CAULMERT LIMITED

Engineering, Environmental & Planning
Consultancy Services

Bryn Posteg Landfill Site

Sundorne Products (Llanidloes) Ltd

Quarterly Monitoring Review

October – December 2019

Prepared by:

Caulmert Limited
InTec, Parc Menai, Bangor, Gwynedd, LL57 4FG
Tel: 01248 672666
Fax: 01248 672601
Email: seanobrien@caulmert.com
Web: www.caulmert.com

Doc ref: 3913-CAU-XX-XX-RP-V-0304.A0-C1

January 2020

APPROVAL RECORD

Site: **Bryn Posteg Landfill**

Client: **Potters Waste Management**

Document Title: **Quarterly Monitoring Review, October – December 2019**

Document Ref: **3913-CAU-XX-XX-RP-V-0304**

Report Status: **Final**

Project Director: **Andy Stocks**

Project Manager: **Diana Brookshaw**

Caulmert Limited: **InTec, Parc Menai, Bangor, Gwynedd, LL57 4FG**

Tel: **01248 672 666**

Author	Sean O'Brien	**Date**	24/01/2020
Reviewer	Diana Brookshaw	**Date**	05/02/2020
Approved	Sean O'Brien	**Date**	11/02/2020

DISCLAIMER

TABLE OF CONTENTS

DRAWINGS

3376-CAU-XX-XX-DR-V-1801	Gas Extraction and Monitoring Infrastructure Plan
3997-CAU-XX-XX-DR-V-1804-X	As Built Replacement Leachate Wells
3033-CAU-XX-XX-DR-S-1800	Site Layout Plan

APPENDICES

Appendix 1	Landfill gas
Appendix 2	Leachate
Appendix 3	Groundwater
Appendix 4	Surface water
Appendix 5	Dust

1.0 INTRODUCTION

1.1 Background

1.1.1 This report has been compiled in compliance with the Environmental Permit (EP) BU7766, Variation Notice Number EPR/BU7766IC for Bryn Posteg Landfill Site, which requires that the monitoring data collected at the site is reviewed quarterly. The data reviewed in this report was collected between the 1st of October and the 31st of December 2019.

1.1.2 This report records and reviews monitoring data collected during this quarter, for landfill gas, leachate, groundwater and surface water and discusses this data in relation to emission limits set in the latest EP variation. The data will also be included in an Annual Monitoring Review, as required by the EP. Third party information supplied by Potters Waste Management (Potters) has been used in good faith within this document. Caulmert Ltd has not attempted to verify the information.

1.2 Site Location and Surrounding Land-use

1.2.1 Bryn Posteg Landfill Site is located approximately 3 km south east of Llanidloes in Powys and is centred at National Grid Reference SN 971 822. The site is accessed via the B4518, Llanidloes to Tylwch road. The B4518 runs parallel with the western site boundary.

1.2.2 The landfill site was developed from the surface void of a former lead mine. Controlled landfilling has taken place since 1982.

1.2.3 Bryn Posteg is situated amongst predominantly agricultural land. There are seven residential receptors located within approximately 450 m of the waste mass, these are:

- Valley View, 100 m to the north west;
- Rhoswen, 200 m to the east;
- Pant, 250 m to the east;
- Bryn Posteg Farm, 250 to the west;
- Penbryn Du, 300 m to the north
- Tawelfa, 300 m to the North
- Maes-Socyn, 350 m to the south-west
- Talcen-Llwydiarth, 450 m to the south-east

2.0 LANDFILL GAS

2.1 Gas Collection Compound and Extraction Wells

2.1.1 In-waste gas and daily gas collection data is included in Appendix 1. In-waste gas was recorded in October, November and December.

2.1.2 There were 193 occasions that the total percentage of gas was above 100 %, although it did not exceed 106%, and as such the results are not considered to be erroneous or be subject to significant error due to gas interference.

2.1.3 Methane concentrations within the waste ranged from 0.1 % in BPSP0001 to 86.2 % in GW204. The majority of wells had average methane concentrations of between 55% and 65%. Carbon dioxide concentrations ranged from 0.1 % in BPSP0001, also in to 50.4 % in GW309. Typical methane concentrations were between 35% and 45%.

2.1.4 Oxygen concentrations similar to atmospheric concentrations (above 15 %) were detected in GW214, GW308 and BPSP0001. This is an improvement in comparison to the previous quarter when concentrations were at or above 15 % oxygen at 8 locations.

2.1.5 Carbon monoxide concentrations were above the management level (100 ppm) at least once in 24 locations. As observed during previous Quarterly Review periods, the highest concentrations were seen in Phase 9D with maximum concentrations of 511 ppm in GW314.

2.2 Perimeter Monitoring Results

2.2.1 Routine landfill gas (LFG) monitoring is required to be carried out on a weekly basis at 36 boreholes situated around the site perimeter. All boreholes have the prefix 'G' in the monitoring data. Concentrations of methane (CH_4) and carbon dioxide (CO_2) are measured alongside oxygen (O_2), relative pressure and atmospheric pressure on each visit.

2.2.2 Summary tables displaying all CH_4, CO_2 and O_2 monitoring data collected during this period are included in Appendix 1. Concentrations are compared to Trigger Limits and Compliance Limits. The Trigger Limits are included in the Site's Gas Action Plan, part of the Landfill Gas Management Plan (3428-CAU-XX-XX-RP-V-0303.A0.C4) and serve as a first stage of identifying any potential lateral landfill gas migration. The Trigger Limits are lower than the Permit Compliance Limits to allow early identification of any methane or carbon dioxide increase at perimeter wells.

2.2.3 A summary of the average landfill gas concentrations detected at the perimeter locations with ongoing lateral landfill gas migration is included in Table 2.1 below.

Table 2.1 Landfill Gas Average Concentrations (% v/v)

Date	G12		G19		G20		G21		G22	
	CH4	CO2	CH4	CO2	CH4	CO2	CH4	CO2	CH4	CO2
2016	68.8	3.8	71.4	32.9	71.9	28.3	50.0	12.9	67.8	20.1
2017	57.6	3.6	68.7	32.1	71.0	26.9	54.5	14.8	71.6	23.3
2018 Q1	75.7	4.2	67.6	27.0	64.0	19.6	39.8	10.3	50.4	18.8
2018 Q2	53.2	3.4	60.4	17.5	52.8	18.1	64.3	15.7	68.7	21.7
2018 Q3	49.6	3.4	68.9	34.0	67.8	35.3	52.5	16.2	71.8	27.2
2018 Q4	60.1	3.9	65.0	14.7	60.7	13.3	45.1	13.7	74.0	22.4
2019 Q1	66.4	4.6	70.2	21.9	71.9	5.5	50.5	14.8	68.5	16.7
2019 Q2	64.5	4.4	64.2	25.3	68.7	19.5	54.7	17.6	76.3	19.7
2019 Q3	46.6	3.3	36.1	7.5	21.1	7.7	22.4	8.0	62.4	19.1
2019 Q4	50.0	3.8	52.3	10.6	55.1	9.3	30.7	9.8	70.9	21.7
Date	G23		G24		G25		G35		G38	
	CH4	CO2	CH4	CO2	CH4	CO2	CH4	CO2	CH4	CO2
2016	14.4	9.4	8.9	5.1	51.0	13.0	26.8	15.4	56.7	27.9
2017	14.8	9.8	12.4	5.3	37.8	14.8	48.5	23.1	54.9	29.2
2018 Q1	3.1	7.0	5.4	1.8	36.0	12.0	4.6	4.0	46.2	17.5
2018 Q2	14.6	9.4	27.9	13.1	14.0	11.2	42.3	22.2	34.1	12.9
2018 Q3	18.5	11.6	29.6	13.4	52.8	16.4	64.8	30.0	48.6	31.6
2018 Q4	14.3	8.9	4.4	2.6	23.6	16.5	22.3	13.5	29.6	14.3
2019 Q1	5.1	5.2	14.1	2.8	23.9	15.3	13.3	12.2	50.1	22.1
2019 Q2	7.7	5.8	12.2	5.8	5.6	5.6	24.1	14.7	22.2	20.7
2019 Q3	2.9	11.0	16.3	9.0	17.8	14.0	40.5	22.9	1.5	2.0
2019 Q4	5.2	6.4	8.6	3.7	39.9	17.5	7.2	6.1	22.0	9.4

Table showing average gas concentrations for locations with ongoing lateral landfill gas migration. Increases in concentration compared to the previous period are highlighted by red text.

2.2.4 Methane concentrations exceeded the Compliance Limit value of 1.0 %[1] at least once in 13 of the monitoring locations. The maximum concentration was 85.5 %, detected at G20, on the 18th of October 2019. This is comparable to the maximum concentrations detected here previously.

2.2.5 Carbon dioxide concentrations exceeded the Compliance Limit value of 1.5 % on at least one occasion at 27 monitoring locations. The maximum concentration was 23.9 %, detected in G22 on the 9th and 18th October 2019. This is lower than the maximum concentration detected during the previous review period (34 % at G35).

2.2.6 Methane concentrations along the south western boundary of the site (G01 – G08) typically show very little gas migration with maximum concentrations of 0.1 % at all locations, with the exception of G01. An increase in methane concentration was detected in this location in 2019. This trend has continued during this review period with methane concentrations reported between 0.0 % and 28.3 %. Carbon dioxide concentrations were similar to those detected in the previous review period with an average of 2.33 % (the average in Q3 was 2.86 %).

2.2.7 Methane concentrations remained low at the other locations along the south eastern boundary, however, carbon dioxide fluctuated at G03, G07 and G08 where averages were 2.13 % 1.91 % and 1.28 % respectfully.

[1] All gas concentrations are expressed as % v/v

2.2.8 The highest landfill gas concentrations have been detected primarily in the vicinity of the oldest phases; Phase 1 and 2 in perimeter wells G19 – G25. Gas extraction is undertaken in these phases. The concentrations of landfill gas in these perimeter wells fluctuated during the review period in similarly elevated concentrations to those detected previously (see graphs and tables in Appendix 1).

2.2.9 Highly variable concentrations of landfill gas are often detected at G35 and G38, which was also the case in the period of October – December 2019. Average methane concentrations in G35 was 42.9 % during Q3, however this decreased significantly during this review period with an average of 7.2 %. Average carbon dioxide concentrations also decreased from 23.9 % in Q3 to 6.1 % in this Q4 review period.

2.2.10 Concentrations in G38 have increased in this quarter compared to Q3. Average methane increased in Q4 to 22.4 %, however, this value is lower than the averages at this location reported in Q1 and Q2 (50.5 % and 44.14 % respectively). Carbon dioxide showed a similar pattern increasing on average in Q4 (9.4 %) compared to Q3 (2.1 %), but remaining below the concentrations reported in the first half of 2019 (~21 %).

2.2.11 Landfill gas concentrations have increased at G36 during this review period. Methane increased on average from 22.3 % during Q3 to 29.9 % during this Q4 review period. Average carbon dioxide was similar to the 4.4 % in Q3 during this review period at 4.5 %.

2.2.12 Consistently elevated concentrations of methane and carbon dioxide have also been detected at G12. A maximum methane concentration of 76.2 % was detected on the 9th October, an increase from the 68.4 % detected during the previous quarter. Concentrations at G12 will be monitored closely to identify any improvement in the control of landfill gas migration as a result of the recently installed leachate extraction infrastructure in this area of the landfill.

2.2.13 Perimeter landfill gas concentrations are currently being addressed as part of ongoing investigation of the efficiency and improvement actions for the operation and management of the landfill gas extraction system.

2.2.14 A cut off trench is currently has been constructed along the eastern section of Phase 1 to facilitate leachate and gas extraction to a greater capacity than the current infrastructure can support (CQA Plan reference; EXEA/Bryn Posteg/CQAP/IVT/December 2018). The perimeter landfill gas concentrations along this flank will be monitored closely to identify any trends.

3.0 LEACHATE

3.1 Summary of Monitoring Results

Monitoring of leachate levels

3.1.1 The installation of replacement leachate extraction and monitoring wells was carried out between April and June 2019, in accordance with the CQA Plan (3376-CAU-XX-XX-RP-V-0302.A0-C1). The infrastructure layout is shown in Drawing 3997-CAU-XX-XX-DR-V-1804-X, and details of the work are included in the CQA Validation Report (3997-CAU-XX-XX-RP-V-0303-A0.C1).

3.1.2 This new infrastructure facilitates leachate extraction to be managed in line with the requirements of the permit.

3.1.3 Leachate levels obtained from all locations during this quarter are presented below and in Appendix 2.

Table 3.1 Leachate Level Summary

Location	LCP1	LCP2	LCP3	LCP6	LCP7
Date	Leachate Head (m)	Leachate Head (m)	Leachate Head (m)	Leachate Head (m)	Leachate Head (m)
03/10/2019	7.58	13.20	9.43	7.78	5.32
09/10/2019	8.68	12.85	9.75	6.50	6.09
30/10/2019	8.09	9.94	7.06	7.09	4.47
06/11/2019	5.43	10.00	6.81	6.72	3.64
13/11/2019	4.02	9.95	6.13	6.27	2.90
05/12/2019	7.54	9.09	6.05	6.44	1.72
09/12/2019	7.23	10.16	6.15	6.36	2.02
18/12/2019	6.51	10.61	5.95	6.12	2.22
27/12/2019	7.01	10.34	6.09	5.81	4.42
EP Limit	1	1	1	1	1

Location	LCP8	RMLP9A	RMLP9B West	RMLP9C	RMLP9D
Date	Leachate Head (m)	Leachate Head (m)	Leachate Head (m)	Leachate Head (m)	Leachate Head (m)
03/10/2019	6.09	5.05	9.11	18.98	22.76
09/10/2019	7.39	5.72	10.23	18.09	23.96
30/10/2019	5.50	5.03	4.52	12.30	22.71
06/11/2019	4.44	5.09	4.08	11.49	23.06
13/11/2019	3.68	5.26	3.30	11.07	22.75
27/11/2019	-	7.13	13.77	-	13.12
05/12/2019	5.89	5.45	1.91	13.81	11.12
09/12/2019	-	5.93	1.87	11.21	10.82
18/12/2019	-	6.68	1.67	9.61	10.92
27/12/2019	-	8.03	1.67	10.31	10.82
EP Limit	1	1	1	1	1

3.1.4 Leachate level is presented as leachate above the base of the well as required by the Permit. The 2019 installations all intercept the leachate drainage layer of their respective cells. Further leachate level information is included in Appendix 2, showing the ordinance level utilized to accurately calculate the leachate height.

3.1.5 All leachate levels were above the compliance limit of 1 m above the cell base. Levels have, however, decreased in most locations and particularly at RMLP9B West, RMLP9C and RMLP9D over the review period.

3.1.6 RMLP9B West decreased from a maximum leachate height of 13 m on 27th November to a minimum of 1.67 m on the 18th December. RMLP9C decreased from the maximum leachate height of 18.98 m on the 3rd October to a minimum of 9.61 m on the 18th December. Similarly, a significant decrease in leachate level was observed at RMLP9D. Leachate reduced from 23.96 m above the cell base to 10.82 m on the 12th December. The results suggest an ongoing improvement in leachate management over Q4 of 2019.

Monitoring of leachate quality

3.1.7 Raw leachate samples were analysed in October, November and December for ammoniacal nitrogen, chloride, COD and pH. All results are summarised in tables in Appendix 2.

3.1.8 The pH was relatively stable throughout the review period with values between 6.5 and 8.3 recorded. Ammoniacal nitrogen ranged from 32.1 mg/l (LCP 1) to 2290 mg/l (LCP3).

3.1.9 Chloride concentrations ranged from 178 mg/l in LCP 1 to 8140 mg/l within LCP2. On average, chloride concentrations within LCP2 (7985 mg/l) were considerably higher than the rest of the site. The location containing the next highest average concentration was LCP3 at 4400 mg/l.

3.1.10 Concentrations of ammoniacal nitrogen and chloride at RMLP9C and RMLP9D decreased throughout the review period. The concentrations at all other locations are comparable to those previously detected and reflects the age of the waste in the respective phases.

Treated leachate

3.1.11 Potters undertake daily in-situ and monthly laboratory testing of treated leachate to assess its suitability for discharge. If the parameters exceed the Discharge Consent Limit, no discharge is made.

3.1.12 Treated leachate (final discharge) was tested during October, November and December for pH, ammoniacal nitrogen, suspended solids, BOD, COD, Total Petroleum Hydrocarbons (C6 – C40), sulphate and dissolved methane. All results are tabulated in Appendix 2.

3.1.13 Ammoniacal nitrogen remained below the discharge consent of 150 mg/l throughout the review period. pH was slightly below the lower limit of the discharge consent of 6 – 10 in October (5.8) but increased in the following months.

3.1.14 COD, sulphate and suspended solids concentrations remained below their respective EP limits throughout the review period. A concentration of dissolved methane was detected during October at 0.011 mg/l, no dissolved methane was detected during the remainder of the review period.

3.1.15 TPH was detected at a concentration of 1030 µg/L and 1370 µg/L during October and December, a decrease from the maximum of 8330 µg/L detected during the previous review period. As required by the Permit, no visible oils were detected in the treated leachate.

3.1.16 The volume of treated leachate discharged between the 1st October and the 31st December 2019 was 15,044 m^3. 985 m^3 was removed by tanker for off-site treatment.

4.0 GROUNDWATER

4.1 Groundwater Levels

4.1.1 Groundwater levels were recorded monthly at W1-W15. The results indicated that groundwater elevation remained relatively stable over the review period in all locations. Summary tables and time series graphs are presented in Appendix 3.

4.2 Summary of Monitoring Results

4.2.1 Groundwater is sampled at locations W1 – W9. W10 was previously inaccessible but has been remediated and was sampled in December. W11 was dry for the duration of the review period. Samples were tested for a monthly suite of parameters and a larger quarterly suite including hazardous substances was carried out in November. All monitoring data is included in Appendix 3.

4.2.2 Concentrations of monthly parameters were below their respective Compliance Limits, with the exception of chloride in W1.

4.2.3 The maximum chloride concentration in W1 was 269 mg/l, lower than the maximum found during the last review period (310 mg/l). This trend in chloride at W1 has occurred seasonally at this location, as discussed in detail in the Caulmert Letter Report 3033-CAU-XX-XX-CO-V-9101.

4.2.4 No ammoniacal nitrogen was detected at W1, W2 and W6 –W10 during the review period. Concentrations at W3, W4 and W5 were below the compliance limit (2 mg/l) throughout the review period.

4.2.5 Of the quarterly parameters, toluene was detected at W3 (2.7 µg/l), below the Compliance Limit (4 µg/l). This is a significant reduction from the peak concentration detected here in the previous review period (38.3 µg/l).

4.2.6 Mecoprop was detected at concentrations of 0.12 µg/l and 0.15 µg/l at W4 and W5 respectively, slightly above the compliance limit (0.1 µg/l). These concentrations are comparable to those detected in the previous review period (0.13 µg/l and 0.16 µg/l respectively). The remaining quarterly parameters were all below their respective compliance limits and were mostly undetected.

4.2.7 Of the hazardous substances tested in November, heavier fraction hydrocarbons (C10-C40) were detected in groundwater locations W3, and W5-8. The concentrations are consistent with occasional instances of detection of these substances in groundwater around the site historically (for example in 2016), and likely reflect variations in groundwater quality around the site.

5.0 SURFACE WATER

5.1 Summary of Monitoring Results

5.1.1 The permit requires monthly monitoring at monitoring points P1, P2 and P3.

5.1.2 P3 is the discharge point for the proposed reed bed which has not yet been commissioned, therefore no samples were analysed during this review period.

5.1.3 Surface water samples were collected at SW1 (P1) and SW2 (P2) in October, November and December. A summary table displaying surface water monitoring data is enclosed in Appendix 4.

5.1.4 Ammoniacal nitrogen concentrations were below the limit of detection in P1 and P2 throughout the review period.

5.1.5 Suspended solids concentration were above the 50 mg/l Compliance Limit at P2 in November (99 mg/L). Concentrations were below the compliance limit on all other occasions at P1 and P2.

5.1.6 pH was neutral with values ranging from 6.8 in P1 to 8 in P2. All values were within the permitted range of 6-9.

5.1.7 Electrical conductivity ranged from 90.3 µS/cm to 115 µS/cm in P1 and 173 µS/cm to 278 µS/cm in P2. Chloride concentrations were low with maxima at P1 and P2 of 10.3 mg/l and 17 mg/l respectively.

5.1.8 BOD was low, with maxima of 2 mg/L at P1 and 3 mg/L at P2.

5.1.9 Low concentrations of petroleum hydrocarbons were detected in P1 and P2 during this review period. Hydrocarbons in the ranges; EH >C24 - C40 were detected at P1 during November (22 µg/l) and P2 during December (35 µg/l).

6.0 DUST

6.1 Monitoring Results

6.1.1 Dust monitoring was undertaken between the 23rd of September 2019 to the 31st of October 2019 at locations BP1, BP2 and BP3. The dust monitoring results, as supplied by the subcontracted laboratory, are summarized in Table 2 below. A Certificate of Analysis is enclosed in Appendix 5.

Table 2: Dust Monitoring Results

Period	29/09/19 - 31/10/19		
Location	**Mass of Undissolved Solids mg**	**Result mg/m²/day**	**Compliance Limit mg/m²/day**
BP 1	114	88	200
BP 2	15	12	200
BP 3	17.9	14	200

6.1.2 Dust concentrations remained below the Compliance Limit at all locations during this review period.

7.0 SUMMARY

7.1 Landfill gas

7.1.1 The CH_4 Compliance Limit was exceeded at 13 locations, similar to that observed in the previous review period (Quarter 3 2019). CO_2 Compliance Limit was exceeded at 27 locations on a number of occasions during the monitoring period, as observed in the previous quarter. Compliance Limits exceedances and landfill gas management are currently under review by Potters as part of the improvement actions stipulated in the Landfill Gas Management Plan, in agreement with NRW.

7.2 Leachate

7.2.1 Leachate levels were above the compliance limit at all monitored locations during this quarter. Significant reductions of leachate levels were, however, recorded at RMLP9B West, RMLP9C and RMLP9D.

7.2.2 As reported previously, considerably higher concentrations of chloride were detected within LCP2 when compared to the rest of the monitoring locations.

7.2.3 There was one deviation of pH in the final discharge (treated leachate) quality in relation to the discharge consent during this review period, when pH was 5.8 slightly below the lower limit of 6.

7.2.4 The volume of treated leachate discharged between the 1st October and the 31st December was 15,044 m^3. Additionally, 985 m^3 was tankered off site for treatment.

7.3 Groundwater

7.3.1 Groundwater levels in all locations remained relatively stable over the review period.

7.3.2 Low ammoniacal nitrogen concentrations were detected at W3, W4 and W5 throughout the review period, however, these did not exceed the compliance limit (2 mg/l).

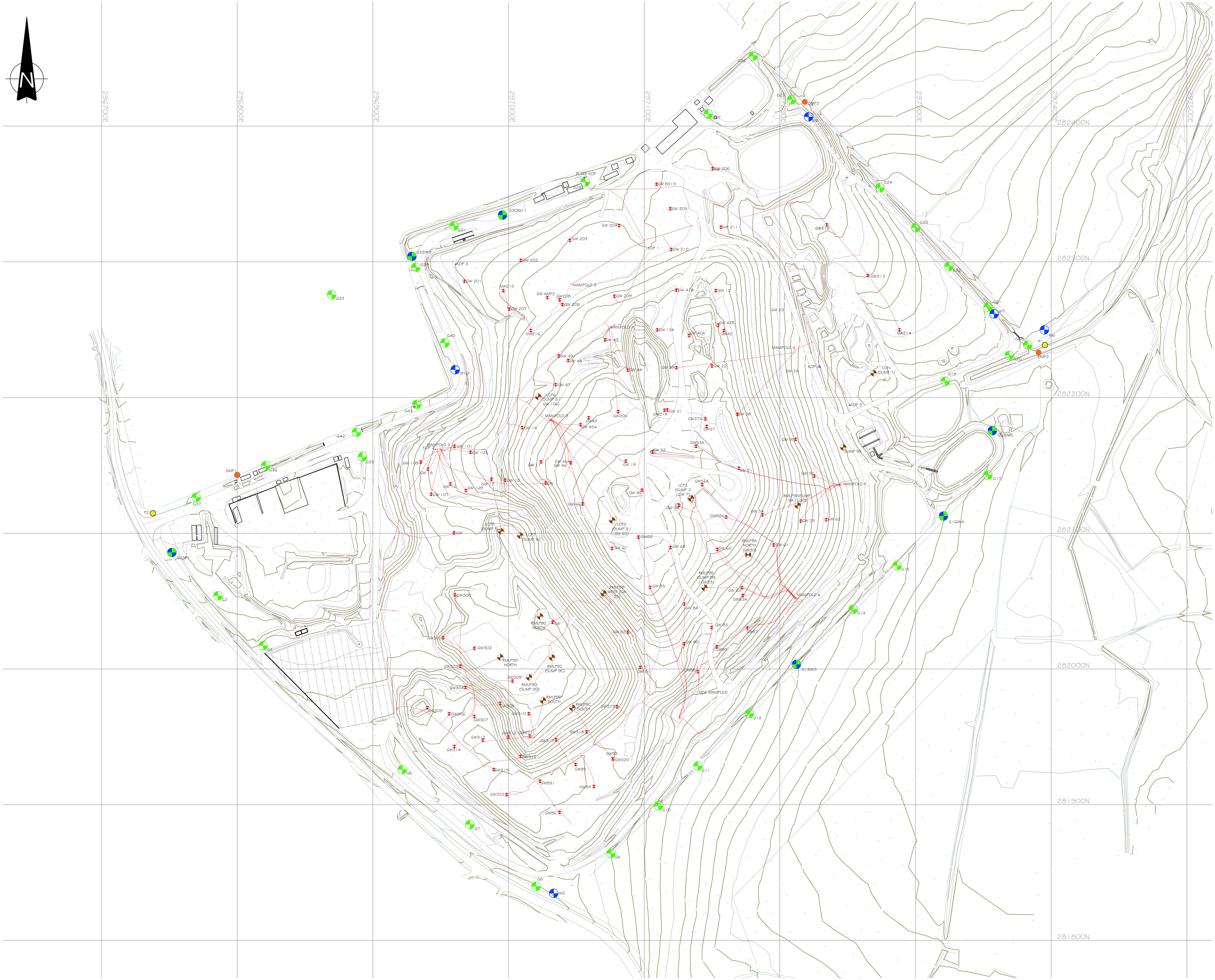
7.3.3 Chloride within W1 exceeded the compliance limit as noted in the previous reviews since 2005. This trend in chloride at W1 has occurred seasonally at this location, as discussed in detail in the Caulmert Letter Report 3033-CAU-XX-XX-CO-V-9101.

7.4 Surface Water

7.4.1 Surface water samples were collected at P1 and P2 monthly during this quarter. An exceedance of the suspended solids compliance limit was detected at P2 in November. No other compliance limits were exceeded at any of the monitoring points. Low concentrations of petroleum hydrocarbons were detected at both locations.

7.5 Dust

7.5.1 Dust concentrations remained below the 200 mg/m^2/day Compliance Limit at all locations during this review period.



NOTE

1. DO NOT SCALE FROM THIS DRAWING, WORK FROM FIGURED DIMENSIONS ONLY. ALL DIMENSIONS ARE IN MILLIMETRES AND ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM U.N.O.

2. NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING WILL BE ALLOWED WITHOUT THE PRIOR PERMISSION IN WRITING.

3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALIST DRAWINGS AND SPECIFICATIONS.

4. MAXIMUM SURCHARGE LOAD ON 50.0m FLOOR 20KN/m2 UNLESS OTHERWISE STATED.

LEGEND

- IN WASTE GAS WELL
- LEACHATE COLLECTION / MONITORING POINT
- PERIMETER GAS MONITORING BOREHOLE
- PERIMETER GROUNDWATER MONITORING BOREHOLE
- PERIMETER GAS & GROUNDWATER MONITORING BOREHOLE
- SURFACE WATER MONITORING LOCATION
- DUST MONITORING POINT

REV	MODIFICATIONS	BY	RE	AP	DATE
C2	GAS MONITORING LOCATIONS NAME CHANGE	DA	SO	SO	09.05.19
C1	BOREHOLE NAME CHANGE	DA	HC	HC	16.10.18
P3	MINOR AMENDMENTS	DA	SO	SO	31.05.18
P2	MINOR AMENDMENTS	DA	SO	SO	29.05.18
P1	ISSUED FOR COMMENT	RWG	SO	SO	04.05.18

POTTERS WASTE MANAGEMENT

PROJECT:

BRYN POSTEG LANDFILL SITE

TITLE:

GAS EXTRACTION AND MONITORING INFRASTRUCTURE PLAN

DRAWN BY	DATE	
RWG	04.05.2018	
REVIEWED BY: SO	SCALE @ A1: 1:1250	JOB REF: 3376
AUTHORISED BY: SO	ISSUE: S1	REVISION: C2

DRAWING NUMBER
3376-CAU-XX-XX-DR-V-1801

Caulmert
engineering environmental planning

WWW.CAULMERT.COM

Registered Office: InTec, Parc Menai, Bangor, Gwynedd, LL57 4FG Company Registered No: 06716319

NOTE

1. DO NOT SCALE FROM THIS DRAWING, WORK FROM FIGURED DIMENSIONS ONLY. ALL DIMENSIONS ARE IN MILLIMETRES AND ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM U.N.O.

2. NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING WILL BE ALLOWED WITHOUT THE PRIOR PERMISSION IN WRITING.

3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALIST DRAWINGS AND SPECIFICATIONS.

4. LOCATIONS OF PEGS TAKEN FROM NRG DRAWING : Bryn Posteg_Proposed Drilling Locations_May2019 : 1284/TP/14 : 01

LEGEND

- IN WASTE GAS WELL
- OLD, REPLACED LEACHATE WELL
- NEW, REPLACEMENT LEACHATE WELL
- LEACHATE COLLECTION/MONITORING POINT
- NEW IN WASTE GAS WELL

REV	MODIFICATIONS	BY	RE	AP	DATE
X	AS BUILT	AAR	SO	DB	18.07.19

PURPOSE OF ISSUE: AS BUILT
STATUS: CR

CLIENT: PotterGroup

PROJECT:
BRYN
POSTEG
LANDFILL

TITLE:
AS BUILT
REPLACEMENT
LEACHATE WELLS

DRAWN BY	REVIEWED BY	AUTHORISED BY	SCALE @ A1
AAR	SO	DB	1:1250

DATE	JOB REF:	REVISION
18.07.2019	3997	X

DRAWING NUMBER
3997-CAU-XX-XX-DR-V-1804

Caulmert
engineering environmental planning
WWW.CAULMERT.COM

Registered Office: InTec, Parc Menai, Bangor, Gwynedd, LL57 4FG Company Registered No: 06716319

DISSOLVED AIR FLOTATION SYSTEM

BIOMASS CHP SYSTEM

LANDFILL GAS UTILISATION PLANT

STORAGE

LEACHATE TREATMENT PLANT

INACTIVE CAPPED LANDFILL

SURFACE WATER COLLECTION PONDS

WHEEL WASH

OFFICE & WEIGHBRIDGE

SITE ENTRANCE

SITE CANTEEN & OFFICE

ACTIVE LANDFILL

GREEN WASTE COMPOST SLAB (SEPARATE PERMIT)

1

2

3

4

282400N

282300N

282200N

282100N

282000N

281900N

281800N

296700E

296800E

296900E

297000E

297100E

297200E

297300E

297400E

297500E

NOTE

1. DO NOT SCALE FROM THIS DRAWING, WORK FROM FIGURED DIMENSIONS ONLY. ALL DIMENSIONS ARE IN MILLIMETRES AND ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM U.N.O.

2. NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING WILL BE ALLOWED WITHOUT THE PRIOR PERMISSION IN WRITING.

3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALIST DRAWINGS AND SPECIFICATIONS.

- SITE BOUNDARY
- MRF PERMIT ACTIVITY
- LANDFILL PERMIT / GENERAL SITE ACTIVITY
- GREEN WASTE COMPOSTING PERMIT ACTIVITY
- CAPPED LANDFILL

1. MBT COMPOST (MRF PERMIT)
2. WASTE RECPETION (MRF PERMIT)
3. TYRE STORAGE & BAILING (MRF PERMIT)
4. TROMMEL (LANDFILL PERMIT)

REV	MODIFICATIONS	BY	RE	AP	DATE
C1	APPROVED AND ISSUED	EJD	SB	SB	19/12/17
P1	ISSUED FOR COMMENT	EJD	SB	SB	20/11/17

POTTERS WASTE MANAGEMENT

PROJECT:

BRYN POSTEG LANDFILL SITE

TITLE:

ENVIRONMENTAL MONITORING PLAN

DRAWN BY	DATE	
EJD	20/11/2017	
REVIEWED BY	SCALE @ A1	JOB REF:
SB	1:1250	3033
AUTHORISED BY	ISSUE	REVISION
SB	A0	C1

DRAWING NUMBER: 3033-CAU-XX-XX-DR-S-1800

Caulmert engineering environmental planning

WWW.CAULMERT.COM

Registered Office: InTec, Parc Menai, Bangor, Gwynedd, LL57 4FG Company Registered No: 06716319

Appendix 1

APPENDIX 1 – LANDFILL GAS

Table 1: In-waste Gas monitoring data

ID	Methane			Carbon Dioxide			Oxygen		
	Min	Max	Average	Min	Max	Average	Min	Max	Average
BPIW0007	48.60	62.00	57.10	38.70	40.80	40.03	0.10	2.40	0.87
BPIW0011	36.20	61.90	52.20	23.00	41.40	34.77	0.20	8.20	2.87
BPIW0014	57.30	65.40	61.53	37.80	40.70	38.90	0.10	1.30	0.50
BPIW0015	41.80	73.30	59.20	18.10	39.40	29.03	0.20	8.60	3.03
BPIW0016	55.50	64.50	60.50	37.10	40.30	38.97	0.20	1.10	0.53
BPIW0017	59.40	62.80	60.73	38.10	41.00	39.90	0.30	0.60	0.43
BPIW0018	58.30	61.40	59.50	33.40	43.10	37.47	0.00	0.40	0.17
BPIW0019	47.30	61.40	56.30	34.70	40.20	37.53	0.10	1.00	0.47
BPIW0021	59.30	66.20	63.27	37.00	41.10	39.13	0.10	0.70	0.30
BPIW0022	57.90	65.40	62.23	34.80	41.70	37.80	0.10	1.70	0.73
BPIW0024	61.70	72.70	66.33	28.50	35.50	31.77	0.10	2.40	1.00
BPIW0025	60.60	64.70	63.30	36.90	40.00	38.53	0.00	0.10	0.07
BPIW0030	59.20	64.10	61.13	34.10	38.90	37.17	0.60	1.50	0.93
BPIW0032	31.80	62.40	51.63	20.40	41.90	33.40	0.00	9.80	3.30
BPIW0033	39.50	58.40	51.10	26.50	42.70	35.77	0.70	7.00	3.07
BPIW0035	52.90	62.20	58.73	35.10	42.80	39.50	0.00	1.80	0.63
BPIW0037	56.10	68.00	62.97	35.50	40.50	37.77	0.10	1.10	0.43
BPIW0038	63.60	66.70	64.80	36.60	41.00	38.17	0.10	0.30	0.17
BPIW0039	62.70	64.10	63.23	36.50	41.60	39.03	0.00	0.30	0.13
BPIW0043	48.00	55.30	50.97	31.10	40.90	35.00	0.40	1.10	0.70
BPIW0044	57.40	67.40	62.93	35.90	37.70	36.70	0.10	0.20	0.13
BPIW0045	57.90	69.60	62.90	32.00	42.10	38.10	0.00	0.70	0.40
BPIW0047	56.40	63.70	58.93	37.00	39.80	38.60	0.10	1.10	0.43
BPIW0048	61.90	66.20	64.03	35.80	39.70	38.27	0.00	0.20	0.10
BPIW0049	50.60	73.30	60.70	25.40	32.00	29.10	0.10	3.50	1.33
BPIW0051	34.80	63.30	53.33	22.00	39.40	33.10	0.10	8.10	2.77
BPIW0052	56.80	59.50	57.97	37.20	43.40	40.90	0.00	0.30	0.13
BPIW0054	59.40	63.80	62.03	34.50	41.00	38.13	0.00	0.30	0.13
BPIW0055	61.00	63.20	61.93	34.50	39.70	37.73	0.10	0.80	0.37
BPIW0061	51.50	63.50	59.27	31.20	40.70	37.07	0.10	2.90	1.03
BPIW0062	56.80	64.80	61.53	32.20	40.20	37.07	0.10	2.70	0.97
BPIW0063	60.10	64.70	62.70	37.50	40.00	38.57	0.20	0.40	0.30
BPIW0066	50.00	59.70	55.67	40.30	44.20	42.17	0.10	0.10	0.10
BPIW0067	61.00	61.00	61.00	41.80	41.80	41.80	0.10	0.10	0.10
BPIW0068	61.30	62.30	61.67	40.30	43.50	41.70	0.00	0.20	0.10
BPIW0069	50.30	60.70	57.10	39.60	44.80	41.73	0.20	2.20	0.90
BPIW0082	43.70	63.70	54.67	31.40	41.80	37.07	0.10	2.40	0.93
BPIW0083	46.90	61.60	53.27	33.40	36.30	35.30	0.10	4.40	1.77
BPIW0084	58.90	60.60	60.00	41.00	46.30	43.17	0.10	0.10	0.10
BPIW0086	50.90	61.90	57.63	38.30	45.50	41.37	0.10	0.20	0.13
BPIW0087	62.10	65.80	63.90	37.40	40.70	39.43	0.00	0.10	0.07
BPIW0088	42.50	60.40	48.83	30.40	41.00	34.43	0.30	2.10	0.93
BPIW0090	38.20	59.80	51.37	24.90	42.90	36.23	0.10	7.50	2.83
BPIW0093	59.80	65.10	63.03	38.40	43.20	40.87	0.10	0.20	0.17
BPIW0094	64.10	64.10	64.10	39.40	39.40	39.40	0.20	0.20	0.20
BPIW0095	50.40	64.80	57.23	31.00	40.90	36.40	0.20	3.30	2.13
BPIW0099	60.50	68.10	63.97	34.60	40.30	37.43	0.10	0.60	0.40
BPIW0104	56.50	66.40	62.23	37.10	39.40	38.47	0.00	0.10	0.07
BPIW0106	38.00	61.10	51.47	29.80	37.40	33.40	0.30	4.80	2.57
BPIW011A	56.40	62.00	59.87	34.70	40.30	38.20	0.00	0.20	0.13
BPIW013A	63.70	70.30	67.43	33.20	39.90	36.57	0.10	0.10	0.10
BPIW0202	24.40	61.40	46.53	11.40	28.50	22.03	0.10	13.20	4.50
BPIW0203	59.30	68.20	64.00	26.80	30.60	28.47	0.10	0.60	0.33

APPENDIX 1 – LANDFILL GAS

ID	Methane			Carbon Dioxide			Oxygen		
	Min	Max	Average	Min	Max	Average	Min	Max	Average
BPIW0204	44.30	86.20	71.97	6.30	15.90	12.43	0.10	10.40	3.53
BPIW0206	48.30	62.10	56.77	27.90	37.60	32.93	0.20	1.50	0.77
BPIW0207	48.10	74.50	57.37	24.70	27.80	26.30	0.30	4.60	2.60
BPIW0208	53.30	65.30	60.73	27.90	35.30	32.40	0.20	3.70	1.60
BPIW0209	55.60	75.50	67.70	27.10	40.70	32.63	0.10	1.10	0.50
BPIW020A	59.40	62.70	61.33	36.90	42.90	39.83	0.00	0.30	0.17
BPIW0211	46.50	72.40	62.03	18.20	35.10	27.90	0.10	7.30	2.53
BPIW0212	48.50	71.80	61.40	24.30	35.80	30.30	0.80	6.40	2.80
BPIW0213	55.80	67.90	63.17	29.60	34.90	32.03	0.70	3.60	1.67
BPIW0214	6.20	69.70	47.40	3.20	33.80	22.90	0.10	20.90	7.33
BPIW0215	59.30	61.40	60.03	28.10	33.40	31.07	0.10	1.70	0.67
BPIW0216	56.60	63.50	59.90	33.00	39.10	35.10	0.00	0.30	0.20
BPIW021A	58.70	66.10	62.97	37.00	41.20	39.27	0.10	0.70	0.30
BPIW0300	59.80	63.60	61.57	39.30	45.20	42.03	0.10	0.30	0.23
BPIW0301	61.10	63.80	62.83	38.50	41.80	40.53	0.10	0.20	0.17
BPIW0302	2.00	65.80	39.63	35.50	50.30	41.13	0.00	9.20	4.10
BPIW0303	59.30	59.30	59.30	42.60	42.60	42.60	0.30	0.30	0.30
BPIW0304	59.60	61.10	60.17	41.70	46.10	43.20	0.20	0.20	0.20
BPIW0305	60.30	63.10	61.50	36.10	41.30	39.20	0.30	1.20	0.60
BPIW0306	30.60	64.10	51.03	17.70	43.70	34.23	0.10	11.30	3.83
BPIW0307	58.30	60.20	59.33	42.50	44.00	43.07	0.10	0.70	0.33
BPIW0308	0.40	57.80	30.67	6.10	40.30	26.23	0.90	19.00	8.20
BPIW0309	54.70	57.70	55.83	37.50	50.40	43.77	0.00	0.40	0.17
BPIW0310	27.00	60.20	48.80	17.20	45.10	33.30	0.10	12.00	4.50
BPIW0311	57.00	64.70	60.27	36.60	45.40	41.77	0.10	0.80	0.33
BPIW0312	53.00	57.50	55.77	33.60	45.50	41.10	0.10	3.50	1.23
BPIW0313	58.00	59.90	58.73	42.40	46.50	44.20	0.10	0.30	0.20
BPIW0314	59.60	63.70	61.67	38.90	44.00	41.93	0.10	0.30	0.17
BPIW0315	59.90	63.30	61.47	39.90	44.00	42.10	0.10	0.20	0.13
BPIW0316	51.10	60.60	56.87	36.10	45.20	41.47	0.10	3.00	1.10
BPIW0317	58.20	61.90	60.20	40.60	46.80	43.27	0.10	0.30	0.20
BPIW0318	59.00	63.70	61.33	39.30	42.60	41.17	0.10	0.30	0.17
BPIW0319	58.20	63.80	61.37	38.70	43.60	41.83	0.10	0.30	0.17
BPIW0320	47.70	64.10	58.07	36.80	42.40	39.23	0.20	3.40	1.30
BPIW0321	60.20	63.70	62.30	39.40	42.00	41.07	0.10	0.20	0.13
BPIW0322	53.40	64.20	60.00	34.50	41.10	37.70	0.10	1.50	0.57
BPIW0323	48.30	64.60	58.83	27.70	39.50	35.53	0.10	5.60	1.93
BPIW0325	60.60	62.60	61.67	39.60	44.60	41.63	0.10	0.50	0.23
BPIW0326	57.10	62.40	60.10	37.00	41.30	39.83	0.00	0.30	0.13
BPIW0327	59.10	61.50	60.13	40.30	46.70	43.27	0.10	0.20	0.17
BPIW037A	64.00	67.00	65.33	36.70	40.30	38.27	0.10	0.10	0.10
BPIW040A	31.50	61.80	50.87	28.90	39.10	34.27	0.00	0.10	0.03
BPIW041B	64.40	70.00	66.70	30.90	39.50	36.00	0.10	0.50	0.23
BPIW042B	57.10	62.70	60.23	33.80	40.30	36.67	0.00	0.30	0.13
BPIW045A	61.00	64.20	62.43	32.30	39.40	36.20	0.20	1.00	0.50
BPIW053A	51.40	63.90	56.73	35.00	41.20	38.07	0.10	0.10	0.10
BPIW056A	50.00	63.70	57.73	36.80	41.80	39.07	0.10	2.40	0.87
BPIW059A	56.60	56.90	56.77	35.20	45.40	40.63	0.00	1.90	1.07
BPIW063A	60.50	63.50	61.87	37.10	41.20	39.53	0.10	0.60	0.33
BPIW208A	47.70	63.00	57.27	26.70	40.60	35.27	0.30	6.10	2.23
BPSP0001	0.10	61.10	24.91	0.10	40.00	16.30	0.50	20.90	12.24
BPSP0002	55.30	61.60	58.10	33.90	40.80	37.23	0.20	1.60	0.93
BPSP0003	58.00	68.30	63.33	32.90	39.00	36.00	0.20	0.80	0.43
BPSP0004	55.00	57.30	56.20	36.10	41.10	38.90	0.90	1.50	1.13

APPENDIX 1 – LANDFILL GAS

ID	Methane			Carbon Dioxide			Oxygen		
	Min	Max	Average	Min	Max	Average	Min	Max	Average
BPSP0005	54.90	62.80	57.87	26.80	38.60	31.50	0.20	1.40	0.60
BPW00937	0.20	0.20	0.20	0.10	0.10	0.10	20.40	20.40	20.40

APPENDIX 1 – LANDFILL GAS

Table 2: In-waste Gas Carbon monoxide and Hydrogen sulphide monitoring data

ID	Carbon Monoxide			Hydrogen Sulphide		
	Min	Max	Average	Min	Max	Average
Management Limit	100 ppm			N/A		
BPIW0007	4	35	20	0	0	0
BPIW0011	1	70	25	0	0	0
BPIW0014	3	158	66	0	0	0
BPIW0015	2	18	7	0	0	0
BPIW0016	3	18	9	0	0	0
BPIW0017	4	44	30	0	0	0
BPIW0018	2	47	26	0	0	0
BPIW0019	3	46	22	0	0	0
BPIW0021	3	59	27	0	0	0
BPIW0022	2	45	17	0	0	0
BPIW0024	2	10	6	0	0	0
BPIW0025	2	13	6	0	0	0
BPIW0030	3	39	15	0	0	0
BPIW0032	1	9	6	0	0	0
BPIW0033	3	34	16	0	0	0
BPIW0035	4	32	16	0	0	0
BPIW0037	2	42	21	0	0	0
BPIW0038	2	40	18	0	1	0
BPIW0039	5	137	54	0	0	0
BPIW0043	1	133	46	0	1	0
BPIW0044	2	115	41	0	0	0
BPIW0045	4	93	39	0	0	0
BPIW0047	3	220	82	0	0	0
BPIW0048	3	24	14	0	0	0
BPIW0049	1	87	31	0	0	0
BPIW0051	2	66	35	0	0	0
BPIW0052	4	56	37	0	0	0
BPIW0054	2	9	6	0	0	0
BPIW0055	2	50	19	0	0	0
BPIW0061	2	7	4	0	0	0
BPIW0062	2	5	3	0	0	0
BPIW0063	2	9	6	0	0	0
BPIW0066	6	104	62	0	0	0
BPIW0067	6	6	6	0	0	0
BPIW0068	5	51	26	0	0	0
BPIW0069	5	67	38	0	0	0
BPIW0082	2	15	8	0	0	0
BPIW0083	3	7	5	0	0	0
BPIW0084	5	83	39	0	0	0
BPIW0086	5	25	18	0	0	0
BPIW0087	8	248	89	0	0	0
BPIW0088	1	9	4	0	0	0
BPIW0090	3	292	105	0	1	0
BPIW0093	7	44	26	0	1	0
BPIW0094	7	7	7	0	0	0
BPIW0095	3	20	12	0	5	2
BPIW0099	5	71	27	0	0	0
BPIW0104	3	18	11	0	0	0
BPIW0106	3	19	13	0	0	0
BPIW011A	3	38	21	0	0	0
BPIW013A	3	44	19	0	0	0
BPIW0202	1	6	4	0	0	0

APPENDIX 1 – LANDFILL GAS

ID	Carbon Monoxide			Hydrogen Sulphide		
	Min	Max	Average	Min	Max	Average
Management Limit	100 ppm			N/A		
BPIW0203	1	21	9	0	0	0
BPIW0204	1	8	5	0	0	0
BPIW0206	4	14	8	0	0	0
BPIW0207	2	13	7	0	0	0
BPIW0208	1	15	10	0	0	0
BPIW0209	1	127	44	0	0	0
BPIW020A	4	99	56	0	0	0
BPIW0211	2	6	4	0	0	0
BPIW0212	1	28	11	0	0	0
BPIW0213	6	30	15	0	0	0
BPIW0214	1	17	8	0	0	0
BPIW0215	3	13	7	0	0	0
BPIW0216	2	8	5	0	0	0
BPIW021A	3	51	25	0	0	0
BPIW0300	8	68	36	0	0	0
BPIW0301	2	34	19	0	0	0
BPIW0302	9	22	16	0	75	25
BPIW0303	13	13	13	0	0	0
BPIW0304	22	133	78	0	6	3
BPIW0305	1	39	20	0	1	0
BPIW0306	1	1	1	0	2	1
BPIW0307	24	24	24	2	4	3
BPIW0308	12	18	15	0	7	2
BPIW0309	15	46	31	0	15	6
BPIW0310	0	7	4	0	11	4
BPIW0311	0	115	58	0	7	2
BPIW0312	5	5	5	0	1	1
BPIW0313	15	15	15	1	8	5
BPIW0314	8	511	191	0	7	3
BPIW0315	7	436	176	0	4	2
BPIW0316	6	442	175	0	1	0
BPIW0317	10	392	148	2	10	6
BPIW0318	7	291	107	0	18	7
BPIW0319	7	231	110	0	159	65
BPIW0320	6	217	86	0	1	1
BPIW0321	9	209	83	0	0	0
BPIW0322	4	171	63	0	0	0
BPIW0323	2	95	35	0	0	0
BPIW0325	13	19	16	0	6	3
BPIW0326	0	363	140	0	2	1
BPIW0327	5	153	55	0	1	0
BPIW037A	2	40	20	0	7	2
BPIW040A	5	204	77	0	0	0
BPIW041B	2	87	32	0	0	0
BPIW042B	2	201	69	0	0	0
BPIW045A	3	15	9	0	0	0
BPIW053A	3	49	22	0	0	0
BPIW056A	3	59	25	0	0	0
BPIW059A	4	77	51	0	0	0
BPIW063A	3	14	9	0	0	0
BPIW208A	1	26	15	0	0	0
BPSP0001	0	72	21	0	95	14
BPSP0002	7	66	45	0	1	0

APPENDIX 1 – LANDFILL GAS

ID	Carbon Monoxide			Hydrogen Sulphide		
	Min	Max	Average	Min	Max	Average
Management Limit	100 ppm			N/A		
BPSP0003	4	76	30	0	1	0
BPSP0004	10	93	65	0	1	0
BPSP0005	3	33	13	0	0	0
BPW00937	0	0	0	0	0	0

Table 3: Perimeter Gas Monitoring Data (exceedances highlighted yellow)

Sample Point	Date	Methane	Carbon Dioxide	Oxygen
		% v/v	% v/v	% v/v
Compliance Limit		1	1.5	N/A
Trigger Limit		0.8	1.3	N/A
G01	02/10/2019	28.3	1.8	3.5
	10/10/2019	0.5	3.2	19.8
	16/10/2019	22.4	2.1	2.8
	23/10/2019	17.5	2.8	2.1
	13/11/2019	31.8	1.7	0.2
	09/12/2019	9.4	2.4	3.1
G02	02/10/2019	0.1	0	20.5
	10/10/2019	0.1	0	20.5
	16/10/2019	0.1	0	20
	23/10/2019	0	0.7	20
	13/11/2019	0	1.4	20.2
	09/12/2019	0	0.8	20.3
G03	02/10/2019	0.1	2.6	13.8
	10/10/2019	0.1	2.5	13.7
	16/10/2019	0.1	2.6	13
	23/10/2019	0	0.8	19.2
	13/11/2019	0	1.5	19.1
	09/12/2019	0	2.8	9.7
G07	02/10/2019	0.1	0.1	20.4
	10/10/2019	0.1	1.9	19.9
	16/10/2019	0.1	2.3	19.3
	23/10/2019	0	2.2	19.8
	13/11/2019	0	2.9	19.9
	09/12/2019	0	2.1	20.1
G08	02/10/2019	0.1	2.4	17
	10/10/2019	0.1	1.8	17.1
	16/10/2019	0.1	1.3	16.7
	23/10/2019	0	1.1	16.9
	13/11/2019	0	0.7	15.2
	09/12/2019	0	0.4	12.2
G09	02/10/2019	0	0	20.5
	02/10/2019	0.1	0	21
	10/10/2019	0.1	0	21
	16/10/2019	0.1	0	22.3
	23/10/2019	0	0	21.1
	13/11/2019	0	0	21.5
	09/12/2019	0	0.1	21.7
G10	02/10/2019	0	2.2	20
	10/10/2019	0.1	0.1	21
	16/10/2019	0.1	0.9	20.3

APPENDIX 1 – LANDFILL GAS

Sample Point	Date	Methane	Carbon Dioxide	Oxygen
		% v/v	% v/v	% v/v
Compliance Limit		1	1.5	N/A
Trigger Limit		0.8	1.3	N/A
	23/10/2019	0	2	19.3
	13/11/2019	0	2.3	19.6
	09/12/2019	0	3.4	17.8
G11	02/10/2019	0	0	21
	16/10/2019	0.1	0	20.9
	23/10/2019	0	0.1	21.2
	09/12/2019	0	0.2	22.1
G12	02/10/2019	0	0	21.4
	02/10/2019	20.2	3.4	12.8
	09/10/2019	76.2	5	2.1
	16/10/2019	64	4.4	4.3
	23/10/2019	73.3	4.9	2.2
	13/11/2019	66.1	4.9	3.3
	13/11/2019	65	4.9	3.6
	09/12/2019	0	0	22
G13	02/10/2019	0.1	0	>>>>
	10/10/2019	0.1	0	21.2
	18/10/2019	0	0	21.2
	23/10/2019	0	0	21.4
	13/11/2019	0	0	21.7
	09/12/2019	0	0.2	22
G14	02/10/2019	0	0.9	20.5
	10/10/2019	0.1	0.4	21
	18/10/2019	0	2.5	19.5
	23/10/2019	0	2.4	19.6
	13/11/2019	0	0.3	23.4
	09/12/2019	0	0	22.6
G15	02/10/2019	0	0.7	20.1
	10/10/2019	0.1	0.7	20.1
	18/10/2019	0	1.6	19.1
	23/10/2019	0	1.1	20.1
	09/12/2019	0	1.4	20.8
G16	02/10/2019	0	0	22.1
	10/10/2019	0.1	0	21.4
	18/10/2019	0	0	21.5
	23/10/2019	0	0	21.6
	13/11/2019	0	0	21.9
	13/11/2019	0	0	21.9
	09/12/2019	0	0	22.5
G17	10/10/2019	0.1	0	21.5
	18/10/2019	0	0	21.5
	23/10/2019	0	0	21.6
	09/12/2019	0	0.1	22.7
G18	02/10/2019	0	0.4	21.1
	10/10/2019	0.1	0.4	21.2
	18/10/2019	0	0.6	21.2
	23/10/2019	0	0.4	21.3
	13/11/2019	0	1.1	21.3
	09/12/2019	0	0.7	22.2

APPENDIX 1 – LANDFILL GAS

Sample Point	Date	Methane	Carbon Dioxide	Oxygen
		% v/v	% v/v	% v/v
Compliance Limit		1	1.5	N/A
Trigger Limit		0.8	1.3	N/A
G19	18/10/2019	58.5	13.1	3
	23/10/2019	77.5	15.1	0.3
	13/11/2019	73.3	14.1	0.8
	09/12/2019	0	0	22.8
G20	02/10/2019	75.9	7.4	0.8
	09/10/2019	47	6.6	0.2
	18/10/2019	85.5	13.9	0.3
	23/10/2019	76.5	23.2	0.2
	13/11/2019	37.8	4.3	0.2
	09/12/2019	7.7	0.5	18
G21	02/10/2019	0.1	0	21.4
	02/10/2019	0.1	0	21.5
	09/10/2019	40.5	15	0.3
	18/10/2019	38.9	13.7	0.3
	23/10/2019	48.9	14.3	0.2
	13/11/2019	56	15.8	0.2
	09/12/2019	0	0.1	22.9
G22	02/10/2019	0.1	0	21.5
	02/10/2019	52.8	18.3	3.9
	09/10/2019	76.1	23.9	0.1
	18/10/2019	75.3	23.9	0.2
	23/10/2019	73.8	22.7	0.2
	13/11/2019	71.4	22.3	0.2
	09/12/2019	76.1	18.8	0.4
G23	02/10/2019	2.7	8.1	0.2
	09/10/2019	15.1	5.6	16.6
	09/10/2019	0.3	1.3	19
	18/10/2019	2.4	9.2	0.2
	23/10/2019	0.7	1.5	14.7
	13/11/2019	6.2	8.1	0.1
	09/12/2019	3.8	6.1	0.3
G24	02/10/2019	14.2	6.1	17
	09/10/2019	12.3	4.7	17.4
	18/10/2019	9.3	3.6	18.3
	23/10/2019	7.2	2.8	18.9
	13/11/2019	5.4	2.7	18.8
	09/12/2019	3.2	2.2	19.6
G25	02/10/2019	41.6	17.1	1.2
	09/10/2019	47.6	21	0.2
	18/10/2019	41.1	19.3	1
	23/10/2019	34.7	13.3	4.2
	13/11/2019	29.7	15.9	5.6
	09/12/2019	44.4	18.1	0.3
G26	02/10/2019	0.2	3.2	14.4
	09/10/2019	0.1	0	21.4
	09/10/2019	0.1	3.3	15.1
	18/10/2019	0	4.3	13.8
	23/10/2019	0	4.4	13.9
	13/11/2019	0.3	4.6	12.9

APPENDIX 1 – LANDFILL GAS

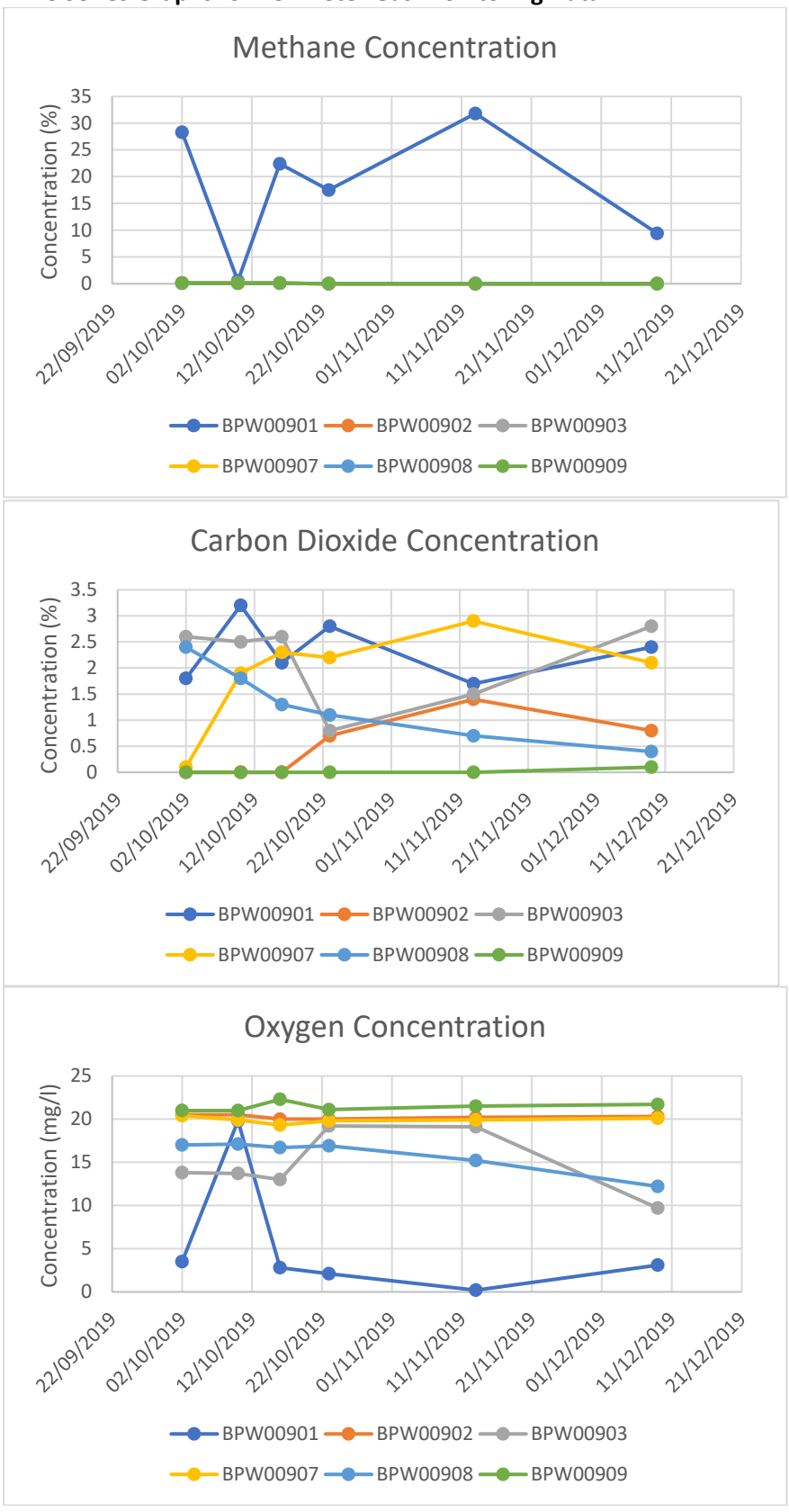
Sample Point	Date	Methane	Carbon Dioxide	Oxygen
		% v/v	% v/v	% v/v
Compliance Limit		1	1.5	N/A
Trigger Limit		0.8	1.3	N/A
	09/12/2019	0.1	3.9	13.7
G27	02/10/2019	0.1	0	21.6
	09/10/2019	0.1	0	21.6
	18/10/2019	0	0	21.5
	23/10/2019	0	0	21.6
	13/11/2019	0.1	0	21.6
	09/12/2019	0.1	0.1	22.8
G29	02/10/2019	20.8	4.5	10.9
	18/10/2019	0	0	21.7
	23/10/2019	0	0	21.6
	13/11/2019	48.8	6.1	1
	13/11/2019	49.2	6.2	1.9
	09/12/2019	18.1	1.9	18.2
G30	02/10/2019	0	0	21.6
	09/10/2019	0.1	0.1	21.5
	18/10/2019	0	0.1	21.4
	23/10/2019	0	0	21.5
	13/11/2019	0	0	21.6
	09/12/2019	0.2	0.4	22.2
G31	02/10/2019	0.1	6.4	15.4
	09/10/2019	0.1	8.8	15.7
	18/10/2019	0	6.6	14.8
	23/10/2019	0	5.8	15.8
	13/11/2019	0	4.4	17.3
	13/11/2019	0	4.5	17.6
	09/12/2019	0.1	1	20.2
G32	02/10/2019	0.1	0.6	21
	09/10/2019	0.1	2.4	19.5
	18/10/2019	0	1.3	20.5
	23/10/2019	0	1.2	20.3
	13/11/2019	0	0.4	22.2
	09/12/2019	0.1	0.3	22.6
G33	02/10/2019	0	0	20.9
	02/10/2019	0	0	21.3
	13/11/2019	0	3.1	16.2
G35	02/10/2019	22.7	12.3	13.5
	09/10/2019	11.1	7.5	17.8
	18/10/2019	3	3.3	20.5
	23/10/2019	1.7	2.4	20.7
	13/11/2019	0.4	2.9	21
	09/12/2019	4.5	8.3	9.1
G36	09/10/2019	35.6	4.8	9.8
	18/10/2019	38.5	5	9.3
	23/10/2019	33.9	5.3	8.2
	13/11/2019	41.2	6.9	5.8
	09/12/2019	0.1	0.4	22.3
G37	09/10/2019	0.1	0.1	21.4
	18/10/2019	0	0.4	21.6
	23/10/2019	0	0.7	21.2

APPENDIX 1 – LANDFILL GAS

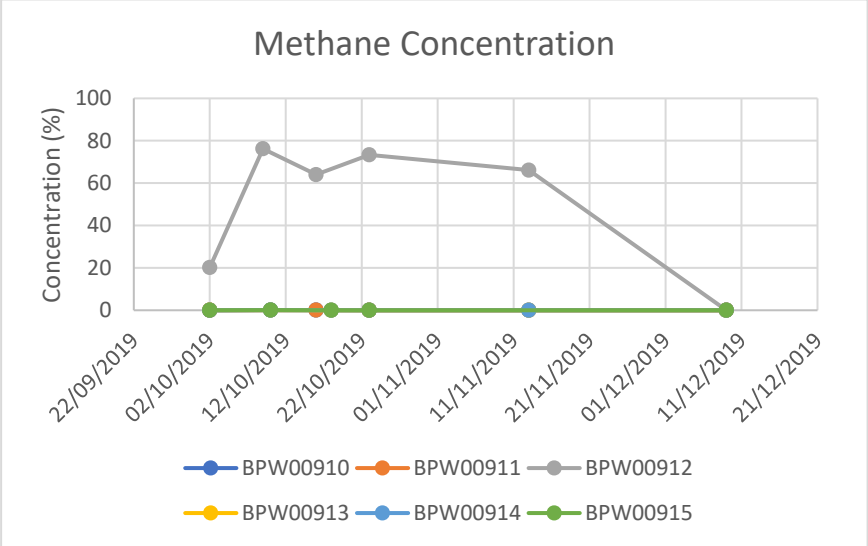
Sample Point	Date	Methane	Carbon Dioxide	Oxygen
		% v/v	% v/v	% v/v
Compliance Limit		1	1.5	N/A
Trigger Limit		0.8	1.3	N/A
	13/11/2019	0	2.1	20.8
	09/12/2019	0.1	1.1	21.3
G38	02/10/2019	1	1.2	20.2
	09/10/2019	28.9	11.7	8
	18/10/2019	50	18.3	1.8
	23/10/2019	30.3	15.9	0.2
	09/12/2019	0	0	22.8
G39	02/10/2019	0.1	2.6	19.2
	09/10/2019	0.3	0	21.7
	18/10/2019	0	0	21.6
	23/10/2019	0	2.1	19.9
	13/11/2019	0	1.2	19.9
	09/12/2019	0.1	0.4	20.7
G40	02/10/2019	1	1.1	18.9
	09/10/2019	0.1	1	18.8
	18/10/2019	0	0.1	21.4
	23/10/2019	0	0.6	20.7
	13/11/2019	0	2.4	18.8
	09/12/2019	0.1	1.5	19
G41	02/10/2019	0.9	2.9	16.2
	09/10/2019	0.8	2.8	15
	18/10/2019	0.1	1.6	20.9
	23/10/2019	0	0.5	21
	13/11/2019	0	2.4	18.2
	09/12/2019	0.1	0.8	19
G42	02/10/2019	0.1	0	21.3
	09/10/2019	0.1	0.7	21.1
	18/10/2019	0	0	21.8
	23/10/2019	0	0	21.6
	13/11/2019	0	0	21.8
	09/12/2019	0.1	0.9	22.3

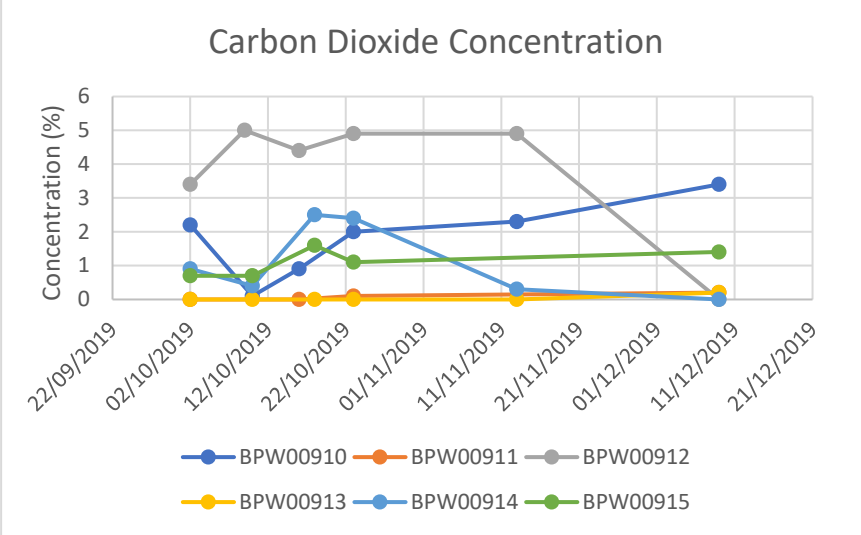
APPENDIX 1 – LANDFILL GAS

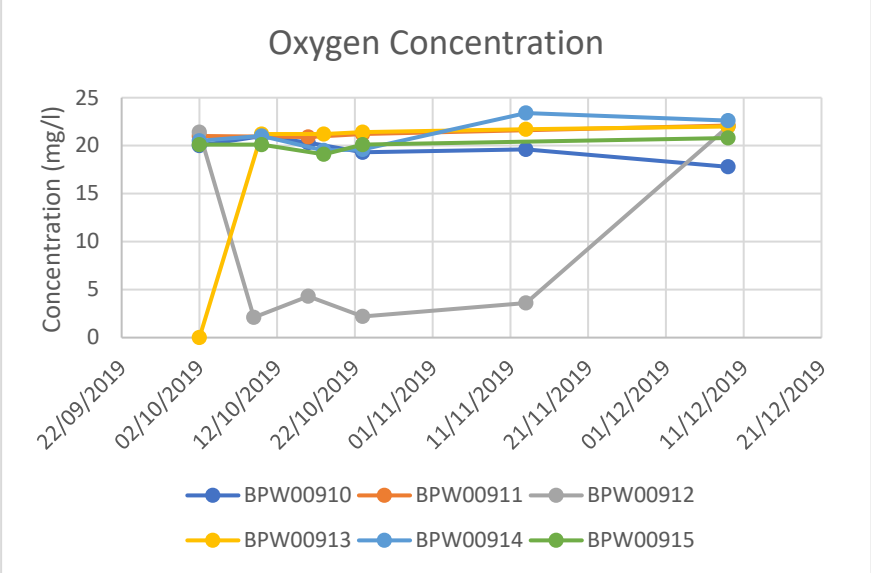
Time Series Graphs for Perimeter Gas Monitoring Data



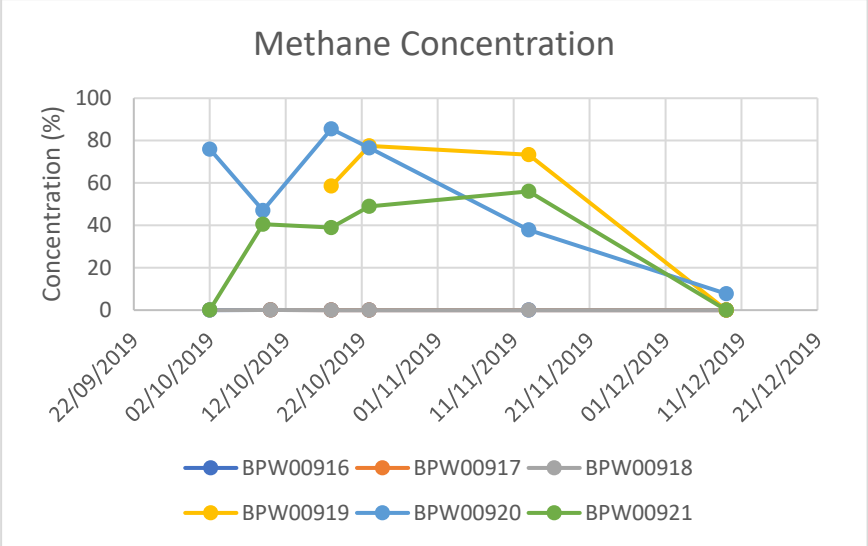
APPENDIX 1 – LANDFILL GAS

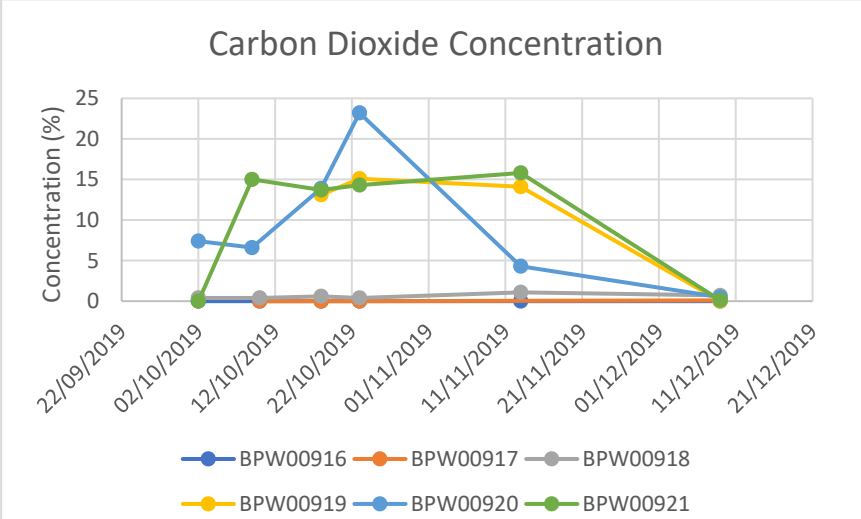


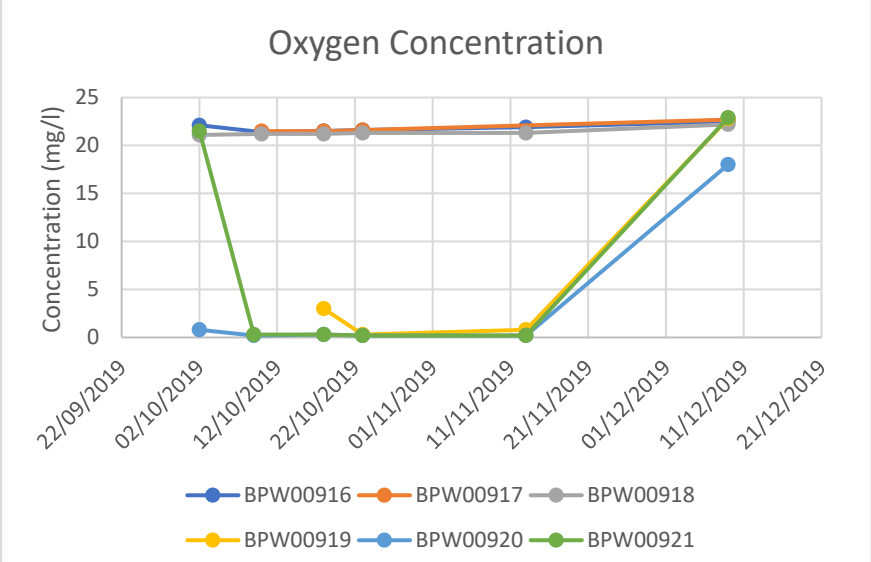




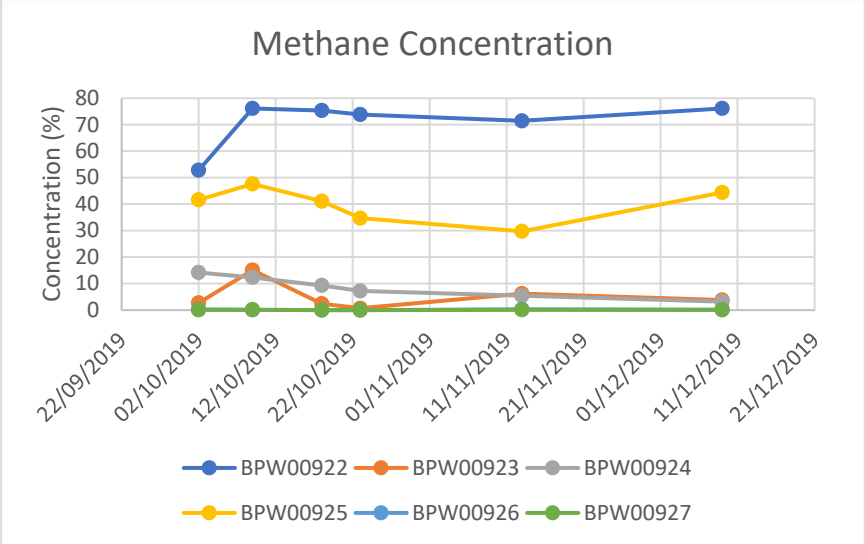
APPENDIX 1 – LANDFILL GAS

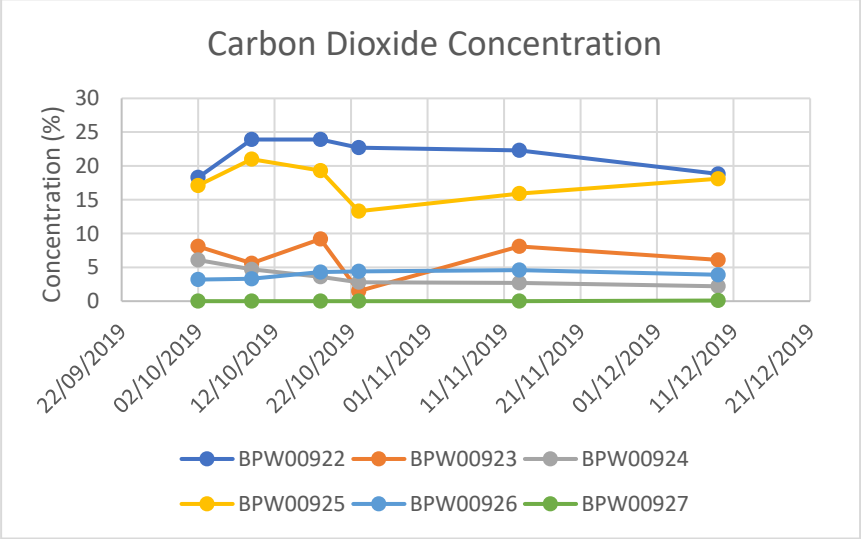


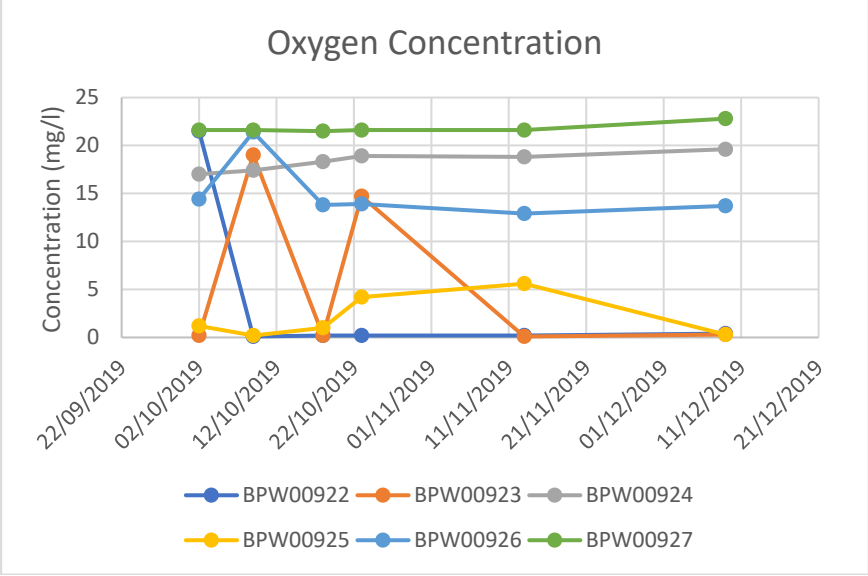




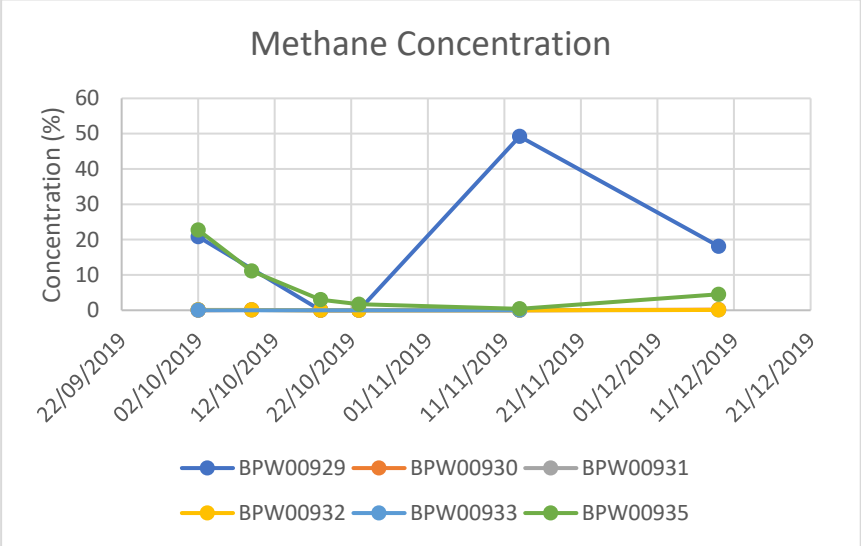
APPENDIX 1 – LANDFILL GAS

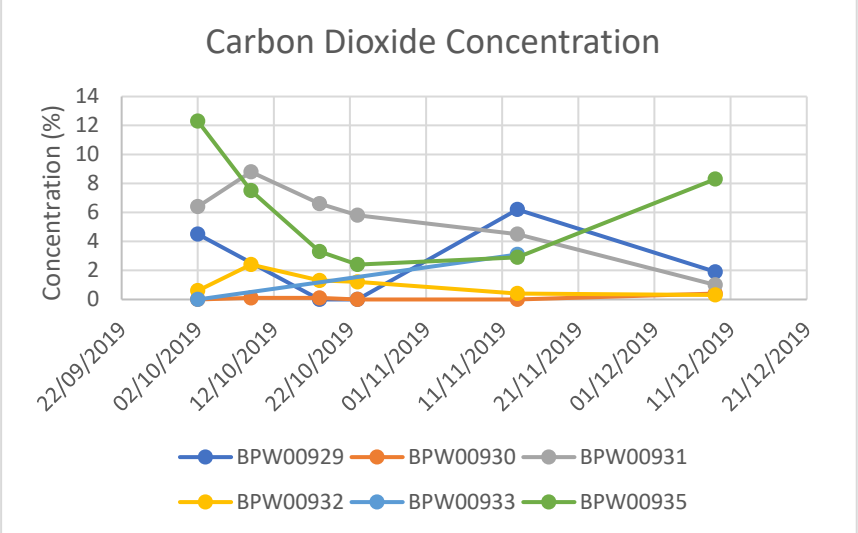


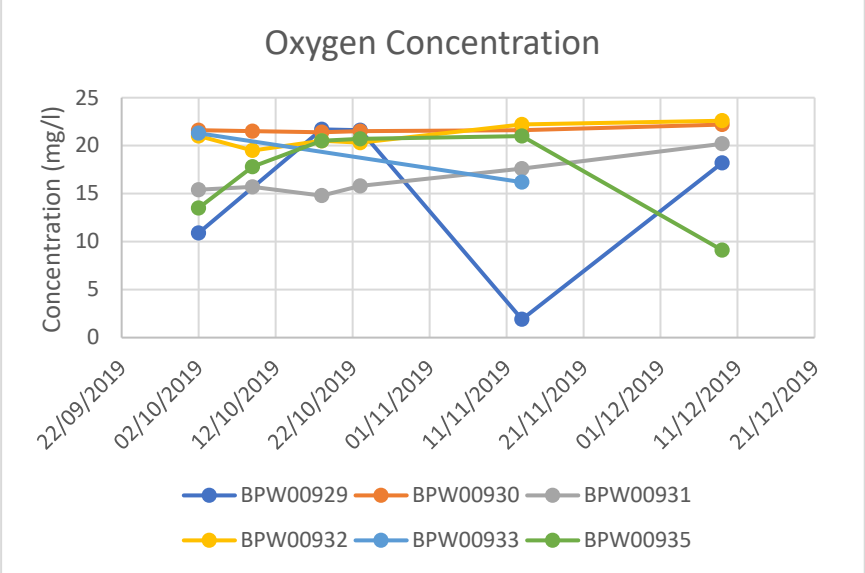




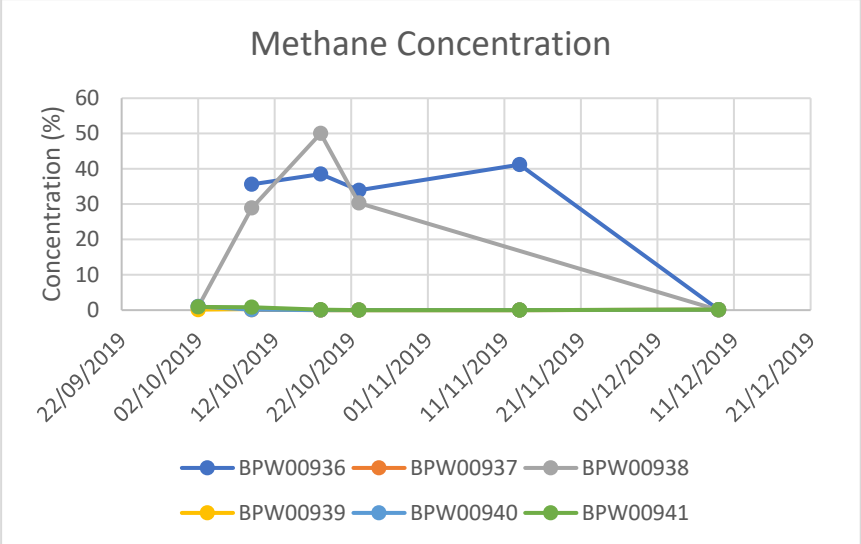
APPENDIX 1 – LANDFILL GAS

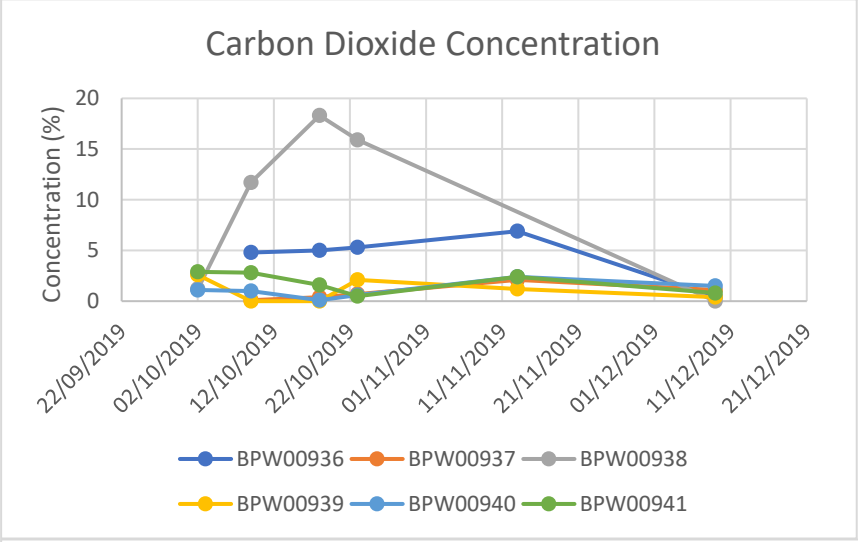


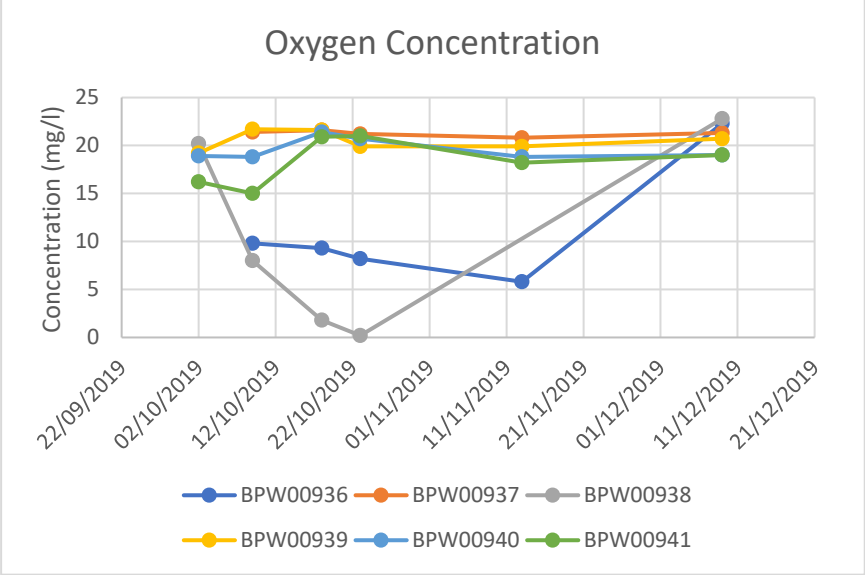




APPENDIX 1 – LANDFILL GAS







Appendix 2

APPENDIX 2 – LEACHATE

Table 1: Leachate Level Data

Location	LCP1			LCP2			LCP3			LCP6			LCP7		
	Cover Level (mAOD)		318.91	Cover Level (mAOD)		348.51	Cover Level (mAOD)		350	Cover Level (mAOD)		339.26	Cover Level (mAOD)		327.12
	Base		310	Base		311	Base		311	Base		310	Base		310
	(mAOD)			(mAOD)			(mAOD)			(mAOD)			(mAOD)		
Date	Dip (mBGL)	Level (mAOD)	Leachate Head (m)	Dip (mBGL)	Level (mAOD)	Leachate Head (m)	Dip (mBGL)	Level (mAOD)	Leachate Head (m)	Dip (mBGL)	Level (mAOD)	Leachate Head (m)	Dip (mBGL)	Level (mAOD)	Leachate Head (m)
03/10/2019	1.33	317.58	7.58	24.31	324.20	13.20	29.57	320.43	9.43	21.48	317.78	7.78	11.80	315.32	5.32
09/10/2019	0.23	318.68	8.68	24.66	323.85	12.85	29.25	320.75	9.75	22.76	316.50	6.50	11.03	316.09	6.09
30/10/2019	0.82	318.09	8.09	27.57	320.94	9.94	31.94	318.06	7.06	22.17	317.09	7.09	12.65	314.47	4.47
06/11/2019	3.48	315.43	5.43	27.51	321.00	10.00	32.19	317.81	6.81	22.54	316.72	6.72	13.48	313.64	3.64
13/11/2019	4.89	314.02	4.02	27.56	320.95	9.95	32.87	317.13	6.13	22.99	316.27	6.27	14.22	312.90	2.90
05/12/2019	1.37	317.54	7.54	28.42	320.09	9.09	32.95	317.05	6.05	22.82	316.44	6.44	15.40	311.72	1.72
09/12/2019	1.68	317.23	7.23	27.35	321.16	10.16	32.85	317.15	6.15	22.90	316.36	6.36	15.10	312.02	2.02
18/12/2019	2.40	316.51	6.51	26.90	321.61	10.61	33.05	316.95	5.95	23.14	316.12	6.12	14.90	312.22	2.22
27/12/2019	1.90	317.01	7.01	27.17	321.34	10.34	32.91	317.09	6.09	23.45	315.81	5.81	12.70	314.42	4.42
EP Limit			1			1			1			1			1
Location	LCP8			RMLP9A			RMLP9B West			RMLP9C			RMLP9D		
	Cover Level (mAOD)		323.69	Cover Level (mAOD)		335.17	Cover Level (mAOD)		340.1	Cover Level (mAOD)		334.11	Cover Level (mAOD)		334.62
	Base		310	Base		307.54	Base		307.83	Base		307	Base		307
	(mAOD)			(mAOD)			(mAOD)			(mAOD)			(mAOD)		
Date	Dip (mBGL)	Level (mAOD)	Leachate Head (m)	Dip (mBGL)	Level (mAOD)	Leachate Head (m)	Dip (mBGL)	Level (mAOD)	Leachate Head (m)	Dip (mBGL)	Level (mAOD)	Leachate Head (m)	Dip (mBGL)	Level (mAOD)	Leachate Head (m)
03/10/2019	7.60	316.09	6.09	22.58	312.59	5.05	23.16	316.94	9.11	8.13	325.98	18.98	4.86	329.76	22.76
09/10/2019	6.30	317.39	7.39	21.91	313.26	5.72	22.04	318.06	10.23	9.02	325.09	18.09	3.66	330.96	23.96
30/10/2019	8.19	315.50	5.50	22.60	312.57	5.03	27.75	312.35	4.52	14.81	319.30	12.30	4.91	329.71	22.71
06/11/2019	9.25	314.44	4.44	22.54	312.63	5.09	28.19	311.91	4.08	15.62	318.49	11.49	4.56	330.06	23.06
13/11/2019	10.01	313.68	3.68	22.37	312.80	5.26	28.97	311.13	3.30	16.04	318.07	11.07	4.87	329.75	22.75
27/11/2019	-	-	-	20.50	314.67	7.13	18.50	321.60	13.77	-	-	-	14.50	320.12	13.12
05/12/2019	7.80	315.89	5.89	22.18	312.99	5.45	30.36	309.74	1.91	13.30	320.81	13.81	16.50	318.12	11.12
09/12/2019	-	-	-	21.70	313.47	5.93	30.40	309.70	1.87	15.90	318.21	11.21	16.80	317.82	10.82
18/12/2019	-	-	-	20.95	314.22	6.68	30.60	309.50	1.67	17.50	316.61	9.61	16.70	317.92	10.92
27/12/2019	-	-	-	19.60	315.57	8.03	30.60	309.50	1.67	16.80	317.31	10.31	16.80	317.82	10.82
EP Limit			1			1			1			1			1

APPENDIX 2 – LEACHATE

Table 2: Monthly raw leachate monitoring data

Perameter	Units	Date	LCP 1	LCP 2	LCP 3	LCP 7	LCP 8	LCP 6	RMLP9A	RMLP9B	RMLP9C	RMLP9D
Ammoniacal Nitrogen as N	mg/l	31/10/2019	73.5	2180	2290	742	495	1470	1590	1990	1720	2110
		29/11/2019	32.1	1910	2140	101	630	1200	1450	697	1420	1260
		15/12/2019	82.3	1960	2050	969	86.4	1080	1380	1900	353	1100
Chloride as Cl	mg/l	31/10/2019	250	8140	4490	960	820	2080	2010	2790	2060	2670
		15/12/2019	341	7830	4310	1550	178	1930	1690	2830	359	1410
pH	pH units	31/10/2019	8	8	8	7.8	7.7	7.8	8.2	8.2	8.2	8.2
		29/11/2019	6.5	8	7.9	7.6	7.5	8.1	8.2	7.8	7.9	8.3
		15/12/2019	7.6	8.1	7.9	7.7	7.5	8.1	8.1	7.9	8	7.7

Table 3: Annual raw leachate monitoring data

Parameters	µnits	LCP1	LCP2	LCP3	LCP6	Sample 2 - LCP6	LCP7	LCP 8	RMLP9A	RMLP9C	RMLP9D
1,1,1,2-Tetrachloroethane	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
1,1,1-Trichloroethane	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
1,1,2,2-Tetrachloroethane	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
1,1,2-Trichloroethane	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
1,1-Dichloroethane	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
1,1-Dichloroethene	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
1,1-Dichloropropene	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
1,2,3-Trichlorobenzene	ng/l	<10	<86	<86	<86	<86	<86	<86	<86	<86	<170
1,2,3-Trichlorobenzene	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
1,2,3-Trichloropropane	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
1,2,4-Trichlorobenzene	ng/l	<10	<68	<68	<68	<68	<68	<68	<68	<68	<134
1,2,4-Trichlorobenzene	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
1,2,4-Trimethylbenzene	µg/l	2.2	8.16	10.1	12.9	13.7	<1.00	6.83	6.39	-	18.1
1,2-Dibromo-3-chloropropane	µg/l	<2.00	<8.00	<8.00	<8.00	<8.00	<2.00	<2.00	<8.00	-	<8.00
1,2-Dibromoethane	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
1,2-Dichlorobenzene	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
1,2-Dichloroethane	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
1,2-Dichloropropane	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
1,3,5-Trichlorobenzene	ng/l	<12	<114	<114	<114	<114	<114	<114	<114	<114	<226
1,3,5-Trimethylbenzene	µg/l	<1.00	<4.00	<4.00	4.04	4.16	<1.00	2.1	<4.00	-	<4.00
1,3-Dichlorobenzene	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00

APPENDIX 2 – LEACHATE

Parameters	µnits	LCP1	LCP2	LCP3	LCP6	Sample 2 - LCP6	LCP7	LCP 8	RMLP9A	RMLP9C	RMLP9D
1,3-Dichloropropane	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
1,4-Dichlorobenzene	µg/l	<1.00	<4.00	4.23	8.51	<4.00	<1.00	4.03	<4.00	-	<4.00
2,2-Dichloropropane	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
2,3,6 - TBA	µg/l	<0.10	<20.0	<20.0	<20.0	<20.0	<2.00	<20.0	<20.0	<20.0	<20.0
2,4 - D	µg/l	<0.10	<20.0	<20.0	<20.0	<20.0	<2.00	<20.0	<20.0	<20.0	<20.0
2,4 - DB	µg/l	<0.10	<20.0	<20.0	<20.0	<20.0	<2.00	<20.0	<20.0	<20.0	<20.0
2,4,5 - T	µg/l	<0.10	<20.0	<20.0	<20.0	<20.0	<2.00	<20.0	<20.0	<20.0	<20.0
2-Chlorotoluene	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
4-Chlorotoluene	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
Aldrin	ng/l	<11	<101	<101	<101	<101	<101	<101	<101	<101	<200
alpha-Chlordane	ng/l	<13	<121	<121	<121	<121	<121	<121	<121	<121	<241
alpha-Endosulphan	ng/l	<18	<169	<169	<169	<169	<169	<169	<169	<169	<338
alpha-HCH	ng/l	<9	<85	<85	<85	<85	<85	<85	<85	<85	<169
Azinphos-ethyl	µg/l	<0.009	<0.085	<0.085	<0.085	<0.085	<0.085	<0.085	<0.085	<0.085	<0.169
Azinphos-methyl	µg/l	<0.008	<0.068	<0.068	<0.068	<0.068	<0.068	<0.068	<0.068	<0.068	0.191
Benzene	µg/l	1.87	<4.00	<4.00	2.64	6.55	<1.00	4.36	5.2	-	13.6
beta-Endosulphan	ng/l	<13	<126	<126	<126	<126	<126	<126	<126	<126	<251
beta-HCH	ng/l	<9	<76	<76	<76	<76	<76	<76	<76	<76	<152
Bromobenzene	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
Bromochloromethane	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
Bromodichloromethane	µg/l	<1.00	<1.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
Bromoform	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
Bromomethane	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
Bromoxynil	µg/l	<0.10	<20.0	<20.0	<20.0	<20.0	<2.00	<20.0	<20.0	<20.0	<20.0
Cadmium , Total as Cd	mg/l	<0.0006	0.0007	0.0008	<0.0006	<0.0006	0.0008	<0.0006	<0.0060	<0.0006	0.0007
Carbon Tetrachloride	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
Carbophenothion	µg/l	<0.014	<0.132	<0.132	<0.132	<0.132	<0.132	<0.132	<0.132	<0.132	<0.263
Chlorfenvinphos	µg/l	<0.010	<0.087	<0.087	<0.087	<0.087	<0.087	<0.087	<0.087	<0.087	<0.174
Chlorobenzene	µg/l	<1.00	<4.00	<4.00	<4.00	6.43	<1.00	4.7	<4.00	-	<4.00
Chloroethane	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
Chloroform	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
Chloromethane	µg/l	<2.00	<8.00	<8.00	<8.00	<8.00	<2.00	<2.00	<8.00	-	<8.00
Chlorotoluron	µg/l	<0.50	<1.00	<1.00	<0.50	<0.50	<0.50	<0.50	<1.00	<1.00	<1.00

APPENDIX 2 – LEACHATE

Parameters	µnits	LCP1	LCP2	LCP3	LCP6	Sample 2 - LCP6	LCP7	LCP 8	RMLP9A	RMLP9C	RMLP9D
Chlorpyriphos	µg/l	<0.007	<0.064	<0.064	<0.064	<0.064	<0.064	<0.064	<0.064	<0.064	<0.126
Chromium , Total as Cr	mg/l	0.004	0.132	0.31	0.122	0.155	0.038	0.073	0.264	0.44	0.247
cis-1,2-Dichloroethene	µg/l	4.3	1.19	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
cis-1,3-Dichloropropene	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
Copper, Total as Cu	mg/l	0.84	0.485	1.12	0.342	0.029	0.137	0.1	0.544	0.519	1.01
Cyanide, Total as CN	mg/l	<0.009	0.016	0.012	0.013	0.022	<0.009	<0.009	0.014	-	0.016
Diazinon	µg/l	<0.012	<0.109	<0.109	<0.109	<0.109	<0.109	<0.109	<0.109	<0.109	<0.217
Dibromochloromethane	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
Dibromomethane	µg/l	<1.00	<1.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
Dicamba	µg/l	<0.10	<20.0	<20.0	<20.0	<20.0	<2.00	<20.0	<20.0	<20.0	<20.0
Dichlobenil	ng/l	<9	<83	<83	<83	<83	<83	<83	<83	<83	212
Dichlorodifluoromethane	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
Dichloromethane	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
Dichlorprop	µg/l	<0.10	<20.0	<20.0	<20.0	<20.0	<2.00	<20.0	<20.0	<20.0	<20.0
Dichlorvos	µg/l	<0.006	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.097
Dieldrin	ng/l	<12	<108	<108	<108	<108	<108	<108	<108	<108	<215
Dimethoate	µg/l	<0.02	<0.139	<0.139	<0.139	<0.139	<0.139	<0.139	<0.139	<0.139	<0.276
Diuron	µg/l	<0.50	<1.00	<1.00	<0.50	<0.50	<0.50	<0.50	<1.00	<1.00	<1.00
EH >C10 - C16	µg/l	66	1180	1270	757	779	<100	359	1640	849	1800
EH >C16 - C24	µg/l	<40	332	118	288	368	<100	142	514	208	717
EH >C24 - C40	µg/l	<40	110	319	203	282	<100	122	210	<100	533
EH >C6 - C40	µg/l	66	1620	1820	1400	1550	<100	624	2370	1230	3640
EH >C6 - C8	µg/l	<40	<100	<100	<100	<100	<100	<100	<100	<100	211
EH >C8 - C10	µg/l	<40	<100	115	148	123	<100	<100	<100	177	380
Endrin	ng/l	<14	<128	<128	<128	<128	<128	<128	<128	<128	<255
Ethyl Benzene	µg/l	8.54	14.2	13.5	9.36	24.9	<1.00	10.6	10.2	-	14.8
Fenitrothion	µg/l	<0.010	<0.089	<0.089	<0.089	<0.089	<0.089	<0.089	<0.089	<0.089	<0.176
Fenthion	µg/l	<0.011	<0.097	<0.097	<0.097	<0.097	<0.097	<0.097	<0.097	<0.097	<0.192
gamma-Chlordane	ng/l	<13	<120	<120	<120	<120	<120	<120	<120	<120	<239
gamma-HCH	ng/l	<9.3	<83.5	<83.5	<83.5	<83.5	<83.5	<83.5	<83.5	<83.5	<166.0
Heptachlor Epoxide	ng/l	<14	<136	<136	<136	<136	<136	<136	<136	<136	<271
Hexachlorobenzene	ng/l	<9	<78	<78	<78	<78	<78	<78	<78	<78	<155
Hexachlorobutadiene	ng/l	<7	<67	<67	<67	<67	<67	<67	<67	<67	<132

APPENDIX 2 – LEACHATE

Parameters	µnits	LCP1	LCP2	LCP3	LCP6	Sample 2 - LCP6	LCP7	LCP 8	RMLP9A	RMLP9C	RMLP9D
Hexachlorobutadiene	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
Ioxynil	µg/l	<0.10	<20.0	<20.0	<20.0	<20.0	<2.00	<20.0	<20.0	<20.0	<20.0
Isodrin	ng/l	<13	<124	<124	<124	<124	<124	<124	<124	<124	<247
iso-Propylbenzene	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
Isoproturon	µg/l	<0.50	<1.00	<1.00	<0.50	<0.50	<0.50	<0.50	<1.00	<1.00	<1.00
Lead , Total as Pb	mg/l	0.048	0.015	0.13	0.028	0.007	0.03	0.006	0.495	0.037	0.07
Linuron	µg/l	<0.50	<1.00	<1.00	<0.50	<0.50	<0.50	<0.50	<1.00	<1.00	<1.00
m&p Xylene	µg/l	16.7	22.4	32.6	26.5	49.6	<1.00	15.3	16.6	-	32.1
Malathion	µg/l	<0.011	<0.096	<0.096	<0.096	<0.096	<0.096	<0.096	<0.096	<0.096	<0.192
MCPA	µg/l	0.54	<20.0	<20.0	<20.0	<20.0	<2.00	<20.0	<20.0	<20.0	<20.0
MCPB	µg/l	<0.10	<20.0	<20.0	<20.0	<20.0	<2.00	<20.0	<20.0	<20.0	<20.0
Mecoprop	µg/l	2.6	90.3	46.7	38.7	<16.0	1.85	22.2	27.9	102	37.8
Mercury, Total as Hg	mg/l	<0.00010	-	-	-	-	<0.00010	-	-	-	-
Methabenzthiazuron	µg/l	<0.50	<1.00	<1.00	<0.50	<0.50	<0.50	<0.50	<1.00	<1.00	<1.00
Mevinphos	µg/l	<0.020	<0.083	<0.083	<0.083	<0.083	<0.083	<0.083	<0.083	<0.083	<0.165
Monolinuron	µg/l	<0.50	<1.00	<1.00	<0.50	<0.50	<0.50	<0.50	<1.00	<1.00	<1.00
Monuron	µg/l	<0.50	<1.00	<1.00	<0.50	<0.50	<0.50	<0.50	<1.00	<1.00	<1.00
MTBE	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
Naphthalene	µg/l	<1.00	7.82	5.24	4.61	<4.00	<1.00	4.32	4.2	-	14.7
n-butylbenzene	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
Nickel, Total as Ni	mg/l	0.032	0.266	0.504	0.271	0.074	0.059	0.083	0.273	0.174	0.105
n-propylbenzene	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	1.08	<4.00	-	<4.00
o,p - DDE	ng/l	<9	<78	<78	<78	<78	<78	<78	<78	<78	<155
o,p - DDT	ng/l	<10	<90	<90	<90	<90	<90	<90	<90	<90	<179
o,p - TDE	ng/l	<9	<86	<86	<86	<86	<86	<86	<86	<86	<171
o-Xylene	µg/l	3.87	9.24	10.5	10	16.3	<1.00	6.15	7.25	-	14.4
p,p - DDE	ng/l	<10	<86	<86	<86	<86	<86	<86	<86	<86	<172
p,p - DDT	ng/l	<14	<129	<129	<129	<129	<129	<129	<129	<129	<257
p,p - TDE	ng/l	<9	<78	<78	<78	<78	<78	<78	<78	<78	<155
Parathion-ethyl	µg/l	<0.009	<0.085	<0.085	<0.085	<0.085	<0.085	<0.085	<0.085	<0.085	<0.169
Parathion-methyl	µg/l	<0.008	<0.076	<0.076	<0.076	<0.076	<0.076	<0.076	<0.076	<0.076	<0.151
Phorate	µg/l	<0.013	<0.120	<0.120	<0.120	<0.120	<0.120	<0.120	<0.120	<0.120	<0.238
Phosalone	µg/l	<0.016	<0.147	<0.147	<0.147	<0.147	<0.147	<0.147	<0.147	<0.147	<0.294

APPENDIX 2 – LEACHATE

Parameters	µnits	LCP1	LCP2	LCP3	LCP6	Sample 2 - LCP6	LCP7	LCP 8	RMLP9A	RMLP9C	RMLP9D
Pirimiphos-methyl	µg/l	<0.010	<0.089	<0.089	<0.089	<0.089	<0.089	<0.089	<0.089	<0.089	<0.178
p-isopropyltoluene	µg/l	3.86	46.5	20.2	34.3	19.1	<1.00	2.07	20.8	-	20.2
Propetamphos	µg/l	<0.008	<0.069	<0.069	<0.069	<0.069	<0.069	<0.069	<0.069	<0.069	<0.137
sec-butylbenzene	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
Styrene	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
Tecnazene	ng/l	<34	<334	<334	<334	<334	<334	<334	<334	<334	<667
tert-Butylbenzene	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
Tetrachloroethene	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
Toluene	µg/l	17.9	19.6	74.2	15	14.8	<1.00	4.92	14.4	-	59.1
trans-1,2-Dichloroethene	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
trans-1,3-Dichloropropene	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
Triallate	ng/l	<42	<411	<411	<411	<411	<411	<411	<411	<411	<820
Triazophos	µg/l	<0.009	<0.083	<0.083	<0.083	<0.083	<0.083	<0.083	<0.083	<0.083	0.201
Tributyl Tin	µg/l	<3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Trichloroethene	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
Trichlorofluoromethane	µg/l	<1.00	<4.00	<4.00	<4.00	<4.00	<1.00	<1.00	<4.00	-	<4.00
Trifluralin	ng/l	<37	<359	<359	<359	<359	<359	<359	<359	<359	<718
Triphenyl Tin	µg/l	<3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Vinyl Chloride	µg/l	1.33	<2.00	<2.00	<2.00	<2.00	<0.500	<0.500	<2.00	-	<2.00
Xylene, Total	µg/l	20.5	31.7	43.1	36.5	65.9	<1.00	21.4	23.8	-	46.5
Zinc, Total as Zn	mg/l	0.233	0.31	1.74	0.238	0.275	0.312	0.08	1.32	1.16	1.07

APPENDIX 2 – LEACHATE

Table 4: Final discharge monthly monitoring data (EP exceedances highlighted)

Parameter	Unit	Discharge Consent	Treated Leachate		
			31/10/2019	29/11/2019	15/12/2019
Ammoniacal Nitrogen as N	mg/l	150	88.7	66.5	59.3
BOD + ATU (20 day)	mg/l	-	302	-	191
BOD + ATU (5 day)	mg/l	-	44	-	13
COD (1 hr settled)	mg/l	1000	360	497	636
COD (Filtered)	mg/l	-	349	-	601
COD (Total)	mg/l	-	441	-	633
EH >C6 - C40	ug/l	-	1030	-	1370
Methane, Dissolved	mg/l	-	0.011	<0.010	<0.010
pH	pH units	6 to 10	5.8	6.1	6.2
Sulphate as SO4, High Level	mg/l	1000	82	-	41.4
Total Suspended Solids	mg/l	500	86	51	18

APPENDIX 2 – LEACHATE

Table 5: Final discharge quarterly monitoring data

Sample Matrix	unit	Treated Leachate
Cadmium , Total as Cd	mg/l	<0.0006
Chromium , Total as Cr	mg/l	0.03
Copper, Total as Cu	mg/l	0.035
Lead , Total as Pb	mg/l	<0.006
Mercury, Total as Hg	mg/l	<0.00020
Nickel, Total as Ni	mg/l	0.046
Zinc, Total as Zn	mg/l	0.148
Cyanide, Total as CN	mg/l	0.243
1,1,1,2-Tetrachloroethane	µg/l	<1.00
1,1,1-Trichloroethane	µg/l	<1.00
1,1,2,2-Tetrachloroethane	µg/l	<1.00
1,1,2-Trichloroethane	µg/l	<1.00
1,1-Dichloroethane	µg/l	<1.00
1,1-Dichloroethene	µg/l	<1.00
1,1-Dichloropropene	µg/l	<1.00
1,2,3-Trichlorobenzene	µg/l	<1.00
1,2,3-Trichloropropane	µg/l	<1.00
1,2,4-Trichlorobenzene	µg/l	<1.00
1,2,4-Trimethylbenzene	µg/l	<1.00
1,2-Dibromo-3-chloropropane	µg/l	<2.00
1,2-Dibromoethane	µg/l	<1.00
1,2-Dichlorobenzene	µg/l	<1.00
1,2-Dichloroethane	µg/l	<1.00
1,2-Dichloropropane	µg/l	<1.00
1,3,5-Trimethylbenzene	µg/l	<1.00
1,3-Dichlorobenzene	µg/l	<1.00
1,3-Dichloropropane	µg/l	<1.00
1,4-Dichlorobenzene	µg/l	<1.00
2,2-Dichloropropane	µg/l	<1.00
2,3,6 - TBA	µg/l	<20.0
2,4 - D	µg/l	<20.0
2,4 - DB	µg/l	<20.0
2,4,5 - T	µg/l	<20.0
2-Chlorotoluene	µg/l	<1.00
4-Chlorotoluene	µg/l	<1.00
Benzene	µg/l	<1.00
Bromobenzene	µg/l	<1.00
Bromochloromethane	µg/l	<1.00
Bromodichloromethane	µg/l	<1.00
Bromoform	µg/l	<1.00
Bromomethane	µg/l	<1.00
Bromoxynil	µg/l	<20.0
Carbon Tetrachloride	µg/l	<1.00
Chlorobenzene	µg/l	<1.00
Chloroethane	µg/l	<1.00
Chloroform	µg/l	<1.00
Chloromethane	µg/l	<2.00
cis-1,2-Dichloroethene	µg/l	<1.00
cis-1,3-Dichloropropene	µg/l	<1.00
Dibromochloromethane	µg/l	<1.00
Dibromomethane	µg/l	<1.00
Dicamba	µg/l	<20.0
Dichlorodifluoromethane	µg/l	<1.00
Dichloromethane	µg/l	<1.00
Dichlorprop	µg/l	<20.0

APPENDIX 2 – LEACHATE

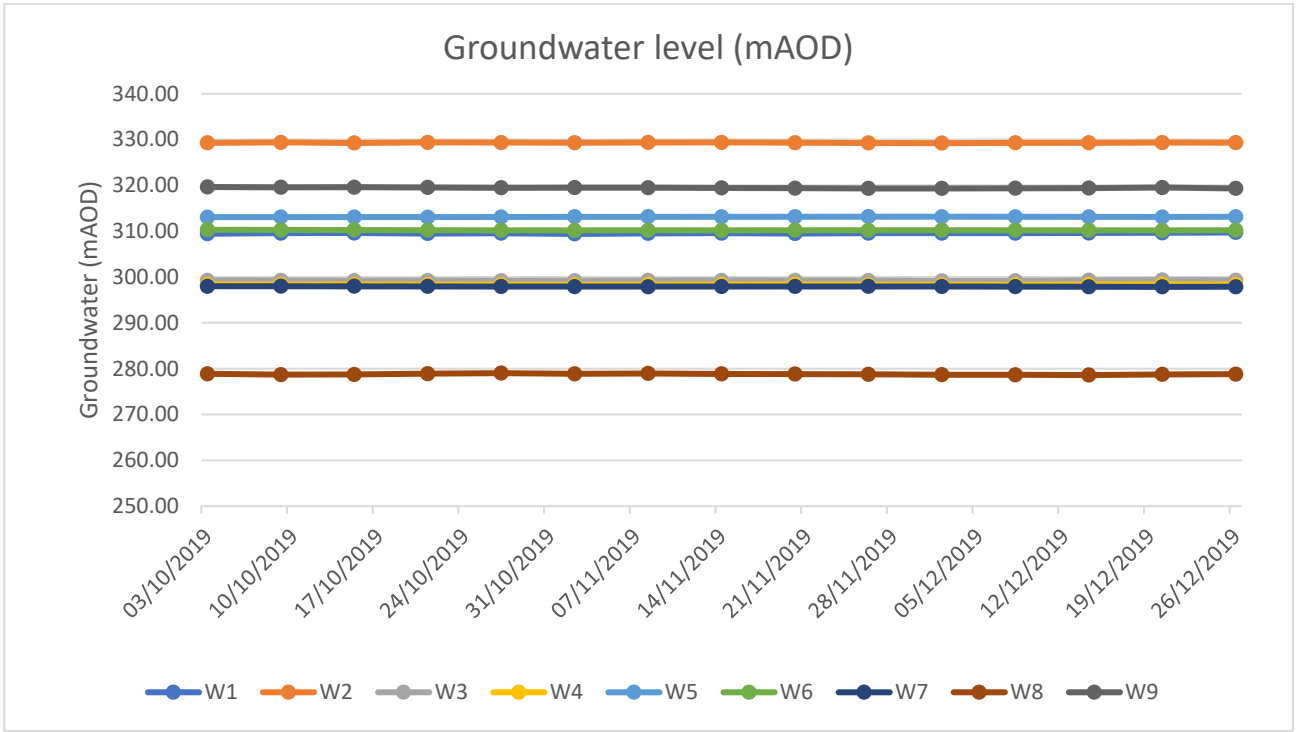
Sample Matrix	unit	Treated Leachate
EH >C10 - C16	µg/l	1540
EH >C16 - C24	µg/l	147
EH >C24 - C40	µg/l	<100
EH >C6 - C40	µg/l	1690
EH >C6 - C8	µg/l	<100
EH >C8 - C10	µg/l	<100
Ethyl Benzene	µg/l	<1.00
Fenthion	µg/l	<0.192
Hexachlorobenzene	µg/l	<155
Hexachlorobutadiene	µg/l	<1.00
Ioxynil	µg/l	<20.0
iso-Propylbenzene	µg/l	<1.00
m&p Xylene	µg/l	<1.00
MCPA	µg/l	<20.0
MCPB	µg/l	<20.0
Mecoprop	µg/l	<16.0
MTBE	µg/l	<1.00
Naphthalene	µg/l	<1.00
n-butylbenzene	µg/l	<1.00
n-propylbenzene	µg/l	<1.00
o-Xylene	µg/l	<1.00
p-isopropyltoluene	µg/l	<1.00
sec-butylbenzene	µg/l	<1.00
Styrene	µg/l	<1.00
Sulphate as SO4, High Level	mg/l	50.4
tert-Butylbenzene	µg/l	<1.00
Tetrachloroethene	µg/l	<1.00
Toluene	µg/l	<1.00
trans-1,2-Dichloroethene	µg/l	<1.00
trans-1,3-Dichloropropene	µg/l	<1.00
Trichloroethene	µg/l	<1.00
Trichlorofluoromethane	µg/l	<1.00
Vinyl Chloride	µg/l	<0.500
Xylene, Total	µg/l	<1.00

Appendix 3

APPENDIX 3 – GROUNDWATER

Table 1: Weekly level data (calculated metres above ordinance datum)

mAOD	W1	W2	W3	W4	W5	W6	W7	W8	W9
03/10/2019	309.44	329.27	299.26	298.35	313.06	310.31	297.97	278.86	319.66
09/10/2019	309.57	329.36	299.24	298.39	313.08	310.26	298.01	278.69	319.57
15/10/2019	309.59	329.24	299.19	298.36	313.09	310.27	297.98	278.72	319.59
21/10/2019	309.47	329.36	299.22	298.33	313.04	310.23	297.96	278.90	319.53
27/10/2019	309.54	329.33	299.17	298.31	313.07	310.19	297.94	279.03	319.46
02/11/2019	309.43	329.29	299.19	298.27	313.14	310.16	297.90	278.86	319.50
08/11/2019	309.51	329.34	299.24	298.33	313.18	310.17	297.86	278.96	319.48
14/11/2019	309.57	329.37	299.26	298.35	313.12	310.14	297.91	278.85	319.43
20/11/2019	309.48	329.30	299.25	298.37	313.14	310.21	297.94	278.82	319.37
26/11/2019	309.57	329.24	299.22	298.32	313.17	310.16	297.96	278.76	319.32
02/12/2019	309.57	329.23	299.15	298.28	313.15	310.23	297.93	278.68	319.33
08/12/2019	309.56	329.28	299.18	298.29	313.10	310.22	297.89	278.65	319.35
14/12/2019	309.59	329.27	299.27	298.36	313.12	310.17	297.86	278.62	319.39
20/12/2019	309.63	329.33	299.34	298.38	313.09	310.16	297.84	278.75	319.52
26/12/2019	309.72	329.31	299.29	298.34	313.15	310.20	297.86	278.79	319.33



APPENDIX 3 – GROUNDWATER

Table 3: Groundwater Monthly monitoring data

Parameter	Unit	Compliance Limit	Date	GW 1	GW 2	GW 3	GW 4	GW 5	GW 6	GW 7	GW 8	GW 9	GW10
Ammoniacal Nitrogen as N	mg/l	2	Oct-19	-	<0.41	<0.41	1.44	0.96	<0.41	<0.41	<0.41	<0.41	-
			Nov-19	<0.41	<0.41	15.1	1.5	1.15	<0.41	<0.41	<0.41	<0.41	-
			Dec-19	<0.41	<0.41	<0.41	1.13	1.17	<0.41	<0.41	<0.41	<0.41	<0.41
Chloride as Cl	mg/l	69	Oct-19	-	32.7	10.6	22.7	23.8	20.6	13.8	23.1	18.7	-
			Nov-19	269	28.5	14.4	22.1	23.8	15.2	14.7	16	16.9	-
			Dec-19	268	33.2	11.5	18.4	18.2	12.9	12.5	13.6	19.2	21.3
Conductivity-Electrical 20C	uS/cm	-	Oct-19	-	177	120	318	205	167	270	314	176	-
			Nov-19	847	178	221	317	198	135	291	268	176	-
			Dec-19	855	190	137	313	201	125	314	279	168	465
Cyanide, Total as CN	mg/l	-	Oct-19	-	-	<0.009	<0.009	0.051	<0.009	<0.009	<0.009	<0.009	-
			Nov-19	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	-
			Dec-19	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
pH	pH units	-	Oct-19	-	7.7	6.3	7.4	7.4	6.8	7.5	7.6	7.7	-
			Nov-19	6.6	7.5	7.1	7.4	6.4	6.7	7.9	7.6	6.9	-
			Dec-19	6.3	6.7	5.8	6.9	6.3	6.4	7.2	7.2	6.3	6.8
Sulphate as SO4	mg/l	-	Oct-19	-	<4.4	23.2	27.5	26.4	6.4	9	21.7	24.1	-
			Nov-19	8.4	<4.4	16.5	31.4	25.2	5.2	18.4	24.3	23.1	-
			Dec-19	7.3	<4.4	24.9	32.7	24.3	<4.4	20	24.8	30.3	143

APPENDIX 3 – GROUNDWATER

Table 4: Groundwater Quarterly monitoring data (with compliance limits)

Reference	Unit	Trigger	W1	W2	W3	W4	W5	W6	W7	W8	W9
Cadmium , Total as Cd	**mg/l**	**0.0056**	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006
Nickel , Total as Ni	**mg/l**	**0.12**	<0.003	<0.003	0.01	0.004	0.008	0.016	<0.003	<0.003	<0.003
Toluene	**µg/l**	**4**	<1.00	<1.00	2.7	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Total Xylenes	**µg/l**	**3**	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Zinc, Total as Zn	**mg/l**	**0.85**	0.02	0.06	0.105	0.02	0.15	0.05	0.09	<0.018	0.11
Ethyl Benzene	**µg/l**	**1**	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Mecoprop	**µg/l**	**0.1**	<0.04	<0.04	<1.60	0.12	0.15	<0.04	<0.04	<0.04	<0.04
2,4 - D	**µg/l**	**0.1**	<0.05	<0.05	<2.00	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05

Table 5: Groundwater Quarterly monitoring data (without compliance limits)

Reference	Unit	W1	W2	W3	W4	W5	W6	W7	W8	W9
Acenaphthene	ug/l	<0.02	<0.02	<0.10	<0.02	<0.01	<0.01	<0.02	-	-
Acenaphthylene	ug/l	<0.02	<0.02	<0.10	<0.02	<0.01	<0.01	<0.02	<0.01	-
Alkalinity as CaCO3	mg/l	19.2	52	73.4	112	42.8	40.6	130	107	38.4
Anthracene	ug/l	<0.02	<0.02	<0.10	<0.02	<0.01	<0.01	<0.02	<0.01	-
Antimony Ultra Low Total as Sb	mg/l	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Arsenic, Ultra Low Total as As	mg/l	0.0023	0.0016	0.011	0.017	0.0058	0.036	0.056	0.0015	0.00046
Benzene	ug/l	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo (a) anthracene	ug/l	<0.02	<0.02	<0.10	<0.02	<0.01	<0.01	<0.02	<0.01	-
Benzo (a) pyrene	ug/l	<0.02	<0.02	<0.10	<0.02	<0.01	<0.01	<0.02	<0.01	-
Benzo (b) fluoranthene	ug/l	<0.02	<0.02	<0.10	<0.02	<0.01	<0.01	<0.02	<0.01	-
Benzo (g,h,i) perylene	ug/l	<0.02	<0.02	<0.10	<0.02	<0.01	<0.01	<0.02	<0.01	-
Benzo (k) fluoranthene	ug/l	<0.02	<0.02	<0.10	<0.02	<0.01	<0.01	<0.02	<0.01	-
Bicarbonate Alkalinity	mg/l	19.2	52	73.4	112	42.8	40.6	130	107	38.4
Calcium , Total as Ca	mg/l	9.61	9.34	12.7	38.4	17	14.4	41.3	37.9	14.1
Chromium , Total as Cr	mg/l	<0.002	<0.002	<0.002	<0.002	0.004	<0.002	<0.002	<0.002	<0.002
Chrysene	ug/l	<0.02	<0.02	<0.10	<0.02	<0.01	<0.01	<0.02	<0.01	-
Copper, Total as Cu	mg/l	<0.009	<0.009	0.012	<0.009	0.022	0.023	<0.009	<0.009	<0.009
Dibenz (a,h) anthracene	ug/l	<0.02	<0.02	<0.10	<0.02	<0.01	<0.01	<0.02	<0.01	-
Dissolved Oxygen, Fixed	mg/l	3.7	4.4	1.5	<0.5	1.9	5.5	3.5	3.6	5.5
Fluoranthene	ug/l	<0.02	<0.02	<0.10	<0.02	<0.01	<0.01	<0.02	<0.01	-
Fluorene	ug/l	<0.02	<0.02	<0.10	<0.02	<0.01	<0.01	<0.02	<0.01	-
Indeno (1,2,3) cd pyrene	ug/l	<0.02	<0.02	<0.10	<0.02	<0.01	<0.01	<0.02	<0.01	-
Iron , Total as Fe	mg/l	0.66	1.39	7.82	5.69	3.84	1.28	7.62	0.83	<0.23
Lead , Total as Pb	mg/l	<0.006	<0.006	0.023	<0.006	0.024	0.006	0.094	0.01	<0.006

APPENDIX 3 – GROUNDWATER

Reference	Unit	W1	W2	W3	W4	W5	W6	W7	W8	W9
m&p Xylene	ug/l	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Magnesium, Total as Mg	mg/l	2.2	1.2	2.7	8.7	4.2	3.7	6.8	9.2	4.5
Manganese , Total as Mn	mg/l	0.318	0.031	2.94	3.45	1.78	3.04	1.55	0.949	0.087
Mercury, Total as Hg	mg/l	0.00003	<0.00001	<0.00010	<0.00001	0.00003	0.00001	0.00002	<0.00001	0.00001
Naphthalene	ug/l	<0.02	<0.02	<0.10	<0.02	<0.01	<0.01	<0.02	<0.01	-
Nitrate as N	mg/l	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
o-Xylene	ug/l	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
PAH, Total	ug/l	<0.02	<0.02	<0.10	<0.02	<0.01	<0.01	<0.02	<0.01	-
Phenanthrene	ug/l	<0.02	<0.02	<0.10	<0.02	<0.01	<0.01	<0.02	<0.01	-
Phenols Mono (Phenol Index)	mg/l	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Potassium , Total as K	mg/l	1.14	3.78	0.85	2.58	2.77	2.2	2.52	1.3	0.9
Pyrene	ug/l	<0.02	<0.02	<0.10	<0.02	<0.01	<0.01	<0.02	<0.01	-
Selenium Ultra Low Total as Se	mg/l	<0.00060	<0.00060	<0.00060	<0.00060	<0.00060	<0.00060	<0.00060	<0.00060	<0.00060
Silver , Total as Ag	mg/l	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007
Sodium , Total as Na	mg/l	148	23.8	8.11	12.8	6.19	12.8	13	9.75	12.6

Appendix 4

APPENDIX 4 – SURFACE WATER

Table 1: Monthly monitoring data

LOCATION	DATE	pH	Conductivity-Electrical 20C	Ammoniacal Nitrogen as N (LL)	Chloride as Cl	Total Suspended Solids	BOD + ATU (5 day)	EH >C6 - C40	EH >C6 - C8	EH >C8 - C10	EH >C16 - C24	EH >C24 - C40	EH >C10 - C16
		pH units	µS/cm	mg/l	mg/l	mg/l	mg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Compliance Limit		6 - 9	N/A	0.25	N/A	50	N/A	N/A	N/A	N/A	N/A	N/A	N/A
P1 (SW 1)	Oct-19	7.3	115	<0.06	10.3	1	1	<20	<20	<20	<20	<20	<20
	Nov-19	6.8	98.8	<0.06	7.5	3	1	22	<20	<20	<20	22	<20
	Dec-19	7.3	90.3	<0.06	7.1	2	2	<20	<20	<20	<20	<20	<20
P2 (SW 2)	Oct-19	8	267	<0.06	11.6	30	1	<20	<20	<20	<20	<20	<20
	Nov-19	7.8	278	<0.06	16.7	99	3	<20	<20	<20	<20	<20	<20
	Dec-19	7.5	173	<0.06	17	34	2	35	<20	<20	<20	35	<20

APPENDIX 4 – SURFACE WATER

Table 2: Quarterly monitoring data

Sample Matrix	units	SW 1	SW 2
Cadmium , Total as Cd	mg/l	<0.0006	<0.0006
Dissolved Oxygen, Fixed	mg/l	9.9	8.8
COD (Total)	mg/l	41	34
Cyanide, Total as CN	mg/l	<0.009	<0.009
2,3,6 - TBA	µg/l	<0.05	<0.10
2,4 - D	µg/l	<0.05	<0.10
2,4 - DB	µg/l	<0.05	<0.10
2,4,5 - T	µg/l	<0.05	<0.10
Bromoxynil	µg/l	<0.05	<0.10
Dicamba	µg/l	<0.05	<0.10
Dichlorprop	µg/l	<0.05	<0.10
Ioxynil	µg/l	<0.05	<0.10
MCPA	µg/l	<0.05	<0.10
MCPB	µg/l	<0.05	<0.10
Mecoprop	µg/l	<0.04	<0.08
1,1,1,2-Tetrachloroethane	µg/l	<1.00	<1.00
1,1,1-Trichloroethane	µg/l	<1.00	<1.00
1,1,2,2-Tetrachloroethane	µg/l	<1.00	<1.00
1,1,2-Trichloroethane	µg/l	<1.00	<1.00
1,1-Dichloroethane	µg/l	<1.00	<1.00
1,1-Dichloroethene	µg/l	<1.00	<1.00
1,1-Dichloropropene	µg/l	<1.00	<1.00
1,2,3-Trichlorobenzene	µg/l	<1.00	<1.00
1,2,3-Trichloropropane	µg/l	<1.00	<1.00
1,2,4-Trichlorobenzene	µg/l	<1.00	<1.00
1,2,4-Trimethylbenzene	µg/l	<1.00	<1.00
1,2-Dibromo-3-chloropropane	µg/l	<2.00	<2.00
1,2-Dibromoethane	µg/l	<1.00	<1.00
1,2-Dichlorobenzene	µg/l	<1.00	<1.00
1,2-Dichloroethane	µg/l	<1.00	<1.00
1,2-Dichloropropane	µg/l	<1.00	<1.00
1,3,5-Trimethylbenzene	µg/l	<1.00	<1.00
1,3-Dichlorobenzene	µg/l	<1.00	<1.00
1,3-Dichloropropane	µg/l	<1.00	<1.00
1,4-Dichlorobenzene	µg/l	<1.00	<1.00
2,2-Dichloropropane	µg/l	<1.00	<1.00
2-Chlorotoluene	µg/l	<1.00	<1.00
4-Chlorotoluene	µg/l	<1.00	<1.00
Benzene	µg/l	<1.00	<1.00
Bromobenzene	µg/l	<1.00	<1.00
Bromochloromethane	µg/l	<1.00	<1.00
Bromodichloromethane	µg/l	<1.00	<1.00
Bromoform	µg/l	<1.00	<1.00
Bromomethane	µg/l	<1.00	<1.00
Carbon Tetrachloride	µg/l	<1.00	<1.00
Chlorobenzene	µg/l	<1.00	<1.00
Chloroethane	µg/l	<1.00	<1.00
Chloroform	µg/l	<1.00	<1.00
Chloromethane	µg/l	<2.00	<2.00
cis-1,2-Dichloroethene	µg/l	<1.00	<1.00
cis-1,3-Dichloropropene	µg/l	<1.00	<1.00
Dibromochloromethane	µg/l	<1.00	<1.00

APPENDIX 4 – SURFACE WATER

Sample Matrix	units	SW 1	SW 2
Dibromomethane	µg/l	<1.00	<1.00
Dichlorodifluoromethane	µg/l	<1.00	<1.00
Dichloromethane	µg/l	<1.00	<1.00
Ethyl Benzene	µg/l	<1.00	<1.00
Hexachlorobutadiene	µg/l	<1.00	<1.00
iso-Propylbenzene	µg/l	<1.00	<1.00
m&p Xylene	µg/l	<1.00	<1.00
MTBE	µg/l	<1.00	<1.00
Naphthalene	µg/l	<1.00	<1.00
n-butylbenzene	µg/l	<1.00	<1.00
n-propylbenzene	µg/l	<1.00	<1.00
o-Xylene	µg/l	<1.00	<1.00
p-isopropyltoluene	µg/l	<1.00	<1.00
sec-butylbenzene	µg/l	<1.00	<1.00
Styrene	µg/l	<1.00	<1.00
tert-Butylbenzene	µg/l	<1.00	<1.00
Tetrachloroethene	µg/l	<1.00	<1.00
Toluene	µg/l	<1.00	<1.00
trans-1,2-Dichloroethene	µg/l	<1.00	<1.00
trans-1,3-Dichloropropene	µg/l	<1.00	<1.00
Trichloroethene	µg/l	<1.00	<1.00
Trichlorofluoromethane	µg/l	<1.00	<1.00
Vinyl Chloride	µg/l	<0.500	<0.500
Xylene, Total	µg/l	<1.00	<1.00

Appendix 5

Caulmert
engineering environmental planning

Registered Office: Intec, Parc Menai, Bangor, Gwynedd, LL57 4FG
Tel: 01248 672666
Fax: 01248 672601
Email: contact@caulmert.com
Web: www.caulmert.com