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DATE: Monday, July 12, 2021

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REPORT COMPILED ON 7/12/2021 10:46 PM

RE: RESULTS FROM WASTEWATER SARS-COV-2 MONITORING

Purpose

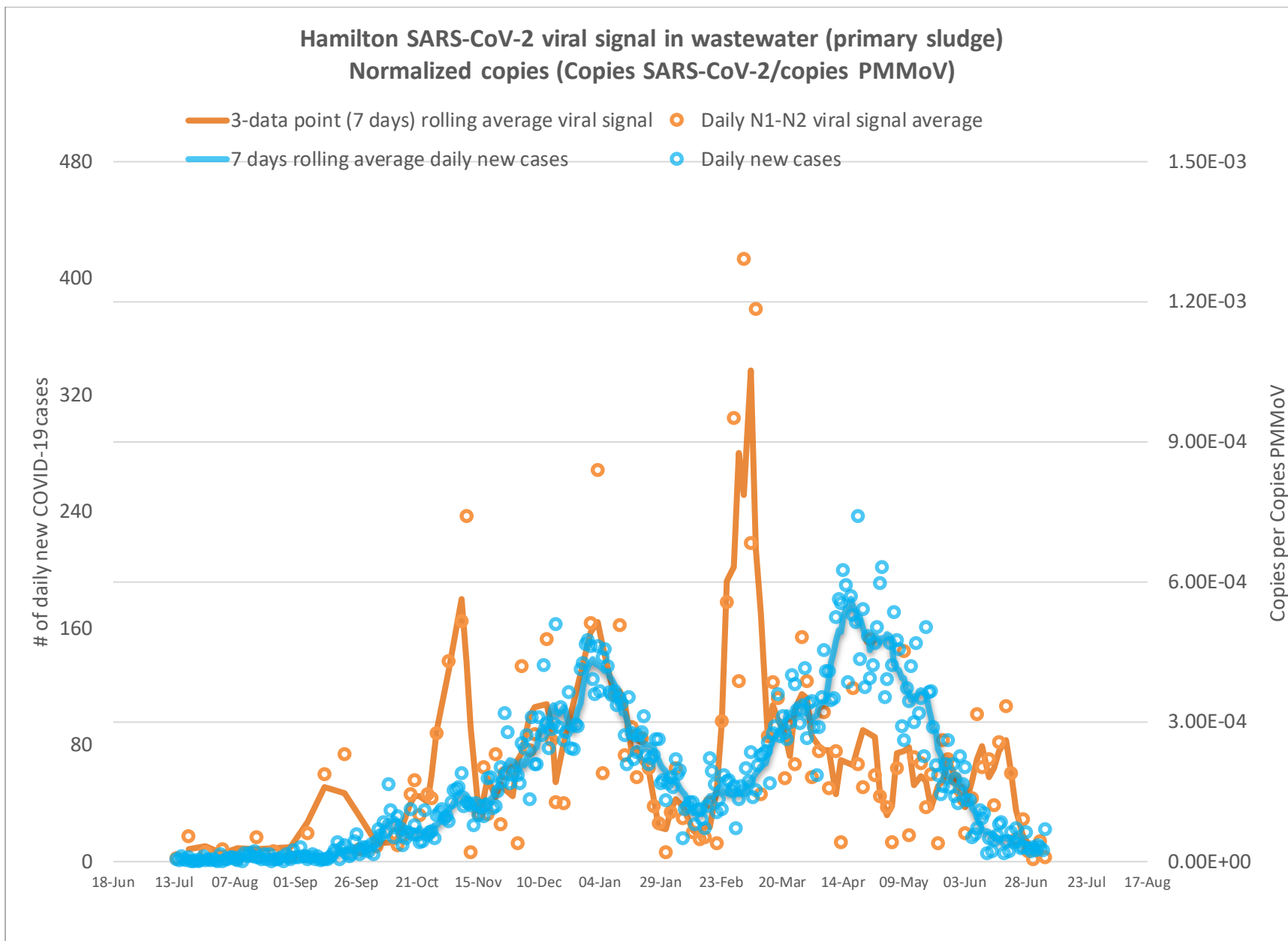
This research data set is generated to track SARS-CoV-2 signal at the Hamilton wastewater treatment plant to the City of Hamilton. Trends relating to the sewer effluent from the Willowgrove LTCH are also shown below. This information is generated in an attempt to support efforts to control and placate COVID-19 infections in the community. Note that at this time an understanding of appropriate units for SARS-CoV-2 signal at the facility level is still being studied for better representation of the prevalence in the facility.

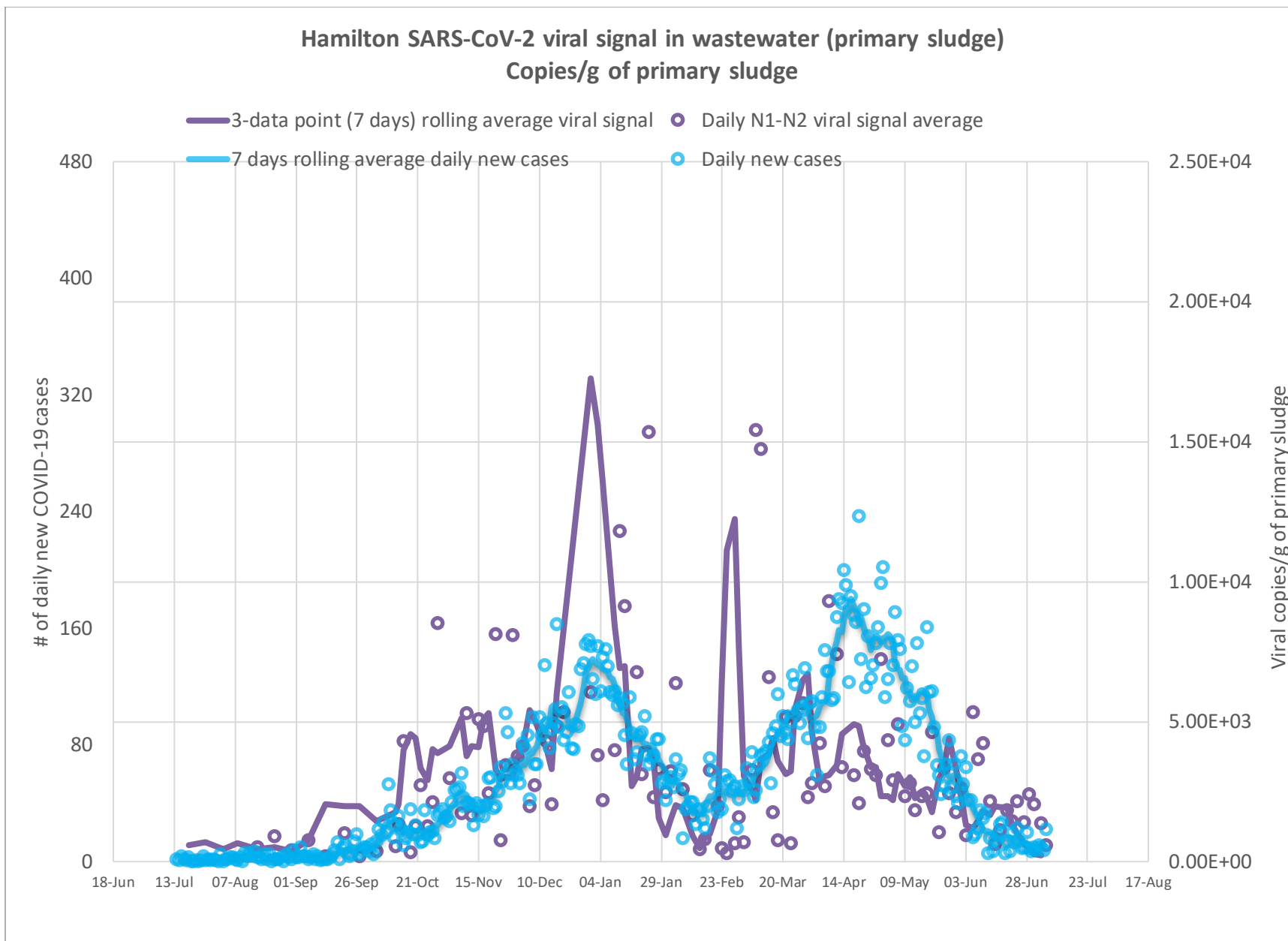
Investigation Summary:

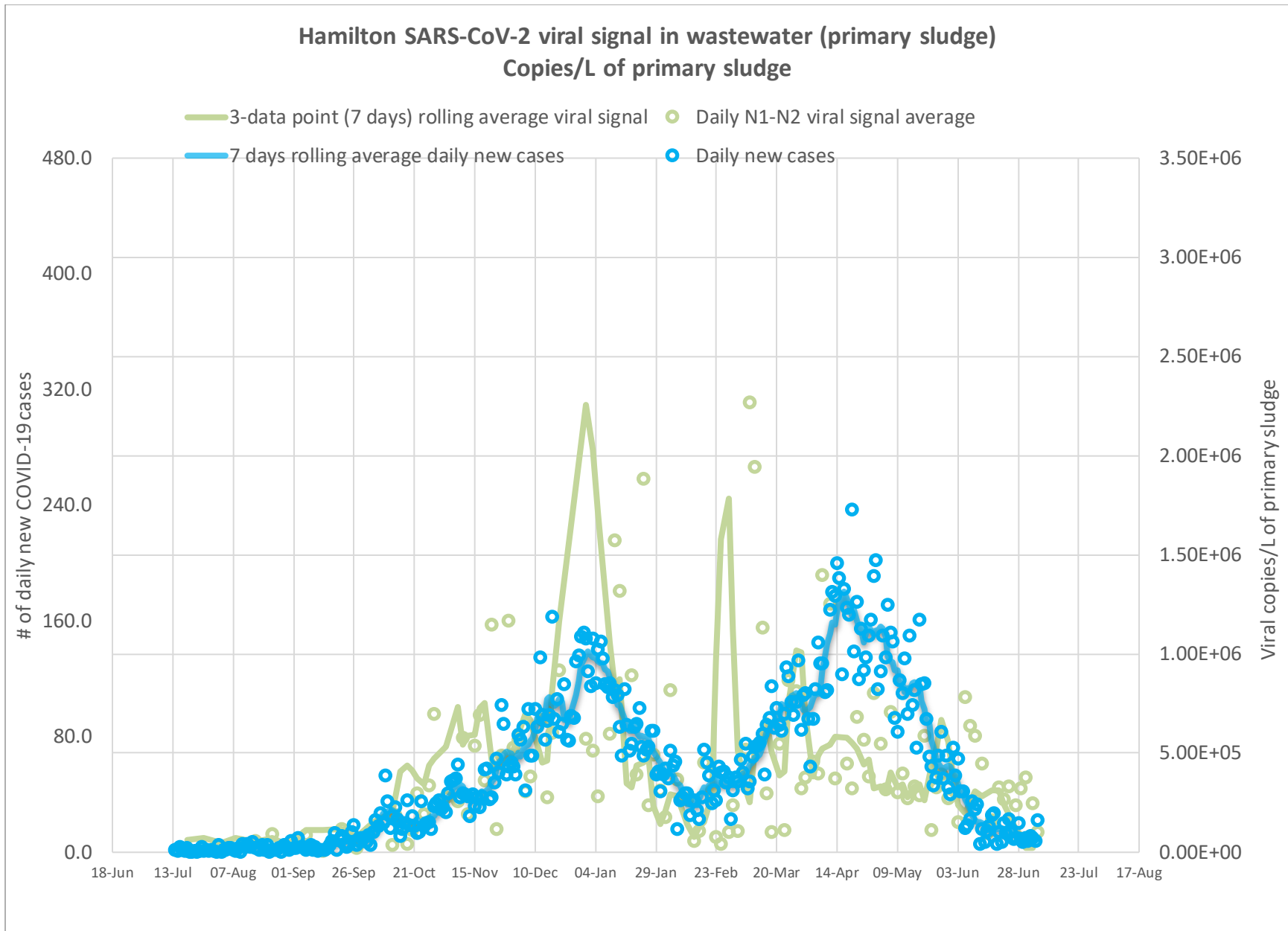
- General trends of COVID-19 wastewater viral signal is fluctuating at a relatively low level.
- Predictive values of wastewater viral signal data will not be reported due to limitations and uncertainties at this time with respect to varying fecal shedding periods in patients and unreported active cases in the community.
- B.1.1.7 (a.k.a. UK variant) was **not detected** in primary sludge samples from Jul 4th and Jul 6th through monitoring by RT-PCR.

Quality Control:

- Standard curves $R^2 \geq 0.95$.
- Primer efficiency between 90%-130%.
- No template controls are negative.







WOODWARD WWTP MONITORING – PRIMARY SLUDGE SAMPLE

Sample Date	Avg N1-N2 raw copies	N1 - N2 Avg. normalized signal (copies/copies of PMMoV)	N1-N2 copies/g wastewater solids	N1-N2 copies/L wastewater solids
14-Jul	1.94	0.000007	504.72	58142.9
19-Jul	3.76	0.000054	900.60	91818.1
26-Jul	1.12	0.000019	398.03	38561.8
02-Aug	4.22	0.000027	780.59	89435.7
08-Aug	1.51	0.000007	185.17	9465.2
16-Aug	5.61	0.000053	999.38	117017.1
23-Aug	1.01	0.000023	193.11	22980.4
30-Aug	1.37	0.000010	379.87	N/A
06-Sep	1.90	0.000060	536.17	36936.6
13-Sep	5.95	0.000187	1336.60	185633.6
21-Sep	17.79	0.000231	4289.54	N/A
27-Sep	0.96	0.000026	338.33	44526.4
04-Oct	6.62	0.000033	1268.78	114412.4
12-Oct	9.25	0.000059	2741.08	299250.3
13-Oct	4.96	0.000036	1252.47	193607.2
15-Oct	10.60	0.000053	2127.83	336112.1
18-Oct	36.60	0.000144	8533.42	698630.8
20-Oct	14.58	0.000175	2970.37	279556.1
22-Oct	10.34	0.000100	1715.52	257241.6
25-Oct	23.61	0.000144	5318.22	578848.7
27-Oct	8.29	0.000136	1676.42	193726.6
29-Oct	15.89	0.000276	5096.02	536368.8
03-Nov	25.90	0.000430	4831.61	690993.4
08-Nov	9.68	0.000516	2455.23	364742.2
10-Nov	29.73	0.000741	8128.34	1148696.3
12-Nov	5.50	0.000021	764.72	119519.8
15-Nov	19.85	0.000101	3439.82	488265.7
17-Nov	28.07	0.000203	8079.08	1166073.3
19-Nov	19.29	0.000102	3765.32	529535.7

22-Nov	18.25	0.000230	4116.12	569217.9
24-Nov	7.96	0.000081	1982.72	308124.0
26-Nov	17.30	0.000190	2720.19	384723.2
29-Nov	19.90	0.000194	4303.69	665823.4
01-Dec	7.23	0.000040	2039.39	278020.2
03-Dec	24.06	0.000420	4837.13	601582.3
06-Dec	18.98	0.000239	5323.59	917121.7
08-Dec	19.11	0.000274	6053.05	571225.9
13-Dec	21.39	0.000478	3801.31	510677.5
15-Dec	7.35	0.000261	2179.72	281663.4
17-Dec	15.67	0.000098	3966.94	596816.2
20-Dec	30.33	0.000125	11811.80	1574218.1
31-Dec	37.71	0.000512	9132.87	1319471.3
03-Jan	127.93	0.000840	30835.70	3873734.4
05-Jan	26.02	0.000189	6769.62	891846.6
10-Jan	16.62	0.000357	3113.80	392004.5
12-Jan	58.33	0.000508	15351.38	1883384.0
14-Jan	8.79	0.000228	2308.66	236458.4
17-Jan	12.58	0.000288	3303.30	493141.3
19-Jan	9.86	0.000180	2470.60	313093.5
21-Jan	12.41	0.000265	3231.37	178056.5
24-Jan	23.95	0.000201	6379.54	817044.1
26-Jan	9.79	0.000119	2592.74	369044.1
28-Jan	6.28	0.000082	1648.65	266105.0
31-Jan	1.67	0.000021	430.57	57958.7
02-Feb	3.08	0.000106	804.54	109730.6
04-Feb	12.46	0.000200	3283.82	451919.4
07-Feb	7.64	0.000094	1980.16	310618.1
11-Feb	1.80	0.000062	467.15	77172.6
14-Feb	1.13	0.000047	297.61	44424.2
16-Feb	2.48	0.000052	660.78	104178.0
18-Feb	6.03	0.000128	1587.86	238734.6
21-Feb	2.61	0.000039	682.55	108998.8
23-Feb	12.31	0.000300	3261.60	517859.8
25-Feb	58.56	0.000555	15400.96	2270140.5

28-Feb	55.57	0.000951	14735.99	1943088.1
02-Mar	25.31	0.000386	6607.64	1131244.2
04-Mar	6.65	0.001291	1768.71	298333.5
07-Mar	2.93	0.000682	780.14	100970.1
09-Mar	19.34	0.001185	5156.62	549180.5
11-Mar	2.49	0.000144	645.94	114191.3
14-Mar	19.71	0.000270	5212.65	869131.8
16-Mar	21.71	0.000385	5663.66	814236.3
18-Mar	8.90	0.000351	2310.35	324315.7
21-Mar	10.67	0.000179	2796.88	377816.3
23-Mar	16.31	0.000292	4245.18	456335.8
25-Mar	10.27	0.000209	2688.81	395168.4
28-Mar	35.55	0.000482	9319.46	1398129.1
30-Mar	28.72	0.000388	7403.97	1255269.1
01-Apr	12.76	0.000182	3386.20	372879.4
04-Apr	11.76	0.000237	3091.84	449607.6
06-Apr	7.97	0.000321	2084.54	323562.3
08-Apr	15.19	0.000157	3948.61	683326.7
11-Apr	12.44	0.000237	3285.96	567263.2
13-Apr	11.85	0.000042	3073.96	383115.9
18-Apr	27.60	0.000371	7251.03	801891.0
20-Apr	16.97	0.000208	4356.62	546951.4
22-Apr	11.03	0.000160	2900.88	315579.1
25-Apr	18.69	0.000477	4922.30	708073.5
27-Apr	8.86	0.000186	2331.89	300317.7
29-Apr	10.86	0.000140	2817.48	398328.1
02-May	7.18	0.000117	1848.85	271327.6
04-May	8.86	0.000042	2332.34	332136.8
06-May	9.27	0.000201	2450.87	286218.8
09-May	17.57	0.000452	4624.85	589333.2
11-May	3.91	0.000057	1040.17	109977.2
13-May	12.72	0.000224	3335.17	325996.2
16-May	9.50	0.000211	2436.56	394710.4
18-May	6.82	0.000118	1768.53	269851.3
20-May	10.62	0.000186	2624.89	365273.2

23-May	3.59	0.000040	943.23	151883.7
25-May	20.28	0.000260	5330.34	784266.1
27-May	13.99	0.000220	3678.24	637273.4
30-May	15.87	0.000177	4225.69	588426.7
01-Jun	8.28	0.000153	2142.74	446987.0
03-Jun	4.75	0.000062	611.53	96151.8
06-Jun	8.60	0.000137	1122.88	164748.8
08-Jun	14.17	0.000317	1827.29	325120.4
10-Jun	10.81	0.000204	1433.45	269039.8
13-Jun	16.33	0.000220	2145.90	331648.2
15-Jun	10.71	0.000122	1420.89	238837.5
17-Jun	18.78	0.000256	2410.18	320770.2
20-Jun	15.81	0.000334	2043.23	375014.1
22-Jun	10.45	0.000190	1361.27	247784.3
24-Jun	4.31	0.000049	573.59	101302.5
27-Jun	8.79	0.000091	1153.71	223689.6
29-Jun	1.76	0.000023	234.39	25021.5
01-Jul	0.48	0.000004	63.21	10129.4
04-Jul	3.76	0.000044	483.05	32554.5
06-Jul	0.98	0.000009	129.11	23619.7

Bold number in red font: below the limit of detection

NEIGHBOURHOOD MONITORING LOCATION - HAMILTON

Sample Date	Avg N1-N2 raw copies	N1-N2 Avg. normalized (copies/copies of PMMoV)	N1-N2 copies/g wastewater solids
18-May	Below the limit of detection		
19-May	7.86	0.00010	2053.34
20-May	16.31	0.00028	4211.77
25-May	4.57	0.00008	1191.69
26-May	5.46	0.00012	1401.81
27-May	3.70	0.00011	971.90
28-May	4.46	0.00007	1176.76
01-Jun	17.01	0.00059	4460.96
02-Jun	31.16	0.00052	8016.49
03-Jun	3.54	0.00012	462.60
08-Jun	21.51	0.00070	2824.25
09-Jun	2.49	0.00021	329.48
10-Jun	10.38	0.00082	1358.50
11-Jun	13.09	0.00083	1698.23
14-Jun	Below the limit of detection		
15-Jun	Below the limit of detection		
16-Jun	Below the limit of detection		
17-Jun	26.04	0.00094	3441.22
18-Jun	6.80	0.00028	892.61
22-Jun	8.35	0.00039	1090.13
23-Jun	8.22	0.00023	N/A*
25-Jun	4.11	0.00034	534.76
26-Jun	3.47	0.00011	447.01
27-Jun	2.28	0.00005	298.41
28-Jun	4.20	0.00009	558.88
30-Jun	Below the limit of detection		
01-Jul	Below the limit of detection		
02-Jul	Below the limit of detection		
06-Jul	Below the limit of detection		
07-Jul	Below the limit of detection		

N/A* (on Jun 23): not enough pellet to quantify.

LONG TERM CARE MONITORING - Facility #1

Sample Date	ID	Avg N1-N2 raw copies	N1-N2 Avg. normalized (copies/copies of PMMoV)	N1-N2 copies/g wastewater solids
2-Dec	Upstream (Site 1)	27.83	0.00017	7212.79
12-Dec	Upstream (Site 1)	31.51	0.003605	8117.91
14-Dec	Upstream (Site 1)	63.72	0.010895	15111.6
16-Dec	Upstream (Site 1)	35.32	0.00972	8263.82
5-Jan	Upstream (Site 1)	57.11	0.01104	14796.9
6-Jan	Upstream (Site 1)	27.27	0.013302	7120.1
8-Jan	Upstream (Site 1)	6.17	0.02363	1611.52
13-Jan	Upstream (Site 1)	13.11	0.002261	3395.43
14-Jan	Upstream (Site 1)	2.71	0.000161	703.23
19-Jan	Upstream (Site 1)	10.65	0.000013	2782.08
20-Jan	Upstream (Site 1)	25.46	0.000031	6603.29
22-Jan	Upstream (Site 1)	0.51	0.000002	134.83
26-Jan	Upstream (Site 1)	18.58	0.000369	4800.4
27-Jan	Upstream (Site 1)	114.76	0.000919	30603.01
29-Jan	Upstream (Site 1)	3.20	0.000482	846.38
2-Feb	Upstream (Site 1)	47.95	0.000900	12171.92
3-Feb	Upstream (Site 1)	172.96	0.001242	44970.51
9-Feb	Upstream (Site 1)	11.82	0.000123	3133.57
10-Feb	Upstream (Site 1)	11.89	0.000298	3061.75
12-Feb	Upstream (Site 1)	2.51	0.000063	368.75
13-Feb	Upstream (Site 1)	5.19	0.000063	1168.50
19-Feb	Upstream (Site 1)	4.49	0.000003	2995.91

20-Feb	Upstream (Site 1)	14.94	0.000014	3948.57
23-Feb	Upstream (Site 1)	309.76	0.002944	79456.74
25-Feb	Upstream (Site 1)	5.53	0.000088	1436.44
26-Feb	Upstream (Site 1)	2.79	0.000014	739.73
2-Mar	Upstream (Site 1)	3.25	0.000046	833.95
3-Mar	Upstream (Site 1)	55.63	0.000211	14818.17
4-Mar	Upstream (Site 1)	Below the limit of detection		
9-Mar	Upstream (Site 1)	11.47	0.000477	3058.25
10-Mar	Upstream (Site 1)	4.99	0.000182	1314.99
11-Mar	Upstream (Site 1)	Below the limit of detection		
16-Mar	Upstream (Site 1)	16.79	0.001556	4390.24
17-Mar	Upstream (Site 1)	19.42	0.002781	4997.86
18-Mar	Upstream (Site 1)	No detection		
24-Mar	Upstream (Site 1)	4.38	0.001342	1144.03
25-Mar	Upstream (Site 1)	No detection		
26-Mar	Upstream (Site 1)	No detection		
30-Mar	Upstream (Site 1)	77.65	0.006293	20246.27
31-Mar	Upstream (Site 1)	7.25	0.000423	1886.94
1-Apr	Upstream (Site 1)	3.84	0.000139	1005.8
6-Apr	Upstream (Site 1)	7.66	0.000506	1978.69
7-Apr	Upstream (Site 1)	101.01	0.022237	26325.43
8-Apr	Upstream (Site 1)	30.76	0.002274	8102.24
13-Apr	Upstream (Site 1)	38.86	0.000952	10006.62
14-Apr	Upstream (Site 1)	54.07	0.009377	13950.9
15-Apr	Upstream (Site 1)	44.29	0.004357	11470.6
20-Apr	Upstream (Site 1)	53.96	0.000748	13975.5

21-Apr	Upstream (Site 1)	36.22	0.001735	9403.4
22-Apr	Upstream (Site 1)	0.84	0.000325	215.3
27-Apr	Upstream (Site 1)	2.80	0.000112	727.6
28-Apr	Upstream (Site 1)	No sample collected		
29-Apr	Upstream (Site 1)	1.83	0.000341	478.7
30-Apr	Upstream (Site 1)	4.64	0.001281	1233.3
4-May	Upstream (Site 1)	7.70	0.002218	2031.8
6-May	Upstream (Site 1)	9.37	0.000691	2408.62
7-May	Upstream (Site 1)	Not enough solids to quantity		

Sample Date	ID	Avg N1-N2 raw copies	N1-N2 Avg. normalized (copies/copies of PMMoV)	N1-N2 copies/g wastewater solids
2-Dec	Downstream (Site 2)	52.07	0.001786	12098.98
14-Dec	Downstream (Site 2)	73.65	0.000014	16477.3
16-Dec	Downstream (Site 2)	47.88	0.000144	21449.89
18-Dec	Downstream (Site 2)			
21-Dec	Downstream (Site 2)	140.65	0.004435	30855.4
5-Jan	Downstream (Site 2)	22.82	0.000783	5891.076
6-Jan	Downstream (Site 2)	8.4	0.001291	2213.12
8-Jan	Downstream (Site 2)	8.82	0.001775	2321.7
13-Jan	Downstream (Site 2)			
14-Jan	Downstream (Site 2)	1.97	0.000104	521.95
19-Jan	Downstream (Site 2)	46.01	0.000233	11969.04
20-Jan	Downstream (Site 2)	134.25	0.000171	35572.18
22-Jan	Downstream (Site 2)	2.57	0.000035	683.7
26-Jan	Downstream (Site 2)	20.22	0.000477	5376.79

27-Jan	Downstream (Site 2)	119.12	0.003493	31117.88
29-Jan	Downstream (Site 2)	3.86	0.000741	1027.87
2-Feb	Downstream (Site 2)			
3-Feb	Downstream (Site 2)	733.70	0.022215	194177.15
4-Feb	Downstream (Site 2)	63.43	0.001900	16408.27
9-Feb	Downstream (Site 2)	21.50	0.042731	5624.70
12-Feb	Downstream (Site 2)	2.27	0.000013	426.97
13-Feb	Downstream (Site 2)	5.49	0.000017	1688.76
19-Feb	Downstream (Site 2)	4.15	0.000009	1063.78
20-Feb	Downstream (Site 2)	19.14	0.000022	12758.03
23-Feb	Downstream (Site 2)	38.17	0.000051	9805.97
24-Feb	Downstream (Site 2)	36.49	0.000111	9829.84
25-Feb	Downstream (Site 2)	1.30	0.000007	343.24
2-Mar	Downstream (Site 2)	21.70	0.000227	5686.49
3-Mar	Downstream (Site 2)	48.68	0.000246	12598.96
4-Mar	Downstream (Site 2)	Below the limit of detection		
9-Mar	Downstream (Site 2)	4.82	0.000052	1270.66
10-Mar	Downstream (Site 2)	11.91	0.000183	3166.73
11-Mar	Downstream (Site 2)	Below the limit of detection		
16-Mar	Downstream (Site 2)	15.41	0.000969	4079.65
17-Mar	Downstream (Site 2)	67.84	0.001641	18053.56
18-Mar	Downstream (Site 2)	No detection		
24-Mar	Downstream (Site 2)	41.18	0.003434	10720.11
25-Mar	Downstream (Site 2)	No detection		
26-Mar	Downstream (Site 2)	No detection		
30-Mar	Downstream (Site 2)	97.08	0.000954	25449.75

31-Mar	Downstream (Site 2)	21.62	0.001253	5671.96
1-Apr	Downstream (Site 2)	52.55	0.00081	13726.8
6-Apr	Downstream (Site 2)	24.27	0.000658	6418.89
7-Apr	Downstream (Site 2)	79.33	0.001779	20586.24
8-Apr	Downstream (Site 2)	45.69	0.002154	11737.9
13-Apr	Downstream (Site 2)	46.95	0.002345	12122.66
14-Apr	Downstream (Site 2)	75.89	0.009836	19732.46
15-Apr	Downstream (Site 2)	98.45	0.004605	25320.25
20-Apr	Downstream (Site 2)	99.68	0.007897	25638.77
21-Apr	Downstream (Site 2)	119.72	0.004617	31043.94
22-Apr	Downstream (Site 2)	38.35	0.014504	9991.83
27-Apr	Downstream (Site 2)	8.59	0.000238	2289.97
28-Apr	Downstream (Site 2)	84.28	0.006442	21810.89
29-Apr	Downstream (Site 2)	5.90	0.000875	1572.74
30-Apr	Downstream (Site 2)	6.32	0.000351	1628.12
4-May	Downstream (Site 2)	71.85	0.004496	18925.91
6-May	Downstream (Site 2)	20.86	0.000971	5435.3
7-May	Downstream (Site 2)	39.99	0.002901	10301.14

LONG TERM CARE MONITORING - Facility #2

Sample Date	Avg N1-N2 raw copies	N1-N2 Avg. normalized (copies/copies of PMMoV)	N1-N2 copies/g wastewater solids
19-Jan	34.98	0.000347	9080.38
20-Jan	147.57	0.000615	38369.93
22-Jan	33.30	0.000644	8603.41

26-Jan	90.61	0.001205	26763.58
27-Jan	31.79	0.001966	8221.39
29-Jan	1.35	0.001836	349.41
02-Feb	102.03	0.002853	27077.23
03-Feb	213.27	0.008835	56241.54
05-Feb	1.39	0.000058	363.66
10-Feb	3.99	0.000233	1058.07
13-Feb	Below the limit of detection		
12-Feb	18.09	0.000049	4795.52
13-Feb	13.29	0.000362	3470.80
26-Feb	4.49	0.000045	1162.64
27-Feb	4.22	0.000126	1086.39
02-Mar	17.75	0.000643	4715.32
03-Mar	8.09	0.000964	2085.80
04-Mar	12.04	0.000088	3130.66
09-Mar	8.03	0.001815	2124.17
10-Mar	Below the limit of detection		
11-Mar	11.63	0.001636	3019.52
16-Mar	21.24	0.008824	5537.12
17-Mar	4.00	0.001639	1054.51
18-Mar	6.24	0.007382	1638.49
23-Mar	7.73	0.005502	2034.40
24-Mar	17.27	0.015105	4477.02
25-Mar	4.35	0.000246	1142.18
30-Mar	52.80	0.017554	13689.99
31-Mar	16.60	0.001704	4403.23

01-Apr	Non detected		
06-Apr	Non detected		
08-Apr	4.32	0.007876	1129.58
13-Apr	1.75	0.000098	459.87
14-Apr	6.21	0.001811	1634.74
15-Apr	1.98	0.000171	510.62
20-Apr	14.78	0.006802	3859.18
21-Apr	37.45	0.018861	9609.96
22-Apr	Non detected		
27-Apr	2.58	0.000810	669.88
28-Apr	9.58	0.008584	2542.75
29-Apr	Non detected		
04-May	19.51	0.013494	5181.95
05-May	3.28	0.002612	872.34
06-May	Non detected		
12-May	1.45	0.000476	372.66
13-May	3.71	0.001332	952.20
14-May	7.08	0.001319	1825.07
21-May	Non detected		
25-May	Below the limit of detection		
26-May	Below the limit of detection		
27-May	Non detected		
01-Jun	9.38	0.001762	2419.08
02-Jun	Below the limit of detection		
03-Jun	13.90	0.007890	1808.70
08-Jun	Below the limit of detection		

LONG TERM CARE MONITORING - Facility #3 (CITF)

Sample Date	Avg N1-N2 raw copies	N1-N2 Avg. normalized (copies/copies of PMMoV)	N1-N2 copies/g wastewater solids
06-Jul	14.09	0.00574	3736.24
07-Jul	46.59	0.12113	12224.12