

Lamby Way annual report January 2019 – December 2019

**With reference to section 4.2 of Lamby Way Landfill site permit Variation
notice UP3130MA of permit JP3239ST**



Lamby Way Landfill Site

Variation Notice UP3130MA

2019 Annual Report as per Schedule 4.2 sub section 4.2.1

- (a) Review of result - See Appendix 1
- (b) Annual Improvement targets

Since 1st January 2019:

1. Maintenance overhaul of all perimeter gas sampling points. Six valves/well heads were replaced and all surrounding vegetation was cleared around the sampling points to allow easier access.
2. Vegetation clearing – Several sampling locations were in danger of being lost due to plant growth, predominantly C1, C2, C3, C4 and C5. These areas were stripped back and access is now considerably easier. Also Gas monitoring points G13 – G20 have undergone maintenance and new sampling taps have been installed on all Gas monitoring that required them (10 total). See below.



3. Gas monitoring points G20 and G21 have had new brick chambers built around them to protect them as they are outside the perimeter.
4. Submersible field pumps in MH4 and MH22 have been replaced for like for like pumps to improve reliability to the LTP.
5. LTP maintenance tender has been put out to the market for renewal. Specification has been passed to NRW for review. New tender to begin in February 2020.

(c) Energy consumption of site as set out in schedule 5 Table S5.3

(d) Water consumption of site as set out in schedule 5 Table S5.3

Table S5.3 Performance Parameters				
Parameter		Frequency of assessment	Annual total	Unit
Potable water use		Annual	6299	Cubic meters
Energy used (including for leachate treatment)		Annual	201.90	MWh electricity
Non potable water		Annual	N/A	Cubic meters

(e) Annual production / treatment as set out in schedule 5 Table S5.2

Table S5.2 Annual Production /Treatment	
Leachate:	Cubic metres/ year
Disposed of off site:	0
Disposed of to any onsite effluent treatment plant;	18,452 m3
Recalculated into the waste mass.	0 m3
Surface Water and / or groundwater:	Cubic metres / year
Disposed of off site;	Not measured
Disposed of to any onsite effluent treatment plant;	0
Landfill gas:	Normalised cubic metres/ year
Combustion in flares	547,375 m ³
Combustion in gas engines;	6,835,954 m ³
Other methods of gas utilisation	0

(f) Details of an contamination or decontamination of the site

- No waste has been rejected from site – Landfill is closed
- No known acts of vandalism and/or unauthorised activity are known to have caused the introduction of any unauthorised materials.
- No fuel or oil spills have been reported. The site maintains a good supply of spill kits in the event that they are required.
- Surface water inspections have not produced any recordings of visible oils and greases in Surface Water sampling manholes. In addition to this as a result of an NRW Car1 form, SW2, SW3, SW4 and SW5 are cleaned and/or jetted to minimise the amount of contamination whilst sampling.

(g) Topographical survey required by condition 3.6.3

See Appendix 4.0 - Drawing – ‘Lamby Way Landfill Site – Topographical Plan’

(h) Volumetric difference (m3) between most recent topographical survey and previous annual topographical survey i.e. additional volume of landfill void that is occupied by waste.

See attached plan

- (i) Assessment of settlement behaviour difference (m3) between most recent topographical survey and previous annual topographical survey for areas that did not receive waste between surveys.

See attached plan

- (j) Calculation of remaining capacity (m3) derived from the pre-settlement contours and the most recent topographical survey.

n/a – Landfill closed, no further tipping possible

See additional map *Annual report section (i)*

- (k) Compliance testing undertaken within this period

1. Six monthly calibration of G5000 Gas meter
2. Calibration of LTP flow meter to Mcerts standard. Mcerts registered flow meter installed and the plant is due for full Mcerts accreditation maintained since 15th March 2013.
3. Leachate treatment plant will begin a new maintenance tender by the end of February 2020, yet to be awarded.
4. Landfill and Aftercare manager has resat his COT in Landfill Operations and Closed Landfill

Appendix 1 – Review of Results

Lamby Way: Data Report – 2019

Report into the data received from January 2019 to December 2019 at Lamby Way Landfill site. Data included for Perimeter Gas, Leachate, Groundwater and Surface water in accordance with Schedule 4 – Emissions & Monitoring plans for permit variation number UP3130MA.

Summary of missing Data.

Some of the sampling locations at Lamby Way are not able to be sampled from, the details of which are shown below along with proposed/implemented resolutions.

Groundwater borehole (C7) – Borehole is blocked by debris just out of reach – reasons unknown. Sampling pipe can not get past the obstruction.

Groundwater borehole (C15) – Sampling not always possible due to borehole being intermittently dry. On reflection it might have something to do with the tides.

Leachate well (SL1) - Borehole is dry, no action possible. Situation will be monitored further to see if/when sampling will be possible.

Leachate well (SL2) - Borehole is dry, no action possible. Situation will be monitored further to see if/when sampling will be possible.

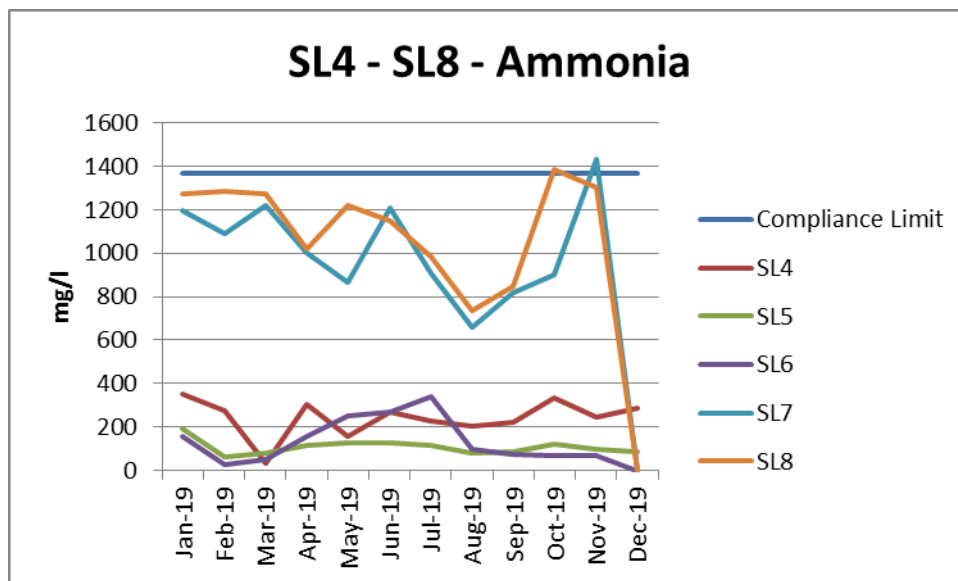
Leachate well (SL3) - Borehole is blocked below surface, reason unknown. New sampling method of using a pipe with a ball valve was attempted but failed as the valve could not pass the blockage.

Leachate Data (SL1 – SL9)

Lamby Way South Leachate sampling points run from SL1 to SL9 inclusive. The data below does not include data from SL1, SL2 or SL3 as they are dry and sampling is not possible. Continual monitoring of this situation will continue to see if sampling will be possible from SL 1-3 in the future.

Ammoniacal Nitrogen (Ammonia)

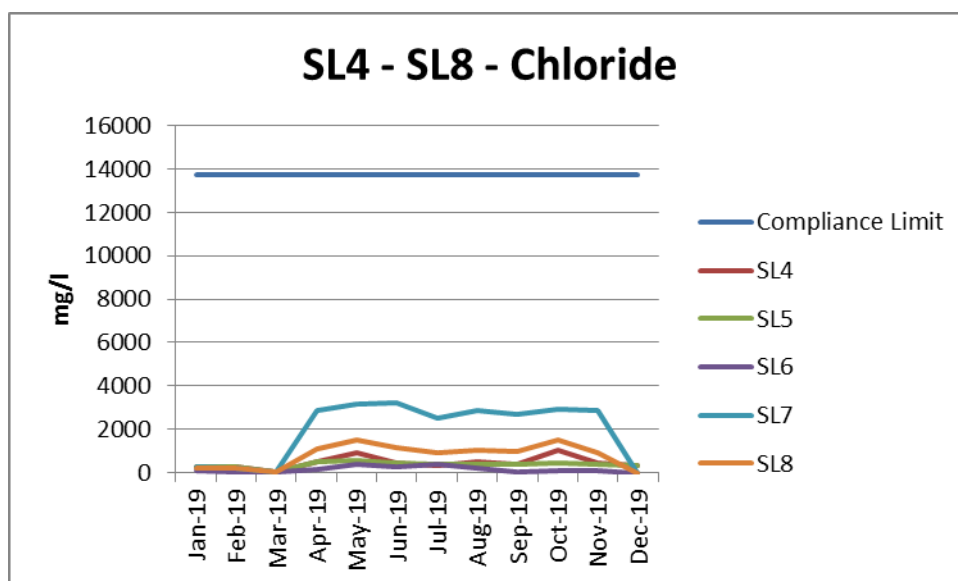
Ammoniacal nitrogen ($\text{NH}_3\text{-N}$) is a measure commonly used for testing the quantity of Ammonium ions, derived naturally from ammonia, and returned to ammonia via organic processes, in water or waste liquids. It is a measure used mainly for quantifying values in waste treatment and water purification systems, as well as a measure of the health of natural and manmade water reserves.



There were 2 breaches of the 1370mg/l trigger level detected in 2019. One of these results was in SL7 with the other detected in SL8. The results measured were 1387mg/l in February and 1430mg/l in December. The situation will be monitored to see if this is a continued upwards trend or an isolated period.

Chloride

Chloride levels in a waste mass are closely linked to naturally occurring sea water. It is measured to determine if there is any ingress of sea water (or saline ground waters) into a waste mass.

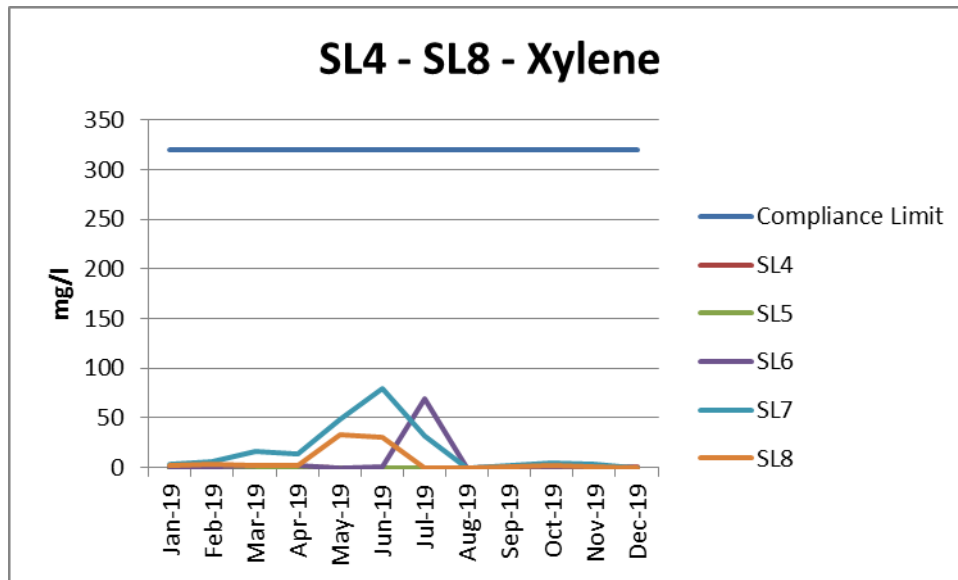


This data shows the distribution of Chloride data in Lamby Way South.

All results remained compliant, with no results near the 13713 mg/l trigger level.

Xylene

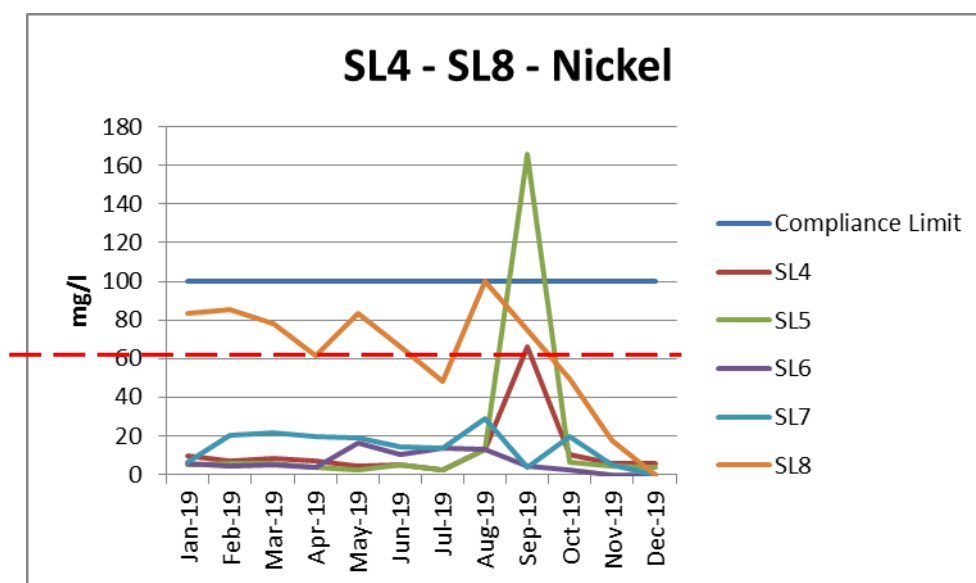
In the presence of Acidic conditions Xylene can be the pre-cursor to more dangerous compounds of the Benzene family, especially in the presence of Chloride.



All results remained compliant, with no results near the trigger level.

Nickel

Nickel occurs naturally in soils, groundwater, and surface water. It is often used in electroplating, stainless steel and alloy products. As with most heavy metals, nickel can damage the heart and liver of animals exposed to large amounts over a prolonged period of time.



This data shows the distribution of nickel data in LWS in 2019. From the graph you can see that there was one breach of the 100mg/l trigger level. This occurred in September in SL5. The other notable elevated value recorded was of 100mg/l in SL8 during August.

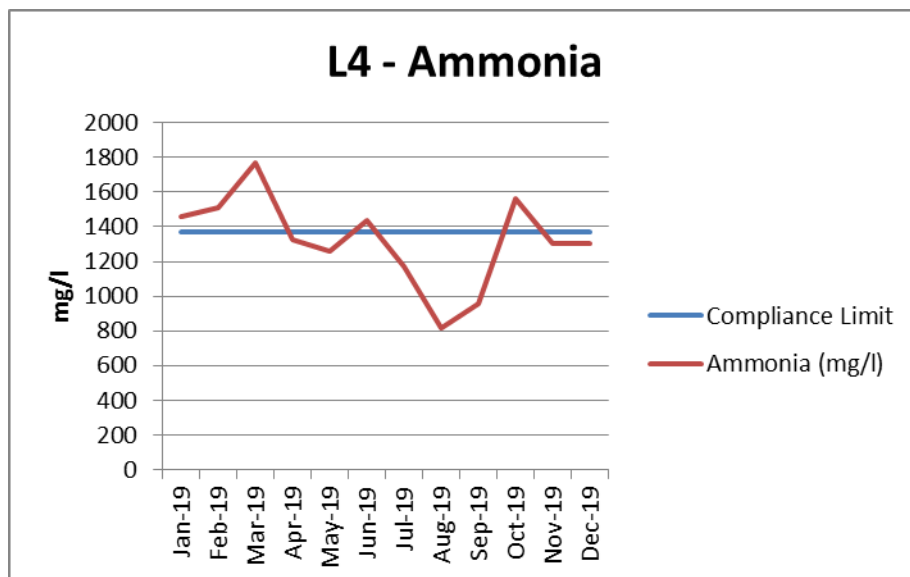
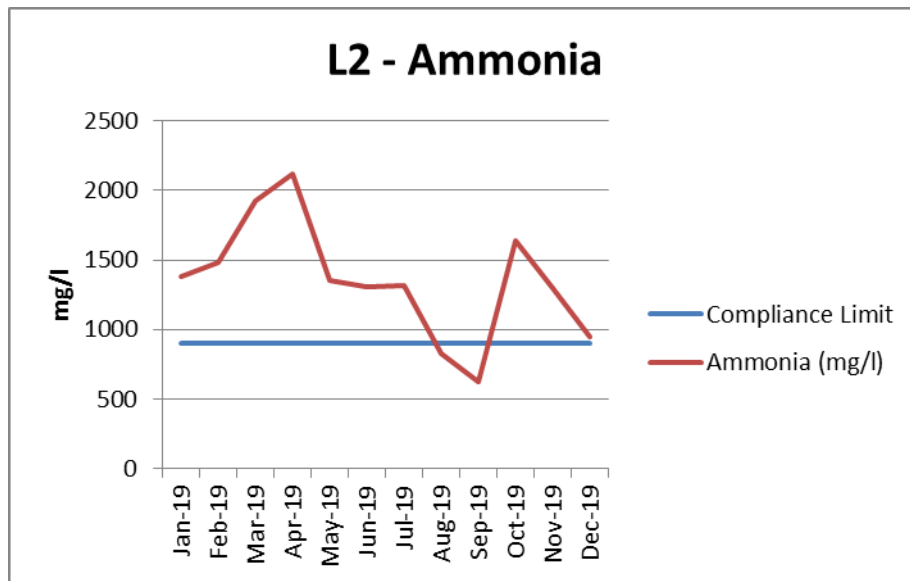
Leachate Data – (L2, L4, L7)

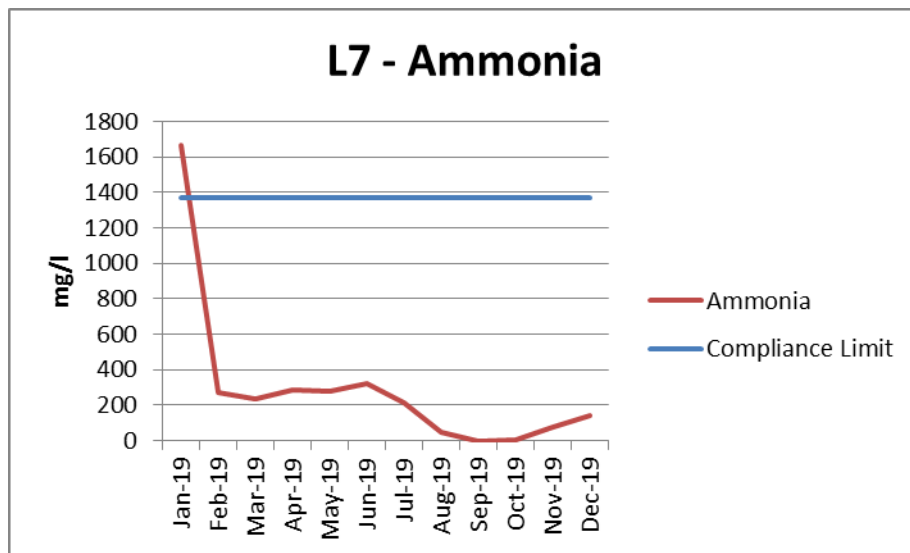
Lamby Way East leachate is sampled from three locations, L2, L4 and MH5. In the interests of keeping references to the permit as accurate as possible, MH5 will be referred to as L7 (as it is in the permit) to avoid any confusion.

Ammoniacal Nitrogen (Ammonia)

This data shows the concentrations of Ammonia in LWE leachate. Two trigger levels are shown, as there are different trigger levels in place for L2 and L4/L7. It was agreed verbally with NRW that L7 should use the same trigger levels as L4 even though this is not shown in Lamby Ways IPPC permit.

The trigger levels for L2 is 904mg/l whereas the trigger level for L4 and L7 is 1370mg/l.

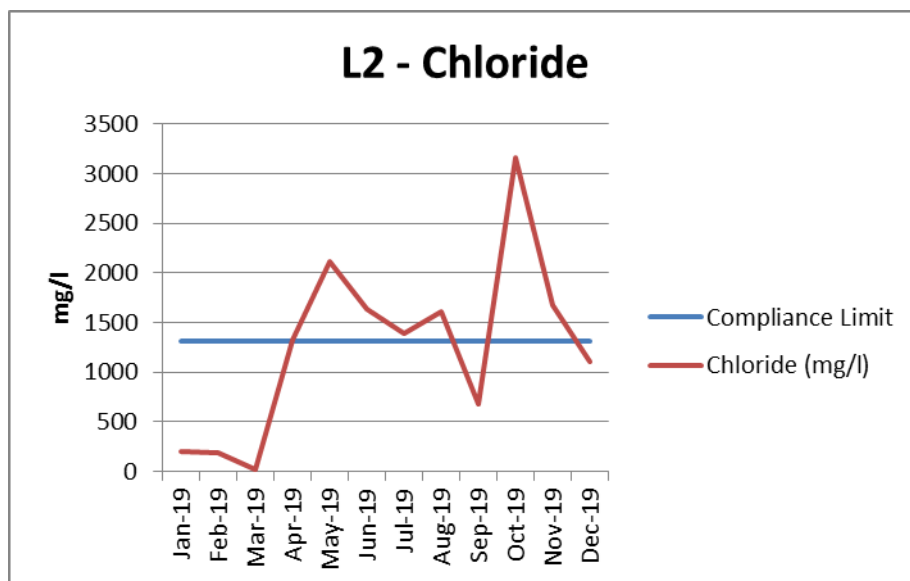


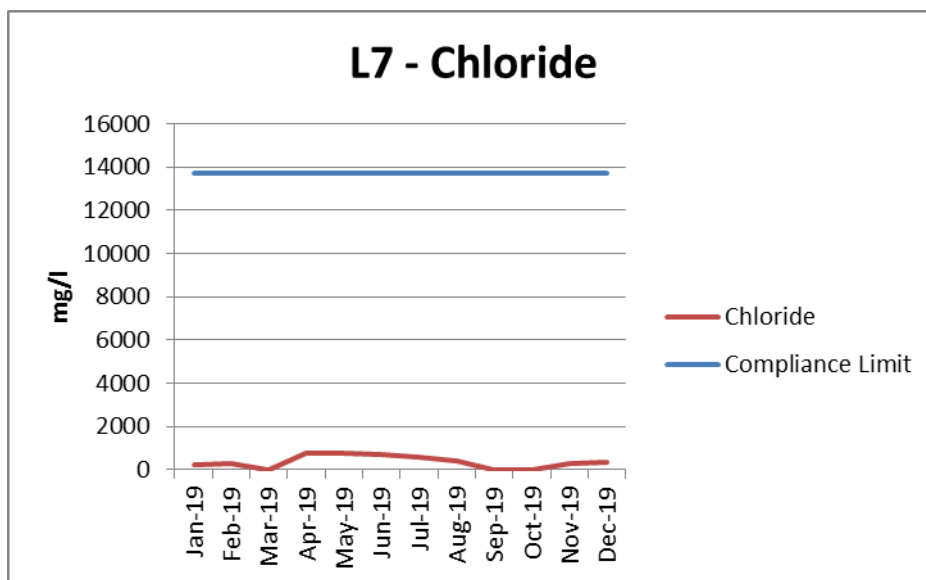
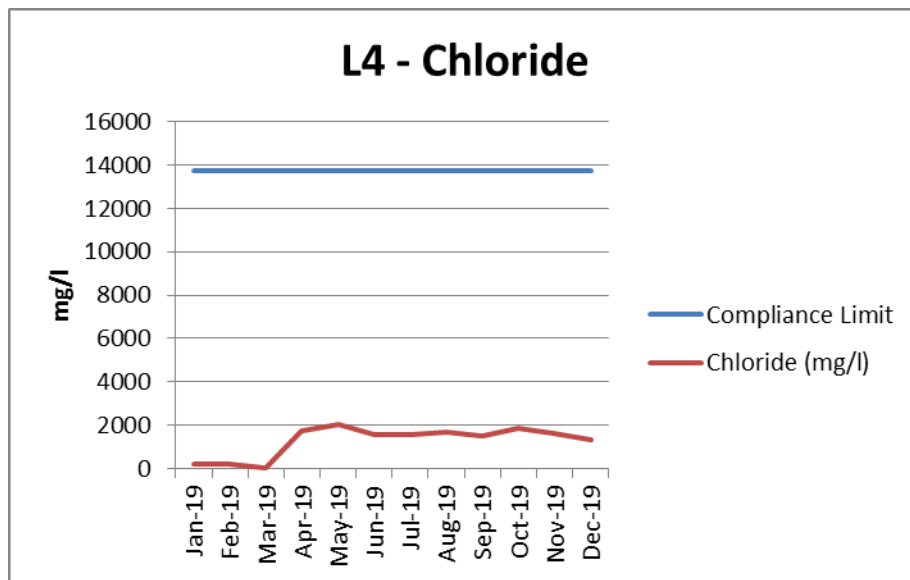


From this data we can see that L2 has had 10 breaches of the 904mg/l trigger level. There were 5 breaches in L4 of the 1370mg/l trigger level and 1 breach from L7.

Chloride

This data shows the concentrations of Chloride in LWE leachate. Two trigger levels are shown, as there are different trigger levels in place for L2 and L4. There is no limit in place for L7, therefore the limit for L4 has been shown for illustrative purposes.

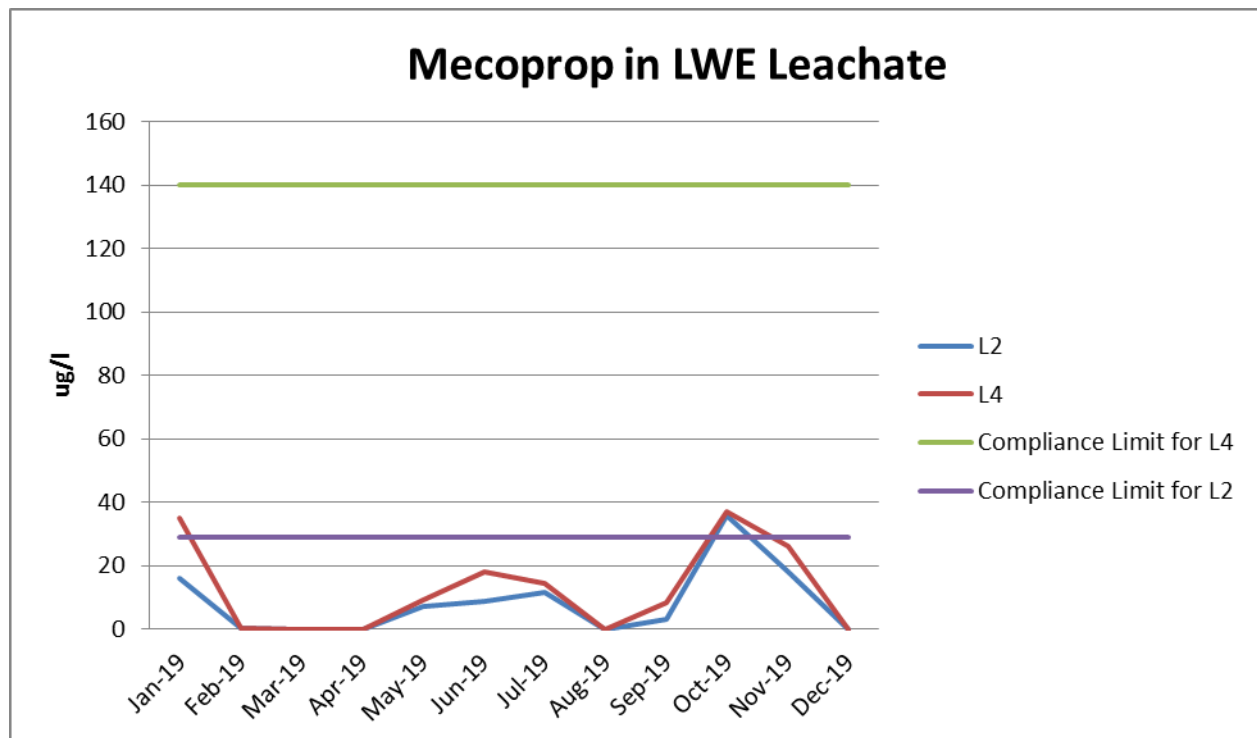




From this data we can see that L2 has had 7 breaches of the 1306mg/l trigger level. There were no breaches in L4 or L7.

Mecoprop

Mecoprop or Methylchlorophenoxypropionic acid (MCP) is a common general use herbicide found in many household weed killers and "weed-and-feed" type lawn fertilizers.



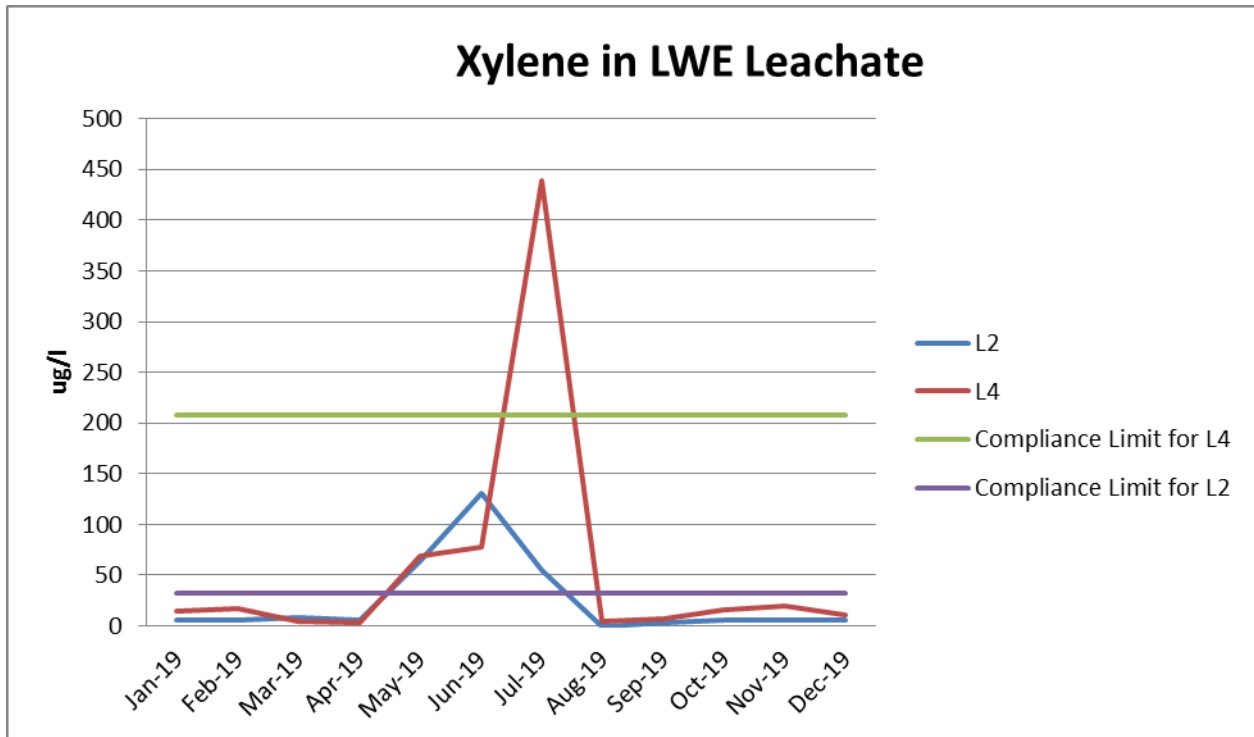
This figure shows the distribution of Mecoprop data in LWE.

There are two trigger levels, 29ug/l for L2 and 140ug/l for L4 and L7.

From this data we can see that the only breach in the trigger levels was on the lower limit of 29ug/l in L2. This level was breached once in October.

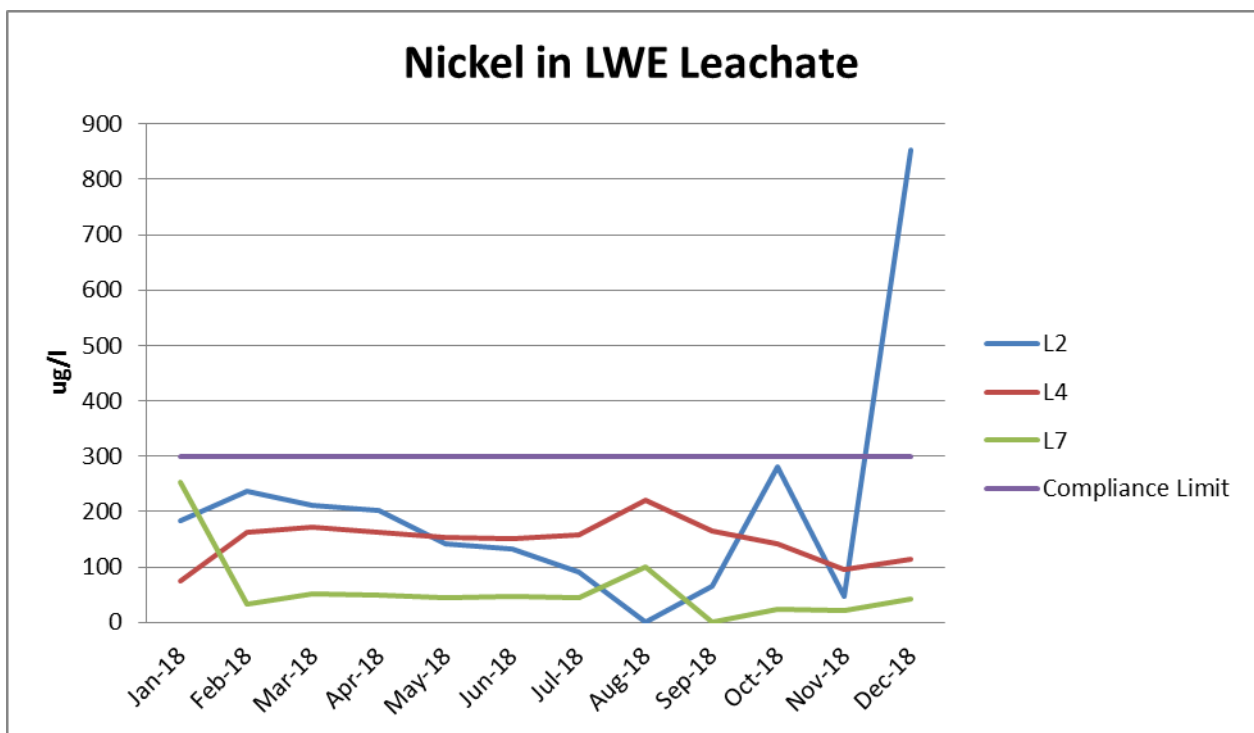
No mecoprop data from L7 is reported.

Xylene



There were 3 breaches of the 32ug/l trigger level for L2 and 1 breach of the 208ug/l for L4. Breaches occurred during May, June and July for L2 and during July for L4.

Nickel



This data shows the Nickel data for 2019 in Lamby Way East leachate. The trigger level for Nickel is 300ug/l

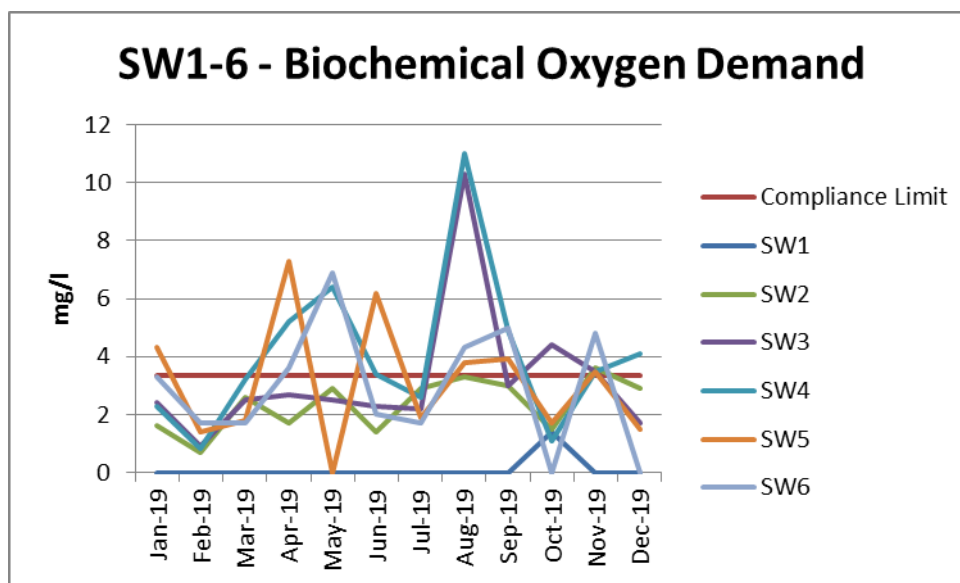
There was 1 breaches in 2019 during December in L2. The average reading over the period was 222g/l for L2 and 148ug/l for L4.

Surface Water (SW1-SW6)

There are 6 surface water monitoring points in Lamby Way, designated SW1 to SW6. SW6 on most drawings is labelled as Outfall D in reference to when the site was a dilute and disperse site in 2005. This data shows Outfall D as SW6 as it is in the permit to avoid any confusion.

Biochemical Oxygen Demand (BOD)

Biochemical oxygen demand (or BOD) is the amount of dissolved oxygen needed by aerobic biological organisms in a body of water to break down organic material present in a given water sample at certain temperature over a specific time period. The term also refers to a chemical procedure for determining this amount. This is not a precise quantitative test, although it is widely used as an indication of the organic quality of water. The BOD value is most commonly expressed in milligrams of oxygen consumed per litre of sample during 5 days of incubation at 20 °C.



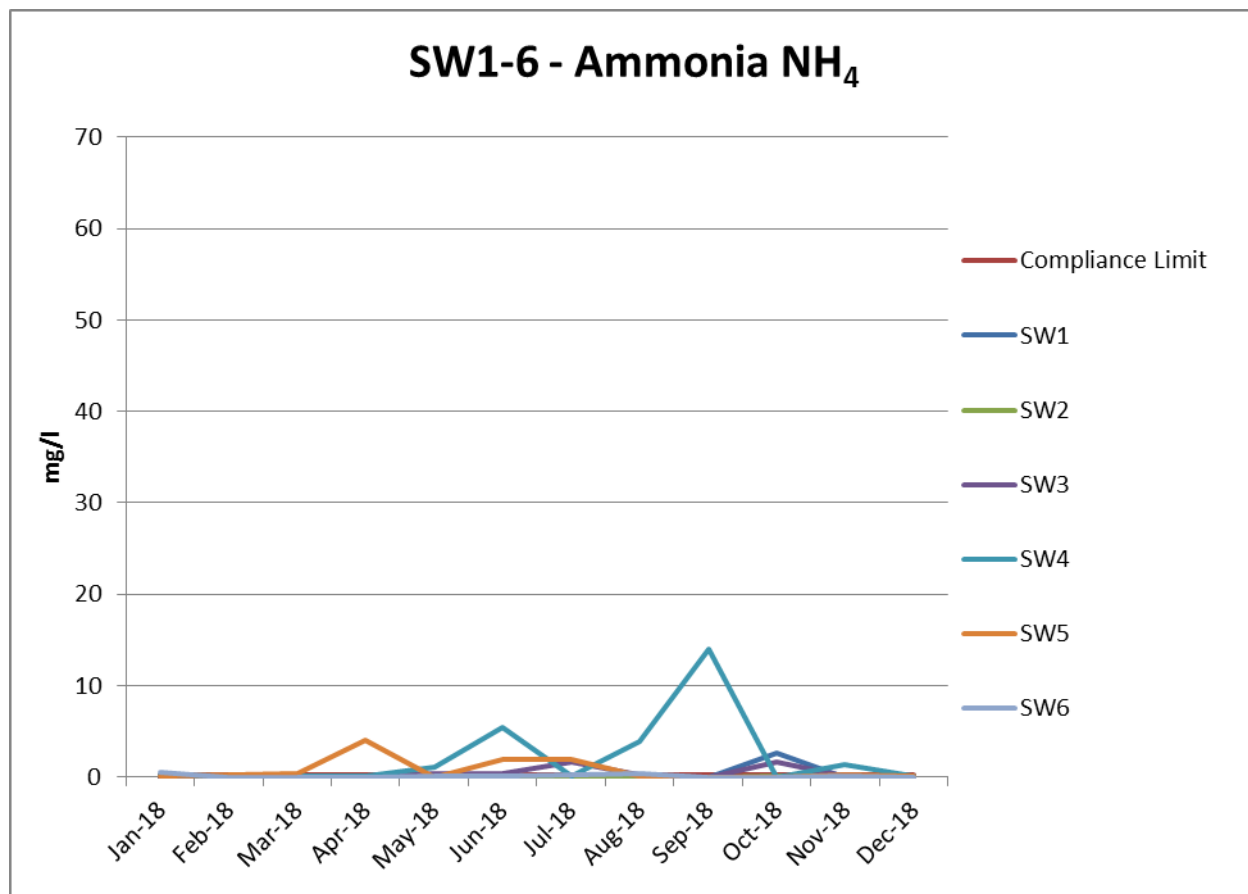
This graph shows the distribution of BOD data in surface water in 2019. In total there were 22 breaches of the 3.35mg/l limit with the following distribution.

SW1	0
SW2	1
SW3	3
SW4	7
SW5	6
SW6	5
	22

From this distribution the breaches are varied across the site and have occurred throughout the year, predominantly between April and November. It is not know why this is occurring and we will continue to monitor this closely.

Only one sample was obtained from SW1 in October 2019. No sample could be obtained during all other monitoring periods.

Ammoniacal Nitrogen (Ammonia)



In total there were 19 breaches of the 0.17mg/l limit, the breaches are varied across the site and have occurred throughout the year.

Only one sample was obtained from SW1 which breached the limit. SW2 did not breach the limit once during 2019. The distribution of breaches per sampling location is shown below.

SW1	1
SW2	0
SW3	5
SW4	6
SW5	4
SW6	3
	19
Total	

Ground Water (C1-C22)

Ammoniacal Nitrogen (Ammonia)

The trigger levels for the GW boreholes are shown below, as modified by the most recent Hydrological Risk Assessment.

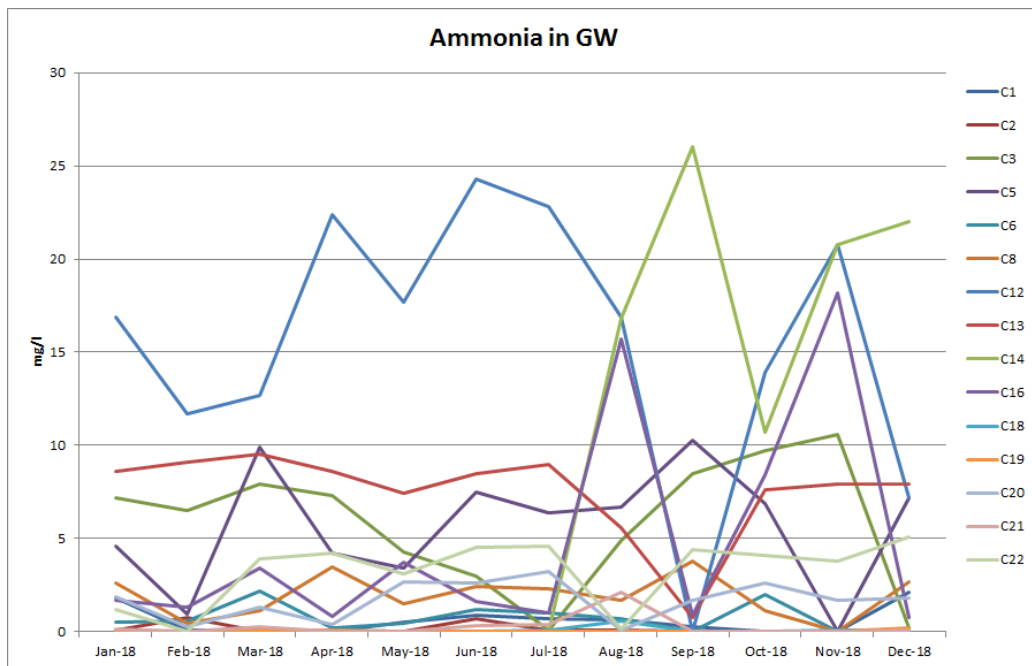
C1	Am Ni	N/A
C2	Am Ni	2.09 mg/l
C3	Am Ni	8.94 mg/l
C4	Am Ni	11.4 mg/l
C5	Am Ni	20.87 mg/l
C6	Am Ni	5.02 mg/l
C8	Am Ni	12.07 mg/l
C10	Am Ni	22.62 mg/l
C12	Am Ni	19.49 mg/l
C14	Am Ni	25.88 mg/l
C16	Am Ni	12.62 mg/l
C18	Am Ni	18.39 mg/l
C19	Am Ni	19.03 mg/l
C20	Am Ni	15.4 mg/l
C21	Am Ni	9.65 mg/l
C22	Am Ni	12.10 mg/l

In total there were 9 breaches of the new HRA trigger levels with C14 recording the highest average reading of 19.26mg/l, although samples could not be obtained from C14 for 7 months from January to July inclusive.

The distribution of breaches is shown below.

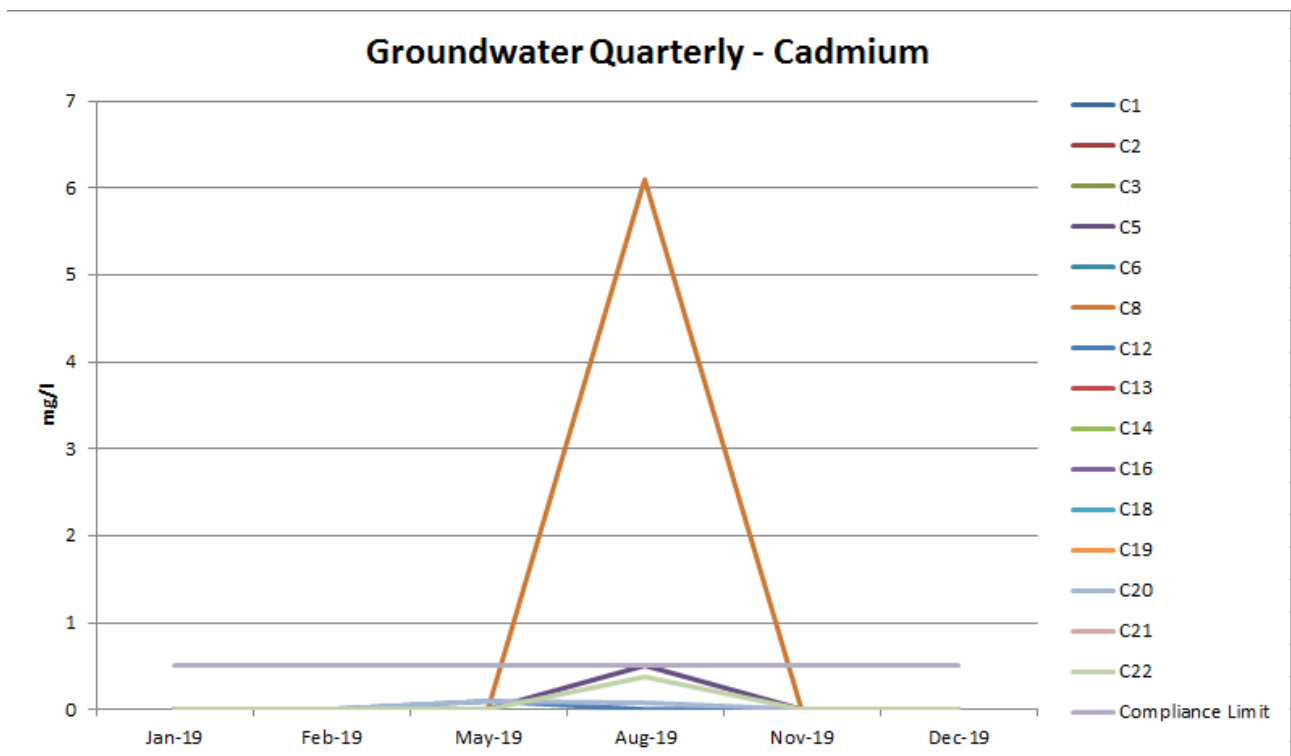
C3	2
C12	4
C14	1
C16	2
	9 Total

The lowest average readings were found in C19 at 0.059mg/l.



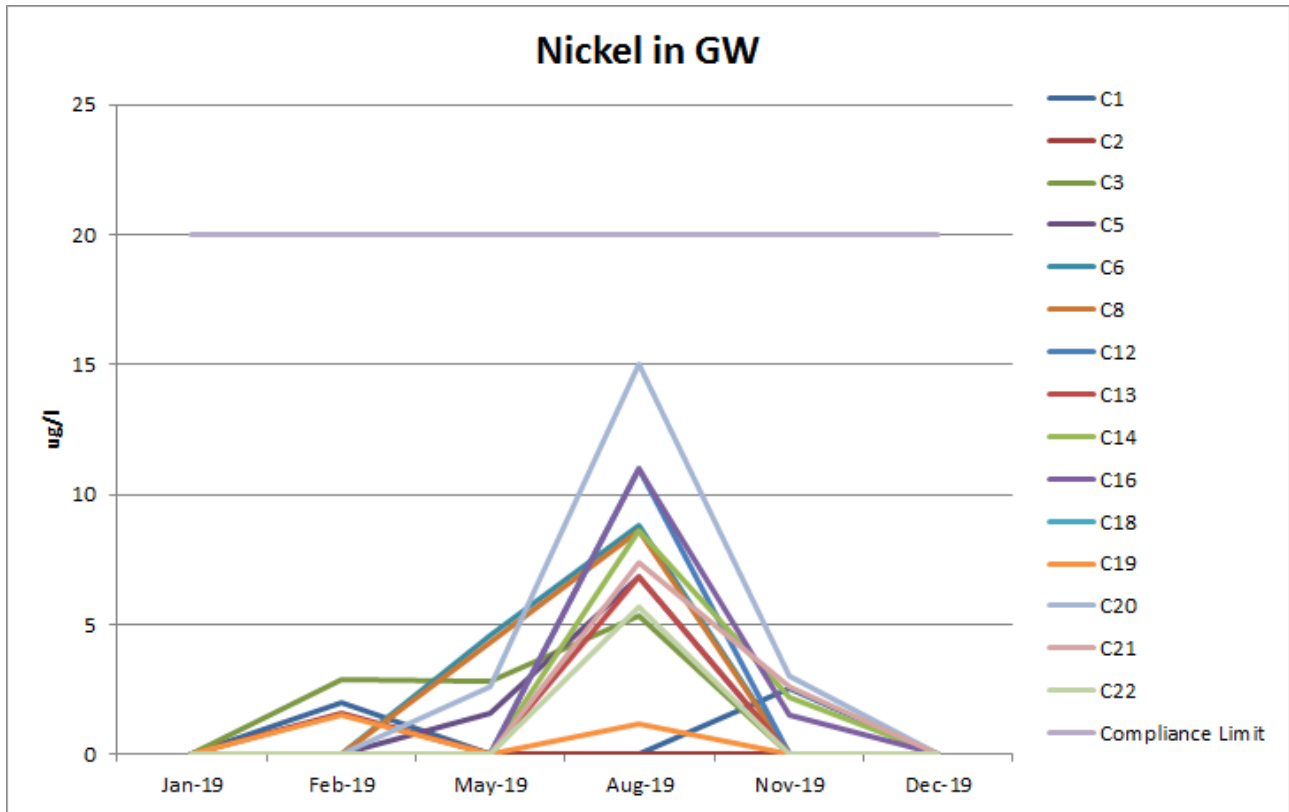
Cadmium

Cadmium can be found in low concentrations in rocks, coal, and petroleum and enters the ground and surface water when dissolved by acidic waters. It may enter the environment from industrial discharge, mining waste, metal plating, water pipes, batteries, paints and pigments, plastic stabilizers, and landfill leachate. Cadmium replaces zinc bio chemically in the body and can cause severe health implications such as high blood pressure, liver and kidney damage, and anaemia. It is toxic to aquatic organisms.



There was 1 breach of the Cadmium trigger level in 2019 from borehole C8 in August. This was the highest recorded reading of 6.1mg/l.

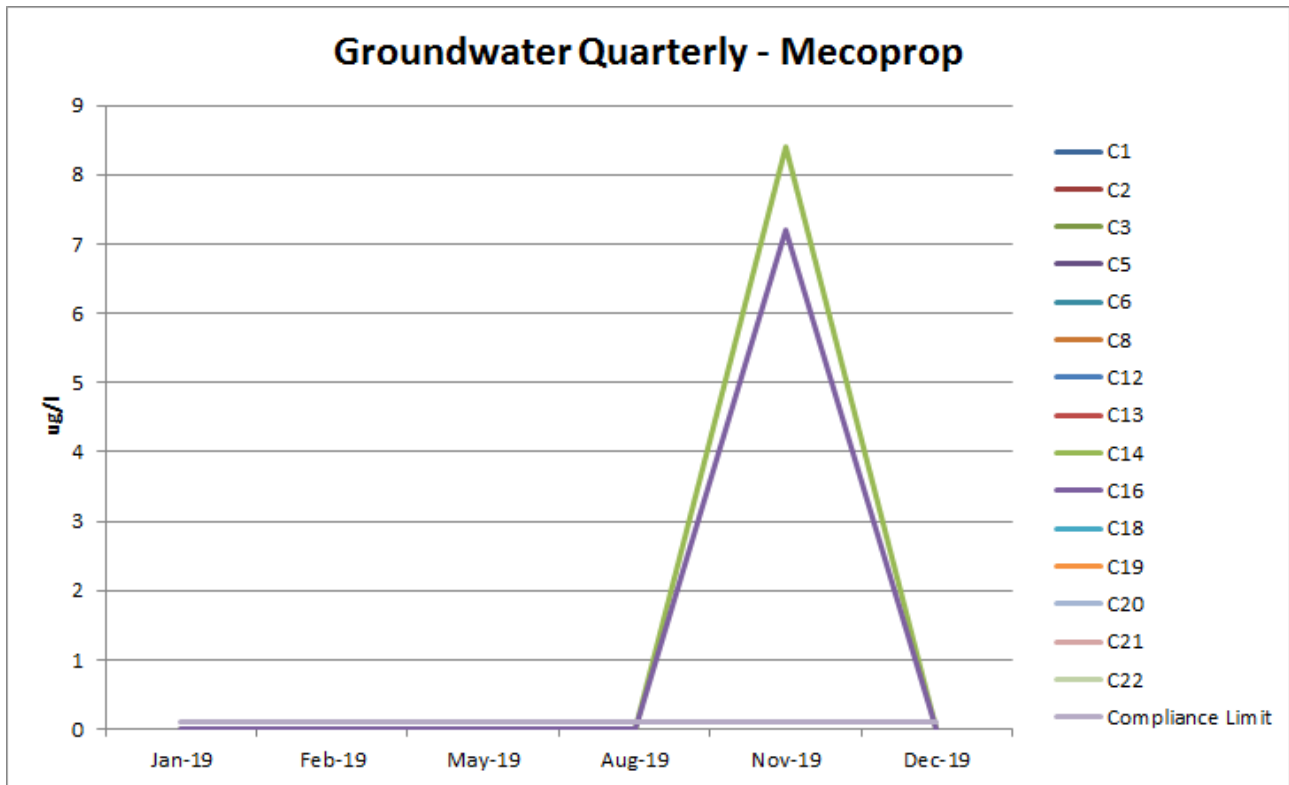
Nickel



These figures show the Nickel data for Lamby Way groundwater. The trigger level for Nickel is 20ug/l.

From this data we can see that there were no breaches in 2019.

Mecoprop



This graph shows the distribution of Mecoprop data in groundwater during 2019.

There were a total of 2 breaches of the revised 0.1ug/l trigger level, these were both in November for boreholes C14 and C16.

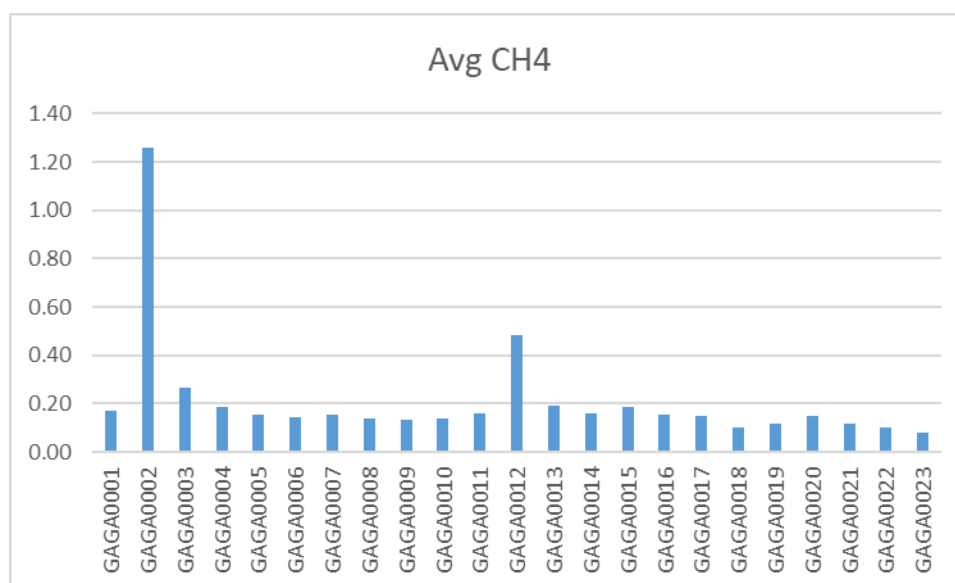
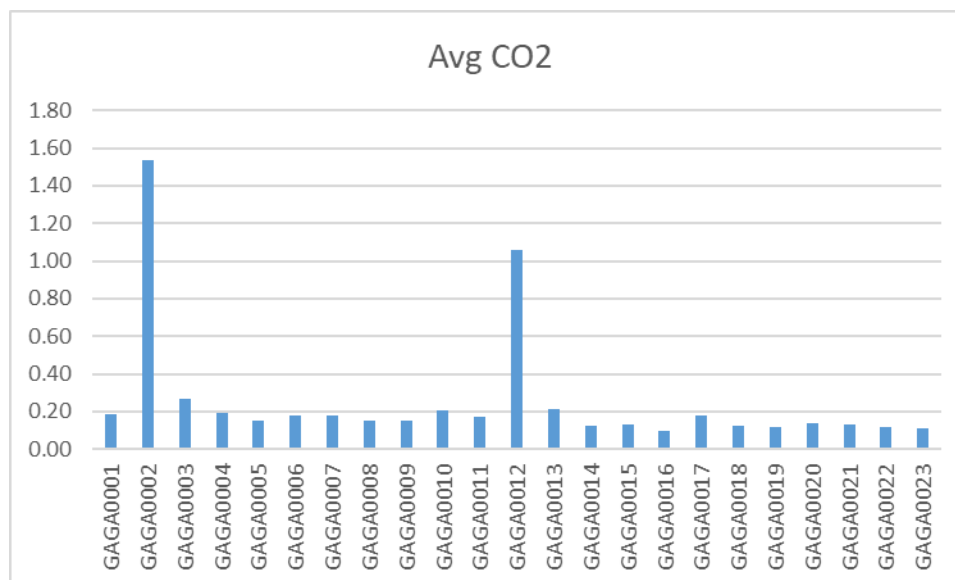
It should be noted that the laboratory reported all other mecoprop results as <0.1ug/l as they were below the detection limit. This will have affected the trend graph for these results.

Xylene

No breaches of the 1ug/l trigger level were detected in 2019. As with the mecoprop, all results were below the detection limit and were reported as <0.1ug/l.

Perimeter Gas Data

As with all other previously reported years, the highest volumes of CO₂ and CH₄ are detected within G2 and G12, both located on the eastern perimeter of Lamby Way Landfill site.



Leachate volumes

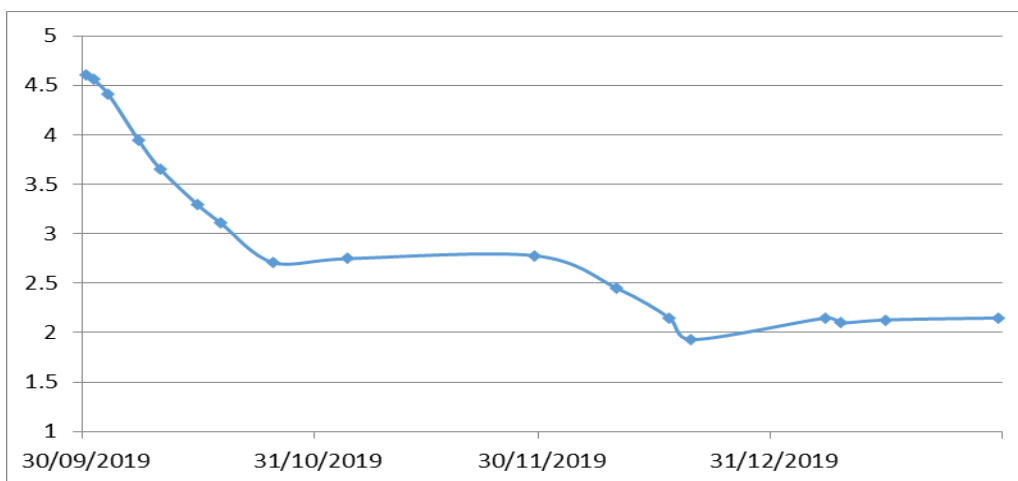
Date	Meter reading	Volumes Discharged	Days	Avg m3
01/10/2019	355770	227	1	227
02/10/2019	355841	71	1	71
03/10/2019	355863	22	1	22
04/10/2019	356183	320	1	320
07/10/2019	357112	929	3	310
09/10/2019	357771	659	2	330
10/10/2019	358059	288	1	288
14/10/2019	359365	326	3	109
16/10/2019	359976	611	2	306
18/10/2019	360638	662	2	331
21/10/2019	361226	588	3	196
23/10/2019	361543	317	2	159
01/11/2019	362647	1104	8	138
04/11/2019	362737	90	1	90
08/11/2019	363102	365	4	91
14/11/2019	363137	35	3	12
28/11/2019	363472	335	2	168
29/11/2019	363684	212	1	212
02/12/2019	364141	457	2	229
03/12/2019	364443	302	1	302
04/12/2019	364736	293	1	293
05/12/2019	364892	156	1	156
06/12/2019	365097	205	1	205
09/12/2019	365446	349	3	116
11/12/2019	365663	217	2	109
12/12/2019	365781	118	1	118
13/12/2019	365887	106	2	53
17/12/2019	366147	260	4	65
19/12/2019	366232	85	2	43
02/01/2020	366425	193	18	11
07/01/2020	367074	649	5	130
09/01/2020	367219	145	2	73
13/01/2020	367301	82	4	21
15/01/2020	367579	278	2	139
17/01/2020	367696	117	2	59
20/01/2020	367705	9	3	3
21/01/2020	367729	24	1	24
22/01/2020	367798	69	1	69
23/01/2020	367816	18	1	18
24/01/2020	367965	149	1	149
27/01/2020	368032	67	3	22
28/01/2020	368215	183	1	183
30/01/2020	368364	149	2	75

Total since 1/10 12,594 m3

Leachate levels have declined since September until a plateau was reached at around 2.1 meters

Leachate head within Lamby Way 2019

Dip date	Leachate Level
30/09/2019	4.61
01/10/2019	4.56
03/10/2019	4.41
07/10/2019	3.95
10/10/2019	3.65
15/10/2019	3.29
18/10/2019	3.11
25/10/2019	2.71
04/11/2019	2.75
29/11/2019	2.78
10/12/2019	2.45
17/12/2019	2.15
20/12/2019	1.93
07/01/2020	2.15
09/01/2020	2.1
15/01/2020	2.13
30/01/2020	2.15



Weather conditions at Lamby Way 2019

The annual rainfall for Lamby Way is shown below

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL	
81	87	175	96	46	142	54	139	185	198	172	180	1555	mm