

C&P Environmental Ltd

Giants Grave Landfill Site

Quarterly Data Submission - October to December 2023

Environmental Permit EPR/SP3298FT/T009

Prepared for: Neath Port Talbot County Borough Council

**The Quays
Brunel Way
Baglan Energy Park
Neath
SA11 2GG**

By: C & P Environmental Limited

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SUMMARY

This document provides the key data that have been recorded during the October to December 2023 monitoring quarter.

Leachate Monitoring

Discharge Flap Valve

No exceedance of the Discharge Flap compliance limits during this monitoring period.

Leachate level monitoring

For the October to December monitoring there were two monitoring locations that exceeded its respective revised leachate compliance levels:

- LW17 (in November & December), although there continues to be difficulty to obtain accurate depth measurements for this well.
- A1305 in each month October to December inclusive

The following table details the highest recorded leachate levels at each location for information:

Leachate well	Leachate level recorded (m) - highest reading	Revised compliance level (m)
LW5	1.58 (Oct)	1.6
LW8	0.96 (Dec)	1.0
LW15	1.06 (Oct)	2.1
LW17	2.92 (Nov), 2.92 (Dec)*	1.0
A1302	2.79 (Nov)	3.0
A1305	2.91 (Oct), 2.91 (Nov) & 2.82 (Dec)	2.8

**Due to previous difficulties in measuring the leachate level in this well, the October reading of 'dry' is expected to be erroneous.*

Groundwater Monitoring

The samples from the following locations exceeded the compliance (trigger) levels during this monitoring quarter for the following components:

- Ammoniacal nitrogen: Exceedance of the ammoniacal nitrogen compliance level was recorded in this quarter as per the following table:

Borehole	Month	Concentration (mg/l)	Control level (mg/l)	Compliance level (mg/l)
BH43B	October	83	72.6	108.9
	November	73		
BH45B	October	130	39.7	59.5
	November	120		

Note - the ammoniacal nitrogen for BH45B in December was an unusually low concentration of 0.021mg/l.

There were no other exceedances of the control levels for ammoniacal nitrogen recorded during the October to December 2023 monitoring period.

The 2-yearly hazardous suite of analysis (including the 6-monthly suite) was completed for the groundwater monitoring in October. This was for the locations BH5, BH8, BH12, BH15, BH9B, BH1B, BH43B and BH45B. The data and trends will be reviewed as part of the annual monitoring report for 2023.

Surface Water Monitoring

The ammoniacal nitrogen control and compliance levels for the surface water monitoring locations for the Canal and River are not stated in the environmental permit but are set within the Landfill Aftercare Plan.

No compliance or control levels were exceeded for the River or Canal sampling locations during this monitoring quarter.

Perimeter Gas Monitoring

There was an exceedance of the carbon dioxide actions level in the borehole BH4 in November (although carbon dioxide levels much lower in October and December).

Borehole	Month	Methane (%)	Carbon Dioxide (%)	Methane compliance level (%)	Carbon Dioxide action level (%)
BH4	November	0	4.1	1.2	2.0

There are no exceedances of a methane compliance limit/action level between October and December 2023.

The quarterly data is provided in the following tables:

Page 4	Section A Tables	Leachate Monitoring Data
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Section A Tables - Leachate Monitoring Data

A1 - Leachate Level and Quality Monitoring Data

Monitoring location		Borehole Levels	Borehole Depth	Difference	pH	Temperature	Conductivity	Dissolved oxygen	Chloride	Ammoniacal nitrogen	Potassium
		mbTOC	mbTOC	m	-	°C	µS	mg/l	mg/l	mg/l	mg/l
LW1	Oct-23		4.98								
	Nov-23		4.98								
	Dec-23		4.98								
LW3	Oct-23		7.64		6.8	18.9	810	6.9	9.6	0.59	10
	Nov-23		7.64								
	Dec-23		7.64								
LW5	Oct-23	5.47	7.05	1.58	6.8	18	890	8.6	9.8	2.6	12
	Nov-23	5.6	7.05	1.45							
	Dec-23	5.62	7.05	1.43							
LW8	Oct-23	5.3	5.94	0.64	7.2	19.7	1100	5.5	20	13	21
	Nov-23	5.95	5.94	dry							
	Dec-23	4.98	5.94	0.96							
LW9	Oct-23		7.05		7.3	n/a	780	i/s	13	1.5	8.3
	Nov-23		7.05								
	Dec-23		7.05								
LW15	Oct-23	9.5	10.56	1.06	7.2	20.9	3000	7.1	170	160	130
	Nov-23	10.39	10.56	0.17							
	Dec-23	10.46	10.56	0.1							
LW16	Oct-23		9.06		7.3	16.9	5300	4.6	490	350	290
	Nov-23		9.06								
	Dec-23		9.06								
LW17b	Oct-23	dry	14.56	dry	Unable to retrieve a sample						
	Nov-23	11.64	14.56	2.92							
	Dec-23	11.64	14.56	2.92							
LW18	Oct-23		10.17		6.7		1000	4.9	12	11	10
	Nov-23		10.17								
	Dec-23		10.17								
A1301	Oct-23		19.69		7.7	27	7800	6.6	860	540	340
	Nov-23		19.69								
	Dec-23		19.69								
A1302	Oct-23	16	18.09	2.09	7.1	24.8	2900	6.5	120	190	87
	Nov-23	15.3	18.09	2.79							
	Dec-23	15.32	18.09	2.77							
A1303	Oct-23		11.13		7.2	18.3	2100	6.3	120	120	71
	Nov-23		11.13								
	Dec-23		11.13								
A1304	Oct-23		14		7	16.8	2000	6.3	85	120	70
	Nov-23		14								
	Dec-23		14								
A1305CV	Oct-23	10.27	13.18	2.91	7.2	17.2	4300	4.4	310	280	160
	Nov-23	10.27	13.18	2.91							
	Dec-23	10.36	13.18	2.82							

Blanks indicate data not recorded. Black shading is for data not required for this location. Grey shading is for data not required on this month. **Red figures** indicate exceedance of compliance level.

Comments:

The November leachate level in LW8 was recorded at 5.95mbTOC and so resulted in a leachate level of -0.01m (when considering the accepted depth of this location as 5.94mbTOC). Therefore, the leachate well has been recorded as dry in this month.

The October leachate level in LW17b was recorded as dry on the field monitoring results, although the leachate recorded before and after has been 2m+. However, this well continues to be difficult to record leachate levels accurately and this result is expected to be erroneous.

pH, Conductivity and dissolved oxygen analysed at the laboratory during this monitoring period.

'u/s' means unsuitable sample for the analysis.

A2 - Leachate Quality Monitoring - Discharge Flap Valve

Parameter	Units	Oct-23	Nov-23	Dec-23	Compliance limits
Ammoniacal Nitrogen	mg/l	3.1	8.9	9.6	190
As (dissolved)	µg/l	3.38	2.59	1.81	130
Cd (dissolved)	µg/l	0.04	0.04	0.1	3
Cr (dissolved)	µg/l	0.5	1.3	0.7	40
Cu (dissolved)	µg/l	2.9	2.3	7.5	85
Iron	mg/l	0.016	0.021	0.028	40
Pb (dissolved)	µg/l	<0.2	<0.2	<0.2	40
Ni (dissolved)	µg/l	2.3	3.7	2.9	90
Zn (dissolved)	µg/l	4.8	5.8	17	376

Section B Tables - Groundwater Monitoring Data

B1 - Groundwater Level Monitoring & Monthly Data

Monitoring location		Borehole Levels	Borehole Depth	Difference	pH	Temperature	Conductivity	Chloride	Ammoniacal nitrogen	Potassium
		mbTOC	mbTOC	m	-	°C	µS	mg/l	mg/l	mg/l
BH4	Oct-23	0.6	2.8	2.2						
	Nov-23	0.46	2.8	2.34						
	Dec-23	0.41	2.8	2.39						
BH5	Oct-23	0.49	3.36	2.87	7.4	15.8	720	30	<0.015	7.9
	Nov-23	0.18	3.36	3.18	8.1	11.8	660	20	<0.015	6.2
	Dec-23	0.35	3.36	3.01	7.3	12.3	630	17	0.017	6.3
BH6	Oct-23	0.7	3.05	2.35						
	Nov-23	0.28	3.05	2.77						
	Dec-23	0.3	3.05	2.75						
BH7	Oct-23	Flooded	3	flooded						
	Nov-23	0.75	3	2.25						
	Dec-23	0.2	3	2.8						
BH8	Oct-23	0.48	3.69	3.21	7.4	15.5	1500	520	20	22
	Nov-23	0.8	3.69	2.89	8.2	12.1	1200	130	2.3	12
	Dec-23	0.59	3.69	3.1	7.4	12.9	630	30	<0.015	3.5
BH12	Oct-23	2.67	3.78	1.11	7.4	16.2	870	7.3	0.23	8.3
	Nov-23	2.45	3.78	1.33	8.2	12.6	280	6.2	0.055	5.5
	Dec-23	1.6	3.78	2.18	7	12.5	730	16	<0.015	16
BH15	Oct-23	2	3.86	1.86	6.9	15.1	1000	29	0.028	28
	Nov-23	1.82	3.86	2.04	8	12.3	740	15	<0.015	18
	Dec-23	1.48	3.86	2.38	Water levels monitored a week prior to groundwater sampling - but location flooded at the time of sampling					
BH9B	Oct-23	4.78	10.3	5.52	7	14.2	14000	5300	0.85	130
	Nov-23	4.74	10.3	5.56	8.1	11.2	9300	3600	0.77	110
	Dec-23	4.6	10.3	5.7	7.1	13.1	14000	4200	0.67	91
BH7B	Oct-23	4.57	11.28	6.71						
	Nov-23	4.56	11.28	6.72						
	Dec-23	4.39	11.28	6.89						
BH5B	Oct-23	4.4	11.23	6.83						
	Nov-23	4.37	11.23	6.86						
	Dec-23	4.3	11.23	6.93						
BH3W	Oct-23	2.96	7.84	4.88						
	Nov-23	2.92	7.84	4.92						
	Dec-23	2.86	7.84	4.98						
BH1B	Oct-23	3.38	7.9	4.52	8.1	15.3	3300	570	0.65	30
	Nov-23	4.51	7.9	3.39	8.5	13.7	2600	330	0.3	22
	Dec-23	3.24	7.9	4.66	7.9	13.2	3200	370	0.98	28
BH45B	Oct-23	3.97	9.41	5.44	7	14.1	2700	170	130	87
	Nov-23	3.96	9.41	5.45	7.3	11.8	2400	270	120	99
	Dec-23	3.93	9.41	5.48	7.3	11.8	230	11	0.021	6
BH43B	Oct-23	4.1	8.93	4.83	7.3	15.1	2000	130	83	54
	Nov-23	4.1	8.93	4.83	7.5	12	1800	110	73	75
	Dec-23	4.1	8.93	4.83	7.1	13.6	1900	100	68	58
BH40B	Oct-23	3.88	6.9	3.02						
	Nov-23	3.91	6.9	2.99						
	Dec-23	3.76	6.9	3.14						

Blanks indicate data not recorded (on-site temperature readings in January). Black shading is for data not required for this location. **Red figures** indicate exceedance of compliance/trigger level. **Orange figures** indicate exceedance of control level.

pH and Conductivity analysed at the laboratory during this monitoring period.

‘u/s’ means unsuitable sample for the analysis.

Section C Table - Surface Water Monitoring Data

Monitoring location		pH	Temperature	Conductivity	Dissolved oxygen		Ammoniacal Nitrogen as N	BOD	COD	Ni (Dissolved)	Nitrate as N	Phenol	Suspended Solids (total)
		-	°C	µS	mg/m3	mg/l	mg/l	mg/l	mg/l	µg/l	mg/l	µg/l	mg/l
River north	Oct-23	8	15.2	2700		9.8	0.039	1.2	15	2.8	0.58	<0.5	31
	Nov-23	8	9.3	21000		11	0.035	1.3	1100	1	0.37	<0.5	530
	Dec-23	8.1	12.1	140		11	0.04	9.7	110	1.4	0.15	<0.5	450
River south	Oct-23	7.8	15.2	10000		9.8	0.04	1.1	19	1.9	0.46	<0.5	13
	Nov-23	8	9.3	40000		11	0.13	1.8	1200	1	0.41	<0.5	760
	Dec-23	7.7	12.1	200		11	0.041	1.7	33	2.3	0.16	<0.5	60
Canal north	Oct-23	7.3	13.4	190		7.7	0.079	2.2	12	1.9	0.26	<0.5	54
	Nov-23	7.6	7.5	210		9.1	0.056	1.6	16	1.5	0.57	<0.5	6
	Dec-23	7.1	11.9	180		8.8	0.037	1.3	10	1.7	0.44	<0.5	27
Canal south	Oct-23	7.1	13.2	200		4.2	0.24	1.5	7.6	7.6	0.24	<0.5	4
	Nov-23	7.7	7.5	220		9.2	0.22	1.5	6.8	4.7	0.83	<0.5	4
	Dec-23	6.9	11.8	190		8.9	0.22	2.1	5.7	2.2	0.63	<0.5	<2

Blanks indicate data not recorded. **Red figures** indicate exceedance of trigger level for ammoniacal nitrogen (in the Landfill Aftercare Plan). **Orange figures** indicate exceedance of control level for ammoniacal nitrogen (in the Landfill Aftercare Plan).

pH, Conductivity and DO analysed at the laboratory during this monitoring period.

‘u/s’ means unsuitable sample for the analysis.

Section D Table - Perimeter Gas Monitoring Data

Monitoring location	Month	Methane	Carbon dioxide	Oxygen	Carbon monoxide	Atmospheric pressure	Differential pressure
		%	%	%	ppm	mbar	mbar
BH4	Oct-23	0	0.2	20.8	0	990	0.03
	Nov-23	0	4.1	18.2	0	1026	0
	Dec-23	0.1	1.6	20.2	0	1008	-0.02
BH5	Oct-23	0	1.9	19.2	0	990	0.02
	Nov-23	0	1.9	19.7	0	1026	0
	Dec-23	0	0.9	20.4	0	1008	0.02
BH8	Oct-23	0	0.6	20.2	0	990	-0.02
	Nov-23	0.1	0.3	20.2	0	1026	0.02
	Dec-23	0	0.2	15.8	0	1008	0.02
BH12	Oct-23	0.1	1.2	20	0	990	0.09
	Nov-23	0.1	0.8	20	0	1026	0.03
	Dec-23	0.1	0.9	19.9	0	1008	0
BH15	Oct-23	0.1	1.6	19.2	0	990	0.02
	Nov-23	0.1	1	19.9	0	1026	0.02
	Dec-23	0	2	19.2	0	1008	0.02
BH9B	Oct-23	0	0.1	20.8	0	990	0
	Nov-23	0	0.1	20.6	0	1026	0.03
	Dec-23	0	0.1	20.6	0	1008	0.02
BH7B	Oct-23	0	0.7	20.7	0	990	0.02
	Nov-23	0	0.4	20.4	0	1026	0.02
	Dec-23	0	0.2	20.5	0	1008	-0.03
BH5B	Oct-23	0	0.1	20	0	990	0
	Nov-23	0	0.1	21	0	1026	0
	Dec-23	0	0.1	20.8	0	1008	-0.02
BH3W	Oct-23	0	0.6	20.2	0	990	0
	Nov-23	0	2.9	15.4	0	1026	0
	Dec-23	0	0.5	20.4	0	1008	0
BH1B	Oct-23	0.1	0.3	21	0	990	0
	Nov-23	0.1	0.7	20.3	0	1027	0
	Dec-23	0.1	0.6	20.4	0	1036	0
BH49W	Oct-23	0	0.4	20.4	0	990	0
	Nov-23	0	0.6	20.4	0	1026	0.03
	Dec-23	0	0.6	20.5	0	1008	0
BH47W	Oct-23	0	0.2	20.8	0	990	0.02
	Nov-23	0	0.1	21.1	0	1026	-0.05
	Dec-23	0	0.1	21.2	0	1008	0.03
BH55B	Oct-23	0.1	4.6	16	0	1004	0
	Nov-23	0.1	4.1	17.6	0	1008	-0.07
	Dec-23	0.1	3.9	16.5	0	1036	0
BH45B	Oct-23	43.3	13.7	1.6	6	988	0.02
	Nov-23	1.1	2.2	17.9	0	1027	0
	Dec-23	15.4	6.3	10.4	2	1036	0
BH43B	Oct-23	60	9.1	14.9	1	988	-0.02
	Nov-23	80.1	10.4	10.1	2	1027	0
	Dec-23	30.9	4.5	13.4	0	1036	0.01
BH40B	Oct-23	3	0.9	19.1	0	988	0.03
	Nov-23	1.4	0.5	20.5	0	1027	0
	Dec-23	0.4	0.8	18.7	0	1036	0.02

Red figures indicate a compliance limit breach for methane. Orange figures indicate exceedance of an action level for methane or carbon dioxide (from the Landfill Aftercare Plan).

Note - the carbon dioxide reading in October in BH1B was recorded on the field monitoring sheets at 0.03%, but this checked and confirmed as being 0.3%.