999192	0.999596
23/08/2018	397717	-333.79383	-166.89692	0.999161	0.999580
24/08/2018	498142	-420.52793	-210.26397	0.999156	0.999578
25/08/2018	520001	-401.37252	-200.68626	0.999228	0.999614
26/08/2018	512229	-389.16179	-194.58089	0.999240	0.999620
27/08/2018	496536	-392.40538	-196.20269	0.999210	0.999605
28/08/2018	478354	-375.98690	-187.99345	0.999214	0.999607
29/08/2018	506143	-395.87949	-197.93975	0.999218	0.999609
30/08/2018	490260	-378.35423	-189.17711	0.999228	0.999614
31/08/2018	432326	-353.48926	-176.74463	0.999182	0.999591
01/09/2018	407340	-351.10043	-175.55022	0.999138	0.999569
02/09/2018	391897	-339.36136	-169.68068	0.999134	0.999567
03/09/2018	406497	-331.39211	-165.69606	0.999185	0.999592
04/09/2018	454022	-355.95856	-177.97928	0.999216	0.999608
05/09/2018	423316	-351.68925	-175.84462	0.999169	0.999585
06/09/2018	535711	-534.01910	-267.00955	0.999003	0.999502
07/09/2018	578911	-593.73373	-296.86687	0.998974	0.999487
08/09/2018	520410	-395.99717	-197.99859	0.999239	0.999620
09/09/2018	459631	-365.74634	-182.87317	0.999204	0.999602
10/09/2018	481171	-387.59576	-193.79788	0.999194	0.999597
11/09/2018	435059	-356.15731	-178.07865	0.999181	0.999591
12/09/2018	466959	-395.71910	-197.85955	0.999153	0.999576
13/09/2018	467228	-395.64790	-197.82395	0.999153	0.999577

14/09/2018	553271	-445.77749	-222.88874	0.999194	0.999597
15/09/2018	476704	-394.71961	-197.35981	0.999172	0.999586
16/09/2018	504584	-392.95445	-196.47722	0.999221	0.999611
17/09/2018	475166	-394.42076	-197.21038	0.999170	0.999585
18/09/2018	404372	-345.81440	-172.90720	0.999145	0.999572
19/09/2018	464603	-366.22850	-183.11425	0.999212	0.999606
20/09/2018	525620	-401.86396	-200.93198	0.999235	0.999618
21/09/2018	622478	-682.91449	-341.45724	0.998903	0.999451
22/09/2018	626119	-672.20739	-336.10369	0.998926	0.999463
23/09/2018	618483	-484.40905	-242.20453	0.999217	0.999608
24/09/2018	643199	-523.20493	-261.60247	0.999187	0.999593
25/09/2018	625238	-482.87345	-241.43672	0.999228	0.999614
26/09/2018	494409	-421.92315	-210.96158	0.999147	0.999573
27/09/2018	480689	-420.65745	-210.32873	0.999125	0.999562
28/09/2018	471134	-396.51646	-198.25823	0.999158	0.999579
29/09/2018	634464	-503.08954	-251.54477	0.999207	0.999604
30/09/2018	696562	-517.09789	-258.54894	0.999258	0.999629
01/10/2018	732198	-743.01697	-371.50849	0.998985	0.999493
02/10/2018	622352	-463.72978	-231.86489	0.999255	0.999627
03/10/2018	744515	-846.37988	-423.18994	0.998863	0.999432
04/10/2018	625322	-463.14144	-231.57072	0.999259	0.999630
05/10/2018	673957	-617.23950	-308.61975	0.999084	0.999542
06/10/2018	754211	-644.14067	-322.07033	0.999146	0.999573
07/10/2018	804766	-921.96342	-460.98171	0.998854	0.999427
08/10/2018	719738	-636.02076	-318.01038	0.999116	0.999558
09/10/2018	613345	-465.01431	-232.50715	0.999242	0.999621
10/10/2018	531143	-439.94765	-219.97382	0.999172	0.999586
11/10/2018	575913	-452.70305	-226.35152	0.999214	0.999607
12/10/2018	619734	-569.85055	-284.92528	0.999080	0.999540
13/10/2018	529568	-421.08250	-210.54125	0.999205	0.999602
14/10/2018	644345	-536.28687	-268.14344	0.999168	0.999584
15/10/2018	748948	-809.73669	-404.86834	0.998919	0.999459
16/10/2018	694428	-621.42196	-310.71098	0.999105	0.999553
17/10/2018	706297	-597.31722	-298.65861	0.999154	0.999577
18/10/2018	790543	-783.57970	-391.78985	0.999009	0.999504
19/10/2018	736512	-595.98689	-297.99345	0.999191	0.999595
20/10/2018	686132	-612.06112	-306.03056	0.999108	0.999554
21/10/2018	712444	-711.20905	-355.60453	0.999002	0.999501
22/10/2018	786648	-844.41083	-422.20542	0.998927	0.999463
23/10/2018	769324	-530.26819	-265.13409	0.999311	0.999655
24/10/2018	785980	-753.75257	-376.87629	0.999041	0.999521
25/10/2018	793273	-788.31146	-394.15573	0.999006	0.999503
26/10/2018	870561	-1082.06597	-541.03298	0.998757	0.999379
27/10/2018	472815706	-81499.93466	-40749.96733	0.999828	0.999914
28/10/2018	1007472	-1189.01665	-594.50832	0.998820	0.999410
29/10/2018	1084105	-1148.30302	-574.15151	0.998941	0.999470

30/10/2018	1041676	-1224.86568	-612.43284	0.998824	0.999412
31/10/2018	935478	-1082.36644	-541.18322	0.998843	0.999421
01/11/2018	901260	-1137.35673	-568.67836	0.998738	0.999369
02/11/2018	915789	-1157.07661	-578.53831	0.998737	0.999368
03/11/2018	880073	-1126.90221	-563.45111	0.998720	0.999360
04/11/2018	713982	-844.01982	-422.00991	0.998818	0.999409
05/11/2018	837900	-1062.18582	-531.09291	0.998732	0.999366
06/11/2018	695482	-597.41695	-298.70848	0.999141	0.999571
07/11/2018	768050	-955.99953	-477.99976	0.998755	0.999378
08/11/2018	848672	-1108.58027	-554.29013	0.998694	0.999347
09/11/2018	854603	-1165.15910	-582.57955	0.998637	0.999318
10/11/2018	803783	-979.64738	-489.82369	0.998781	0.999391
11/11/2018	793584	-976.68719	-488.34360	0.998769	0.999385
12/11/2018	893112	-1190.72304	-595.36152	0.998667	0.999333
13/11/2018	835813	-1099.04700	-549.52350	0.998685	0.999343
14/11/2018	803750	-1040.55659	-520.27829	0.998705	0.999353
15/11/2018	794238	-828.00547	-414.00274	0.998957	0.999479
16/11/2018	735031	-664.41563	-332.20782	0.999096	0.999548
17/11/2018	767524	-730.04261	-365.02131	0.999049	0.999524
18/11/2018	854695	-989.25340	-494.62670	0.998843	0.999421
19/11/2018	940643	-1081.99703	-540.99852	0.998850	0.999425
20/11/2018	986453	-1149.92267	-574.96133	0.998834	0.999417
21/11/2018	1075863	-1105.05783	-552.52891	0.998973	0.999486
22/11/2018	1093649	-1093.20023	-546.60012	0.999000	0.999500
23/11/2018	1082807	-1244.17772	-622.08886	0.998851	0.999425
24/11/2018	988273	-1179.71816	-589.85908	0.998806	0.999403
25/11/2018	984986	-1159.98723	-579.99362	0.998822	0.999411
26/11/2018	988896	-1165.32252	-582.66126	0.998822	0.999411
27/11/2018	1052979	-1240.25929	-620.12964	0.998822	0.999411
28/11/2018	896756	-1067.52503	-533.76251	0.998810	0.999405
29/11/2018	824095	-944.65962	-472.32981	0.998854	0.999427
30/11/2018	931493	-1182.58695	-591.29348	0.998730	0.999365
01/12/2018	857271	-1142.46733	-571.23367	0.998667	0.999334
02/12/2018	797870	-989.02922	-494.51461	0.998760	0.999380
03/12/2018	908514	-1191.11204	-595.55602	0.998689	0.999344
04/12/2018	1073920	-1239.42628	-619.71314	0.998846	0.999423
05/12/2018	1013674	-1136.49819	-568.24909	0.998879	0.999439
06/12/2018	799534	-929.36046	-464.68023	0.998838	0.999419
07/12/2018	849887	-1001.46500	-500.73250	0.998822	0.999411
08/12/2018	922941	-1053.60276	-526.80138	0.998858	0.999429
09/12/2018	874388	-985.99863	-492.99932	0.998872	0.999436
10/12/2018	894682	-1116.58011	-558.29006	0.998752	0.999376
11/12/2018	894118	-1132.67913	-566.33956	0.998733	0.999367
12/12/2018	1050484	-1239.61572	-619.80786	0.998820	0.999410
13/12/2018	1102906	-1222.40835	-611.20418	0.998892	0.999446
14/12/2018	1216371	-1263.91345	-631.95673	0.998961	0.999480



17/12/2018	659319	-810.57688	-405.28844	0.998771	0.999385
18/12/2018	961335	-1200.69458	-600.34729	0.998751	0.999376
19/12/2018	964578	-1173.04485	-586.52243	0.998784	0.999392
20/12/2018	953823	-1219.77623	-609.88811	0.998721	0.999361
21/12/2018	942074	-1220.05053	-610.02526	0.998705	0.999352
22/12/2018	869811	-1074.00658	-537.00329	0.998765	0.999383
23/12/2018	920468	-1198.71293	-599.35647	0.998698	0.999349
24/12/2018	960789	-1156.20732	-578.10366	0.998797	0.999398
25/12/2018	843047	-1054.02975	-527.01488	0.998750	0.999375
26/12/2018	817155	-1083.05469	-541.52734	0.998675	0.999337
27/12/2018	824350	-1016.96820	-508.48410	0.998766	0.999383
28/12/2018	777882	-699.15539	-349.57769	0.999101	0.999551
29/12/2018	797896	-836.87757	-418.43879	0.998951	0.999476
30/12/2018	779738	-893.42781	-446.71391	0.998854	0.999427
31/12/2018	648162	-757.64593	-378.82296	0.998831	0.999416
01/01/2019	834328	-904.75989	-452.37994	0.998916	0.999458
02/01/2019	1100994	-1221.32494	-610.66247	0.998891	0.999445
03/01/2019	1084063	-1255.49479	-627.74739	0.998842	0.999421
04/01/2019	1120742	-1159.19667	-579.59833	0.998966	0.999483
05/01/2019	1015855	-1163.68685	-581.84343	0.998854	0.999427
06/01/2019	888371	-1045.41972	-522.70986	0.998823	0.999412
07/01/2019	967362	-1069.49978	-534.74989	0.998894	0.999447
08/01/2019	983917	-1193.96397	-596.98198	0.998787	0.999393
09/01/2019	1169623	-1163.27933	-581.63967	0.999005	0.999503
10/01/2019	1122443	-1124.29148	-562.14574	0.998998	0.999499
11/01/2019	1071309	-1228.13310	-614.06655	0.998854	0.999427
12/01/2019	940158	-1156.79622	-578.39811	0.998770	0.999385
13/01/2019	891807	-1102.55096	-551.27548	0.998764	0.999382
14/01/2019	995284	-1181.22897	-590.61448	0.998813	0.999407
15/01/2019	946215	-1183.48338	-591.74169	0.998749	0.999375
16/01/2019	1019352	-1195.55297	-597.77648	0.998827	0.999414
17/01/2019	1162048	-1257.06068	-628.53034	0.998918	0.999459
18/01/2019	1247671	-1289.37841	-644.68921	0.998967	0.999483
19/01/2019	1145603	-1250.19235	-625.09617	0.998909	0.999454
20/01/2019	1070607	-1227.43789	-613.71894	0.998854	0.999427
21/01/2019	1115980	-1217.62618	-608.81309	0.998909	0.999454
22/01/2019	1181859	-1263.63338	-631.81669	0.998931	0.999465
23/01/2019	1294270	-1287.54966	-643.77483	0.999005	0.999503
24/01/2019	1128265	-1248.52949	-624.26474	0.998893	0.999447
25/01/2019	974309	-1202.52739	-601.26369	0.998766	0.999383
26/01/2019	904834	-1098.05084	-549.02542	0.998786	0.999393
27/01/2019	1093107	-1235.92058	-617.96029	0.998869	0.999435
28/01/2019	1198860	-1179.20818	-589.60409	0.999016	0.999508
29/01/2019	1223837	-1161.59223	-580.79612	0.999051	0.999525
30/01/2019	1320971	-1286.68312	-643.34156	0.999026	0.999513
31/01/2019	1264954	-1302.33183	-651.16591	0.998970	0.999485

01/02/2019	1296583	-1312.97516	-656.48758	0.998987	0.999494
02/02/2019	1226602	-1289.36239	-644.68119	0.998949	0.999474
03/02/2019	1198015	-1276.85371	-638.42686	0.998934	0.999467
04/02/2019	1094244	-1198.65816	-599.32908	0.998905	0.999452
05/02/2019	1123666	-1130.79433	-565.39717	0.998994	0.999497
06/02/2019	1038987	-1213.55282	-606.77641	0.998832	0.999416
07/02/2019	1074215	-1231.37074	-615.68537	0.998854	0.999427
08/02/2019	1033424	-1195.23190	-597.61595	0.998843	0.999422
09/02/2019	995079	-1052.85245	-526.42622	0.998942	0.999471
10/02/2019	1031801	-1150.85456	-575.42728	0.998885	0.999442
11/02/2019	1046000	-1128.64782	-564.32391	0.998921	0.999460
12/02/2019	994571	-1103.38776	-551.69388	0.998891	0.999445
13/02/2019	954172	-1209.71050	-604.85525	0.998732	0.999366
14/02/2019	932132	-1195.50073	-597.75037	0.998717	0.999359
15/02/2019	919030	-1028.61695	-514.30847	0.998881	0.999440
16/02/2019	819202	-964.48679	-482.24339	0.998823	0.999411
17/02/2019	817404	-952.29004	-476.14502	0.998835	0.999417
18/02/2019	940519	-1103.04364	-551.52182	0.998827	0.999414
19/02/2019	923686	-1010.84657	-505.42329	0.998906	0.999453
20/02/2019	999489	-1106.32326	-553.16163	0.998893	0.999447
21/02/2019	763923	-743.92189	-371.96095	0.999026	0.999513
22/02/2019	755146	-796.62343	-398.31171	0.998945	0.999473
23/02/2019	742259	-726.90574	-363.45287	0.999021	0.999510
24/02/2019	755477	-749.72609	-374.86305	0.999008	0.999504
25/02/2019	827719	-956.35622	-478.17811	0.998845	0.999422
26/02/2019	763747	-833.28148	-416.64074	0.998909	0.999454
27/02/2019	792465	-858.70457	-429.35228	0.998916	0.999458
28/02/2019	898249	-1088.87844	-544.43922	0.998788	0.999394
01/03/2019	916623	-1119.86542	-559.93271	0.998778	0.999389
02/03/2019	856828	-1133.73841	-566.86921	0.998677	0.999338
03/03/2019	903421	-1135.29285	-567.64643	0.998743	0.999372
04/03/2019	1013947	-1231.63626	-615.81813	0.998785	0.999393
05/03/2019	971513	-1132.90730	-566.45365	0.998834	0.999417
06/03/2019	877779	-988.41220	-494.20610	0.998874	0.999437
07/03/2019	1017047	-1094.95716	-547.47858	0.998923	0.999462
08/03/2019	1085547	-1125.98618	-562.99309	0.998963	0.999481
09/03/2019	940616	-1034.92668	-517.46334	0.998900	0.999450
10/03/2019	1082929	-1238.77402	-619.38701	0.998856	0.999428
11/03/2019	1041276	-1092.97630	-546.48815	0.998950	0.999475
12/03/2019	1047154	-1231.84804	-615.92402	0.998824	0.999412
13/03/2019	1105326	-1137.60382	-568.80191	0.998971	0.999485
14/03/2019	948671	-1084.38980	-542.19490	0.998857	0.999428
15/03/2019	940550	-1167.90097	-583.95049	0.998758	0.999379
16/03/2019	958950	-1067.21042	-533.60521	0.998887	0.999444
17/03/2019	979075	-1165.14784	-582.57392	0.998810	0.999405
18/03/2019	1003329	-1153.97103	-576.98552	0.998850	0.999425

19/03/2019	850916	-1135.38874	-567.69437	0.998666	0.999333
20/03/2019	729655	-677.78343	-338.89171	0.999071	0.999536
21/03/2019	741515	-635.96534	-317.98267	0.999142	0.999571
22/03/2019	815913	-917.76294	-458.88147	0.998875	0.999438
23/03/2019	817878	-944.19178	-472.09589	0.998846	0.999423
24/03/2019	899408	-1185.28161	-592.64080	0.998682	0.999341
25/03/2019	893993	-1143.45762	-571.72881	0.998721	0.999360
26/03/2019	896220	-1166.53430	-583.26715	0.998698	0.999349
27/03/2019	882173	-1170.74242	-585.37121	0.998673	0.999336
28/03/2019	803139	-915.07814	-457.53907	0.998861	0.999430
29/03/2019	792899	-909.52562	-454.76281	0.998853	0.999426
30/03/2019	752338	-845.02207	-422.51103	0.998877	0.999438
31/03/2019	827444	-952.11365	-476.05682	0.998849	0.999425
01/04/2019	889698	-1056.01677	-528.00839	0.998813	0.999407
02/04/2019	890349	-1112.15873	-556.07936	0.998751	0.999375
03/04/2019	1051941	-1083.91050	-541.95525	0.998970	0.999485
04/04/2019	1111982	-1200.40149	-600.20074	0.998920	0.999460
05/04/2019	963350	-1100.53996	-550.26998	0.998858	0.999429
06/04/2019	801547	-921.08506	-460.54253	0.998851	0.999425
07/04/2019	762210	-687.31687	-343.65844	0.999098	0.999549
08/04/2019	749889	-762.92982	-381.46491	0.998983	0.999491
09/04/2019	785149	-842.26617	-421.13309	0.998927	0.999464
10/04/2019	890727	-1070.69848	-535.34924	0.998798	0.999399
11/04/2019	877827	-1066.15795	-533.07897	0.998785	0.999393
12/04/2019	914319	-1164.33988	-582.16994	0.998727	0.999363
13/04/2019	905083	-1137.21711	-568.60855	0.998744	0.999372
14/04/2019	1035134	-1219.76472	-609.88236	0.998822	0.999411
15/04/2019	850478	-1034.16486	-517.08243	0.998784	0.999392
16/04/2019	823108	-889.90517	-444.95258	0.998919	0.999459
17/04/2019	656679	-506.10261	-253.05130	0.999229	0.999615
18/04/2019	616054	-466.15243	-233.07621	0.999243	0.999622
19/04/2019	549117	-449.27506	-224.63753	0.999182	0.999591
20/04/2019	456777	-348.40064	-174.20032	0.999237	0.999619
21/04/2019	411296	-350.97372	-175.48686	0.999147	0.999573
22/04/2019	375414	-306.98458	-153.49229	0.999182	0.999591
23/04/2019	447990	-406.27838	-203.13919	0.999093	0.999547
24/04/2019	512164	-418.11121	-209.05561	0.999184	0.999592
25/04/2019	631896	-575.68368	-287.84184	0.999089	0.999544
26/04/2019	721736	-641.27507	-320.63754	0.999111	0.999556
27/04/2019	910320	-1131.38757	-565.69378	0.998757	0.999379
28/04/2019	679889	-593.50722	-296.75361	0.999127	0.999564
29/04/2019	678708	-513.35638	-256.67819	0.999244	0.999622
30/04/2019	605677	-462.63765	-231.31882	0.999236	0.999618
01/05/2019	623820	-471.09225	-235.54613	0.999245	0.999622
02/05/2019	634834	-564.26766	-282.13383	0.999111	0.999556
03/05/2019	725185	-729.62098	-364.81049	0.998994	0.999497

04/05/2019	760909	-823.87218	-411.93609	0.998917	0.999459
05/05/2019	772670	-883.87454	-441.93727	0.998856	0.999428
06/05/2019	714449	-700.68400	-350.34200	0.999019	0.999510
07/05/2019	744025	-745.17238	-372.58619	0.998998	0.999499
08/05/2019	836673	-854.98651	-427.49325	0.998978	0.999489
09/05/2019	848865	-961.55914	-480.77957	0.998867	0.999434
10/05/2019	816295	-1031.63402	-515.81701	0.998736	0.999368
11/05/2019	660535	-522.92395	-261.46197	0.999208	0.999604
12/05/2019	642582	-584.97896	-292.48948	0.999090	0.999545
13/05/2019	590362	-514.33575	-257.16788	0.999129	0.999564
14/05/2019	532708	-442.23275	-221.11638	0.999170	0.999585
15/05/2019	469749	-346.94459	-173.47229	0.999261	0.999631
16/05/2019	471421	-363.75291	-181.87645	0.999228	0.999614
17/05/2019	496373	-407.91275	-203.95637	0.999178	0.999589
18/05/2019	527424	-404.82658	-202.41329	0.999232	0.999616
19/05/2019	526398	-444.63049	-222.31525	0.999155	0.999578
20/05/2019	516889	-403.33118	-201.66559	0.999220	0.999610
21/05/2019	475137	-376.87161	-188.43581	0.999207	0.999603
22/05/2019	529673	-426.99570	-213.49785	0.999194	0.999597
23/05/2019	495090	-379.73048	-189.86524	0.999233	0.999617
24/05/2019	442059	-349.90925	-174.95462	0.999208	0.999604
25/05/2019	449106	-357.96946	-178.98473	0.999203	0.999601
26/05/2019	432983	-350.02517	-175.01258	0.999192	0.999596
27/05/2019	516482	-399.56631	-199.78316	0.999226	0.999613
28/05/2019	520224	-440.65718	-220.32859	0.999153	0.999576
29/05/2019	620534	-545.71659	-272.85830	0.999121	0.999560
30/05/2019	513177	-408.06842	-204.03421	0.999205	0.999602
31/05/2019	425359	-341.85998	-170.92999	0.999196	0.999598
01/06/2019	432941	-377.78007	-188.89004	0.999127	0.999564
02/06/2019	411981	-358.88355	-179.44177	0.999129	0.999564
03/06/2019	474426	-435.58191	-217.79095	0.999082	0.999541
04/06/2019	516538	-403.81391	-201.90695	0.999218	0.999609
05/06/2019	544297	-455.92317	-227.96158	0.999162	0.999581
06/06/2019	520364	-452.91736	-226.45868	0.999130	0.999565
07/06/2019	594861	-505.13141	-252.56571	0.999151	0.999575
08/06/2019	622578	-620.75777	-310.37889	0.999003	0.999501
09/06/2019	542346	-453.93331	-226.96666	0.999163	0.999582
10/06/2019	542848	-428.32047	-214.16024	0.999211	0.999605
11/06/2019	723641	-603.81837	-301.90918	0.999166	0.999583
12/06/2019	693389	-619.87239	-309.93619	0.999106	0.999553
13/06/2019	586647	-460.27155	-230.13577	0.999215	0.999608
14/06/2019	630638	-606.77234	-303.38617	0.999038	0.999519
15/06/2019	554181	-447.04438	-223.52219	0.999193	0.999597
16/06/2019	525441	-437.48389	-218.74194	0.999167	0.999584
17/06/2019	535840	-440.41019	-220.20510	0.999178	0.999589
18/06/2019	466043	-407.31234	-203.65617	0.999126	0.999563

19/06/2019	515918	-529.69168	-264.84584	0.998973	0.999487
20/06/2019	499975	-406.98490	-203.49245	0.999186	0.999593
21/06/2019	448027	-344.31949	-172.15974	0.999231	0.999616
22/06/2019	389520	-328.47548	-164.23774	0.999157	0.999578
23/06/2019	445950	-380.74934	-190.37467	0.999146	0.999573