

NANTYCAWS LANDFILL

Landfill Surface Emissions Survey 2021
Prepared for: CWM Environmental Limited

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Executive Summary

SLR Consulting Ltd (SLR) have been commissioned by CWM Environmental Ltd (CWM) to undertake the 2021 Surface Emissions Survey at Nantycaws Landfill.

The Stage 1 landfill gas surface emissions walkover survey was undertaken on 14th and 15th October 2021, with the site being divided into 2 zones to reflect the various specifications of restoration within the landfill area.

The walkover survey demonstrated ongoing compliance across the majority of the cap within the surveyed area. The survey identified nine distinct areas of cap and 11 features which required further investigation and remediation. Following remediation, the identified areas were re-surveyed on 18th January 2022 and found to be compliant. There are currently no new areas of capping; as such there is no requirement for a Stage 2 flux survey.

CONTENTS

1.0 INTRODUCTION	1
1.1 Background	1
1.2 Survey Methodology – Walkover	1
1.3 Previous Assessments	2
2.0 DEFINITION OF ZONES	3
2.1 Description of Zone 1	3
2.1.1 Zone 1A	3
2.1.2 Zone 1B	3
2.1.3 Zone 1C	3
2.1.4 Zone 1D	3
2.1.5 Zone 1E	3
2.2 Description of Zone 2	3
2.2.1 Zone 2A	3
2.2.2 Zone 2B	4
2.2.3 Zone 2C	4
2.2.4 Zone 2D	4
3.0 WALKOVER SURVEY	5
3.1 Climatic Conditions	5
3.2 Gas Management System Conditions	5
3.3 Walkover Survey Results	5
4.0 PHASE 2 SURFACE EMISSIONS SURVEY – RE-MONITORING AND FLUX REQUIREMENTS	8
4.1 Re-monitoring Results	8
4.2 Flux Requirements	9
5.0 CONCLUSIONS	10

DOCUMENT REFERENCES

TABLES

Table 3-1 Weather Conditions prior and during the Walkover Survey	5
Table 3-2 Stage 1 Survey Results: Cap	6
Table 3-3 Stage 1 Survey Results – Gas / Leachate Infrastructure	6
Table 4-1 Re-Monitoring Results 18 th January 2022	8

DRAWINGS

Drawing AQ1	10
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APPENDICES

Appendix A: Stage 1 Walkover Results	
Appendix B: Stage 1 Walkover Photos	
Appendix C: Gas Management Abstraction System Data	
Appendix D: Gastec Flame Ionisation Detector Calibration Certificate	

1.0 INTRODUCTION

SLR Consulting Ltd (SLR) has been commissioned by CWM Environmental Ltd (CWM) to undertake an annual survey of landfill gas surface emissions at Nantycaws Landfill Site, Carmarthenshire. This report provides the results of the 2021 annual survey, with monitoring undertaken on the 14th and 15th October 2021.

1.1 Background

Nantycaws Landfill is located approximately 8km to the east of Carmarthen and 1.5km to the south-east of the small village of Nantycaws, to the immediate south of the A48. The area surrounding Nantycaws Landfill is agricultural, with open fields to the north and east.

To comply with the Landfill Directive, methane emissions through the cap of a landfill need to be monitored and any need for remediation must be prioritised as well as quantifying the total emissions of methane from the whole site area.

The Environment Agency (EA), supported by National Resources Wales (NRW), produced the Guidance for Monitoring Landfill Gas Surface Emissions¹ (LFTGN07). The purpose of the guidance is to provide a standard set of monitoring methods for determining the emission of methane from the surface of a landfill. A two-stage approach is required by the guidance. The first stage involves a walkover survey to locate any significant emission sources and to identify any failures in the gas collection infrastructure. The second stage of the survey, which aims to quantify the surface emissions from the site, can only take place once any remediation work required as an outcome of the first stage has been completed. This report represents the surface emissions survey. This report describes the techniques and methodology used in the assessment, followed by analysis of the results of the surveys.

1.2 Survey Methodology – Walkover

The site has been divided into zones with similar characteristics with respect to the factors that will affect surface emissions. The main characteristic used for zoning of the landfill is the nature of the capping, which are described below:

- permanent capping: filled and restored phases of an operational or closed landfill with a permanent cap, where no more waste will be accepted; and
- temporarily capped zones of an operational landfill not currently accepting wastes and not expected to do so within 3 months.

Faults in the capping layer of a landfill are the primary cause of surface emissions. Therefore, where the characteristics or age of the cap differ, surface emissions may vary. Boundaries between different areas of differing characteristics may also be areas of higher emissions. The walkover survey was undertaken on all permanent and temporary capped areas of the landfill, with the exception of any areas which were inaccessible due to gradient and surface material. Methane concentrations were monitored using a hand-held flame ionisation detector (FID) held close to the ground (<5cm). Monitoring was undertaken on a 25m and 50m grid on temporary and permanently capped areas, respectively, or smaller transects where required, such as on side slopes and edges of the cap. Where high concentrations of methane were detected and when it was appropriate, the survey deviated to locate the source. A written record of methane concentration was recorded at each location.

¹ Guidance on Monitoring Landfill Gas Surface Emissions V2 2010. Environment Agency.

Gas wells, leachate wells and pipework were inspected closely, with measurement of methane concentrations taken around the well and landfill surface. A separate reading was taken from the actual gas well and associated pipework if it protruded above the landfill surface.

1.3 Previous Assessments

This report presents the 2021 surface emissions survey for Nantycaws Landfill. The most recent surface emission survey for Nantycaws prior to this report was the survey undertaken in 2020².

² SLR Consulting Ltd. 2020 Surface Emissions Survey Stage 1 Walkover 402.00610.00036. October 2020.

2.0 DEFINITION OF ZONES

For the purposes of this assessment, Nantycaws landfill has been divided into two zones according to the type of capping in place as shown in Drawing AQ1. Zone 1 represents the permanently capped areas of the landfill and Zone 2 represents the areas of the landfill with temporary capping in place. There has been no deposition of waste into the landfill since December 2016, with no changes to the capped areas since the 2020 surface emissions survey².

2.1 Description of Zone 1

Zone 1 comprises all the permanently capped areas of Nantycaws Landfill; this zone has been subdivided into five subzones (1A – 1E) due to the date or type of capping in place, as described below.

2.1.1 Zone 1A

Zone 1A comprises the majority of Cell 1; this zone has been permanently capped with 300mm of clay soils, 1.0mm HDPE geomembrane and completed with restoration soils. The zone is fully restored and is covered with dense vegetation to the north of the access track and short vegetation to the south of the track. This area was capped in 1999.

2.1.2 Zone 1B

Zone 1B comprises a large, grassed area which includes the grassed plateau of Cells 2, 4 and 5 and the densely vegetated flank of Cells 4, 5 and 6. The permanent capping installed within this area includes 1.0mm LLDPE geomembrane cap followed by 1m of restoration soils.

2.1.3 Zone 1C

Zone 1C comprises permanent areas of capping incorporating the western flanks of Cells 3 and 4. Restoration soils have been placed on Zone 1C in September 2014. Long grass vegetation dominates Zone 1C.

2.1.4 Zone 1D

Zone 1D comprises permanent capping installed in October 2012, covering the western corner of Cell 2 and western edge of Cell 6. This area is defined by short grasses and small shrubbery. This is capped with 1.0 LLDPE geomembrane cap and covered with 1m of restoration soils.

2.1.5 Zone 1E

Zone 1E comprises permanent capping characterised by 1mm LLDPE geomembrane cap and 1m restoration soils. This area comprises of long grasses and dense, inaccessible vegetation.

2.2 Description of Zone 2

Zone 2 comprises of all temporarily capped areas of Nantycaws Landfill; this zone has been subdivided into four subzones (2A – 2D) due to either the date or type of capping in place. The zones are described below.

2.2.1 Zone 2A

Zone 2A is a small area of temporary cap within Cell 1. This area is capped with a minimum of 250-300mm of clay and is covered in dense vegetation.

2.2.2 Zone 2B

Zone 2B comprises temporarily capped areas of the northern flank of Cell 3 and Cell 6. The capping in Zone 2B comprises of 1mm LLDPE geomembrane.

2.2.3 Zone 2C

Zone 2C comprises temporarily capped area of the northern and western slope of Cell 7A. This is capped with 1mm LLDPE geomembrane in February 2015.

2.2.4 Zone 2D

Zone 2D comprises of a temporary capped area of the north-eastern slope of Cell 3 and north-western slope of Cell 2. It also comprises a small area in the southern extent of Cell 7A. This was capped with 1mm LLDPE geomembrane in December 2016.

3.0 WALKOVER SURVEY

3.1 Climatic Conditions

The Stage 1 walkover was completed on the 14th and 15th October 2021. Data from a walkover survey can be directly influenced by the meteorological conditions prevailing before and during the monitoring period. Weather data using on-site observations and local meteorological station data are presented in Table 3-1, covering the date of the Stage 1 walkover survey and the preceding 3-days.

Table 3-1
Weather Conditions prior and during the Walkover Survey

Date	Weather Conditions (Daytime)			
	Average Wind (mph)	Wind Direction	Avg. Temperature (°C)	Pressure (bar)
11th October 2021 AM	1.2	WSW	9.3	1,016.8
11th October 2021 PM	2.3	SSE	12.0	1,015.8
12th October 2021 AM	0.6	WNW	9.0	1,012.8
12th October 2021 PM	3.0	SW	13.3	1,011.5
13th October 2021 AM	0.3	WNW	11.4	1,012.5
13th October 2021 PM	1.0	WNW	13.3	1,012.6
14th October 2021 AM	4.2	SSW	14.2	1,014.9
14th October 2021 PM	3.1	WSW	13.2	1,012.1
15th October 2021 AM	1.2	SW	12.4	1,010.0
15th October 2021 PM	2.7	ESE	13.4	1,012.1

For landfill surface emissions surveys, the EA Guidance Note LFTGN07 suggests wind speeds of Beaufort scale 2 or below (equal to 7mph or below). From the data presented in Table 3-1, it can be seen during the walkover on the 14th and 15th October that wind speeds were consistently less than 7mph and that atmospheric pressures were stable.

3.2 Gas Management System Conditions

The site currently has two engines and one flare in operation. Gas abstraction system data between 7th September and 15th October 2021 was provided by Nantycaws landfill management and is presented in Appendix C.

3.3 Walkover Survey Results

The results of the Stage 1 walkover survey are presented in Appendix A, illustrating the monitoring locations and corresponding methane concentrations. The results are summarised in the following subsections.

The instrument used to measure methane concentration was a Gastec FID. The Gastec FID has a range of 0 – 10,000ppm with a minimum detectable limit of 1ppm. The instrument used had been calibrated on 6th October 2021 (Serial Number 8067). The calibration certificate is presented in Appendix D.

According to LFTGN07, a quantitative flux survey will be of little value until the concentration of methane in the air is:

- less than 100 parts per million by volume (ppmv) immediately above the surface on the main zones of the cap; and
- less than 1,000 ppmv close to any discrete feature.

Observations of methane levels from the surface of the cap found nine locations and 11 features recording concentrations above the guidance criteria of 100ppm and 1000ppm, respectively. These locations are annotated on Drawing AQ1. Results are shown in Table 3-2 and Table 3-3 below and photos of the areas / features requiring investigation are presented in Appendix B.

Table 3-2
Stage 1 Survey Results: Cap

Ref	Grid Reference (NGR) (m)	Maximum Methane Concentration (ppm)	Exceedance Information
C1	x246988, y217493	1,000	Bare soil next to NYCW0903
C2	x246941, y217539	2,000	Holes in seam between membrane sheets between NYCW0901 and NYCW0908
C3	x246830, y217494	2,000	Hole in membrane next to NYCW1210
C4	x246825, y217496	1,200	Hole in seam between membrane sheets next to NYCW1210
C5	x246784, y217426	3,000	Hole in membrane between NYCW1404 and SUMP2
C6	x246873, y217404	>5,000	Hole in membrane between NYCW1412 and NYCW1411
C7	x246876, y217407	>5,000	Hole in seam between membrane sheets between NYCW1412 and NYCW1411
C8	x246859, y217432	>5,000	Lots of small holes in membrane approximately 15m north of NYCW1411
C9	x246915, y217424	1,000	Hole in membrane approximately 4m south of NYCW1201

Table 3-3
Stage 1 Survey Results – Gas / Leachate Infrastructure

Ref	Grid Reference (NGR) (m)	Maximum Methane Concentration (ppm)	Exceedance Information
F1	x246966, y217476	3,000	NYCW1002 – Base of well
F2	x246989, y217495	1,000	NYCW0903 – Base of well

Ref	Grid Reference (NGR) (m)	Maximum Methane Concentration (ppm)	Exceedance Information
F3	x246948, y217442	2,000	NYCR1001 – Base of smaller pipe
F4	x246875, y217446	>5,000	NYCLW016 – Base of well
F5	x246890, y217458	>5,000	NYCLW015 – Base of well
F6	x246798, y217462	1,400	Next to NYCW1402 – Base of well
F7	x246790, y217435	4,000	NYCW1404 – In collar
F8	x246824, y217415	>5,000	NYCLW017 – Base of well
F9	x246851, y217385	8,000	Unlabelled by 1407 – In collar
F10	x246884, y247419	1,500	S4 – Base of well
F11	x246921, y217303	5,000	NYCW0911 – Base of well

4.0 PHASE 2 SURFACE EMISSIONS SURVEY – RE-MONITORING AND FLUX REQUIREMENTS

4.1 Re-monitoring Results

Following the findings of the Stage 1 walkover survey, nine areas of cap and 11 features were identified as requiring further investigation and possible remediation. CWM investigated these areas and remediation was undertaken. Re-monitoring of the areas identified was undertaken on 18th January 2022, the results of which are detailed below in Table 4-1.

Table 4-1
Re-Monitoring Results 18th January 2022

Reference	Remediation undertaken	Maximum Methane Concentration (ppm)
C1	Removal of soil to uncover gas infrastructure beneath to allow repair works	800
C2	Extrusion wield	500
C3	Extrusion wield	100
C4	Extrusion wield	500
C5	Extrusion wield	0
C6	Extrusion wield	0
C7	Extrusion wield	0
C8	Extrusion wield	500
C9	Extrusion wield	0
F1	Removal of soil to uncover gas infrastructure beneath to allow repair works	80
F2	Removal of soil to uncover gas infrastructure beneath to allow repair works	100
F3	Removal of soil to uncover gas infrastructure beneath to allow repair works	500
F4	Extrusion wield at base of well	0
F5	Extrusion wield at base of well	0
F6	Extrusion wield at base of well	0
F7	Bentonite clay	500
F8	Extrusion wield at base of well	0
F9	Bentonite clay	0
F10	Extrusion wield at base of well	0
F11	Extrusion wield at base of well	0

Concentrations recorded at all exceedence locations were shown to have been remediated sufficiently so that they were no longer exceeding the relevant criteria. Any areas where concentrations remained elevated are to be investigated further by CWM to ensure they don't deteriorate further and remain below the relevant criteria.

4.2 Flux Requirements

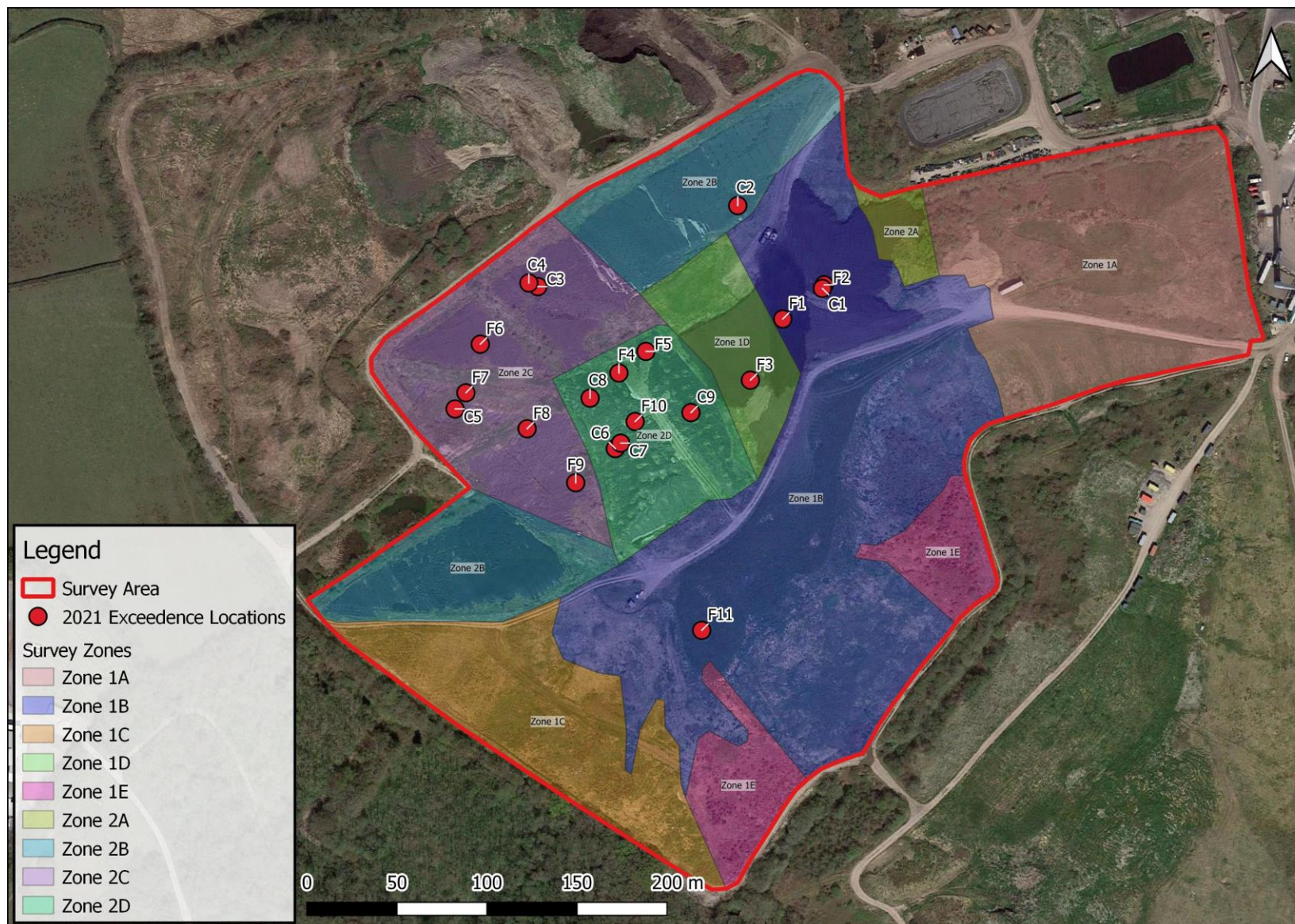
Nantycaws Landfill has not received any waste into the landfill since 2016. Since the 2020 surface emissions survey, no additional areas of landfill have been capped and completed that would require a Stage 2 flux survey. Equally, no existing areas of the landfill have changed the nature of the cap that would require a Stage 2 flux survey. As such, there is no requirement for a flux survey to be undertaken as part of the 2021 Surface Emissions Survey.

5.0 CONCLUSIONS

The 2021 landfill gas surface emissions walkover survey has demonstrated ongoing compliance across the majority of the cap, with nine areas of cap and 11 features needing remediation. Following remediation, the identified areas of cap and features were re-monitored and found to be compliant. As such, it can be concluded that Nantycaws Landfill continues to be in compliance with the Landfill Directive.

Nantycaws Landfill has not received any additional waste into the landfill since 2016. There have been no new areas of cap installed or amended since the previous surface emissions survey undertaken in 2020. As such, there is no requirement at present for a Stage 2 flux survey to be undertaken.

DRAWINGS



AQ1 – Survey Zones and Exceedence Locations

APPENDIX A

Stage 1 Walkover Results

Table A-1 – Walkover Survey Results

Feature ID	Measured Concentration (ppm methane)
NYCW0056	0
NYCW0035	10
NYCW0055	110
NYCW0036	500
NYCW0054	0
NYCW2021	0
NYCW1020	10
NYCW1019	0
NYCL0003	0
NYCW0053	5
NYCL0004	20
NYCW1002	3,000
NYCW0903	1,000
NYCW0902	30
NYCL0013	0
NYCW0901	10
NYCW1007/0908	0
NYCW1006	0
NYCW1003	0
NYCR0905	80
NYCL0005	0
NYCW0904	0
NYCW1102	Inaccessible
NYCW0037	0
Unlabelled by NYCW1102	100
NYCW1101	Inaccessible
NYCR1001	2,000
NYCW1202	0
NYCW1005	200
NYCW1008	0
NTCW1209	0
NYCW1210	0
NYCW1203	300
NYCW1410	0
NYCLW016	>5,000
NYCLW015	>5,000
NYCR1202	0

Feature ID	Measured Concentration (ppm methane)
NYCW0906	0
Next to NYCW1402	1,400
NYCW1402	0
NYCW1403	0
KOP7	0
NYCW1404	4,000
SUMP2	0
NYCW1405	800
NYCLW017/BIGLEAKY	>5,000
NYCW1406	0
NYCW1407	0
Unlabelled by 1407/Car Seat	>5,000
NYCW1412	0
NYCW1411	0
NYCW1206	0
NYCR1201	400
NYCW1201/S1	0
S2	0
S3	0
S4	1,500
NYCL0006	0
KOP4	0
MANIFOLD13	800
KOP5	0
KOP2	0
NYCW1104	0
NYCW1103	0
NYCW0912	0
NYCW0913	0
NYCW0704	0
NYCW1010	0
NYCW0703	0
NYCW0605	Inaccessible
NYCL0002	0
NYCW1011	0
NYCW0705	Inaccessible
NYCW0709	0
NYCW0910	0

Feature ID	Measured Concentration (ppm methane)
NYCW1009	0
NYCW0711	10
NYCW0710	0
NYCW1012	0
NYCW0911	5,000
NYCL0007	Inaccessible
NYCW0909	0
NYCW0908	0
NYCW0942	Inaccessible
NYCW0907	0
NYCW0713	Inaccessible
NYCW0711	Inaccessible
NYCW1016	0
NYCW1015	0
NYCW1014	0
NYCW1013	0
NYCL0010	0
NYCW0511	0
NYCL0009	0
NYCW1018	0
NYCW0509	0
KOP6	0
NWYC1017	0
NYCL0008	0
NYCW0508	0
NYCW0512	Inaccessible
NYCW0513	Inaccessible
NYCW0504	0
NYCW0512	0
NYCL0011	0
NYCL0012	0
NYCL0001	0

APPENDIX B

Stage 1 Walkover Photos



C1



C2



C3



C4



C5



C6



C7



C8



C9



F1



F2



F3



F4



F5



F6



F7



F8



F9



F10



F11

APPENDIX C

Gas Management Abstraction System Data

Table C-1 – Gas Management Abstraction System Data

Reference	Reading Taken On	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Depart valve (%)
NYCW0035	07/09/2021 08:56	0.2	1.1	20.5	0
NYCW0055	07/09/2021 08:59	1.4	1	20	0
NYCW0056	07/09/2021 09:02	49.6	11.4	5.4	12
NYCW1019	07/09/2021 09:04	-	-	-	-
NYCW1020	07/09/2021 09:07	-	-	-	-
NYCW1021	07/09/2021 09:09	0.2	0.5	20.6	0
NYCW0054	07/09/2021 09:12	21.5	16.4	0.4	5
NYCW0036	07/09/2021 09:24	0.2	1.5	20.4	0
NYCW0037	07/09/2021 09:27	43.5	22.2	0.3	14
NYCW0053	07/09/2021 09:47	17.3	5.8	15.7	0
NYCW0901	07/09/2021 10:07	26.5	25.5	0.2	8
NYCW0902	07/09/2021 10:10	31.3	26.2	0.2	28
NYCW0903	07/09/2021 10:13	60.3	34.4	1.2	100
NYCW1002	07/09/2021 10:15	63.1	31.2	1.3	100
NYCW1003	07/09/2021 10:18	35.4	29.2	0.2	16
NYCW1006	07/09/2021 10:21	19.2	22	2.6	30
NYCW1007	07/09/2021 10:23	23.5	22.7	1.6	10
NYCW1008	07/09/2021 10:28	62.4	38.2	0.2	5
NYCW1005	07/09/2021 10:31	38.4	31.4	0.2	8
NYCW1004	07/09/2021 10:34	0.2	1.9	19.9	100
NYCR1001	07/09/2021 10:36	51	33.6	2.5	100
NYCR0905	07/09/2021 10:39	38.4	26.4	1.2	12
NYCW0906	07/09/2021 10:42	61.8	38.1	0.3	100
NYCR1201	07/09/2021 11:21	54.2	39	0.3	100
NYCR1202	07/09/2021 11:24	56.8	39.2	0.7	100
NYCW1206	07/09/2021 11:35	57.6	43	0.2	100
NYCW1412	14/09/2021 09:14	35.9	29.2	0.3	14
NYCW1411	14/09/2021 09:17	59.4	44.4	0.2	100
NYCW1410	14/09/2021 09:21	34.2	29.5	0.2	10
NYCW1203	14/09/2021 09:24	49.8	34.4	0.2	24
NYCW1209	14/09/2021 09:26	27.7	24.5	2	2
NYCW1210	14/09/2021 09:29	15.1	20.7	0.4	0
NYCW1402	14/09/2021 09:32	25.2	24.1	0.2	5
NYCW1403	14/09/2021 09:35	31.6	22	0.2	7

Reference	Reading Taken On	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Depart valve (%)
NYCW1404	14/09/2021 09:42	11	13.4	7.9	0
NYCW1405	14/09/2021 09:45	27.3	26.1	1.1	7
NYCW1406	14/09/2021 09:48	46.2	35.5	0.2	10
NYCW1407	14/09/2021 09:52	64	39.6	0.1	20
NYCW0909	14/09/2021 10:10	68.3	35.5	0.2	5
NYCW1013	14/09/2021 10:16	20.9	24.5	1.3	0
NYCW1014	14/09/2021 10:19	46.6	23.3	4	12
NYCW1015	14/09/2021 10:21	36.8	22.4	0.2	5
NYCW1016	14/09/2021 10:25	37.8	20.3	0.2	10
NYCW0508	14/09/2021 10:28	55	18.8	0.2	20
NYCW1017	14/09/2021 10:30	35.3	19.5	0.1	12
NYCW0509	14/09/2021 10:36	25.4	18.2	0.2	12
NYCW1018	14/09/2021 10:40	9.8	19.5	0.1	0
NYCW0512	14/09/2021 10:48	35.7	20.7	0.1	5
NYCW0513	14/09/2021 10:50	-	-	-	-
NYCW0911	14/09/2021 10:56	47.9	30.5	0.1	100
NYCW0711	14/09/2021 11:00	63.4	38.8	0.1	100
NYCW1009	14/09/2021 11:02	46.9	27.6	0.1	40
NYCW0910	14/09/2021 11:19	30.8	22	7.5	5
NYCW0709	14/09/2021 11:22	48.7	36.3	0.2	100
NYCW0710	14/09/2021 11:25	36.4	26.6	0.1	7
NYCW1012	14/09/2021 11:28	35.5	28.7	0.1	20
NYCW1011	14/09/2021 11:30	30.6	28.5	0.1	22
NYCW1010	14/09/2021 11:33	31.4	29	0.3	14
NYCW0913	14/09/2021 11:37	54.9	36.5	0.1	100
NYCW0912	14/09/2021 11:40	22	23.4	0.3	5
NYCW0904	14/09/2021 13:17	33.1	19.6	0.3	30
NYCW1104	14/09/2021 13:22	0.4	4.6	19.1	0
NYCW1101	14/09/2021 13:25	-	-	-	-
NYCW1102	14/09/2021 13:28	-	-	-	-
NYCW1103	14/09/2021 13:33	-	-	-	-
NYCW0704	14/09/2021 14:08	55.8	29.2	2.1	10
NYCW0703	14/09/2021 14:15	44.7	29.6	0.2	60
NYCW0605	14/09/2021 14:17	33.3	23.1	0.5	5
NYCW0033	20/09/2021 12:23	44.4	25.2	2.1	20

Reference	Reading Taken On	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Depart valve (%)
NYCW0027	20/09/2021 12:34	51.8	24	0.2	30
NYCW0029	20/09/2021 12:36	40	8.2	17.6	0
NYCW0025	20/09/2021 12:39	54.3	14.9	0.3	7
NYCW0023	20/09/2021 12:41	-	-	-	-
NYCW0013	20/09/2021 12:44	-	-	-	-
NYCW0018	20/09/2021 12:47	-	-	-	-
NYCW0012	20/09/2021 12:49	39.8	22.5	0.3	12
NYCW0006	20/09/2021 12:52	30.3	20.8	0.2	17
NYCW0007	20/09/2021 12:54	45	25.7	0.2	35
NYCW0004	20/09/2021 12:58	35.7	23.5	0.2	30
NYCW0003	20/09/2021 13:01	54.1	25.3	0.8	10
NYCW0002	20/09/2021 13:04	33.2	17.6	8	0
NYCW0008	20/09/2021 13:07	64.6	32.4	0.2	100
NYCW0010	20/09/2021 13:10	41.5	27.7	0.2	100
NYCW0022	20/09/2021 13:14	40.6	26.4	0.2	12
NYCW0035	06/10/2021 09:24	34.3	4.4	9.6	0
NYCW0055	06/10/2021 09:28	18.3	10.9	8.2	0
NYCW0056	06/10/2021 09:31	37.4	15.4	5.3	10
NYCW1019	06/10/2021 09:33	0.1	0.1	20.9	0
NYCW1020	06/10/2021 09:35	-	-	-	-
NYCW1021	06/10/2021 09:38	0.1	0.2	20.9	0
NYCW0054	06/10/2021 09:42	15.3	17.1	0.7	2
NYCW0036	06/10/2021 09:47	49.2	26.8	0.3	5
NYCW0704	06/10/2021 11:35	26.5	22.1	0.4	10
NYCW0037	06/10/2021 14:01	40.5	23.5	0.2	14
NYCW0053	06/10/2021 14:04	17.3	6.3	15.9	0
NYCW0901	06/10/2021 14:14	60.7	35.1	0.2	10
NYCW0902	06/10/2021 14:16	34.9	26.8	0.2	28
NYCW0903	06/10/2021 14:19	61.8	34.9	1	100
NYCW1002	06/10/2021 14:21	67.7	32.6	0.3	100
NYCW1003	06/10/2021 14:25	38.7	29.5	0.1	16
NYCW1006	06/10/2021 14:31	61.7	39.2	0.2	35
NYCW1007	06/10/2021 14:35	21	21.2	2	10
NYCW1008	06/10/2021 14:39	28.4	26	1.5	5
NYCW1005	06/10/2021 14:42	38.6	30.9	0.2	8

Reference	Reading Taken On	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Depart valve (%)
NYCW1004	06/10/2021 14:45	61.4	39.5	0.2	100
NYCR1001	06/10/2021 14:48	56.1	36.3	1.3	100
NYCR0905	06/10/2021 14:51	50.8	29.6	0.2	15
NYCW0906	06/10/2021 14:55	63.8	37.7	0.2	100
NYCR1201	06/10/2021 15:07	54.2	38.2	0.5	100
NYCR1202	06/10/2021 15:10	56.7	38.4	1.1	100
NYCW1206	08/10/2021 09:35	57.9	42.9	0.3	100
NYCW1412	08/10/2021 09:37	24.2	26.5	0.3	12
NYCW1411	08/10/2021 09:40	57.9	43.5	0.2	100
NYCW1410	08/10/2021 09:45	37.5	29	0.2	10
NYCW1203	08/10/2021 09:48	31.8	27.8	0.2	24
NYCW1209	08/10/2021 09:50	35	27	0.4	2
NYCW1210	08/10/2021 09:53	56.7	22.7	0.2	5
NYCW1402	08/10/2021 09:56	43.7	30.5	0.4	10
NYCW1403	08/10/2021 10:00	31.4	21.3	0.4	7
NYCW1404	08/10/2021 10:07	61.1	39.9	0.2	5
NYCW1405	08/10/2021 10:09	36.8	30.5	0.2	7
NYCW1406	08/10/2021 10:12	41	33.3	0.2	10
NYCW1407	08/10/2021 10:14	62.7	38.8	0.2	25
NYCW0909	08/10/2021 10:18	19.1	23	2	0
NYCW1013	08/10/2021 10:29	14.9	24.8	0.3	0
NYCW1014	08/10/2021 10:32	42.7	25.5	3.1	12
NYCW1015	08/10/2021 10:34	22.9	21	0.2	5
NYCW1016	08/10/2021 10:38	26	19.6	0.3	8
NYCW0508	08/10/2021 10:41	45.9	18.7	0.2	20
NYCW1017	08/10/2021 10:43	30.5	19.4	0.2	12
NYCW0509	08/10/2021 10:48	25.7	17.7	0.2	12
NYCW1018	08/10/2021 10:50	12.6	18.5	0.2	0
NYCW0512	08/10/2021 10:56	21.8	19.9	0.2	5
NYCW0513	08/10/2021 10:59	-	-	-	-
NYCW0911	08/10/2021 11:04	48.6	30.9	0.2	100
NYCW0711	08/10/2021 11:07	54.6	33.5	2.5	100
NYCW1009	08/10/2021 11:09	53.4	30.7	0.1	40
NYCW0910	08/10/2021 11:34	46.2	30.7	4.9	5
NYCW0709	08/10/2021 11:36	49.8	35.9	0.2	100

Reference	Reading Taken On	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Depart valve (%)
NYCW0710	08/10/2021 11:39	39	27.4	0.2	7
NYCW1012	08/10/2021 11:42	35	29.5	0.2	20
NYCW1011	08/10/2021 11:45	24.3	27.4	0.2	20
NYCW1010	08/10/2021 11:47	30.8	28.1	0.5	14
NYCW0913	08/10/2021 11:52	75.5	21.9	0.2	100
NYCW0912	08/10/2021 11:55	28.1	24.8	0.2	5
NYCW0904	08/10/2021 12:00	29.2	21.1	0.2	30
NYCW1104	08/10/2021 12:03	0.3	0.2	20.5	0
NYCW1101	08/10/2021 12:05	-	-	-	-
NYCW1102	08/10/2021 12:08	-	-	-	-
NYCW1103	08/10/2021 12:11	-	-	-	-
NYCW0703	08/10/2021 12:26	37.2	28.1	0.2	60
NYCW0605	08/10/2021 12:29	30.2	24	0.2	5
NYCW0033	08/10/2021 14:51	47.7	28.2	0.6	22
NYCW0027	08/10/2021 14:56	51.9	24.3	0.2	35
NYCW0029	08/10/2021 14:59	47.2	21	2	10
NYCW0025	08/10/2021 15:03	25.6	20.6	0.2	7
NYCW0023	08/10/2021 15:06	42.3	24.9	0.3	25
NYCW0013	08/10/2021 15:10	40.1	23.5	0.2	15
NYCW0018	08/10/2021 15:16	-	-	-	-
NYCW0012	15/10/2021 07:38	40.3	24.2	0.2	12
NYCW0006	15/10/2021 07:40	28	17.1	4	10
NYCW0007	15/10/2021 07:43	47.2	26.5	0.2	35
NYCW0004	15/10/2021 07:46	40.4	24.1	0.2	30
NYCW0003	15/10/2021 07:48	54.9	26.1	0.3	12
NYCW0002	15/10/2021 07:51	69.5	30.7	0.2	5
NYCW0008	15/10/2021 07:54	64.8	32.3	0.2	100
NYCW0010	15/10/2021 07:57	59.4	29.3	0.2	100
NYCW0022	15/10/2021 08:01	36.8	27.3	0.2	12

APPENDIX D

Gastec Flame Ionisation Detector (FID) Calibration Certificate



British Gas approved test house ~
Repair and maintenance of electronic equipment

Gas & Environmental Services Ltd

Units 1 & 3, Little Ridge Industrial Estate
Welwyn Garden City
Herts, AL7 2BH

Telephone: 01707 373751 Fax: 01707 373752
E-mail: info@gesuk.com Website: www.gesuk.com

Certificate of Test and Calibration

Calibration Date 6th October 2021

Instrument Details Gastec MK 4

Serial Number 8067

Customer SLR Consulting

The above instrument has been serviced in accordance with the manufacturers and British Gas recommended procedures for recalibration and checking of Gastec gas detectors.

The instrument was calibrated using gas standards that are traceable to national standards.

The instrument meets the requirements of British Gas standards, provided it is used and maintained in accordance with the manufacturers instructions

Recalibration is recommended to be carried out at six months from the date on this certificate.

Methane Gas Standard	Range	Readings	Cylinder number
80 ppm	One	80ppm	APE994488
500 ppm	One	525ppm	AGA184231
800 ppm	One	800ppm	APL567755
80 ppm	Two	80ppm	APE994488
500 ppm	Two	500ppm	AGA184231
800 ppm	Two	800ppm	APL567755
8000 ppm	Two	7800ppm	APL12/073701

Terry Evans
Gas & Environmental Services Ltd



Registered in England No. 3018793



VAT Number: 640 1570 72



Registered Office: Unit 3 Little Ridge Ind.Est, Welwyn Garden City, Herts, AL7 2BH



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