

Greater Dublin Drainage Project Addendum

**Environmental Impact Assessment Report Addendum:
Volume 3A Part B of 6**

Appendix A14.2 Baseline Ambient Air Quality Report 2022

Uisce Éireann

October 2023

CONTENTS

1.	Scope	3
2.	Methodology.....	3
3.	Survey results	3

Attachments

Figure 1 – 6 Maps showing Air Quality Monitoring Locations

Laboratory Analysis Reports

Field Observation Records for Odour Assessments

Greater Dublin Drainage Project Addendum

1. Scope

This report presents the results of an updated survey of ambient air quality at various locations in Dublin in the vicinity of the proposed Wastewater Treatment Plant (WwTP) to be located in the townland of Clonshagh (Clonshaugh), County Dublin and the associated proposed Abbotstown pumping station, and along the proposed orbital sewer route and outfall pipeline route.

2. Methodology

The survey was conducted by TMS Environment Ltd personnel during the period 07 November – 20 December 2022. The surveys included the following:

- Diffusion tube surveys for determination of ambient levels of nitrogen dioxide (NO₂) and sulphur dioxide (SO₂), benzene, toluene, ethylbenzene and xylenes (BTEX);
- Subjective assessments of odour at all monitoring locations where diffusion tube monitoring was undertaken.

Diffusion tubes were used for the determination of ambient levels of nitrogen dioxide (NO₂) and sulphur dioxide (SO₂), benzene, toluene, ethylbenzene and xylenes (BTEX) at 12 locations in accordance with standard methodologies including UK Department for Environment, Food & Regulatory Affairs (DEFRA) Technical Guidance LAQM TG(09) (DEFRA 2009), and LAQM TG(22) (DEFRA 2022).

The levels of ambient BTEX, nitrogen dioxide (NO₂) and sulphur dioxide (SO₂) were measured by positioning diffusion tubes at strategic locations for a period of approximately 14 days. The selection of sampling point locations was determined by the location of the proposed site taking in to account the surrounding area, with respect to the location of the samplers relative to buildings and other obstructions, height above ground and sample collection and analysis procedures. After the exposure period was complete, the diffusion tubes were removed from the site; the diffusion tubes were analysed using ultraviolet-visible spectrophotometry to determine the levels of NO₂, ion chromatography to determine levels of SO₂ and gas chromatography (GC) with flame ionisation detection (FID) analysis for BTEX. The locations of the tubes are marked as AQ1 – AQ12 on the attached maps in Figures 1 - 6.

The monitoring personnel also carried out subjective olfactometric assessments at the same locations during the measurement events. The methodology conformed to the general guidance issued by the EPA in the Guidance Note “Air Guidance Note 5 (AG5): Odour Impact Assessment Guidance for EPA Licensed Sites” (EPA 2021). This Guidance offers a systematic and consistent approach to the assessment of odours on and in the local area of facilities and installations that are licensed by the Agency. While the study is aimed at establishing baseline ambient air quality as opposed to examining the air quality impact of a licenced facility, the use of this best-practice Guidance demonstrates the robust assessment procedures adopted for the study.

3. Survey results

The measurement results are presented in Tables 1 - 6. The detailed laboratory analysis results are presented in the attached Laboratory Analysis Reports and the Field Record Sheets for the Odour Assessments.

Greater Dublin Drainage Project Addendum

Table 14.2.1: Monitoring results for NO₂ and SO₂ for 07 November 2022 to 06 December 2022

Monitoring Location	Monitoring dates	NO ₂ µg/m ³	SO ₂ µg/m ³
AQ1 St. Francis Hospice, Connolly Hospital. North of proposed pumping station	07/11/2022 to 21/11/2022	24.8	<3.17
AQ2 Elm Green Nursing Home, Southeast of proposed pumping station	07/11/2022 to 21/11/2022	22.0	<3.13
AQ3 St. Michael's House, south of proposed WwTP	07/11/2022 to 21/11/2022	25.1	<3.17
AQ4 In the vicinity of the proposed WwTP site	23/11/2022 to 06/12/2022	27.4	<3.38
AQ5 In the vicinity of the proposed WwTP site	23/11/2022 to 06/12/2022	21.0	<3.38
AQ6 In the vicinity of the proposed WwTP site	07/11/2022 to 21/11/2022	17.4	<3.15
AQ7 In the vicinity of the proposed WwTP site	23/11/2022 to 06/12/2022	27.6	<3.38
AQ8 In the vicinity of the proposed WwTP site	23/11/2022 to 06/12/2022	20.2	<3.38
AQ9 In the vicinity of the proposed WwTP site	23/11/2022 to 06/12/2022	16.0	<3.38
AQ10 In the vicinity of the proposed WwTP site	23/11/2022 to 06/12/2022	17.8	<3.38
AQ11 Grange	07/11/2022 to 21/11/2022	30.9	<3.16
AQ12 Grange	07/11/2022 to 21/11/2022	21.2	<3.16

NOTE AQ1, AQ2, AQ3, AQ6, AQ11 & AQ12 monitoring was undertaken from 07 November to 21 November 2022
 AQ4, AQ5, AQ7, AQ8, AQ9 & AQ10 monitoring was undertaken from 23 November to 06 December 2022

Greater Dublin Drainage Project Addendum

Table 14.2.2: Monitoring results for NO₂ and SO₂ for 21 November 2022 to 20 December 2022

Monitoring Location	Monitoring dates	NO ₂ µg/m ³	SO ₂ µg/m ³
AQ1 St. Francis Hospice, Connolly Hospital. North of proposed pumping station	21/11/2022 to 06/12/2022	30.3	<2.95
AQ2 Elm Green Nursing Home, Southeast of proposed pumping station	21/11/2022 to 06/12/2022	27.0	<2.95
AQ3 St. Michael's House, south of proposed WwTP	21/11/2022 to 06/12/2022	33.6	<2.95
AQ4 In the vicinity of the proposed WwTP site	06/12/2022 to 20/12/2022	39.4	<3.18
AQ5 In the vicinity of the proposed WwTP site	06/12/2022 to 20/12/2022	33.1	<3.18
AQ6 In the vicinity of the proposed WwTP site	21/11/2022 to 06/12/2022	18.9	<2.95
AQ7 In the vicinity of the proposed WwTP site	06/12/2022 to 20/12/2022	25.5	3.19
AQ8 In the vicinity of the proposed WwTP site	06/12/2022 to 20/12/2022	34.2	<3.19
AQ9 In the vicinity of the proposed WwTP site	06/12/2022 to 20/12/2022	30.1	<3.19
AQ10 In the vicinity of the proposed WwTP site	06/12/2022 to 20/12/2022	26.4	<3.19
AQ11 Grange	21/11/2022 to 06/12/2022	33.3	<2.95
AQ12 Grange	21/11/2022 to 06/12/2022	23.0	<2.95

NOTE AQ1, AQ2, AQ3, AQ6, AQ11 & AQ12 monitoring was undertaken from 21 November to 06 December 2022
 AQ4, AQ5, AQ7, AQ8, AQ9 & AQ10 monitoring was undertaken from 06 December to 20 December 2022

Greater Dublin Drainage Project Addendum

Table 14.2.3: Monitoring results for BTEX, 07 November 2022 to 06 December 2022

Monitoring Location	Benzene $\mu\text{g}/\text{m}^3$	Toluene $\mu\text{g}/\text{m}^3$	Ethylbenzene $\mu\text{g}/\text{m}^3$	m-, p-xylene $\mu\text{g}/\text{m}^3$	o-Xylene $\mu\text{g}/\text{m}^3$
AQ1	0.45	0.85	<0.51	1.4	<0.51
AQ2	0.58	NR	NR	NR	NR
AQ3	<0.39	<0.43	<0.51	<0.51	<0.51
AQ4	0.61	0.99	<0.54	1.4	0.56
AQ5	0.55	0.73	<0.55	1.2	<0.55
AQ6	0.41	0.89	10	12	6.2
AQ7	0.45	0.71	<0.54	0.89	<0.54
AQ8	0.46	0.89	<0.54	1.1	<0.54
AQ9	0.53	0.83	<0.54	1.2	<0.54
AQ10	0.71	0.80	<0.54	0.91	<0.54
AQ11	0.57	0.84	<0.51	0.95	<0.51
AQ12	0.54	0.69	0.85	1.5	0.59

NOTE AQ1, AQ2, AQ3, AQ6, AQ11 & AQ12 monitoring was undertaken from 07 November to 21 November 2022

AQ4, AQ5, AQ7, AQ8, AQ9 & AQ10 monitoring was undertaken from 23 November to 06 December 2022

NR Not reported; sample damaged in transit

Greater Dublin Drainage Project Addendum

Table 14.2.4: Monitoring results for BTEX, 21 November 2022 to 21 December 2022

Monitoring Location	Benzene $\mu\text{g}/\text{m}^3$	Toluene $\mu\text{g}/\text{m}^3$	Ethylbenzene $\mu\text{g}/\text{m}^3$	m-, p-xylene $\mu\text{g}/\text{m}^3$	o-Xylene $\mu\text{g}/\text{m}^3$
AQ1	0.57	0.85	<0.48	0.70	<0.48
AQ2	0.45	0.50	<0.47	<0.47	<0.47
AQ3	0.79	1.09	<0.47	0.96	<0.47
AQ4	0.93	0.83	<0.51	0.56	<0.51
AQ5	0.68	0.72	<0.51	0.56	<0.51
AQ6	0.52	0.82	<0.61	1.0	<0.47
AQ7	0.66	0.62	<0.51	0.54	<0.51
AQ8	0.56	NR	NR	NR	NR
AQ9	0.75	0.79	<0.51	0.53	<0.51
AQ10	0.76	NR	NR	NR	NR
AQ11	0.52	1.5	2.8	3.4	1.5
AQ12	0.53	0.81	<0.47	0.81	<0.47

NOTE AQ1, AQ2, AQ3, AQ6, AQ11 & AQ12 monitoring was undertaken from 21 November to 06 December 2022
 AQ4, AQ5, AQ7, AQ8, AQ9 & AQ10 monitoring was undertaken from 06 December to 20 December 2022
 NR = Not reported; sample damaged in transit

Greater Dublin Drainage Project Addendum

Table 14.2.5: Baseline Odour assessment – 07 November 2022 and 23 November 2022

Monitoring Location	Odour persistence	Odour intensity	Description
AQ1 St. Francis Hospice, Connolly Hospital. North of proposed pumping station	0	0	None detected
AQ2 Elm Green Nursing Home, Southeast of proposed pumping station	0	0	None detected
AQ3 St. Michael's House, south of proposed WwTP	0	0	None detected
AQ4 In the vicinity of the proposed WwTP site	0	0	None detected
AQ5 In the vicinity of the proposed WwTP site	0	0	None detected
AQ6 In the vicinity of the proposed WwTP site	0	0	None detected
AQ7 In the vicinity of the proposed WwTP site	0	0	None detected
AQ8 In the vicinity of the proposed WwTP site	0	0	None detected
AQ9 In the vicinity of the proposed WwTP site	0	0	None detected
AQ10 In the vicinity of the proposed WwTP site	0	0	None detected
AQ11 Grange	0	0	None detected
AQ12 Grange	0	0	None detected

NOTE 1 Odour rating: 0 = No odour, 1 = Faint odour, 2 = Moderate odour, 3 = Strong odour, 4 = Very strong odour

NOTE AQ1, AQ2, AQ3, AQ6, AQ11 & AQ12 monitoring was undertaken on 07 November 2022

AQ4, AQ5, AQ7, AQ8, AQ9 & AQ10 monitoring was undertaken on 23 November 2022

Greater Dublin Drainage Project Addendum

Table 14.2.6: Baseline Odour assessment – 21 November 2022 and 6 December 2022

Monitoring Location	Odour persistence	Odour intensity	Description
AQ1 St. Francis Hospice, Connolly Hospital. North of proposed pumping station	0	0	None detected
AQ2 Elm Green Nursing Home, Southeast of proposed pumping station	0	0	None detected
AQ3 St. Michael's House, south of proposed WwTP	0	0	None detected
AQ4 In the vicinity of the proposed WwTP site	0	0	None detected
AQ5 In the vicinity of the proposed WwTP site	0	0	None detected
AQ6 In the vicinity of the proposed WwTP site	0	0	None detected
AQ7 In the vicinity of the proposed WwTP site	0	0	None detected
AQ8 In the vicinity of the proposed WwTP site	0	0	None detected
AQ9 In the vicinity of the proposed WwTP site	0	0	None detected
AQ10 In the vicinity of the proposed WwTP site	0	0	None detected
AQ11 Grange	0	0	None detected
AQ12 Grange	0	0	None detected

NOTE 1 Odour rating: 0 = No odour, 1 = Faint odour, 2 = Moderate odour, 3 = Strong odour, 4 = Very strong odour

NOTE AQ1, AQ2, AQ3, AQ6, AQ11 & AQ12 monitoring was undertaken on 21 November 2022

AQ4, AQ5, AQ7, AQ8, AQ9 & AQ10 monitoring was undertaken on 06 December 2022

Page left intentionally blank



Client: Fingal Co. Co./Irish Water

Project Ref: 30993

Drawing Title: AQ1

Notes: St. Francis's Hospice, Connolly Hospital. North of proposed pumping station

Date: 22 Dec 2022

Drawn: GA



53 Broomhill Drive,
Tallaght.
Dublin 24
Tel: +353-1-4626710;
Fax: +353-1-4626714



Client: Fingal Co. Co./Irish Water

Project Ref: 30993

Drawing Title: AQ2

Notes: Elm Green Nursing Home,
South of proposed pumping station

Date: 22 Dec 2022

Drawn: GA



53 Broomhill Drive,
Tallaght.
Dublin 24
Tel: +353-1-4626710;
Fax: +353-1-4626714



Client: Fingal Co. Co./Irish Water

Project Ref: 30993

Drawing Title: AQ3

Notes: St. Michael's House, south of proposed WWTP

Date: 22 Dec 2022

Drawn: GA



53 Broomhill Drive,
Tallaght.
Dublin 24
Tel: +353-1-4626710;
Fax: +353-1-4626714



Client: Fingal Co. Co./Irish Water

Project Ref: 30993

Drawing Title: AQ4, AQ5, AQ7, AQ8, AQ9, AQ10

Notes: Boundary of proposed WWTP site

Date: 22 Dec 2022

Drawn: GA



environment ltd

53 Broomhill Drive,
Tallaght.
Dublin 24
Tel: +353-1-4626710;
Fax: +353-1-4626714



Client: Fingal Co. Co./Irish Water

Project Ref: 30993

Drawing Title: AQ6

Notes: East of proposed WWTP

Date: 22 Dec 2022

Drawn: GA



53 Broomhill Drive,
Tallaght.
Dublin 24
Tel: +353-1-4626710;
Fax: +353-1-4626714



Client: Fingal Co. Co./Irish Water

Project Ref: 30993

Drawing Title: AQ11 & AQ12

Notes: Grange

Date: 22 Dec 2022

Drawn: GA



53 Broomhill Drive,
Tallaght.
Dublin 24
Tel: +353-1-4626710;
Fax: +353-1-4626714



Odour Investigation Field Record Sheet – Report Ref: 30993 – 07 November 2022

General	Licensee/Facility	EPA Reg. No.	Assessment by	Date of Inspection	Type of Visit		
	N/A	N/A	GA & NB	07 November 2022	<input checked="" type="radio"/> Announced	<input type="radio"/> Unannounced	
Pre-Assessment Preparation	Observer is free from medical conditions (cold, sore throat, sinus trouble?)	Observer abstinence (30 min) from smoking, flavoured drinks, scented toiletries and deodorizers?	Reason for odour assessment- Compliant verification; routine; other (specify)	Map- Has a map showing assessment locations been attached?		Possible odour related incident (spillage, breakdown of abatement system, power failure)	
	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Complaint Verification <input type="radio"/> Weather Conditions / Process Events <input checked="" type="radio"/> Routine Visit <input type="radio"/> Other:	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Notes <small>(the ranking systems in these notes must be used when completing the field observations table overleaf)</small>	Note 1: Observation point Sensitivity 1 Remote (no housing, commercial/industrial premises or public area within 500m of observation point) 2 Low sensitivity (no housing, commercial/industrial premises or public area within 100m of observation point) 3 Moderate sensitivity (housing, commercial/industrial premises or public area within 100m of observation point) 4 High sensitivity (housing, commercial/industrial premises or public area within area of observation point) 5 Extra sensitive (complaints arising from residents, business and users of public areas within area of observation point)			Note 3: Weather Conditions Precipitation Temperature 1. Dry 1. Cold 2. Rained Recently 2. Cool 3. Drizzle 3. Warm 4. Raining 4. Hot 5. Foggy			
	Note 2: Wind Strength 0. Calm Smoke rises vertically 1. Light Air Direction of wind shown by smoke drift, but not wind vanes 2. Light Breeze Wind felt on face; leaves rustle, ordinary vane moved by wind 3. Gentle Breeze Leaves and small twigs in constant motion 4. Moderate Breeze Raises dust and loose paper; small branches are moved 5. Fresh Breeze Small trees in leaf begin to sway 6. Strong Breeze Large branches in motion; umbrellas used with difficulty against the wind 7. Near Gale Whole trees in motion; inconvenience felt when walking against the wind 8. Gale Twigs break off trees; progress generally impeded 9. Strong Gale Slight structural damage occurs (chimney pots and slates removed)			Note 4: Odour Persistence 0. No Odour 1. Intermittent (detected intermittently during period of assessment) 2. Persistent (detected throughout the period of assessment)			
			Note 5: Intensity 0. No Detectable Odour 1. Faint Odour (barely detectable, need to stand still and inhale facing into wind) 2. Moderate Odour (easily detectable while walking and breathing normally, possibly offensive) 3. Strong Odour (bearable but offensive – might make clothes/ hair smell) 4. Very Strong Odour (unbearable, difficult to remain in area affected by odour)				
	Time: From 08:30 To 13:10			Do any of the odours experienced on-site match those recorded during the survey?		<input type="radio"/> Yes	
				<input checked="" type="radio"/> No			
	List areas inspected to match odour AQ1 – AQ12	What processes were occurring during the off-site odour assessment? N/A	Potential on-site odour sources identified N/A				

		Observer's location		Wind			Weather		Time		Odour Rating		General Comments and Odour description comments
Parameter	Map location No.	Name of household/commercial site (easily identified)	Sensitivity (1-5) Note 1	Direction from which wind blows	Orientation (observer Vs facility)	Strength (0-9) Note 2	Precipitation (1-5) Note 3	Temperature (1-4) Note 3	Start Time 24H clock	End Time 24H clock	Odour persistence (0-2) Note 4	Odour intensity (0-4) Note 5	Description of any odours, other than sources, etc
Thresholds (may indicate nuisance)	-		≥3	-	Downwind Approx DW, or Not detectable	-	-	-	-	-	1 or 2	≥2	Guide: A location where the score meets or exceeds all the threshold values <u>may</u> be deemed subject to nuisance/significant impairment particularly <u>if</u> the observations are supported by public complaints on impact, frequency and duration of odours
Field Observations	N/A	AQ1	4	S	ND	3	2	2	13:01	13:06	0	0	ND
	N/A	AQ2	4	S	ND	3	2	2	08:30	08:35	0	0	ND
	N/A	AQ3	4	S	ND	3	2	2	11:59	12:04	0	0	ND
	N/A	AQ6	4	S	ND	3	2	2	09:30	09:35	0	0	ND
	N/A	AQ11	3	S	ND	3	2	2	09:59	10:04	0	0	ND
	N/A	AQ12	3	S	ND	3	2	2	10:11	10:16	0	0	ND
Brief details of any meeting with local residents / complaints received during assessment (include names/addresses/telephone numbers etc.)													

Odour Investigation Field Record Sheet – Report Ref: 30993 – 21 November 2022

General	Licensee/Facility	EPA Reg. No.	Assessment by	Date of Inspection	Type of Visit																				
	N/A	N/A	GA & NB	21 November 2022	<input checked="" type="radio"/> Announced	<input type="radio"/> Unannounced																			
Pre-Assessment Preparation	Observer is free from medical conditions (cold, sore throat, sinus trouble?)	Observer abstinence (30 min) from smoking, flavoured drinks, scented toiletries and deodorizers?	Reason for odour assessment- Compliant verification; routine; other (specify) <input type="radio"/> Complaint Verification <input type="radio"/> Weather Conditions / Process Events	Map- Has a map showing assessment locations been attached?	Possible odour related incident (spillage, breakdown of abatement system, power failure)																				
	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Routine Visit <input type="radio"/> Other:	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input type="radio"/> Yes <input checked="" type="radio"/> No																			
Notes <small>(the ranking systems in these notes must be used when completing the field observations table overleaf)</small>	Note 1: Observation point Sensitivity 1 Remote (no housing, commercial/industrial premises or public area within 500m of observation point) 2 Low sensitivity (no housing, commercial/industrial premises or public area within 100m of observation point) 3 Moderate sensitivity (housing, commercial/industrial premises or public area within 100m of observation point) 4 High sensitivity (housing, commercial/industrial premises or public area within area of observation point) 5 Extra sensitive (complaints arising from residents, business and users of public areas within area of observation point)			Note 3: Weather Conditions Precipitation Temperature 1. Dry 1. Cold 2. Rained Recently 2. Cool 3. Drizzle 3. Warm 4. Raining 4. Hot 5. Foggy																					
	Note 2: Wind Strength <table border="0"> <tr><td>0. Calm</td><td>Smoke rises vertically</td></tr> <tr><td>1. Light Air</td><td>Direction of wind shown by smoke drift, but not wind vanes</td></tr> <tr><td>2. Light Breeze</td><td>Wind felt on face; leaves rustle, ordinary vane moved by wind</td></tr> <tr><td>3. Gentle Breeze</td><td>Leaves and small twigs in constant motion</td></tr> <tr><td>4. Moderate Breeze</td><td>Raises dust and loose paper; small branches are moved</td></tr> <tr><td>5. Fresh Breeze</td><td>Small trees in leaf begin to sway</td></tr> <tr><td>6. Strong Breeze</td><td>Large branches in motion; umbrellas used with difficulty against the wind</td></tr> <tr><td>7. Near Gale</td><td>Whole trees in motion; inconvenience felt when walking against the wind</td></tr> <tr><td>8. Gale</td><td>Twigs break off trees; progress generally impeded</td></tr> <tr><td>9. Strong Gale</td><td>Slight structural damage occurs (chimney pots and slates removed)</td></tr> </table>			0. Calm	Smoke rises vertically	1. Light Air	Direction of wind shown by smoke drift, but not wind vanes	2. Light Breeze	Wind felt on face; leaves rustle, ordinary vane moved by wind	3. Gentle Breeze	Leaves and small twigs in constant motion	4. Moderate Breeze	Raises dust and loose paper; small branches are moved	5. Fresh Breeze	Small trees in leaf begin to sway	6. Strong Breeze	Large branches in motion; umbrellas used with difficulty against the wind	7. Near Gale	Whole trees in motion; inconvenience felt when walking against the wind	8. Gale	Twigs break off trees; progress generally impeded	9. Strong Gale	Slight structural damage occurs (chimney pots and slates removed)	Note 4: Odour Persistence 0. No Odour 1. Intermittent (detected intermittently during period of assessment) 2. Persistent (detected throughout the period of assessment)	
0. Calm	Smoke rises vertically																								
1. Light Air	Direction of wind shown by smoke drift, but not wind vanes																								
2. Light Breeze	Wind felt on face; leaves rustle, ordinary vane moved by wind																								
3. Gentle Breeze	Leaves and small twigs in constant motion																								
4. Moderate Breeze	Raises dust and loose paper; small branches are moved																								
5. Fresh Breeze	Small trees in leaf begin to sway																								
6. Strong Breeze	Large branches in motion; umbrellas used with difficulty against the wind																								
7. Near Gale	Whole trees in motion; inconvenience felt when walking against the wind																								
8. Gale	Twigs break off trees; progress generally impeded																								
9. Strong Gale	Slight structural damage occurs (chimney pots and slates removed)																								
				Note 5: Intensity 0. No Detectable Odour 1. Faint Odour (barely detectable, need to stand still and inhale facing into wind) 2. Moderate Odour (easily detectable while walking and breathing normally, possibly offensive) 3. Strong Odour (bearable but offensive – might make clothes/ hair smell) 4. Very Strong Odour (unbearable, difficult to remain in area affected by odour)																					
Time: From 09:00 To 11:30				Do any of the odours experienced on-site match those recorded during the survey?		<input type="radio"/> Yes <input checked="" type="radio"/> No																			
List areas inspected to match odour AQ1 – AQ12		What processes were occurring during the off-site odour assessment? N/A		Potential on-site odour sources identified N/A																					

	Observer's location			Wind			Weather		Time		Odour Rating		General Comments and Odour description comments
Parameter	Map location No.	Name of household/commercial site (easily identified)	Sensitivity (1-5) Note 1	Direction from which wind blows	Orientation (observer Vs facility)	Strength (0-9) Note 2	Precipitation (1-5) Note 3	Temperature (1-4) Note 3	Start Time 24H clock	End Time 24H clock	Odour persistence (0-2) Note 4	Odour intensity (0-4) Note 5	Description of any odours, other than sources, etc
Thresholds (may indicate nuisance)	-		≥3	-	Downwind Approx DW, or Not detectable	-	-	-	-	-	1 or 2	≥2	Guide: A location where the score meets or exceeds all the threshold values <u>may</u> be deemed subject to nuisance/significant impairment particularly <u>if</u> the observations are supported by public complaints on impact, frequency and duration of odours
Field Observations	N/A	AQ1	4	S	ND	3	2	1	10:44	10:49	0	0	ND
	N/A	AQ2	4	S	ND	3	2	1	10:59	11:04	0	0	ND
	N/A	AQ3	4	S	ND	3	2	1	10:07	10:12	0	0	ND
	N/A	AQ6	4	S	ND	3	2	1	09:30	09:35	0	0	ND
	N/A	AQ11	3	S	ND	3	2	1	09:19	09:24	0	0	ND
	N/A	AQ12	3	S	ND	3	2	1	09:02	09:07	0	0	ND
Brief details of any meeting with local residents / complaints received during assessment (include names/addresses/telephone numbers etc.)													

Odour Investigation Field Record Sheet – Report Ref: 30993 – 23 November 2022

General	Licensee/Facility	EPA Reg. No.	Assessment by		Date of Inspection	Type of Visit				
	N/A	N/A	GA & NB		23 November 2022	<input checked="" type="radio"/> Announced	<input type="radio"/> Unannounced			
Pre-Assessment Preparation	Observer is free from medical conditions (cold, sore throat, sinus trouble?)	Observer abstinence (30 min) from smoking, flavoured drinks, scented toiletries and deodorizers?	Reason for odour assessment- Compliant verification; routine; other (specify)		Map- Has a map showing assessment locations been attached?	Possible odour related incident (spillage, breakdown of abatement system, power failure)				
	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Complaint Verification	<input type="radio"/> Weather Conditions / Process Events	<input checked="" type="radio"/> Routine Visit	<input type="radio"/> Other:	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Notes (the ranking systems in these notes must be used when completing the field observations table overleaf)	Note 1: Observation point Sensitivity 1 Remote (no housing, commercial/industrial premises or public area within 500m of observation point) 2 Low sensitivity (no housing, commercial/industrial premises or public area within 100m of observation point) 3 Moderate sensitivity (housing, commercial/industrial premises or public area within 100m of observation point) 4 High sensitivity (housing, commercial/industrial premises or public area within area of observation point) 5 Extra sensitive (complaints arising from residents, business and users of public areas within area of observation point)				Note 3: Weather Conditions Precipitation 1. Dry 2. Rained Recently 3. Drizzle 4. Raining 5. Foggy Temperature 1. Cold 2. Cool 3. Warm 4. Hot					
	Note 2: Wind Strength 0. Calm Smoke rises vertically 1. Light Air Direction of wind shown by smoke drift, but not wind vanes 2. Light Breeze Wind felt on face; leaves rustle, ordinary vane moved by wind 3. Gentle Breeze Leaves and small twigs in constant motion 4. Moderate Breeze Raises dust and loose paper; small branches are moved 5. Fresh Breeze Small trees in leaf begin to sway 6. Strong Breeze Large branches in motion; umbrellas used with difficulty against the wind 7. Near Gale Whole trees in motion; inconvenience felt when walking against the wind 8. Gale Twigs break off trees; progress generally impeded 9. Strong Gale Slight structural damage occurs (chimney pots and slates removed)				Note 4: Odour Persistence 0. No Odour 1. Intermittent (detected intermittently during period of assessment) 2. Persistent (detected throughout the period of assessment)					
	Note 5: Intensity 0. No Detectable Odour 1. Faint Odour (barely detectable, need to stand still and inhale facing into wind) 2. Moderate Odour (easily detectable while walking and breathing normally, possibly offensive) 3. Strong Odour (bearable but offensive – might make clothes/ hair smell) 4. Very Strong Odour (unbearable, difficult to remain in area affected by odour)									
	Time: From 10:25 To 12:04				Do any of the odours experienced on-site match those recorded during the survey?	<input type="radio"/> Yes <input checked="" type="radio"/> No				
	List areas inspected to match odour AQ1 – AQ12	What processes were occurring during the off-site odour assessment? N/A			Potential on-site odour sources identified N/A					

	Observer's location			Wind			Weather		Time		Odour Rating		General Comments and Odour description comments
Parameter	Map location No.	Name of household/commercial site (easily identified)	Sensitivity (1-5) Note 1	Direction from which wind blows	Orientation (observer Vs facility)	Strength (0-9) Note 2	Precipitation (1-5) Note 3	Temperature (1-4) Note 3	Start Time 24H clock	End Time 24H clock	Odour persistence (0-2) Note 4	Odour intensity (0-4) Note 5	Description of any odours, other than sources, etc
Thresholds (may indicate nuisance)	-		≥3	-	Downwind Approx DW, or Not detectable	-	-	-	-	-	1 or 2	≥2	Guide: A location where the score meets or exceeds all the threshold values <u>may</u> be deemed subject to nuisance/significant impairment particularly <u>if</u> the observations are supported by public complaints on impact, frequency and duration of odours
Field Observations	N/A	AQ4	4	S	ND	3	2	2	10:40	10:45	0	0	ND
	N/A	AQ5	3	S	ND	3	2	2	11:00	11:05	0	0	ND
	N/A	AQ7	3	S	ND	3	2	2	11:40	11:45	0	0	ND
	N/A	AQ8	3	S	ND	3	2	2	11:30	11:35	0	0	ND
	N/A	AQ9	3	S	ND	3	2	2	11:20	11:25	0	0	ND
	N/A	AQ10	3	S	ND	3	2	2	11:10	11:15	0	0	ND
Brief details of any meeting with local residents / complaints received during assessment (include names/addresses/telephone numbers etc.)													

Odour Investigation Field Record Sheet – Report Ref: 30993 – 06 December 2022

General	Licensee/Facility	EPA Reg. No.	Assessment by		Date of Inspection	Type of Visit			
	N/A	N/A	Graham Adams		06 December 2022	<input checked="" type="radio"/> Announced	<input type="radio"/> Unannounced		
Pre-Assessment Preparation	Observer is free from medical conditions (cold, sore throat, sinus trouble?)	Observer abstinence (30 min) from smoking, flavoured drinks, scented toiletries and deodorizers?	Reason for odour assessment- Compliant verification; routine; other (specify)		Map- Has a map showing assessment locations been attached?	Possible odour related incident (spillage, breakdown of abatement system, power failure)			
	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Complaint Verification	<input type="radio"/> Weather Conditions / Process Events	<input checked="" type="radio"/> Routine Visit	<input type="radio"/> Other:	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Yes
Notes <i>(the ranking systems in these notes must be used when completing the field observations table overleaf)</i>	Note 1: Observation point Sensitivity 1 Remote (no housing, commercial/industrial premises or public area within 500m of observation point) 2 Low sensitivity (no housing, commercial/industrial premises or public area within 100m of observation point) 3 Moderate sensitivity (housing, commercial/industrial premises or public area within 100m of observation point) 4 High sensitivity (housing, commercial/industrial premises or public area within area of observation point) 5 Extra sensitive (complaints arising from residents, business and users of public areas within area of observation point)				Note 3: Weather Conditions				
	Note 2: Wind Strength 0. Calm Smoke rises vertically 1. Light Air Direction of wind shown by smoke drift, but not wind vanes 2. Light Breeze Wind felt on face; leaves rustle, ordinary vane moved by wind 3. Gentle Breeze Leaves and small twigs in constant motion 4. Moderate Breeze Raises dust and loose paper; small branches are moved 5. Fresh Breeze Small trees in leaf begin to sway 6. Strong Breeze Large branches in motion; umbrellas used with difficulty against the wind 7. Near Gale Whole trees in motion; inconvenience felt when walking against the wind 8. Gale Twigs break off trees; progress generally impeded 9. Strong Gale Slight structural damage occurs (chimney pots and slates removed)				Note 4: Odour Persistence 0. No Odour 1. Intermittent (detected intermittently during period of assessment) 2. Persistent (detected throughout the period of assessment)				
					Note 5: Intensity 0. No Detectable Odour 1. Faint Odour (barely detectable, need to stand still and inhale facing into wind) 2. Moderate Odour (easily detectable while walking and breathing normally, possibly offensive) 3. Strong Odour (bearable but offensive – might make clothes/ hair smell) 4. Very Strong Odour (unbearable, difficult to remain in area affected by odour)				
	Time: From 09:31 To 10:18				Do any of the odours experienced on-site match those recorded during the survey?	<input type="radio"/> Yes <input checked="" type="radio"/> No			
	List areas inspected to match odour AQ1 – AQ12	What processes were occurring during the off-site odour assessment? N/A			Potential on-site odour sources identified N/A				

		Observer's location		Wind			Weather		Time		Odour Rating		General Comments and Odour description comments
Parameter	Map location No.	Name of household/commercial site (easily identified)	Sensitivity (1-5) Note 1	Direction from which wind blows	Orientation (observer Vs facility)	Strength (0-9) Note 2	Precipitation (1-5) Note 3	Temperature (1-4) Note 3	Start Time 24H clock	End Time 24H clock	Odour persistence (0-2) Note 4	Odour intensity (0-4) Note 5	Description of any odours, other than sources, etc
Thresholds (may indicate nuisance)	-		≥3	-	Downwind Approx DW, or Not detectable	-	-	-	-	-	1 or 2	≥2	Guide: A location where the score meets or exceeds all the threshold values <u>may</u> be deemed subject to nuisance/significant impairment particularly <u>if</u> the observations are supported by public complaints on impact, frequency and duration of odours
Field Observations	N/A	AQ4	4	NE	ND	1	4	1	11:44	11:49	0	0	ND
	N/A	AQ5	3	NE	ND	1	4	1	12:02	12:07	0	0	ND
	N/A	AQ7	3	NE	ND	1	2	2	13:05	13:10	0	0	ND
	N/A	AQ8	3	NE	ND	1	2	2	12:50	12:55	0	0	ND
	N/A	AQ9	3	NE	ND	1	2	2	12:36	12:41	0	0	ND
	N/A	AQ10	3	NE	ND	1	2	2	12:23	12:28	0	0	ND
Brief details of any meeting with local residents / complaints received during assessment (include names/addresses/telephone numbers etc.)													

LABORATORY ANALYSIS REPORT

DETERMINATION OF AMBIENT AIR VOLATILE ORGANIC COMPOUNDS IN DIFFUSION TUBES BY THERMAL DESORPTION / GAS CHROMATOGRAPHY

Report number Q09411R
Booking in reference no R2913
Despatch note no 97547
Customer TMS Environmental
53 Broomhill Drive
Tallaght
Dublin 24
Ireland
Date samples received 25/11/2022
Job Reference 30993

Location	Tube no	Date exposed*	Date finished*	Exposure hours*	Benzene	Toluene	BTEX Ethyl Benzene ng on Tube	mp-Xylene	o-Xylene
AQ2-1	GRA02384	07/11/2022	21/11/2022	338.50	7.6	344	232	228	101
AQ6-1	003084	07/11/2022	21/11/2022	336.17	5.3	10.4	101	120	60.7
AQ11-1	003083	07/11/2022	21/11/2022	335.43	7.5	9.8	<5	9.3	<5
AQ12-1	GRA07256	07/11/2022	21/11/2022	334.87	7.0	8.0	8.3	14.8	5.8
AQ3-1	000009	07/11/2022	21/11/2022	334.23	<5	<5	<5	<5	<5
AQ1-1	005860	07/11/2022	21/11/2022	333.73	5.9	9.9	<5	14.0	<5
Blank	003190			338.50	1.5	0.9	0.5	1.3	0.5
Laboratory Blank	003614				0.8	0.5	0.6	1.9	1.0

RESULTS ARE NOT BLANK CORRECTED

Tube Type Carbograph 1TD

COMMENTS:

Results below 5ng on tube are below the reporting limit.

The laboratory blank is a system check and will not be from the same batch of tubes analysed.

Tubes GRA02384 (AQ2-1), 003084 (AQ6-1), GRA07256 (AQ12-1) & 005860 (AQ1-1) were received with a cap off. Results may be compromised.

Uncertainty of Measurement

Benzene	±11%
Toluene	±12%
Ethylbenzene	±11%
m/p-Xylene	±13%
o-Xylene	±11%

Reporting Limit

5ng on tube

The reported expanded uncertainty is based on a standard uncertainty multiplied by a factor of $k=2$, providing a level of confidence of approximately 95%. Uncertainty of measurement has not been applied to the reported results.

Analyst name Sarah Cook

Report checked by

Gavin Aikman

Date of analysis

08/12/2022

Date of report

13/12/2022

The analysis has been carried out in accordance with in-house method GLM4

Samples have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures. Results within this report relate only to samples as received. Data provided by the client and any subsequent calculations shall be indicated by an asterisk (*), these calculations and results are not within the scope of our UKAS accreditation. Any queries concerning data in this report should be directed to the Laboratory Manager Gradko International Ltd. This report is not to be reproduced, except in full, without the written permission of Gradko International Ltd.

Form LQF32b BTEX Issue 10 – Nov 2021

Report Number Q09411R

Page 1 of 3

REPORT OFFICIALLY CHECKED

Gradko International Ltd
This signature confirms the authenticity of these results
Signed.....
L. Gates, Laboratory Manager

(A division of Gradko International Ltd.)

St. Martins House, 77 Wales Street Winchester, Hampshire SO23 0RH
tel.: 01962 860331 fax: 01962 841339 e-mail:diffusion@gradko.co.uk

LABORATORY ANALYSIS REPORT

DETERMINATION OF AMBIENT AIR VOLATILE ORGANIC COMPOUNDS IN DIFFUSION TUBES BY THERMAL DESORPTION / GAS CHROMATOGRAPHY

Report number Q09411R1
Booking in reference no R2913
Despatch note no 97547
Customer TMS Environmental
53 Broomhill Drive
Tallaght
Dublin 24
Date samples received 25/11/2022
Job Reference 30993

Location	Tube no	Date exposed*	Date finished*	Exposure hours*	Benzene	Toluene	BTEX Ethyl Benzene	mp-Xylene	o-Xylene
					Values Reported in Parts per Billion (p.p.b.) in Air *				
AQ2-1	GRA02384	07/11/2022	21/11/2022	338.50	0.18	8.0	5.5	5.4	2.4
AQ6-1	003084	07/11/2022	21/11/2022	336.17	0.13	0.24	2.4	2.9	1.5
AQ11-1	003083	07/11/2022	21/11/2022	335.43	0.18	0.23	<0.12	0.22	<0.12
AQ12-1	GRA07256	07/11/2022	21/11/2022	334.87	0.17	0.19	0.20	0.36	0.14
AQ3-1	000009	07/11/2022	21/11/2022	334.23	<0.12	<0.12	<0.12	<0.12	<0.12
AQ1-1	005860	07/11/2022	21/11/2022	333.73	0.15	0.23	<0.12	0.34	<0.12
Blank	003190			338.50	0.04	0.02	0.01	0.03	0.01
Laboratory Blank	003614			338.50	0.02	0.01	0.01	0.05	0.02

RESULTS ARE NOT BLANK CORRECTED

Tube Type Carbograph 1TD

COMMENTS:

Results indicated with < are below the reporting limit calculated for time exposed.

The laboratory blank is a system check and will not be from the same batch of tubes analysed.

Tubes GRA02384 (AQ2-1), 003084 (AQ6-1), GRA07256 (AQ12-1) & 005860 (AQ1-1) were received with a cap off. Results may be compromised.

Weeks exposed	2	Uptake rates (ng.ppm ⁻¹ min ⁻¹)	2.02	2.13	2.07	2.07	2.07
---------------	---	--	------	------	------	------	------

Analyst name	Sarah Cook	Report checked by	Gavin Aikman
--------------	------------	-------------------	--------------

Date of analysis	08/12/2022	Date of report	13/12/2022
------------------	------------	----------------	------------

The analysis has been carried out in accordance with in-house method GLM4

Samples have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures. Results within this report relate only to samples as received. Data provided by the client and any subsequent calculations shall be indicated by an asterisk (*), these calculations and results are not within the scope of our UKAS accreditation. Any queries concerning data in this report should be directed to the Laboratory Manager Gradko International Ltd. This report is not to be reproduced, except in full, without the written permission of Gradko International Ltd.

Form LQF32b BTEX Issue 10 – November 2021

Report Number Q09411R

Page 2 of 3

REPORT OFFICIALLY CHECKED

Gradko International Ltd
This signature confirms the authenticity of these results
Signed.....
L. Gates, Laboratory Manager

(A division of Gradko International Ltd.)

St. Martins House, 77 Wales Street Winchester, Hampshire SO23 0RH
 tel.: 01962 860331 fax: 01962 841339 e-mail:diffusion@gradko.co.uk

LABORATORY ANALYSIS REPORT

DETERMINATION OF AMBIENT AIR VOLATILE ORGANIC COMPOUNDS IN DIFFUSION TUBES BY THERMAL DESORPTION / GAS CHROMATOGRAPHY

Report number Q09411R2
 Booking in reference no R2913
 Despatch note no 97547
 Customer TMS Environmental
 53 Broomhill Drive
 Tallaght
 Dublin 24
 Date samples received 25/11/2022
 Job Reference 30993

Location	Tube no	Date exposed*	Date finished*	Exposure hours*	Benzene	Toluene	BTEX		
							Ethyl Benzene	mp-Xylene	o-Xylene
Values Reported in μgm^{-3} in Air *									
AQ2-1	GRA02384	07/11/2022	21/11/2022	338.50	0.58	29	23	23	10
AQ6-1	003084	07/11/2022	21/11/2022	336.17	0.41	0.89	10	12	6.2
AQ11-1	003083	07/11/2022	21/11/2022	335.43	0.57	0.84	<0.51	0.95	<0.51
AQ12-1	GRA07256	07/11/2022	21/11/2022	334.87	0.54	0.69	0.85	1.5	0.59
AQ3-1	000009	07/11/2022	21/11/2022	334.23	<0.39	<0.43	<0.51	<0.51	<0.51
AQ1-1	005860	07/11/2022	21/11/2022	333.73	0.45	0.85	<0.51	1.4	<0.51
Blank	003190			338.50	0.12	0.08	0.05	0.13	<0.06
Laboratory Blank	003614			338.50	0.06	0.04	0.06	0.20	0.10

RESULTS ARE NOT BLANK CORRECTED

Tube Type Carbograph 1TD

COMMENTS:

Results indicated with < are below the reporting limit calculated for time exposed.

The laboratory blank is a system check and will not be from the same batch of tubes analysed.

Tubes GRA02384 (AQ2-1), 003084 (AQ6-1), GRA07256 (AQ12-1) & 005860 (AQ1-1) were received with a cap off. Results may be compromised.

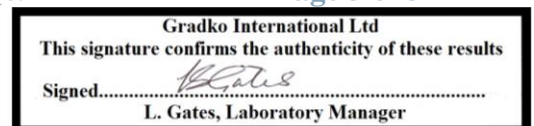
Weeks exposed	2	Uptake rates (ng.ppm ⁻¹ min ⁻¹)	2.02	2.13	2.07	2.07	2.07
---------------	---	--	------	------	------	------	------

Analyst name	Sarah Cook	Report checked by	Gavin Aikman
--------------	------------	-------------------	--------------

Date of analysis	08/12/2022	Date of report	13/12/2022
------------------	------------	----------------	------------

The analysis has been carried out in accordance with in-house method GLM4

Samples have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures. Results within this report relate only to samples as received. Data provided by the client and any subsequent calculations shall be indicated by an asterisk (*), these calculations and results are not within the scope of our UKAS accreditation. Any queries concerning data in this report should be directed to the Laboratory Manager Gradko International Ltd. This report is not to be reproduced, except in full, without the written permission of Gradko International Ltd.



LABORATORY ANALYSIS REPORT

DETERMINATION OF SULPHUR DIOXIDE IN DIFFUSION TUBES BY ION CHROMATOGRAPHY

REPORT NUMBER Q09502R
BOOKING IN REFERENCE No Q09502
DESPATCH NOTE No 97547
CUSTOMER TMS Environmental Attn: Graham Adams
 53 Broomhill Drive
 Tallaght
 Dublin 24
 Ireland
DATE SAMPLES RECEIVED 25/11/2022
JOB NUMBER 30993

Location	Sample Number	Date Exposed*	Date Finished*	Exposure Hours*	SO ₄ ²⁻ µg on tube	SO ₂ µg/m ³ *	SO ₂ ppb*
AQ2-1	2112194	07/11/2022	21/11/2022	338.50	<0.09	<3.13	<1.17
AQ6-1	2112193	07/11/2022	21/11/2022	336.03	<0.09	<3.15	<1.18
AQ11-1	2112192	07/11/2022	21/11/2022	335.43	<0.09	<3.16	<1.18
AQ12-1	2112191	07/11/2022	21/11/2022	334.87	<0.09	<3.16	<1.19
AQ3-1	2112190	07/11/2022	21/11/2022	334.15	<0.09	<3.17	<1.19
AQ1-1	2112189	07/11/2022	21/11/2022	333.73	<0.09	<3.17	<1.19
Blank	2112196			338.50	0.01	0.51	0.19
Laboratory Blank				338.50	0.02	0.72	0.27

Results are not blank subtracted.

Results reported as <0.09µg SO₄²⁻ are below the reporting limit.
 Tubes 2112188 & 2112197-201 were missing on arrival.

Overall M.U. ±11% **Reporting Limit** 0.09µg SO₄²⁻
 The reported expanded uncertainty is based on a standard uncertainty multiplied by a factor of *k*=2, providing a level of confidence of approximately 95%. Uncertainty of measurement has not been applied to the reported results.

Analysed on Dionex ICS1100 ICU10

Analyst Name Hina Ilyas **Report Checked By** Vivek Joseph

Date of Analysis 08/12/2022 **Date of Report** 09/12/2022

Analysis has been carried out in accordance with in-house method GLM1

Samples have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures. Results within this report relate only to samples as received. Data provided by the client and any subsequent calculations shall be indicated by an asterisk (*), these calculations and results are not within the scope of our UKAS accreditation. Any queries concerning data in this report should be directed to the Laboratory Manager Gradko International Ltd. This report is not to be reproduced, except in full, without the written permission of Gradko International Ltd.

Form LQF32b Issue 10 – November 2021

Report Number Q09502R

Page 1 of 1

REPORT OFFICIALLY CHECKED

Gradko International Ltd
 This signature confirms the authenticity of these results
 Signed.....
 L. Gates, Laboratory Manager

LABORATORY ANALYSIS REPORT

NITROGEN DIOXIDE IN DIFFUSION TUBES BY U.V.SPECTROPHOTOMETRY

REPORT NUMBER Q09504R
BOOKING IN REFERENCE Q09504
DESPATCH NOTE 97547
CUSTOMER TMS Environmental Attn: Graham Adams
 53 Broomhill Drive
 Tallaght
 Dublin 24
 Ireland
DATE SAMPLES RECEIVED 25/11/2022
JOB NUMBER 30443

Location	Sample Number	Exposure Data			$\mu\text{g}/\text{m}^3$ *	ppb *	$\mu\text{g NO}_2$ on tube
		Date On*	Date Off*	Time* (hr.)			
AQ2-1	2112166	07/11/2022	21/11/2022	338.50	21.95	11.46	0.54
AQ6-1	2112165	07/11/2022	21/11/2022	336.17	17.35	9.06	0.42
AQ11-1	2112164	07/11/2022	21/11/2022	335.43	30.93	16.14	0.75
AQ12-1	2112163	07/11/2022	21/11/2022	334.87	21.16	11.04	0.52
AQ3-1	2112162	07/11/2022	21/11/2022	334.15	25.12	13.11	0.61
AQ1-1	2112161	07/11/2022	21/11/2022	333.73	24.82	12.95	0.60
Blank	2112168			338.50	0.12	0.06	0.00
Laboratory Blank				338.50	0.16	0.08	0.004

Comment: Results are not blank subtracted

Customer noted missing tubes: 2112160, 2112169, 2112170, 2112171, 2112172 & 2112173.

Results have been corrected to a temperature of 293 K (20°)

Overall M.U. $\pm 9.7\%$

Limit of Detection 0.028 μgNO_2

The reported expanded uncertainty is based on a standard uncertainty multiplied by a factor of $k=2$, providing a level of confidence of approximately 95%. Uncertainty of measurement has not been applied to the reported results.

Tube Preparation: 20% TEA / Water

Analysed on UV CARY1

Analyst Name Sania Choudhury

Report Checked By Vanessa Kellie

Date of Analysis 07/12/2022

Date of Report 07/12/2022

Analysis carried out in accordance with documented in-house Laboratory Method GLM7

Samples have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures. Results within this report relate only to samples as received. Data provided by the client and any subsequent calculations shall be indicated by an asterisk (*), these calculations and results are not within the scope of our UKAS accreditation. Any queries concerning data in this report should be directed to the Laboratory Manager Gradko International Ltd. This report is not to be reproduced, except in full, without the written permission of Gradko International Ltd.

Form LQF32b Issue 10 – November 2021

Report Number Q09504R

Page 1 of 1

REPORT OFFICIALLY CHECKED

Gradko International Ltd
 This signature confirms the authenticity of these results
 Signed.....
 L. Gates, Laboratory Manager

LABORATORY ANALYSIS REPORT

DETERMINATION OF AMBIENT AIR VOLATILE ORGANIC COMPOUNDS IN DIFFUSION TUBES BY THERMAL DESORPTION / GAS CHROMATOGRAPHY

Report number Q09876R
Booking in reference no R2974
Despatch note no 97547
Customer TMS Environmental
53 Broomhill Drive
Tallaght
Dublin 24
Date samples received 09/12/2022
Job Reference 30993

Location	Tube no	Date exposed*	Date finished*	Exposure hours*	Benzene	Toluene	BTEX Ethyl Benzene ng on Tube	m-p- Xylene	o- Xylene
AQ12-2	003683	21/11/2022	06/12/2022	360.03	7.4	10.1	<5	8.5	<5
AQ11-2	004128	21/11/2022	06/12/2022	359.42	7.3	18.7	29.2	36.2	15.8
AQ6-2	GRA03631	21/11/2022	06/12/2022	359.73	7.2	10.3	6.4	10.6	<5
AQ3-2	GRA08977	21/11/2022	06/12/2022	359.48	11.1	13.6	<5	10.1	<5
AQ1-2	GRA04727	21/11/2022	06/12/2022	359.30	8.0	10.6	<5	7.3	<5
AQ2-2	003010	21/11/2022	06/12/2022	359.37	6.3	6.2	<5	<5	<5
Blank	Not provided								
Laboratory Blank	GRA10456				0.59	0.28	0.16	0.90	0.39

RESULTS ARE NOT BLANK CORRECTED

Tube Type Carbograph 1TD

COMMENTS:

Results below 5ng on tube are below the reporting limit.

The laboratory blank is a system check and will not be from the same batch of tubes analysed.

Tube GRA03631 (AQ6-2) was received with a loose cap. Results may be compromised.

Tube 004128 (AQ11-2) was received with a cap off. Results may be compromised.

Uncertainty of Measurement

Benzene	±11%
Toluene	±12%
Ethylbenzene	±11%
m/p-Xylene	±13%
o-Xylene	±11%

Reporting Limit

5ng on tube

The reported expanded uncertainty is based on a standard uncertainty multiplied by a factor of $k=2$, providing a level of confidence of approximately 95%. Uncertainty of measurement has not been applied to the reported results.

Analyst name Sarah Cook

Report checked by Mariella Angelova

Date of analysis 20/12/2022

Date of report 21/12/2022

The analysis has been carried out in accordance with in-house method GLM4

Samples have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures. Results within this report relate only to samples as received. Data provided by the client and any subsequent calculations shall be indicated by an asterisk (*), these calculations and results are not within the scope of our UKAS accreditation. Any queries concerning data in this report should be directed to the Laboratory Manager Gradko International Ltd. This report is not to be reproduced, except in full, without the written permission of Gradko International Ltd.

Form LQF32b BTEX Issue 10 – Nov 2021

Report Number Q09876R

Page 1 of 3

REPORT OFFICIALLY CHECKED

Gradko International Ltd
This signature confirms the authenticity of these results
Signed.....
L. Gates, Laboratory Manager

(A division of Gradko International Ltd.)

St. Martins House, 77 Wales Street Winchester, Hampshire SO23 0RH
 tel.: 01962 860331 fax: 01962 841339 e-mail:diffusion@gradko.co.uk

LABORATORY ANALYSIS REPORT

DETERMINATION OF AMBIENT AIR VOLATILE ORGANIC COMPOUNDS IN DIFFUSION TUBES BY THERMAL DESORPTION / GAS CHROMATOGRAPHY

Report number Q09876R1
 Booking in reference no R2974
 Despatch note no 97547
 Customer TMS Environmental
 53 Broomhill Drive
 Tallaght
 Dublin 24
 Date samples received 09/12/2022
 Job Reference 30993

Location	Tube no	Date exposed*	Date finished*	Exposure hours*	Benzene	Toluene	BTEX Ethyl Benzene	mp-Xylene	o-Xylene
					Values Reported in Parts per Billion (p.p.b.) in Air *				
AQ12-2	003683	21/11/2022	06/12/2022	360.03	0.17	0.22	<0.11	0.19	<0.11
AQ11-2	004128	21/11/2022	06/12/2022	359.42	0.17	0.41	0.65	0.81	0.35
AQ6-2	GRA03631	21/11/2022	06/12/2022	359.73	0.17	0.22	0.14	0.24	<0.11
AQ3-2	GRA08977	21/11/2022	06/12/2022	359.48	0.25	0.30	<0.11	0.23	<0.11
AQ1-2	GRA04727	21/11/2022	06/12/2022	359.30	0.18	0.23	<0.11	0.16	<0.11
AQ2-2	003010	21/11/2022	06/12/2022	359.37	0.15	0.14	<0.11	<0.11	<0.11
Blank Laboratory Blank	Not provided GRA10456			360.03	0.01	0.01	0.004	0.02	0.01

RESULTS ARE NOT BLANK CORRECTED

Tube Type Carbograph 1TD

COMMENTS:

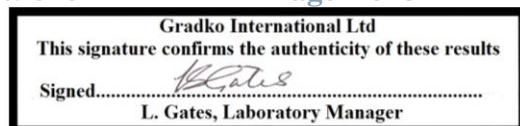
- Results indicated with < are below the reporting limit calculated for time exposed.
- The laboratory blank is a system check and will not be from the same batch of tubes analysed.
- Tube GRA03631 (AQ6-2) was received with a loose cap. Results may be compromised.
- Tube 004128 (AQ11-2) was received with a cap off. Results may be compromised.

Weeks exposed	2	Uptake rates (ng.ppm ⁻¹ min ⁻¹)	2.02	2.13	2.07	2.07	2.07
---------------	---	--	------	------	------	------	------

Analyst name	Sarah Cook	Report checked by	Mariella Angelova
Date of analysis	20/12/2022	Date of report	21/12/2022

The analysis has been carried out in accordance with in-house method GLM4

Samples have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures. Results within this report relate only to samples as received. Data provided by the client and any subsequent calculations shall be indicated by an asterisk (*), these calculations and results are not within the scope of our UKAS accreditation. Any queries concerning data in this report should be directed to the Laboratory Manager Gradko International Ltd. This report is not to be reproduced, except in full, without the written permission of Gradko International Ltd.



(A division of Gradko International Ltd.)

St. Martins House, 77 Wales Street Winchester, Hampshire SO23 0RH
tel.: 01962 860331 fax: 01962 841339 e-mail:diffusion@gradko.co.uk

LABORATORY ANALYSIS REPORT

DETERMINATION OF AMBIENT AIR VOLATILE ORGANIC COMPOUNDS IN DIFFUSION TUBES BY THERMAL DESORPTION / GAS CHROMATOGRAPHY

Report number Q09876R2
Booking in reference no R2974
Despatch note no 97547
Customer TMS Environmental
53 Broomhill Drive
Tallaght
Dublin 24
Date samples received 09/12/2022
Job Reference 30993

Location	Tube no	Date exposed*	Date finished*	Exposure hours*	Benzene	Toluene	BTEX	mp-Xylene	o-Xylene
							Ethyl Benzene		
Values Reported in $\mu\text{g m}^{-3}$ in Air *									
AQ12-2	003683	21/11/2022	06/12/2022	360.03	0.53	0.81	<0.47	0.81	<0.47
AQ11-2	004128	21/11/2022	06/12/2022	359.42	0.52	1.5	2.8	3.4	1.5
AQ6-2	GRA03631	21/11/2022	06/12/2022	359.73	0.52	0.82	0.61	1.0	<0.47
AQ3-2	GRA08977	21/11/2022	06/12/2022	359.48	0.79	1.09	<0.47	0.96	<0.47
AQ1-2	GRA04727	21/11/2022	06/12/2022	359.30	0.57	0.85	<0.48	0.70	<0.48
AQ2-2	003010	21/11/2022	06/12/2022	359.37	0.45	0.50	<0.47	<0.47	<0.47

Blank Not provided

Laboratory Blank 360.03 0.04 0.02 0.02 0.09 0.04

RESULTS ARE NOT BLANK CORRECTED

Tube Type Carbograph 1TD

COMMENTS:

Results indicated with < are below the reporting limit calculated for time exposed.

The laboratory blank is a system check and will not be from the same batch of tubes analysed.

Tube GRA03631 (AQ6-2) was received with a loose cap. Results may be compromised.

Tube 004128 (AQ11-2) was received with a cap off. Results may be compromised.

Weeks exposed 2 Uptake rates ($\text{ng.ppm}^{-1}\text{min}^{-1}$) 2.02 2.13 2.07 2.07 2.07

Analyst name Sarah Cook

Report checked by Mariella Angelova

Date of analysis 20/12/2022

Date of report 21/12/2022

The analysis has been carried out in accordance with in-house method GLM4

Samples have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures. Results within this report relate only to samples as received. Data provided by the client and any subsequent calculations shall be indicated by an asterisk (*), these calculations and results are not within the scope of our UKAS accreditation. Any queries concerning data in this report should be directed to the Laboratory Manager Gradko International Ltd. This report is not to be reproduced, except in full, without the written permission of Gradko International Ltd.

Form LQF32b BTEX Issue 10 – November 2021

Report Number Q09876R

Page 3 of 3

REPORT OFFICIALLY CHECKED

Gradko International Ltd
This signature confirms the authenticity of these results
Signed.....
L. Gates, Laboratory Manager

LABORATORY ANALYSIS REPORT

DETERMINATION OF SULPHUR DIOXIDE IN DIFFUSION TUBES BY ION CHROMATOGRAPHY

REPORT NUMBER Q09946R
BOOKING IN REFERENCE No Q09946
DESPATCH NOTE No 97547
CUSTOMER TMS Environmental Attn: Graham Adams
 53 Broomhill Drive
 Tallaght
 Dublin 24
 Ireland
DATE SAMPLES RECEIVED 09/12/2022
JOB NUMBER 30993

Location	Sample Number	Date Exposed*	Date Finished*	Exposure Hours*	SO ₄ ²⁻ µg on tube	SO ₂ µg/m ³ *	SO ₂ ppb*
AQ12-2	2112188	21/11/2022	06/12/2022	359.98	<0.09	<2.94	<1.10
AQ11-2	2112201	21/11/2022	06/12/2022	359.42	<0.09	<2.95	<1.11
AQ6-2	2112200	21/11/2022	06/12/2022	359.73	<0.09	<2.95	<1.10
AQ3-2	2112199	21/11/2022	06/12/2022	359.48	<0.09	<2.95	<1.11
AQ1-2	2112198	21/11/2022	06/12/2022	359.30	<0.09	<2.95	<1.11
AQ2-2	2112197	21/11/2022	06/12/2022	359.37	<0.09	<2.95	<1.11
Laboratory Blank				359.98	0.01	0.18	0.07

Results are not blank subtracted.

Results reported as <0.09µg SO₄²⁻ are below the reporting limit.

Tube 2112196 was missing on arrival.

Barcodes 2112189-94 from the exposure sheet were not scanned and are not in this report as they are already present in the database under receipt Q09502R.

Overall M.U. ±11% **Reporting Limit** 0.09µg SO₄²⁻
 The reported expanded uncertainty is based on a standard uncertainty multiplied by a factor of k=2, providing a level of confidence of approximately 95%. Uncertainty of measurement has not been applied to the reported results.

Analysed on Dionex ICS1100 ICU10

Analyst Name Hina Ilyas **Report Checked By** Vivek Joseph

Date of Analysis 16/12/2022 **Date of Report** 20/12/2022

Analysis has been carried out in accordance with in-house method GLM1

Samples have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures. Results within this report relate only to samples as received. Data provided by the client and any subsequent calculations shall be indicated by an asterisk (*), these calculations and results are not within the scope of our UKAS accreditation. Any queries concerning data in this report should be directed to the Laboratory Manager Gradko International Ltd. This report is not to be reproduced, except in full, without the written permission of Gradko International Ltd.

Form LQF32b Issue 10 – November 2021

Report Number Q09946R

Page 1 of 1

REPORT OFFICIALLY CHECKED

Gradko International Ltd
 This signature confirms the authenticity of these results
 Signed.....
 L. Gates, Laboratory Manager

LABORATORY ANALYSIS REPORT

DETERMINATION OF SULPHUR DIOXIDE IN DIFFUSION TUBES BY ION CHROMATOGRAPHY

REPORT NUMBER Q09947R
BOOKING IN REFERENCE No Q09947
DESPATCH NOTE No 97547

CUSTOMER TMS Environmental Attn: Graham Adams
53 Broomhill Drive
Tallaght
Dublin 24

DATE SAMPLES RECEIVED Ireland
09/12/2022
JOB NUMBER 30993

Location	Sample Number	Date Exposed*	Date Finished*	Exposure Hours*	SO ₄ ²⁻ µg on tube	SO ₂ µg/m ³ *	SO ₂ ppb*
AQ4-1	2112208	23/11/2022	06/12/2022	313.12	<0.09	<3.38	<1.27
AQ5-1	2112207	23/11/2022	06/12/2022	313.03	<0.09	<3.38	<1.27
AQ7-1	2112206	23/11/2022	06/12/2022	313.42	<0.09	<3.38	<1.27
AQ8-1	2112205	23/11/2022	06/12/2022	313.33	<0.09	<3.38	<1.27
AQ9-1	2112204	23/11/2022	06/12/2022	313.33	<0.09	<3.38	<1.27
AQ10-1	2112203	23/11/2022	06/12/2022	313.25	<0.09	<3.38	<1.27
Laboratory Blank				313.42	0.005	0.17	0.07

Results are not blank subtracted.

Results reported as <0.09µg SO₄²⁻ on tube are below the reporting limit.

Tubes were exposed for shorter than the recommended 2-4 weeks.

Overall M.U. ±11% **Reporting Limit** 0.09µg SO₄²⁻
The reported expanded uncertainty is based on a standard uncertainty multiplied by a factor of k=2, providing a level of confidence of approximately 95%. Uncertainty of measurement has not been applied to the reported results.

Analysed on Dionex ICS1100 ICU10

Analyst Name Isra Otman

Report Checked By

Hina Ilyas

Date of Analysis 20/12/2022

Date of Report

22/12/2022

Analysis has been carried out in accordance with in-house method GLM1

Samples have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures. Results within this report relate only to samples as received. Data provided by the client and any subsequent calculations shall be indicated by an asterisk (*), these calculations and results are not within the scope of our UKAS accreditation. Any queries concerning data in this report should be directed to the Laboratory Manager Gradko International Ltd. This report is not to be reproduced, except in full, without the written permission of Gradko International Ltd.

Form LQF32b Issue 10 – November 2021

Report Number Q09947R

Page 1 of 1

REPORT OFFICIALLY CHECKED

Gradko International Ltd
This signature confirms the authenticity of these results
Signed.....
L. Gates, Laboratory Manager

LABORATORY ANALYSIS REPORT

DETERMINATION OF AMBIENT AIR VOLATILE ORGANIC COMPOUNDS IN DIFFUSION TUBES BY THERMAL DESORPTION / GAS CHROMATOGRAPHY

Report number Q09877R
Booking in reference no R2975
Despatch note no 97547
Customer TMS Environmental
53 Broomhill Drive
Tallaght
Dublin 24
Date samples received 09/12/2022
Job Reference 30993

Location	Tube no	Date exposed*	Date finished*	Exposure hours*	Benzene	Toluene	BTEX Ethyl Benzene ng on Tube	m-p-Xylene	o-Xylene
AQ4-1	003410	23/11/2022	06/12/2022	313.62	7.4	10.8	<5	13.0	5.1
AQ5-1	004139	23/11/2022	06/12/2022	313.03	6.7	7.9	<5	10.9	<5
AQ7-1	003806	23/11/2022	06/12/2022	313.42	5.5	7.7	<5	8.2	<5
AQ8-1	003098	23/11/2022	06/12/2022	313.33	5.6	9.7	<5	10.3	<5
AQ9-1	003010	23/11/2022	06/12/2022	313.33	6.4	9.0	<5	11.0	<5
AQ10-1	003900	23/11/2022	06/12/2022	313.25	8.7	8.7	<5	8.3	<5
Blank	Not provided								
Laboratory Blank	GRA10456				0.59	0.28	0.16	0.90	0.39

RESULTS ARE NOT BLANK CORRECTED

Tube Type Carbograph 1TD

COMMENTS:

Results below 5ng on tube are below the reporting limit.

The laboratory blank is a system check and will not be from the same batch of tubes analysed.

Uncertainty of Measurement

Benzene	±11%
Toluene	±12%
Ethylbenzene	±11%
m/p-Xylene	±13%
o-Xylene	±11%

Reporting Limit

5ng on tube

The reported expanded uncertainty is based on a standard uncertainty multiplied by a factor of $k=2$, providing a level of confidence of approximately 95%. Uncertainty of measurement has not been applied to the reported results.

Analyst name Sarah Cook

Report checked by Katya Paldamova

Date of analysis 20/12/2022

Date of report 10/01/2023

The analysis has been carried out in accordance with in-house method GLM4

Samples have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures. Results within this report relate only to samples as received. Data provided by the client and any subsequent calculations shall be indicated by an asterisk (*), these calculations and results are not within the scope of our UKAS accreditation. Any queries concerning data in this report should be directed to the Laboratory Manager Gradko International Ltd. This report is not to be reproduced, except in full, without the written permission of Gradko International Ltd.

Form LQF32b BTEX Issue 10 – Nov 2021

Report Number Q09877R

Page 1 of 3

REPORT OFFICIALLY CHECKED

Gradko International Ltd
This signature confirms the authenticity of these results
Signed.....*L. Gates*.....
L. Gates, Laboratory Manager

(A division of Gradko International Ltd.)

St. Martins House, 77 Wales Street Winchester, Hampshire SO23 0RH
 tel.: 01962 860331 fax: 01962 841339 e-mail:diffusion@gradko.co.uk

LABORATORY ANALYSIS REPORT

DETERMINATION OF AMBIENT AIR VOLATILE ORGANIC COMPOUNDS IN DIFFUSION TUBES BY THERMAL DESORPTION / GAS CHROMATOGRAPHY

Report number Q09877R1
 Booking in reference no R2975
 Despatch note no 97547
 Customer TMS Environmental
 53 Broomhill Drive
 Tallaght
 Dublin 24
 Date samples received 09/12/2022
 Job Reference 30993

Location	Tube no	Date exposed*	Date finished*	Exposure hours*	Benzene	Toluene	BTEX Ethyl Benzene	mp-Xylene	o-Xylene
					Values Reported in Parts per Billion (p.p.b.) in Air *				
AQ4-1	003410	23/11/2022	06/12/2022	313.62	0.19	0.27	<0.13	0.33	0.13
AQ5-1	004139	23/11/2022	06/12/2022	313.03	0.18	0.20	<0.13	0.28	<0.13
AQ7-1	003806	23/11/2022	06/12/2022	313.42	0.15	0.19	<0.13	0.21	<0.13
AQ8-1	003098	23/11/2022	06/12/2022	313.33	0.15	0.24	<0.13	0.26	<0.13
AQ9-1	003010	23/11/2022	06/12/2022	313.33	0.17	0.22	<0.13	0.28	<0.13
AQ10-1	003900	23/11/2022	06/12/2022	313.25	0.23	0.22	<0.13	0.21	<0.13
Blank Laboratory Blank	Not provided GRA10456			313.62	0.02	0.01	0.004	0.02	0.01

RESULTS ARE NOT BLANK CORRECTED

Tube Type Carbograph 1TD

COMMENTS:

Results indicated with < are below the reporting limit calculated for time exposed.
 The laboratory blank is a system check and will not be from the same batch of tubes analysed.

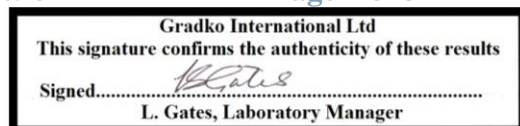
Weeks exposed 2 Uptake rates (ng.ppm⁻¹min⁻¹) 2.02 2.13 2.07 2.07 2.07

Analyst name Sarah Cook Report checked by Katya Paldamova

Date of analysis 20/12/2022 Date of report 10/01/2023

The analysis has been carried out in accordance with in-house method GLM4

Samples have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures. Results within this report relate only to samples as received. Data provided by the client and any subsequent calculations shall be indicated by an asterisk (*), these calculations and results are not within the scope of our UKAS accreditation. Any queries concerning data in this report should be directed to the Laboratory Manager Gradko International Ltd. This report is not to be reproduced, except in full, without the written permission of Gradko International Ltd.



(A division of Gradko International Ltd.)

St. Martins House, 77 Wales Street Winchester, Hampshire SO23 0RH
tel.: 01962 860331 fax: 01962 841339 e-mail:diffusion@gradko.co.uk

LABORATORY ANALYSIS REPORT

DETERMINATION OF AMBIENT AIR VOLATILE ORGANIC COMPOUNDS IN DIFFUSION TUBES BY THERMAL DESORPTION / GAS CHROMATOGRAPHY

Report number Q09877R2
Booking in reference no R2975
Despatch note no 97547
Customer TMS Environmental
53 Broomhill Drive
Tallaght
Dublin 24
Date samples received 09/12/2022
Job Reference 30993

Location	Tube no	Date exposed*	Date finished*	Exposure hours*	Benzene	Toluene	BTEX	mp-Xylene	o-Xylene
							Ethyl Benzene		
Values Reported in $\mu\text{g m}^{-3}$ in Air *									
AQ4-1	003410	23/11/2022	06/12/2022	313.62	0.61	0.99	<0.54	1.4	0.56
AQ5-1	004139	23/11/2022	06/12/2022	313.03	0.55	0.73	<0.55	1.2	<0.55
AQ7-1	003806	23/11/2022	06/12/2022	313.42	0.45	0.71	<0.54	0.89	<0.54
AQ8-1	003098	23/11/2022	06/12/2022	313.33	0.46	0.89	<0.54	1.1	<0.54
AQ9-1	003010	23/11/2022	06/12/2022	313.33	0.53	0.83	<0.54	1.2	<0.54
AQ10-1	003900	23/11/2022	06/12/2022	313.25	0.71	0.80	<0.54	0.91	<0.54

Blank Not provided

Laboratory Blank 313.62 0.05 0.03 0.02 0.10 0.04

RESULTS ARE NOT BLANK CORRECTED

Tube Type Carbograph 1TD

COMMENTS:

Results indicated with < are below the reporting limit calculated for time exposed.

The laboratory blank is a system check and will not be from the same batch of tubes analysed.

Weeks exposed 2 Uptake rates ($\text{ng.ppm}^{-1}\text{min}^{-1}$) 2.02 2.13 2.07 2.07 2.07

Analyst name Sarah Cook

Report checked by Katya Paldamova

Date of analysis 20/12/2022

Date of report 10/01/2023

The analysis has been carried out in accordance with in-house method GLM4

Samples have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures. Results within this report relate only to samples as received. Data provided by the client and any subsequent calculations shall be indicated by an asterisk (*), these calculations and results are not within the scope of our UKAS accreditation. Any queries concerning data in this report should be directed to the Laboratory Manager Gradko International Ltd. This report is not to be reproduced, except in full, without the written permission of Gradko International Ltd.

Form LQF32b BTEX Issue 10 – November 2021

Report Number Q09877R

Page 3 of 3

REPORT OFFICIALLY CHECKED

Gradko International Ltd
This signature confirms the authenticity of these results
Signed.....
L. Gates, Laboratory Manager

LABORATORY ANALYSIS REPORT

NITROGEN DIOXIDE IN DIFFUSION TUBES BY U.V.SPECTROPHOTOMETRY

REPORT NUMBER Q09952R
BOOKING IN REFERENCE Q09952
DESPATCH NOTE 97547
CUSTOMER TMS Environmental Attn: Graham Adams
53 Broomhill Drive
Tallaght
Dublin 24

Ireland

DATE SAMPLES RECEIVED 09/12/2022
JOB NUMBER 30993

Location	Sample Number	Exposure Data			$\mu\text{g}/\text{m}^3$ *	ppb *	$\mu\text{g NO}_2$ on tube
		Date On*	Date Off*	Time* (hr.)			
AQ4-1	2112180	23/11/2022	06/12/2022	313.12	27.38	14.29	0.62
AQ5-1	2112179	23/11/2022	06/12/2022	313.03	20.97	10.94	0.48
AQ7-1	2112177	23/11/2022	06/12/2022	313.42	27.57	14.39	0.63
AQ8-1	2112176	23/11/2022	06/12/2022	313.33	20.20	10.54	0.46
AQ9-1	2112175	23/11/2022	06/12/2022	313.33	15.94	8.32	0.36
AQ10-1	2112174	23/11/2022	06/12/2022	313.25	17.75	9.26	0.40
Laboratory Blank				313.42	0.13	0.07	0.003

Comment: Results are not blank subtracted

Results have been corrected to a temperature of 293 K (20°)

Overall M.U. $\pm 9.7\%$

Limit of Detection 0.028 μgNO_2

The reported expanded uncertainty is based on a standard uncertainty multiplied by a factor of $k=2$, providing a level of confidence of approximately 95%. Uncertainty of measurement has not been applied to the reported results.

Tube Preparation: 20% TEA / Water

Analysed on UV CARY1

Analyst Name Sania Choudhury

Report Checked By Adam Robinson

Date of Analysis 04/01/2023

Date of Report 04/01/2023

Analysis carried out in accordance with documented in-house Laboratory Method GLM7

Samples have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures. Results within this report relate only to samples as received. Data provided by the client and any subsequent calculations shall be indicated by an asterisk (*), these calculations and results are not within the scope of our UKAS accreditation. Any queries concerning data in this report should be directed to the Laboratory Manager Gradko International Ltd. This report is not to be reproduced, except in full, without the written permission of Gradko International Ltd.

Form LQF32b Issue 10 – November 2021

Report Number Q09952R

Page 1 of 1

REPORT OFFICIALLY CHECKED

Gradko International Ltd
This signature confirms the authenticity of these results
Signed.....
L. Gates, Laboratory Manager

LABORATORY ANALYSIS REPORT

NITROGEN DIOXIDE IN DIFFUSION TUBES BY U.V.SPECTROPHOTOMETRY

REPORT NUMBER Q09954R
BOOKING IN REFERENCE Q09954
DESPATCH NOTE 97547
CUSTOMER TMS Environmental Attn: Graham Adams
53 Broomhill Drive
Tallaght
Dublin 24

Ireland

DATE SAMPLES RECEIVED 09/12/2022
JOB NUMBER 30993

Location	Sample Number	Exposure Data			$\mu\text{g}/\text{m}^3$ *	ppb *	$\mu\text{g NO}_2$ on tube
		Date On*	Date Off*	Time* (hr.)			
AQ12-2	2112160	21/11/2022	06/12/2022	359.98	22.93	11.97	0.60
AQ11-2	2112173	21/11/2022	06/12/2022	359.42	33.34	17.40	0.87
AQ6-2	2112172	21/11/2022	06/12/2022	359.73	18.89	9.86	0.49
AQ3-2	2112171	21/11/2022	06/12/2022	359.48	33.53	17.50	0.88
AQ1-2	2112170	21/11/2022	06/12/2022	359.30	30.33	15.83	0.79
AQ2-2	2112169	21/11/2022	06/12/2022	359.37	26.95	14.07	0.70
Laboratory Blank				359.98	0.11	0.06	0.003

Comment: Results are not blank subtracted

Tube 2112168 was missing on arrival.

Results have been corrected to a temperature of 293 K (20°)

Overall M.U. $\pm 9.7\%$

The reported expanded uncertainty is based on a standard uncertainty multiplied by a factor of $k=2$, providing a level of confidence of approximately 95%. Uncertainty of measurement has not been applied to the reported results.

Tube Preparation: 20% TEA / Water

Analyst Name Sania Choudhury

Analysed on UV CARY1

Report Checked By Adam Robinson

Date of Analysis 04/01/2023

Date of Report 04/01/2023

Analysis carried out in accordance with documented in-house Laboratory Method GLM7

Samples have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures. Results within this report relate only to samples as received. Data provided by the client and any subsequent calculations shall be indicated by an asterisk (*), these calculations and results are not within the scope of our UKAS accreditation. Any queries concerning data in this report should be directed to the Laboratory Manager Gradko International Ltd. This report is not to be reproduced, except in full, without the written permission of Gradko International Ltd.

Form LQF32b Issue 10 – November 2021

Report Number Q09954R

Page 1 of 1

REPORT OFFICIALLY CHECKED

Gradko International Ltd
This signature confirms the authenticity of these results
Signed.....
L. Gates, Laboratory Manager