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LABORATORY ANALYSIS REPORT

469616	S/W corner	469603	05/01/2015	15/01/2015	237.57	5.92	17.08	11.15	11.35	32.72	21.37	0.20	0.57
469615	N/W corner	469602	05/01/2015	15/01/2015	237.72	9.85	10.60	0.76	18.87	20.32	1.45	0.33	0.35
	Lab Blanks				237.72	0.21	0.66	0.45	0.41	1.27	0.87	0.007	0.022

Comment: Results are not blank subtracted

[+]NO results are derived by subtracting NO2 from NOx.
Results have been corrected to a temperature of 293K (20C)
Overall M.O.U. 7.3% +/-

Limit of Detection 0.071ug NOx, 0.017ug NO2 on tube

Tube Preparation: 20%TEA/Water Analysed on UVS04 Camspec M550

Analyst Name C. Gemmell

Date of Analysis 23/01/2015

Date of Report 26/01/2015

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

REPORT OFFICIALLY CHECKED

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LABORATORY ANALYSIS REPORT

REPORT NUMBER	X2770R
CUSTOMER	Golder Associates UK Ltd Attenborough House Browns Lane Business Park Stanton-on-the-Wolds Nottinghamshire NG12 5BL
GRADKO LAB REFERENCE	GMSJ0069-0074
DESPATCH NOTE No.	SOR017647
JOB REFERENCE	GAUK107244
DATE SAMPLES RECEIVED	16.01.2015
BOOKING IN REF.	X2770

IDENTIFICATION AND ESTIMATION (SEMI-QUANTITATIVE ANALYSIS) OF TOP 10 VOC ON TENAX DIFFUSION TUBES BY GC/MS

Analysis has been carried out in accordance with in-house method GLM 13

Tube Number	**GRA 09716**
Exposure Time(mins)	**14225**
Sample ID	**NE ONE**

Top 10 VOC	ng on tube	µgm^{-3}*	ppb in air*
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl- +	507.86	185.65	17.85
Phenylmaleic anhydride +	152.20	37.23	5.35
1,2-Benzenedicarboxylic acid, mono(2-ethylhexyl) ester +	127.46	49.82	4.48
Triphenylphosphine oxide +	102.20	39.95	3.59
Benzoic acid +	45.19	7.75	1.59
Benzaldehyde**	25.83	3.85	0.91
Diethyl Phthalate +	14.02	4.38	0.49
Acetic acid	13.97	1.18	0.49
Naphthalene	12.01	2.16	0.42
Acetophenone**	11.28	1.90	0.40

Tube Number	**GRA 05033**
Exposure Time(mins)	**14225**
Sample ID	**NE TWO**

Top 10 VOC	ng on tube	µgm^{-3}*	ppb in air*
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl- +	576.34	210.68	20.26
Benzaldehyde**	19.42	2.89	0.68
Benzoic acid +	16.36	2.81	0.57
Acetic acid	12.88	1.09	0.45

REPORT OFFICIALLY CHECKED

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LABORATORY ANALYSIS REPORT

Nonanal** +	10.62	2.12	0.37
Naphthalene	10.00	1.80	0.35
Acetophenone**	8.80	1.49	0.31
Benzophenone +	8.11	2.08	0.29
Benzene	8.06	0.88	0.28
Toluene	7.86	1.02	0.28

Tube Number GRA 11886
Exposure Time(mins) 14225
Sample ID NE THREE

Top 10 VOC	**ng on tube**	**µgm^{-3}***	**ppb in air***
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl- +	535.06	195.59	18.81
Benzoic acid +	39.64	6.80	1.39
Benzaldehyde**	30.96	4.61	1.09
Acetic acid	15.24	1.29	0.54
Acetophenone**	13.98	2.36	0.49
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester +	12.07	4.72	0.42
Naphthalene	11.36	2.04	0.40
Benzene	10.55	1.16	0.37
Acetone +	10.02	0.85	0.35
Heptane, 2,2,4,6,6-pentamethyl- +	9.49	2.27	0.33

Tube Number GRA 03578
Exposure Time(mins) 14241
Sample ID SE CORNER

Top 10 VOC	**ng on tube**	**µgm^{-3}***	**ppb in air***
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl- +	87.37	31.90	3.07
Benzaldehyde**	12.54	1.87	0.44
Toluene	8.62	1.11	0.30
Benzene	7.54	0.83	0.26
Tridecane	6.44	1.66	0.23
Dodecane	5.49	1.31	0.19
Acetophenone**	<5.00	<0.84	<0.18
Acetone +	<5.00	<0.41	<0.18
Acetic acid	<5.00	<0.42	<0.18
m/p-Xylene	<5.00	<0.74	<0.18

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L. Gates, Laboratory Supervisor

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UKAS TESTING 2187

LABORATORY ANALYSIS REPORT

Tube Number	**GRA 03107**
Exposure Time(mins)	**14250**
Sample ID	**SW CORNER**

Top 10 VOC	**ng on tube**	**µgm^{-3}***	**ppb in air***
Benzene	7.29	0.80	0.26
Acetic acid	6.45	0.54	0.23
Benzaldehyde**	5.52	0.82	0.19
Acetone +	<5.00	<0.41	<0.18
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl- +	<5.00	<1.82	<0.18

5 Compounds detected

Tube Number	**GRA 11812**
Exposure Time(mins)	**14260**
Sample ID	**NW CORNER**

Top 10 VOC	**ng on tube**	**µgm^{-3}***	**ppb in air***
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl- +	131.77	48.05	4.62
Benzaldehyde**	19.05	2.83	0.67
Benzene	11.71	1.28	0.41
Acetophenone**	8.78	1.48	0.31
Phenol	5.36	0.71	0.19
Acetic acid	5.02	0.42	0.18
Naphthalene	<5.00	<0.90	<0.18
m/p-Xylene	<5.00	<0.74	<0.18
Acetone +	<5.00	<0.41	<0.18

9 Compounds detected

Uptake Rates:

All compounds: 2.00 ng.ppm^{-1}.min^{-1}.

Results reported as <5ng on tube are below the reporting limit.

Reporting limit for non BTEX compounds are derived from the non-specific standard Toluene.

Identification and estimation results for ng on tube are calculated by reference to toluene and toluene-d8 Internal standard.

+ These compounds are not covered by our UKAS accredited flexible scope.

****Compounds may be an artifact due to reaction of ozone with the Tenax sorbent.**

Acetic Acid may be an artifact due to the breakdown of Tenax sorbent.

Acetone was detected however Tenax is not the recommended sorbent.

Exposure times were calculated from start and finish times given on the exposure sheet.

		Date of Analysis	**20.01.15**
Analysts Name	**Mariella Angelova**	**Date of Report**	**28.01.15**

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Concentrations in µg/m^3							All Tubes			Tripclicates		
Sample Location	North East 1	North East 2	North East 3	South East	South West	North West	Min	Max	Average	Mean	Standard Deviation	CV
Exposed from	05/01/2015	05/01/2015	05/01/2015	05/01/2015	05/01/2015	05/01/2015						
Exposed to	15/01/2015	15/01/2015	15/01/2015	15/01/2015	15/01/2015	15/01/2015						
Date samples received	16/01/2015	16/01/2015	16/01/2015	16/01/2015	16/01/2015	16/01/2015						
NO_2	31.56	35.73	29.41	35.81	11.35	18.87	11.35	35.81	27.12	32.23	3.21	9.97
NOx	39.85	53.78	54.36	36.51	32.72	20.32	20.32	54.36	39.59	49.33	8.22	16.65
NO	8.30	18.04	24.94	0.70	21.37	1.45	0.70	24.94	12.47	17.09	8.36	48.91

Concentrations in µg/m^3							All Tubes			Tripclicates		
Sample Location	North East 1	North East 2	North East 3	South East	South West	North West	Min	Max	Average	Mean	Standard Deviation	CV
Exposed from	05/01/2015	05/01/2015	05/01/2015	05/01/2015	05/01/2015	05/01/2015						
Exposed to	15/01/2015	15/01/2015	15/01/2015	15/01/2015	15/01/2015	15/01/2015						
Date samples received	16/01/2015	16/01/2015	16/01/2015	16/01/2015	16/01/2015	16/01/2015						
NO_2	31.56	35.73	29.41	35.81	11.35	18.87	11.35	35.81	27.12	32.23	3.21	9.97
NOx	39.85	53.78	54.36	36.51	32.72	20.32	20.32	54.36	39.59	49.33	8.22	16.65
NO	8.30	18.04	24.94	0.70	21.37	1.45	0.70	24.94	12.47	17.09	8.36	48.91

APPENDIX H

Monitoring Period 15 Jan to 16 Feb 2015

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LABORATORY ANALYSIS REPORT

NITROGEN DIOXIDE IN DIFFUSION TUBES BY U.V.SPECTROPHOTOMETRY

REPORT NUMBER X3010R

BOOKING REFERENCE No X3010

DESPATCH NOTE No SOR20953

CUSTOMER Golder Associates UK Ltd
Attenborough House
Browns Lane, Business Park, Stanton-on-the Wolds
Nottinghamshire, NG12 5BL

DATE SAMPLES RECEIVED 18-Feb

NO_2	Tube Number	NO_x	Exposure Data Date On	Date Off	Time (hr.)	NO_2 ppb *	NO_x ppb *	NO ppb * +	NO_2 µg/m^3	NO_x µg/m^3	NO µg/m^3 +	TOTAL µG NO_2	TOTAL µG NOx
476326	NE1	476334	15/01/2015	16/02/2015	768.30	14.82	16.00	1.18	28.40	30.66	2.26	1.59	1.71
476327	NE2	476335	15/01/2015	16/02/2015	768.30	14.64	16.52	1.88	28.04	31.64	3.60	1.57	1.77
476328	NE3	476336	15/01/2015	16/02/2015	768.30	13.12	21.74	8.62	25.14	41.65	16.51	1.40	2.33
476329	SE	476337	15/01/2015	16/02/2015	768.58	16.33	21.77	5.44	31.29	41.71	10.42	1.75	2.33
476330	SW	476338	15/01/2015	16/02/2015	768.85	13.36	14.74	1.38	25.59	28.24	2.65	1.43	1.58
476332	NW	476340	15/01/2015	16/02/2015	769.02	11.94	13.78	1.84	22.88	26.41	3.52	1.28	1.48
Lab Blanks					769.02	0.13	0.26	0.13	0.25	0.50	0.25	0.014	0.028

REPORT OFFICIALLY CHECKED

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LABORATORY ANALYSIS REPORT

Comment: Results are not blank subtracted

+NO results are derived by subtracting NO2 from NOx.

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

Overall M.O.U.	7.3% +/-	**Limit of Detection**	0.071ug NOx, 0.017ug NO2 on tube

Tube Preparation: 20%TEA/Water Analysed on UVS04 Camspec M550

		Analyst Name	C. Gemmell
Date of Analysis	25/02/2015	**Date of Report**	02/03/2015

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

REPORT OFFICIALLY CHECKED

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LABORATORY ANALYSIS REPORT

REPORT NUMBER	**X3014R**
CUSTOMER	**Golder Associates UK Ltd** **Attenborough House** **Browns Lane Business Park** **Stanton-on-the-Wolds** **Nottinghamshire NG12 5BL**
GRADKO LAB REFERENCE	**GMSJ0224-0229**
DESPATCH NOTE No.	**20953**
JOB REFERENCE	**GAUK107445**
DATE SAMPLES RECEIVED	**18.02.2015**
BOOKING IN REF.	**X3014**

IDENTIFICATION AND ESTIMATION (SEMI-QUANTITATIVE ANALYSIS) OF TOP 10 VOC ON TENAX DIFFUSION TUBES BY GC/MS
Analysis has been carried out in accordance with in-house method GLM 13

Tube Number	**GRA 09365**
Exposure Time(mins)	**46098**
Sample ID	**North East 1**

Top 10 VOC	**ng on tube**	**µgm^{-3}***	**ppb in air***
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	2914	329	32
1,2-Benzenedicarboxylic acid, mono(2-ethylhexyl) ester +	816.60	98.49	8.86
Squalene +	418.08	74.37	4.53
2-Naphthyl benzoate +	110.63	11.90	1.20
Triphenylphosphine oxide +	100.35	12.10	1.09
Benzoic acid +	71.58	3.79	0.78
Benzaldehyde**	48.94	2.25	0.53
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester +	38.53	4.65	0.42
Naphthalene	30.87	1.71	0.33
Toluene	26.69	1.07	0.29

Tube Number	**GRA 11856**
Exposure Time(mins)	**46098**
Sample ID	**North East 2**

Top 10 VOC	**ng on tube**	**µgm^{-3}***	**ppb in air***
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	2486	280	27
1,2-Benzenedicarboxylic acid, mono(2-ethylhexyl) ester +	768.82	92.73	8.34
Di-n-octyl phthalate +	251.09	42.49	2.72
Squalene +	123.01	21.88	1.33
Cyclohexadecane +	95.15	9.25	1.03
Hexadecanoic acid, methyl ester +	90.50	10.60	0.98

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Heptadecanoic acid, 16-methyl-, methyl ester +	90.41	11.69	0.98
Octadecanal +	82.77	9.62	0.90
Benzaldehyde**	72.71	3.34	0.79
Naphthalene	46.71	2.59	0.51

Tube Number GRA 11906
Exposure Time(mins) 46098
Sample ID North East 3

Top 10 VOC	**ng on tube**	**µgm^{-3}***	**ppb in air***
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	2695	304	29
Benzoic acid +	152.65	8.08	1.66
Benzaldehyde**	56.82	2.61	0.62
2-Naphthyl benzoate +	41.30	4.44	0.45
Cyclohexadecane +	37.28	3.62	0.40
Phenylmaleic anhydride	30.71	2.32	0.33
Acetophenone**	29.82	1.55	0.32
Toluene	24.40	0.97	0.26
Benzene	23.70	0.80	0.26
m/p-Xylene	19.60	0.90	0.21

Tube Number GRA 10276
Exposure Time(mins) 46115
Sample ID South East

Top 10 VOC	**ng on tube**	**µgm^{-3}***	**ppb in air***
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	779.09	87.85	8.45
Cyclohexadecane +	136.54	13.26	1.48
Octadecanal +	101.22	11.77	1.10
Benzaldehyde**	63.05	2.90	0.68
Toluene	35.61	1.42	0.39
Benzene	31.26	1.06	0.34
m/p-Xylene	28.51	1.31	0.31
Naphthalene	25.93	1.44	0.28
Undecane	21.89	1.48	0.24
Nonanal** +	21.26	1.31	0.23

Tube Number GRA 06211
Exposure Time(mins) 46131
Sample ID South West

Top 10 VOC	**ng on tube**	**µgm^{-3}***	**ppb in air***
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	2619	295	28
Benzoic acid +	221.50	11.72	2.40

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2-Naphthyl benzoate +	106.10	11.41	1.15
Benzaldehyde**	52.97	2.43	0.57
Pentane, 2-methyl-	52.49	1.96	0.57
Pentane, 3-methyl-	39.98	1.49	0.43
Phenylmaleic anhydride	35.59	2.68	0.39
Toluene	29.80	1.19	0.32
Acetophenone**	25.47	1.33	0.28
Hexane	24.31	0.91	0.26

Tube Number GRA 11823
Exposure Time(mins) 46141
Sample ID North West

Top 10 VOC	**ng on tube**	**µgm^{-3*}**	**ppb in air***
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	2015	227	22
Benzoic acid +	202.99	10.73	2.20
2-Naphthyl benzoate +	101.90	10.95	1.10
Benzaldehyde**	52.62	2.42	0.57
Cyclohexadecane +	31.42	3.05	0.34
Naphthalene	28.04	1.56	0.30
Acetophenone**	25.55	1.33	0.28
Diethyl Phthalate +	25.22	2.43	0.27
Benzene	24.63	0.83	0.27
Phenylmaleic anhydride	24.46	1.84	0.27

Uptake Rates:
All compounds: 2.00 ng.ppm^{-1}.min^{-1}.

Results greater than 1000ng are outside of our UKAS accredited calibration range.
Identification and estimation results for ng on tube are calculated by reference to toluene and toluene-d8 Internal standard.
+ These compounds are not covered by our UKAS accredited flexible scope.
****Compounds may be an artifact due to reaction of ozone with the Tenax sorbent.**

Date of Analysis 27.02.15

Analysts Name Mariella Angelova **Date of Report** 04.03.15

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L. Gates, Laboratory Manager

Concentrations in µg/m^3							All Tubes			Triplicate Tubes		
Sample Location	North East 1	North East 2	North East 3	South East	South West	North West	Min	Max	Average	Mean	Standard Deviation	CV
Exposed from	15/01/2015	15/01/2015	15/01/2015	15/01/2015	15/01/2015	15/01/2015						
Exposed to	16/02/2015	16/02/2015	16/02/2015	16/02/2015	16/02/2015	16/02/2015						
Date samples received	18/02/2015	18/02/2015	18/02/2015	18/02/2015	18/02/2015	18/02/2015						
NO_2	28.40	28.04	25.14	31.29	25.59	22.88	22.88	31.29	26.89	27.19	1.79	6.57
NOx	30.66	31.64	41.65	41.71	28.24	26.41	26.41	41.71	33.39	34.65	6.08	17.55
NO	2.26	3.60	16.51	10.42	2.65	3.52	2.26	16.51	6.49	7.46	7.87	105.53

Concentrations in µg/m^3							All Tubes			Triplicate Tubes		
Sample Location	North East 1	North East 2	North East 3	South East	South West	North West	Min	Max	Average	Mean	Standard Deviation	CV
Exposed from	15/01/2015	15/01/2015	15/01/2015	15/01/2015	15/01/2015	15/01/2015						
Exposed to	16/02/2015	16/02/2015	16/02/2015	16/02/2015	16/02/2015	16/02/2015						
Date samples received	18/02/2015	18/02/2015	18/02/2015	18/02/2015	18/02/2015	18/02/2015						
NO_2	28.40	28.04	25.14	31.29	25.59	22.88	22.88	31.29	26.89	27.19	1.79	6.57
NOx	30.66	31.64	41.65	41.71	28.24	26.41	26.41	41.71	33.39	34.65	6.08	17.55
NO	2.26	3.60	16.51	10.42	2.65	3.52	2.26	16.51	6.49	7.46	7.87	105.53

APPENDIX I

Monitoring Period 16 Feb to 17 March 2015

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ilac-MRA UKAS TESTING 2187

LABORATORY ANALYSIS REPORT

NITROGEN DIOXIDE IN DIFFUSION TUBES BY U.V.SPECTROPHOTOMETRY

REPORT NUMBER X3207R

BOOKING REFERENCE No X3207

DESPATCH NOTE No SOR21560

CUSTOMER Golder Associates UK Ltd Attn.: Samantha Arnold
Attenborough House
Browns Lane, Business Park, Stanton-on-the Wolds
Nottinghamshire, NG12 5BL

DATE SAMPLES RECEIVED 19-Mar

NO_2 Tube Number		NO_x	Exposure Data Date On	Date Off	Time (hr.)	NO_2 ppb *	NO_x ppb *	NO ppb * +	NO_2 µg/m^3	NO_x µg/m^3	NO µg/m^3 +	TOTAL µG NO_2	TOTAL µG NOx
491433	NE1	491438	16/02/2015	17/03/2015	698.93	16.70	27.91	11.21	31.99	53.47	21.48	1.63	2.72
491432	NE2	491439	16/02/2015	17/03/2015	698.93	18.21	23.87	5.66	34.88	45.73	10.85	1.77	2.32
491431	NE3	491440	16/02/2015	17/03/2015	698.93	15.77	21.04	5.27	30.22	40.32	10.10	1.54	2.05
491430	SE	491437	16/02/2015	17/03/2015	699.05	15.37	22.44	7.07	29.44	42.99	13.54	1.50	2.18
491429	SW	491436	16/02/2015	17/03/2015	699.32	10.27	14.01	3.74	19.67	26.84	7.16	1.00	1.36
491428	NW	491435	16/02/2015	17/03/2015	699.47	10.35	12.75	2.40	19.83	24.43	4.60	1.01	1.24
Lab Blanks					699.47	0.01	0.31	0.30	0.02	0.59	0.57	0.001	0.030

The Diffusion Tubes have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures calculations and assessments involving the exposure procedures and periods provided by the client are not within the scope of our UKAS accreditation. Those results obtained using exposure data shall be indicated by an asterisk. Any queries concerning the 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.

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LABORATORY ANALYSIS REPORT

Comment: Results are not blank subtracted

+NO results are derived by subtracting NO2 from NOx.
Results have been corrected to a temperature of 293K (20C)

Overall M.O.U.	7.3% +/-	**Limit of Detection**	0.071ug NOx, 0.017ug NO2 on tube

Tube Preparation: 20%TEA/Water Analysed on UVS04 Camspec M550

		Analyst Name	C. Gemmell
Date of Analysis	24/03/2015	**Date of Report**	27/03/2015

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

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LABORATORY ANALYSIS REPORT

REPORT NUMBER	**X3206R**
CUSTOMER	**Golder Associates UK Ltd** **Attenborough House** **Browns Lane Business Park** **Stanton-On-The-Wolds** **Nottinghamshire NG12 5BL**
GRADKO LAB REFERENCE	**GHSJ0273-0278**
DESPATCH NOTE No.	**21560**
DATE SAMPLES RECEIVED	**19.03.2015**
BOOKING IN REF.	**X3206**

IDENTIFICATION AND ESTIMATION (SEMI-QUANTITATIVE ANALYSIS) OF TOP 10 VOC ON TENAX DIFFUSION TUBES BY GC/MS

Analysis has been carried out in accordance with in-house method GLM 13

Tube Number	**GRA 02077**
Exposure Time(mins)	**41928**
Sample ID	**North East 1**

Top 10 VOC	**ng on tube**	**ppb in air***	**µgm^{-3}***
Toluene	28.12	0.34	1.23
Naphthalene	22.93	0.27	1.40
Decane	20.09	0.24	1.36
m/p-Xylene	20.00	0.24	1.01
Benzene	17.79	0.21	0.66
Nonane	12.94	0.15	0.79
Benzene, 1-ethyl-3-methyl-	12.73	0.15	0.73
Undecane	12.38	0.15	0.92
Dodecane	11.63	0.14	0.94
Tridecane	9.52	0.11	0.84

Tube Number	**GRA 09573**
Exposure Time(mins)	**41928**
Sample ID	**North East 2**

Top 10 VOC	**ng on tube**	**ppb in air***	**µgm^{-3}***
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	677.18	8.08	83.99
Heptane, 2,2,4,6,6-pentamethyl- +	69.35	0.83	5.62
Benzaldehyde**	55.56	0.66	2.81
Decanal** +	50.03	0.60	3.72
Diethyl Phthalate +	29.27	0.35	3.10
Hexadecanoic acid, methyl ester +	29.18	0.35	3.76
Acetophenone**	27.46	0.33	1.57

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LABORATORY ANALYSIS REPORT

Toluene	27.43	0.33	1.20
Nonanal** +	26.91	0.32	1.82
1,2,4-Trimethylbenzene	25.44	0.30	1.46

Tube Number GRA 09664
Exposure Time(mins) 41928
Sample ID North East 3

Top 10 VOC	ng on tube	ppb in air*	µgm^{-3}*
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	1943	23	241
Benzoic acid +	121.12	1.44	7.05
Benzophenone +	88.48	1.06	7.68
Benzaldehyde**	72.85	0.87	3.68
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester +	47.32	0.56	6.28
Diethyl Phthalate +	38.13	0.45	4.04
Toluene	37.74	0.45	1.66
Phenylmaleic anhydride	30.91	0.37	2.57
Acetophenone**	29.07	0.35	1.66
Naphthalene	25.77	0.31	1.57

Tube Number GRA 08304
Exposure Time(mins) 41943
Sample ID South East

Top 10 VOC	ng on tube	ppb in air*	µgm^{-3}*
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	1212	14	150
Triphenylphosphine oxide +	140.91	1.68	18.68
Diethyl Phthalate +	140.78	1.68	14.90
Benzoic acid +	131.22	1.56	7.63
1,2-Benzenedicarboxylic acid, mono(2-ethylhexyl) ester +	118.96	1.42	15.77
Benzaldehyde**	55.14	0.66	2.79
Toluene	49.63	0.59	2.18
m/p-Xylene	40.75	0.49	2.06
1,2,4-Trimethylbenzene	40.67	0.48	2.33
Naphthalene	40.26	0.48	2.46

Tube Number GRA 07781
Exposure Time(mins) 41957
Sample ID South West

Top 10 VOC	ng on tube	ppb in air*	µgm^{-3}*
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	749.88	8.94	92.94
Benzoic acid +	97.99	1.17	5.70
Cyclohexadecane +	56.82	0.68	6.07

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Benzaldehyde**	46.93	0.56	2.37
Decanal** +	42.32	0.50	3.15
Pentadecane	41.71	0.50	4.22
Diethyl Phthalate +	30.67	0.37	3.25
Octadecanal +	28.26	0.34	3.61
Acetophenone**	28.02	0.33	1.60
Phenylmaleic anhydride	24.15	0.29	2.00

Tube Number GRA 09111
Exposure Time(mins) 41966
Sample ID North West

Top 10 VOC	**ng on tube**	**ppb in air***	**µgm^{-3}***
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	958.60	11.42	118.78
Benzoic acid +	254.93	3.04	14.82
2-Phenacyl-quinoxaline +	74.52	0.89	8.81
Phenylmaleic anhydride	47.93	0.57	3.97
1,2-Benzenedicarboxylic acid, mono(2-ethylhexyl) ester +	41.74	0.50	5.53
Benzaldehyde**	41.28	0.49	2.09
Acetophenone**	32.24	0.38	1.84
Benzenecarbothioic acid +	20.67	0.25	1.36
Naphthalene	16.79	0.20	1.02
Isopropyl phenyl ketone +	16.28	0.19	1.15

Identification and estimation results for ng on tube are calculated by reference to toluene and toluene-d8 Internal standard.
+ This compound is not covered by our UKAS accredited flexible scope.
****Compounds may be an artifact due to reaction of ozone with the Tenax sorbent.**
Results greater than 1000ng are outside of our UKAS accredited calibration range.
Exposure times were calculated from start and finish times given on the exposure sheet.

Date of Analysis 23.03.2015

Analysts Name Mariella Angelova **Date of Report** 31.03.2015

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Concentrations in µg/m^3							All Tubes			Triplicate Tubes		
Sample Location	North East 1	North East 2	North East 3	South East	South West	North West	Min	Max	Average	Mean	Standard Deviation	CV
Exposed from	16/02/2015	16/02/2015	16/02/2015	16/02/2015	16/02/2015	16/02/2015						
Exposed to	17/03/2015	17/03/2015	17/03/2015	17/03/2015	17/03/2015	17/03/2015						
Date samples received	19/03/2015	19/03/2015	19/03/2015	19/03/2015	19/03/2015	19/03/2015						
NO_2	31.99	34.88	30.22	29.44	19.67	19.83	19.67	34.88	27.67	32.36	2.35	7.27
NOx	53.47	45.73	40.32	42.99	26.84	24.43	24.43	53.47	38.96	46.51	6.61	14.21
NO	21.48	10.85	10.10	13.54	7.16	4.60	4.60	21.48	11.29	14.14	6.36	45.00

Concentrations in µg/m^3							All Tubes			Triplicate Tubes		
Sample Location	North East 1	North East 2	North East 3	South East	South West	North West	Min	Max	Average	Mean	Standard Deviation	CV
Exposed from	16/02/2015	16/02/2015	16/02/2015	16/02/2015	16/02/2015	16/02/2015						
Exposed to	17/03/2015	17/03/2015	17/03/2015	17/03/2015	17/03/2015	17/03/2015						
Date samples received	19/03/2015	19/03/2015	19/03/2015	19/03/2015	19/03/2015	19/03/2015						
NO_2	31.99	34.88	30.22	29.44	19.67	19.83	19.67	34.88	27.67	32.36	2.35	7.27
NOx	53.47	45.73	40.32	42.99	26.84	24.43	24.43	53.47	38.96	46.51	6.61	14.21
NO	21.48	10.85	10.10	13.54	7.16	4.60	4.60	21.48	11.29	14.14	6.36	45.00

APPENDIX J

Monitoring Period 17 March to 15 April 2015

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LABORATORY ANALYSIS REPORT

NITROGEN DIOXIDE IN DIFFUSION TUBES BY U.V.SPECTROPHOTOMETRY

REPORT NUMBER X3409R

BOOKING REFERENCE No X3409

DESPATCH NOTE No SOR22333

CUSTOMER Golder Associates UK Ltd Attn.: Sarah Trevers
Attenborough House
Browns Lane, Business Park, Stanton-on-the Wolds
Nottinghamshire, NG12 5BL

DATE SAMPLES RECEIVED 17-Apr

JOB REFERENCE 14514260347

			Exposure Data			NO_2	NO_X	NO	NO_2	NO_X	NO	TOTAL	TOTAL
NO_2	Tube Number	NO_x	Date On	Date Off	Time (hr.)	ppb *	ppb *	ppb * +	µg/m^3	µg/m^3	µg/m^3 +	µG NO_2	µG NOx
508514	North East one	508522	17/03/2015	15/04/2015	693.48	9.14	14.49	5.34	17.52	27.76	10.24	0.88	1.40
508515	North East two	508523	17/03/2015	15/04/2015	693.48	9.15	12.21	3.05	17.54	23.39	5.85	0.88	1.18
508516	North East three	508524	17/03/2015	15/04/2015	693.48	9.46	13.78	4.32	18.13	26.41	8.27	0.91	1.33
508517	South East	508525	17/03/2015	15/04/2015	693.92	14.49	28.42	13.93	27.76	54.45	26.69	1.40	2.75
508518	South West	508526	17/03/2015	15/04/2015	694.07	8.69	11.35	2.66	16.65	21.75	5.09	0.84	1.10
508519	North West	508527	17/03/2015	15/04/2015	694.32	7.98	10.64	2.66	15.30	20.39	5.09	0.77	1.03

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LABORATORY ANALYSIS REPORT

Lab Blanks	694.32	0.09	0.29	0.19	0.18	0.55	0.37	0.009	0.028

Comment: Results are not blank subtracted

+NO results are derived by subtracting NO2 from NOx.
Results have been corrected to a temperature of 293K (20C)

Overall M.O.U. 5.2% +/-

Limit of Detection 0.029ug NOx, 0.01ug NO2 on tube

Tube Preparation: 20%TEA/Water

Analysed on UVS05 Camspec M550

Analyst Name M. Witek

Date of Analysis 22/04/2015

Date of Report 29/04/2015

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

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LABORATORY ANALYSIS REPORT

REPORT NUMBER	**X3408R**
CUSTOMER	**Golder Associates UK Ltd** **Attenborough House** **Browns Lane Business Park** **Stanton-on-the-Wolds** **Nottinghamshire NG12 3BY**
GRADKO LAB REFERENCE	**PE6J0584-0589**
DESPATCH NOTE No.	**22333**
JOB REFERENCE	**GAUK108083**
DATE SAMPLES RECEIVED	**17.04.15**
BOOKING IN REF.	**X3408**

IDENTIFICATION AND ESTIMATION (SEMI-QUANTITATIVE ANALYSIS) OF TOP 10 VOC ON TENAX DIFFUSION TUBES BY GC/MS

Analysis has been carried out in accordance with in-house method GLM 13

Tube Number	**GRA 03620**
Exposure Time(mins)	**41619**
Sample ID	**North East 1**

Top 10 VOC	**ng on tube**	**µgm^{-3}***	**ppb in air***
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl- +	544.40	68.02	6.54
Benzoic acid +	88.31	5.18	1.06
Ethylbenzene	51.66	2.63	0.62
Acetone	50.24	1.40	0.60
Pentane, 2-methyl- +	49.46	2.04	0.59
m/p-Xylene	47.59	2.42	0.57
Butane, 2-methyl +	44.03	1.52	0.53
Pentane, 3-methyl- +	41.98	1.73	0.50
Benzaldehyde**	28.66	1.46	0.34
Toluene	26.53	1.17	0.32

Tube Number	**GRA 10865**
Exposure Time(mins)	**41619**
Sample ID	**North East 2**

Top 10 VOC	**ng on tube**	**µgm^{-3}***	**ppb in air***
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl- +	571.74	71.44	6.87
Butane, 2-methyl +	238.75	8.26	2.87
Benzoic acid +	143.45	8.41	1.72
Ethylbenzene	61.81	3.15	0.74
m/p-Xylene	60.69	3.09	0.73
Acetone	50.30	1.40	0.60

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LABORATORY ANALYSIS REPORT

2-Butanone	47.56	1.65	0.57
Benzaldehyde**	35.17	1.79	0.42
Toluene	32.52	1.44	0.39
Acetophenone**	25.17	1.45	0.30

Tube Number	**GRA 07775**
Exposure Time(mins)	**41619**
Sample ID	**North East 3**

Top 10 VOC	**ng on tube**	**µgm^{-3*}**	**ppb in air***
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl- +	400.45	50.03	4.81
Benzoic acid +	76.53	4.49	0.92
Benzaldehyde**	36.73	1.87	0.44
Benzene	32.34	1.21	0.39
Toluene	19.51	0.86	0.23
Decane	18.71	1.28	0.22
m/p-Xylene	17.77	0.91	0.21
Acetophenone**	16.98	0.98	0.20
Cyclohexane, methyl-	16.98	0.80	0.20
Pentane, 2-methyl- +	16.75	0.69	0.20

Tube Number	**GRA 11778**
Exposure Time(mins)	**41635**
Sample ID	**South East**

Top 10 VOC	**ng on tube**	**µgm^{-3*}**	**ppb in air***
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl- +	855.86	96.47	9.28
Benzoic acid +	87.84	4.65	0.95
Benzaldehyde**	46.44	2.13	0.50
Benzene	38.77	1.31	0.42
Decane	38.59	2.38	0.42
m/p-Xylene	30.61	1.41	0.33
Toluene	28.68	1.14	0.31
Pentane, 2-methyl- +	27.09	1.01	0.29
Cyclohexane, methyl-	25.33	1.08	0.27
Acetophenone**	23.90	1.24	0.26

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LABORATORY ANALYSIS REPORT

Tube Number	**GRA 10109**
Exposure Time(mins)	**41644**
Sample ID	**South West**

Top 10 VOC	**ng on tube**	**µgm^{-3}***	**ppb in air***
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl- +	368.49	46.01	4.42
Benzaldehyde**	25.89	1.32	0.31
Acetone	17.93	0.50	0.22
Acetophenone**	15.35	0.88	0.18
Naphthalene	13.59	0.84	0.16
Benzoic acid +	12.31	0.72	0.15
Butane, 2-methyl +	12.00	0.41	0.14
Toluene	11.61	0.51	0.14
m/p-Xylene	11.47	0.58	0.14
1-Hexanol, 2-ethyl-	11.40	0.71	0.14

Tube Number	**GRA 11022**
Exposure Time(mins)	**41659**
Sample ID	**North West**

Top 10 VOC	**ng on tube**	**µgm^{-3}***	**ppb in air***
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl- +	388.23	48.46	4.66
Benzoic acid +	128.63	7.53	1.54
Benzaldehyde**	26.03	1.32	0.31
Phenylmaleic anhydride +	22.50	1.88	0.27
Acetophenone**	20.03	1.15	0.24
Pentane, 2-methyl- +	15.99	0.66	0.19
Acetone	15.54	0.43	0.19
Toluene	12.45	0.55	0.15
Naphthalene	11.40	0.70	0.14
Pentane, 3-methyl- +	9.91	0.41	0.12

Uptake Rates:

All compounds: 2.00 ng.ppm^{-1}.min^{-1}.

Identification and estimation results for ng on tube are calculated using toluene standards.

+ These compounds are not covered by our UKAS accredited flexible scope.

****Compounds may be an artifact due to reaction of ozone with the Tenax sorbent.**
Acetone was detected however Tenax is not the recommended sorbent.

Date of Analysis **30.04.15**

Analysts Name **G. Aikman** **Date of Report** **01.05.15**

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Concentrations in µg/m^3							All Tubes			Triplicate Tubes		
Sample Location	North East 1	North East 2	North East 3	South East	South West	North West	Min	Max	Average	Mean	Standard Deviation	CV
Exposed from	17/03/2015	17/03/2015	17/03/2015	17/03/2015	17/03/2015	17/03/2015						
Exposed to	15/04/2015	15/04/2015	15/04/2015	15/04/2015	15/04/2015	15/04/2015						
Date samples received	17/04/2015	17/04/2015	17/04/2015	17/04/2015	17/04/2015	17/04/2015						
NO_2	17.52	17.54	18.13	27.76	16.65	15.30	15.30	27.76	18.82	17.73	0.35	1.95
NOx	27.76	23.39	26.41	54.45	21.75	20.39	20.39	54.45	29.03	25.85	2.24	8.65
NO	10.24	5.85	8.27	26.69	5.09	5.09	5.09	26.69	10.21	8.12	2.20	27.08

Concentrations in µg/m^3							All Tubes			Triplicate Tubes		
Sample Location	North East 1	North East 2	North East 3	South East	South West	North West	Min	Max	Average	Mean	Standard Deviation	CV
Exposed from	17/03/2015	17/03/2015	17/03/2015	17/03/2015	17/03/2015	17/03/2015						
Exposed to	15/04/2015	15/04/2015	15/04/2015	15/04/2015	15/04/2015	15/04/2015						
Date samples received	17/04/2015	17/04/2015	17/04/2015	17/04/2015	17/04/2015	17/04/2015						
NO_2	17.52	17.54	18.13	27.76	16.65	15.30	15.30	27.76	18.82	17.73	0.35	1.95
NOx	27.76	23.39	26.41	54.45	21.75	20.39	20.39	54.45	29.03	25.85	2.24	8.65
NO	10.24	5.85	8.27	26.69	5.09	5.09	5.09	26.69	10.21	8.12	2.20	27.08

APPENDIX K

Monitoring Period 15 April to 20 May 2015

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LABORATORY ANALYSIS REPORT

NITROGEN DIOXIDE IN DIFFUSION TUBES BY U.V.SPECTROPHOTOMETRY

REPORT NUMBER X3648R

BOOKING REFERENCE No X3648

DESPATCH NOTE No SOR23285

CUSTOMER Golder Associates UK Ltd Attn.: Samantha Arnold
Attenborough House
Browns Lane, Business Park, Stanton-on-the Wolds
Nottinghamshire, NG12 5BL

DATE SAMPLES RECEIVED 22-May
JOB REFERENCE

Tube Numbers & Location			Exposure Data			NO_2	NO_X	NO	NO_2	NO_X	NO	TOTAL	TOTAL
NO_2		NO_x	Date On	Date Off	Time (hr.)	ppb *	ppb *	ppb * +	µg/m^3 *	µg/m^3 *	µg/m^3 *+	µG NO_2	µG NOx
523523	North/East 1	523524	15/04/2015	20/05/2015	838.42	4.76	7.81	3.05	9.12	14.97	5.84	0.56	0.91
523522	North/East 2	523525	15/04/2015	20/05/2015	838.42	5.07	8.20	3.13	9.72	15.71	5.99	0.59	0.96
523521	North/East 3	523526	15/04/2015	20/05/2015	838.42	5.19	7.22	2.03	9.94	13.83	3.89	0.61	0.84
523520	South/East	523527	15/04/2015	20/05/2015	838.75	5.88	8.20	2.32	11.27	15.72	4.45	0.69	0.96
523519	South/West	523528	15/04/2015	20/05/2015	838.92	5.45	7.83	2.38	10.45	15.01	4.56	0.64	0.92

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523518	North/West	523529	15/04/2015	20/05/2015	839.17	5.45	8.04	2.59	10.44	15.41	4.97	0.64	0.94
	Lab Blanks				839.17	0.04	0.18	0.14	0.08	0.34	0.26	0.005	0.021

Comment: Results are not blank subtracted

[+]NO results are derived by subtracting NO2 from NOx.
Results have been corrected to a temperature of 293K (20C)

Overall M.O.U. ±5.8%

Limit of Detection 0.033ug NOx, 0.010ug NO_2 on tube

Tube Preparation: 20%TEA/Water

Analysed on UVS08 Camspec M550

Analyst Name C. Gemmell

Date of Analysis 01/06/2015

Date of Report 02/06/2015

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

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LABORATORY ANALYSIS REPORT

REPORT NUMBER	**X3649R**
CUSTOMER	**Golder Associates UK Ltd** **Attenborough House** **Browns Lane Business Park** **Stanton-On-The-Wolds** **Nottinghamshire NG12 5BL**
GRADKO LAB REFERENCE	**GHSJ0444-0449**
DESPATCH NOTE No.	**23285**
DATE SAMPLES RECEIVED	**22.05.2015**
BOOKING IN REF.	**X3649**

IDENTIFICATION AND ESTIMATION (SEMI-QUANTITATIVE ANALYSIS) OF TOP 10 VOC ON TENAX DIFFUSION TUBES BY GC/MS

Analysis has been carried out in accordance with in-house method GLM 13

Tube Number	**GRA 11772*** **
Exposure Time(mins)	**50310**
Sample ID	**North East one**

Top 10 VOC	**ng on tube**	**ppb in air***	**µgm^{-3}***
Cyclohexadecane +	3044	30.25	271.03
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	579.38	5.76	59.88
Hexane, 3-methyl-	506.77	5.04	20.15
1,2-Benzenedicarboxylic acid, diisooctyl ester +	421.41	4.19	65.34
Hexane, 2-methyl- +	304.72	3.03	12.11
Toluene	265.28	2.64	9.70
Heptane	263.12	2.61	10.46
Pentane +	214.41	2.13	6.14
Benzoic acid +	204.13	2.03	9.90
Pentane, 2,3-dimethyl- +	167.82	1.67	6.67

Tube Number	**GRA 06937**
Exposure Time(mins)	**50310**
Sample ID	**North East two**

Top 10 VOC	**ng on tube**	**ppb in air***	**µgm^{-3}***
Cyclohexadecane +	4291	42.65	382.11
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	780.74	7.76	80.70
Benzoic acid +	376.05	3.74	18.24
2-Phenacyl-quinoxaline +	100.22	1.00	9.88
Hexane, 3-methyl-	77.49	0.77	3.08
Butane, 2-methyl- +	59.43	0.59	1.70
Phenylmaleic anhydride	57.99	0.58	4.01

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Hexane, 2-methyl- +	57.18	0.57	2.27
Benzaldehyde**	55.98	0.56	2.36
Octadecanal +	52.12	0.52	5.55

Tube Number GRA 08631
Exposure Time(mins) 50310
Sample ID North East three

Top 10 VOC	ng on tube	ppb in air*	µgm^{-3}*
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	589.01	5.85	60.88
Cyclohexadecane +	498.21	4.95	44.36
1,2-Benzenedicarboxylic acid, mono(2-ethylhexyl) ester +	189.87	1.89	20.98
Benzaldehyde**	70.74	0.70	2.98
2,2'-Binaphthalene, 5,5',6,6',7,7',8,8'-octahydro- +	68.41	0.68	7.13
Benzoic acid +	68.23	0.68	3.31
Butane, 2-methyl- +	60.94	0.61	1.74
Acetophenone**	33.83	0.34	1.61
Toluene	29.85	0.30	1.09
Pentane +	29.57	0.29	0.85

Tube Number GRA 10238
Exposure Time(mins) 50325
Sample ID South East

Top 10 VOC	ng on tube	ppb in air*	µgm^{-3}*
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	482.44	4.79	49.85
Triphenylphosphine oxide +	457.16	4.54	50.51
Cyclohexadecane +	234.65	2.33	20.89
Phthalic acid, decyl 2-pentyl ester +	229.22	2.28	34.25
1,2-Benzenedicarboxylic acid, mono(2-ethylhexyl) ester +	181.38	1.80	20.04
Benzoic acid +	170.26	1.69	8.25
Butane, 2-methyl- +	54.48	0.54	1.56
Benzaldehyde**	40.40	0.40	1.70
2-Phenacyl-quinoxaline +	35.87	0.36	3.54
Hexane, 3-methyl-	33.56	0.33	1.33

Tube Number GRA 10196***
Exposure Time(mins) 50335
Sample ID South West

Top 10 VOC	ng on tube	ppb in air*	µgm^{-3}*
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	661.12	6.57	68.30
Benzoic acid +	274.56	2.73	13.31
Butane, 2-methyl- +	218.34	2.17	6.25

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Cyclohexadecane +	188.30	1.87	16.76
Pentane +	106.13	1.05	3.04
2-Phenacyl-quinoxaline +	82.18	0.82	8.10
Nonanal** +	55.02	0.55	3.10
Toluene	53.09	0.53	1.94
Phenylmaleic anhydride	48.88	0.49	3.38
Benzaldehyde**	46.14	0.46	1.94

Tube Number GRA 07677
Exposure Time(mins) 50345
Sample ID North West

Top 10 VOC	**ng on tube**	**ppb in air***	**µgm^{-3}***
Benzene, 1-methyl-4-(1-methylethyl)-	268.39	2.67	14.29
Benzene, 1-methyl-4-(1-methylethenyl)- +	160.35	1.59	8.41
Cyclohexadecane +	71.10	0.71	6.33
1,2-Benzenedicarboxylic acid, mono(2-ethylhexyl) ester +	48.85	0.49	5.40
2,2'-Binaphthalene, 5,5',6,6',7,7',8,8'-octahydro- +	35.31	0.35	3.67
Toluene	21.96	0.22	0.80
Triphenylphosphine oxide +	19.77	0.20	2.18
Benzene	15.75	0.16	0.49
Naphthalene	13.03	0.13	0.66
Butane, 2-methyl- +	12.59	0.13	0.36

Identification and estimation results for ng on tube are calculated by reference to toluene and toluene-d8 Internal standard.
+ This compound is not covered by our UKAS accredited flexible scope.
****Compounds may be an artifact due to reaction of ozone with the Tenax sorbent.**
*****Tubes GRA 11772 and GRA 10196 were received with a cap off. Results may be compromised.**
Results greater than 1000ng are outside of our UKAS accredited calibration range.
Exposure times were calculated from start and finish times given on the exposure sheet.

Date of Analysis 01.06.2015

Analysts Name Mariella Angelova **Date of Report** 05.06.2015

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Concentrations in µg/m^3							All Tubes			Triplicate Tubes		
Sample Location	North East 1	North East 2	North East 3	South East	South West	North West	Min	Max	Average	Mean	Standard Deviation	CV
Exposed from	15/04/2015	15/04/2015	15/04/2015	15/04/2015	15/04/2015	15/04/2015						
Exposed to	20/05/2015	20/05/2015	20/05/2015	20/05/2015	20/05/2015	20/05/2015						
Date samples received	22/05/2015	22/05/2015	22/05/2015	22/05/2015	22/05/2015	22/05/2015						
NO_2	9.12	9.72	9.94	11.27	10.45	10.44	9.12	11.27	10.16	9.59	0.42	4.42
NOx	14.97	15.71	13.83	15.72	15.01	15.41	13.83	15.72	15.11	14.84	0.95	6.38
NO	5.84	5.99	3.89	4.45	4.56	4.97	3.89	5.99	4.95	5.24	1.17	22.36

Concentrations in µg/m^3							All Tubes			Triplicate Tubes		
Sample Location	North East 1	North East 2	North East 3	South East	South West	North West	Min	Max	Average	Mean	Standard Deviation	CV
Exposed from	15/04/2015	15/04/2015	15/04/2015	15/04/2015	15/04/2015	15/04/2015						
Exposed to	20/05/2015	20/05/2015	20/05/2015	20/05/2015	20/05/2015	20/05/2015						
Date samples received	22/05/2015	22/05/2015	22/05/2015	22/05/2015	22/05/2015	22/05/2015						
NO_2	9.12	9.72	9.94	11.27	10.45	10.44	9.12	11.27	10.16	9.59	0.42	4.42
NOx	14.97	15.71	13.83	15.72	15.01	15.41	13.83	15.72	15.11	14.84	0.95	6.38
NO	5.84	5.99	3.89	4.45	4.56	4.97	3.89	5.99	4.95	5.24	1.17	22.36

APPENDIX L

Monitoring Period 20 May to 12 June 2015

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LABORATORY ANALYSIS REPORT

NITROGEN DIOXIDE IN DIFFUSION TUBES BY U.V.SPECTROPHOTOMETRY

REPORT NUMBER X3840R

BOOKING REFERENCE No X3840

DESPATCH NOTE No SOR 23827

CUSTOMER Golder Associates UK Ltd Attn.: Samantha Arnold
Attenborough House
Browns Lane, Business Park, Stanton-on-the Wolds
Nottinghamshire, NG12 5BL

DATE SAMPLES RECEIVED 17/06/215

Tube Numbers & Location			Exposure Data			NO_2	NO_X	NO	NO_2	NO_X	NO	TOTAL	TOTAL
NO_2		NO_x	Date On	Date Off	Time (hr.)	ppb *	ppb *	ppb * +	µg/m^3 *	µg/m^3 *	µg/m^3 *+	µG NO_2	µG NOx
537761	North East one	537767	20/05/2015	12/06/2015	551.58	5.40	9.44	4.04	10.35	18.08	7.73	0.42	0.73
537760	North East two	537768	20/05/2015	12/06/2015	551.58	4.84	10.17	5.32	9.28	19.48	10.20	0.37	0.78
537759	North East three	537769	20/05/2015	12/06/2015	551.58	5.09	9.66	4.57	9.75	18.51	8.76	0.39	0.74
537758	South East	537766	20/05/2015	12/06/2015	551.75	5.51	9.49	3.98	10.55	18.18	7.63	0.42	0.73
537757	South West	537765	20/05/2015	12/06/2015	551.92	5.05	10.58	5.53	9.67	20.27	10.60	0.39	0.81

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LABORATORY ANALYSIS REPORT

537756	North West	537764	20/05/2015	12/06/2015	552.08	6.74	10.50	3.76	12.91	20.11	7.20	0.52	0.81
	Lab Blanks				552.08	0.07	0.33	0.26	0.12	0.62	0.50	0.005	0.025

Comment: Results are not blank subtracted

Exposure times were calculated from start and finish times given on the exposure sheet.

[+]NO results are derived by subtracting NO2 from NOx.

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

Overall M.O.U. ±5.8%

Limit of Detection 0.033ug NOx, 0.010ug NO_2 on tube

Tube Preparation: 20%TEA/Water

Analysed on UVS08 Camspec M550

Analyst Name C. Gemmell

Date of Analysis 30/06/2015

Date of Report 01/07/2015

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

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LABORATORY ANALYSIS REPORT

REPORT NUMBER	**X3844R**
CUSTOMER	**Golder Associates UK Ltd** **Attenborough House** **Browns Lane Business Park** **Stanton-on-the-Wolds** **Nottinghamshire NG12 5BL**
GRADKO LAB REFERENCE	**GMSJ0760-0765**
DESPATCH NOTE No.	**23827**
DATE SAMPLES RECEIVED	**17.06.2015**
BOOKING IN REF.	**X3844**

IDENTIFICATION AND ESTIMATION (SEMI-QUANTITATIVE ANALYSIS) OF TOP 10 VOC ON TENAX DIFFUSION TUBES BY GC/MS

Analysis has been carried out in accordance with in-house method GLM 13

Tube Number	**GRA 02958**
Exposure Time(mins)	**33150**
Sample ID	**North East one**

Top 10 VOC	**ng on tube**	**µgm^{-3}***	**ppb in air***
Hexane, 3-methyl-	468.34	28.26	7.06
Hexane, 2-methyl- +	277.34	16.73	4.18
Heptane	232.13	14.01	3.50
Butane, 2-methyl- +	191.53	8.32	2.89
Pentane, 2,3-dimethyl-	142.33	8.59	2.15
Toluene	129.67	7.20	1.96
Pentane, 3-ethyl- +	78.27	4.72	1.18
Squalene +	57.47	14.22	0.87
Pentane, 2-methyl-	54.29	2.82	0.82
Methylcyclohexane	53.09	3.14	0.80

Tube Number	**GRA 04964**
Exposure Time(mins)	**33150**
Sample ID	**North East two**

Top 10 VOC	**ng on tube**	**µgm^{-3}***	**ppb in air***
Diethyl Phthalate +	198.99	26.65	3.00
Cyclohexadecane +	160.77	21.73	2.42
Benzoic acid, tridecyl ester +	122.21	22.41	1.84
Nonanal** +	112.05	9.60	1.69
Hexane, 3-methyl-	94.03	5.67	1.42
Benzoic acid, pentyl ester +	89.56	10.37	1.35
Pentadecane	86.55	11.07	1.31

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Benzoic acid, tetradecyl ester +	85.70	16.44	1.29
Naphthalene	74.20	5.73	1.12
Hexane, 2-methyl- +	64.47	3.89	0.97

Tube Number GRA 05965
Exposure Time(mins) 33150
Sample ID North East three

Top 10 VOC	ng on tube	µgm^{-3}*	ppb in air*
Cyclohexadecane +	559.03	75.55	8.43
1,1'-Binaphthalene,5,5',6,6',7,7',8,8'-octahydro- +	177.58	28.07	2.68
Benzoic acid +	147.29	10.84	2.22
Octadecanal +	110.04	17.79	1.66
Squalene +	100.25	24.80	1.51
Nonanal** +	91.37	7.83	1.38
2-Propenoic acid, 3-(4-methoxyphenyl)-, 2-ethylhexyl ester +	78.13	13.67	1.18
2-Ethylhexyl salicylate +	68.20	10.29	1.03
i-Propyl hexadecanoate +	60.25	10.83	0.91
1-Heneicosanol +	52.44	9.87	0.79

Tube Number GRA 02369
Exposure Time(mins) 33160
Sample ID South East

Top 10 VOC	ng on tube	µgm^{-3}*	ppb in air*
1,1'-Binaphthalene,5,5',6,6',7,7',8,8'-octahydro- +	137.14	21.67	2.07
Cyclohexadecane +	66.50	8.98	1.00
Heptadecane	64.08	9.28	0.97
Nonanal** +	60.07	5.15	0.91
Naphthalene	59.09	4.56	0.89
Benzoic acid +	59.00	4.34	0.89
Diethyl Phthalate +	54.70	7.32	0.82
Hexadecane	46.83	6.38	0.71
Hexadecane, 2,6,10,14-tetramethyl- +	40.90	6.96	0.62
Pentadecane	39.12	5.00	0.59

Tube Number GRA 04631
Exposure Time(mins) 33170
Sample ID South West

Top 10 VOC	ng on tube	µgm^{-3}*	ppb in air*
Nonanal** +	128.76	11.02	1.94
Butane, 2-methyl- +	86.08	3.74	1.30
1,1'-Binaphthalene,5,5',6,6',7,7',8,8'-octahydro- +	84.23	13.31	1.27

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Hexane, 3-methyl-	79.76	4.81	1.20
Benzoic acid +	63.69	4.69	0.96
Hexane, 2-methyl- +	60.22	3.63	0.91
Naphthalene	59.93	4.63	0.90
Cyclohexadecane +	51.47	6.95	0.78
Benzaldehyde**	39.41	2.52	0.59
Heptane	38.00	2.29	0.57

Tube Number GRA 03848
Exposure Time(mins) 33185
Sample ID North West

Top 10 VOC	**ng on tube**	**µgm^{-3*}**	**ppb in air***
1,1'-Binaphthalene,5,5',6,6',7,7',8,8'-octahydro- +	255.60	40.36	3.85
Benzoic acid +	182.76	13.44	2.75
Cyclohexadecane +	56.59	7.64	0.85
2-Phenacyl-quinoxaline +	52.20	7.80	0.79
Hexane, 3-methyl-	50.24	3.03	0.76
Hexane, 2-methyl- +	39.27	2.37	0.59
Phenylmaleic anhydride	31.43	3.30	0.47
Benzaldehyde**	30.73	1.96	0.46
Heptane	25.63	1.54	0.39
Butane, 2-methyl- +	23.66	1.03	0.36

Uptake Rates:
All compounds: 2.00 ng.ppm^{-1}.min^{-1}.

Identification and estimation results for ng on tube are calculated by reference to toluene and toluene-d8 Internal standard.
+ These compounds are not covered by our UKAS accredited flexible scope.
****Compounds may be an artifact due to reaction of ozone with the Tenax sorbent.**
Exposure times were calculated from start and finish times given on the exposure sheet.

Date of Analysis 01.07.2015

Analysts Name Mariella Angelova **Date of Report** 02.07.2015

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Concentrations in µg/m^3							All Tubes			Triplicate Tubes		
Sample Location	North East 1	North East 2	North East 3	South East	South West	North West	Min	Max	Average	Mean	Standard Deviation	CV
Exposed from	20/05/2015	20/05/2015	20/05/2015	20/05/2015	20/05/2015	20/05/2015						
Exposed to	12/06/2015	12/06/2015	12/06/2015	12/06/2015	12/06/2015	12/06/2015						
Date samples received	17/06/2015	17/06/2015	17/06/2015	17/06/2015	17/06/2015	17/06/2015						
NO_2	10.35	9.28	9.75	10.55	9.67	12.91	9.28	12.91	10.42	9.79	0.54	5.48
NOx	18.08	19.48	18.51	18.18	20.27	20.11	18.08	20.27	19.11	18.69	0.72	3.84
NO	7.73	10.20	8.76	7.63	10.60	7.20	7.20	10.60	8.69	8.90	1.24	13.95

Concentrations in µg/m^3							All Tubes			Triplicate Tubes		
Sample Location	North East 1	North East 2	North East 3	South East	South West	North West	Min	Max	Average	Mean	Standard Deviation	CV
Exposed from	20/05/2015	20/05/2015	20/05/2015	20/05/2015	20/05/2015	20/05/2015						
Exposed to	12/06/2015	12/06/2015	12/06/2015	12/06/2015	12/06/2015	12/06/2015						
Date samples received	17/06/2015	17/06/2015	17/06/2015	17/06/2015	17/06/2015	17/06/2015						
NO_2	10.35	9.28	9.75	10.55	9.67	12.91	9.28	12.91	10.42	9.79	0.54	5.48
NOx	18.08	19.48	18.51	18.18	20.27	20.11	18.08	20.27	19.11	18.69	0.72	3.84
NO	7.73	10.20	8.76	7.63	10.60	7.20	7.20	10.60	8.69	8.90	1.24	13.95

APPENDIX M

Monitoring Period 12 June to 15 July 2015

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LABORATORY ANALYSIS REPORT

NITROGEN DIOXIDE IN DIFFUSION TUBES BY U.V.SPECTROPHOTOMETRY

REPORT NUMBER X4031R

BOOKING REFERENCE No X4031

DESPATCH NOTE No SOR24262

CUSTOMER Golder Associates UK Ltd Attn.: Samantha Arnold
Attenborough House
Browns Lane, Business Park, Stanton-on-the Wolds
Nottinghamshire, NG12 5BL

DATE SAMPLES RECEIVED 17-Jul

NO_2	Tube Number	NO_x	Exposure Data Date On	Date Off	Time (hr.)	NO_2 ppb *	NO_X ppb *	NO ppb * +	NO_2 µg/m^3 *	NO_X µg/m^3 *	NO µg/m^3 *+	TOTAL µG NO_2	TOTAL µG NOx
557081	Northeast 1	557088	12/06/2015	15/07/2015	789.75	7.39	13.84	6.45	14.16	26.52	12.35	0.81	1.52
557080	Northeast 2	557087	12/06/2015	15/07/2015	789.75	6.96	11.93	4.97	13.33	22.86	9.53	0.77	1.31
557079	Northeast 3	557086	12/06/2015	15/07/2015	789.75	7.97	12.39	4.43	15.26	23.75	8.48	0.88	1.36
557078	Southeast 1	557085	12/06/2015	15/07/2015	789.92	10.40	17.49	7.09	19.93	33.51	13.59	1.14	1.92
557077	Southwest 1	557084	12/06/2015	15/07/2015	790.08	5.39	9.86	4.47	10.33	18.89	8.57	0.59	1.09
557076	Northwest 1	557083	12/06/2015	15/07/2015	790.33	6.11	10.05	3.93	11.72	19.25	7.54	0.67	1.11
	Lab Blanks				790.33	0.09	0.10	0.01	0.17	0.19	0.02	0.010	0.011

Comment: Results are not blank subtracted

REPORT OFFICIALLY CHECKED

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L. Gates, Laboratory Manager

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+NO results are derived by subtracting NO2 from NOx.
Results have been corrected to a temperature of 293K (20C)

Overall M.O.U.	5.2% +/-	**Limit of Detection**	0.029ug NOx, 0.01ug NO2 on tube

Tube Preparation: 20%TEA/Water Analysed on UVS05 Camspec M550

		Analyst Name	C. Fraser
Date of Analysis	23/07/2015	**Date of Report**	28/07/2015

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

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LABORATORY ANALYSIS REPORT

REPORT NUMBER	**X4034R**
CUSTOMER	**Golder Associates UK Ltd**
	Attenborough House
	Browns Lane Business Park
	Stanton-on-the-Wolds
	Nottinghamshire NG12 5BL
GRADKO LAB REFERENCE	**GMSJ0960-0965**
DESPATCH NOTE No.	**24262**
DATE SAMPLES RECEIVED	**17.07.2015**
BOOKING IN REF.	**X4034**

IDENTIFICATION AND ESTIMATION (SEMI-QUANTITATIVE ANALYSIS) OF TOP 10 VOC ON TENAX DIFFUSION TUBES BY GC/MS

Analysis has been carried out in accordance with in-house method GLM 13

Tube Number	**GRA 07783**		
Exposure Time(mins)	**47380**		
Sample ID	**Northeast 1**		
Top 10 VOC	**ng on tube**	**µgm^{-3}***	**ppb in air***
Cyclohexadecane +	687.35	64.99	7.25
Hexadecanal +	212.64	21.54	2.24
Nonanal** +	166.83	10.00	1.76
Diethyl Phthalate +	94.87	8.89	1.00
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	65.50	7.19	0.69
Pentane, 2-methyl-	49.21	1.79	0.52
Benzaldehyde**	48.34	2.16	0.51
Heptadecane	44.76	4.53	0.47
Heptadecane, 4-methyl- +	41.63	4.46	0.44
Benzothiazole +	40.43	2.30	0.43

Tube Number	**GRA 09009**		
Exposure Time(mins)	**47380**		
Sample ID	**Northeast 2**		
Top 10 VOC	**ng on tube**	**µgm^{-3}***	**ppb in air***
Cyclohexadecane +	685.36	64.80	7.23
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	447.09	49.07	4.72
Diethyl Phthalate +	173.82	16.29	1.83
Benzoic acid +	138.71	7.14	1.46
Hexadecanal +	134.19	13.59	1.42
Ethanol, 2-phenoxy- +	100.66	5.86	1.06
Benzaldehyde**	65.37	2.92	0.69
Pentadecane	56.60	5.07	0.60
Heptadecane	49.48	5.01	0.52
Hexadecane	48.06	4.59	0.51

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LABORATORY ANALYSIS REPORT

Tube Number	**GRA 03304**
Exposure Time(mins)	**47380**
Sample ID	**Northeast 3**

Top 10 VOC	**ng on tube**	**µgm^{-3}***	**ppb in air***
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	284.72	31.25	3.00
Cyclohexadecane +	102.04	9.65	1.08
Cyclobutane, methyl- +	93.84	2.77	0.99
Benzaldehyde**	71.59	3.20	0.76
Isopropyl Myristate +	66.58	7.59	0.70
2-Ethylhexyl salicylate +	62.35	6.58	0.66
Heptadecane	54.78	5.55	0.58
Nonanal** +	52.52	3.15	0.55
Diethyl Phthalate +	47.77	4.48	0.50
Naphthalene	43.35	2.34	0.46

Tube Number	**GRA 03393*** **
Exposure Time(mins)	**47400**
Sample ID	**Southeast**

Top 10 VOC	**ng on tube**	**µgm^{-3}***	**ppb in air***
Triphenylphosphine oxide +	668.69	78.44	7.05
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	177.38	19.46	1.87
Nonanal** +	168.15	10.07	1.77
Cyclohexadecane +	84.26	7.96	0.89
Naphthalene	65.72	3.55	0.69
Benzaldehyde**	62.11	2.78	0.66
Benzothiazole +	43.01	2.45	0.45
Acetic Acid	35.82	0.91	0.38
Hexadecanal +	28.61	2.90	0.30
Hexadecane	26.22	2.50	0.28

Tube Number	**GRA 08631*** **
Exposure Time(mins)	**47410**
Sample ID	**Southwest**

Top 10 VOC	**ng on tube**	**µgm^{-3}***	**ppb in air***
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	234.33	25.70	2.47
Diethyl Phthalate +	150.05	14.05	1.58
Nonanal** +	92.46	5.54	0.98
Benzaldehyde**	48.59	2.17	0.51
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester +	47.65	5.59	0.50
Benzene, 1-methyl-4-(1-methylethyl)-	35.78	2.02	0.38

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Naphthalene	30.27	1.63	0.32
Benzothiazole +	28.95	1.65	0.31
Acetophenone**	25.67	1.30	0.27
Acetic Acid	24.67	0.62	0.26

Tube Number GRA 10514
Exposure Time(mins) 47425
Sample ID Northwest

Top 10 VOC	**ng on tube**	**µgm^{-3}***	**ppb in air***
Cyclobutane, methyl- +	336.99	9.95	3.55
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	213.48	23.41	2.25
Nonanal** +	91.05	5.45	0.96
Benzoic acid +	86.79	4.47	0.92
Benzaldehyde**	64.42	2.88	0.68
Toluene	61.19	2.37	0.65
Butane, 2-methyl- +	56.53	1.72	0.60
Naphthalene	54.32	2.93	0.57
Heptadecane	31.55	3.19	0.33
Cyclohexadecane +	31.04	2.93	0.33

Uptake Rates:
All compounds: 2.00 ng.ppm^{-1}.min^{-1}.

Identification and estimation results for ng on tube are calculated by reference to toluene and toluene-d8 Internal standard.
+ These compounds are not covered by our UKAS accredited flexible scope.
****Compounds may be an artifact due to reaction of ozone with the Tenax sorbent.**
Acetic Acid may be an artifact due to the breakdown of Tenax sorbent.
*****Samples South east and South west had an incorrect tube number on diffusion sheet.**
Exposure times were calculated from start and finish times given on the exposure sheet.

Date of Analysis 28.07.2015

Analysts Name Mariella Angelova **Date of Report** 31.07.2015

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Concentrations in µg/m^3							All Tubes			Triplicate Tubes		
Sample Location	North East 1	North East 2	North East 3	South East	South West	North West	Min	Max	Average	Mean	Standard Deviation	CV
Exposed from	12/06/2015	12/06/2015	12/06/2015	12/06/2015	12/06/2015	12/06/2015						
Exposed to	15/07/2015	15/07/2015	15/07/2015	15/07/2015	15/07/2015	15/07/2015						
Date samples received	17/07/2015	17/07/2015	17/07/2015	17/07/2015	17/07/2015	17/07/2015						
NO_2	14.16	13.33	15.26	19.93	10.33	11.72	10.33	19.93	14.12	14.25	0.97	6.79
NOx	26.52	22.86	23.75	33.51	18.89	19.25	18.89	33.51	24.13	24.38	1.91	7.83
NO	12.35	9.53	8.48	13.59	8.57	7.54	7.54	13.59	10.01	10.12	2.00	19.78

Concentrations in µg/m^3							All Tubes			Triplicate Tubes		
Sample Location	North East 1	North East 2	North East 3	South East	South West	North West	Min	Max	Average	Mean	Standard Deviation	CV
Exposed from	12/06/2015	12/06/2015	12/06/2015	12/06/2015	12/06/2015	12/06/2015						
Exposed to	15/07/2015	15/07/2015	15/07/2015	15/07/2015	15/07/2015	15/07/2015						
Date samples received	17/07/2015	17/07/2015	17/07/2015	17/07/2015	17/07/2015	17/07/2015						
NO_2	14.16	13.33	15.26	19.93	10.33	11.72	10.33	19.93	14.12	14.25	0.97	6.79
NOx	26.52	22.86	23.75	33.51	18.89	19.25	18.89	33.51	24.13	24.38	1.91	7.83
NO	12.35	9.53	8.48	13.59	8.57	7.54	7.54	13.59	10.01	10.12	2.00	19.78

APPENDIX N

Monitoring Period 15 July to 13 August 2015

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LABORATORY ANALYSIS REPORT

NITROGEN DIOXIDE IN DIFFUSION TUBES BY U.V.SPECTROPHOTOMETRY

REPORT NUMBER X4226R

BOOKING REFERENCE No X4226

DESPATCH NOTE No SOR24700

CUSTOMER Golder Associates UK Ltd Attn.: Sarah Trevers
Attenborough House
Browns Lane, Business Park, Stanton-on-the Wolds
Nottinghamshire, NG12 5BL

DATE SAMPLES RECEIVED 18/08/2015

NO_2	Tube Number	NO_x	Exposure Data Date On	Date Off	Time (hr.)	NO_2 ppb *	NO_x ppb *	NO ppb * +	NO_2 µg/m³ *	NO_x µg/m³ *	NO µg/m³ *+	TOTAL µG NO_2	TOTAL µG NOx
572720	Northeast 1	572726	15/07/2015	13/08/2015	694.08	7.70	10.30	2.61	14.75	19.74	5.00	0.74	1.00
572719	Northeast 2	572727	15/07/2015	13/08/2015	694.08	7.63	11.99	4.37	14.61	22.98	8.37	0.74	1.16
572718	Northeast 3	572728	15/07/2015	13/08/2015	694.08	7.72	12.21	4.49	14.79	23.39	8.60	0.75	1.18
572717	Southeast	572725	15/07/2015	13/08/2015	694.25	9.47	13.38	3.91	18.15	25.65	7.49	0.92	1.29
572716	Southwest	572724	15/07/2015	13/08/2015	694.42	4.80	7.64	2.84	9.19	14.64	5.45	0.46	0.74
572715	Northwest	572723	15/07/2015	13/08/2015	694.58	5.49	8.17	2.68	10.52	15.65	5.13	0.53	0.79
	Lab Blanks				694.58	0.14	0.34	0.20	0.28	0.65	0.38	0.014	0.033

Comment: Results are not blank subtracted

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LABORATORY ANALYSIS REPORT

+NO results are derived by subtracting NO2 from NOx.
Results have been corrected to a temperature of 293K (20C)

Overall M.O.U.	7.3% +/-	**Limit of Detection**	0.071ug NOx, 0.017ug NO2 on tube

Tube Preparation: 20%TEA/Water Analysed on UVS04 Camspec M550

		Analyst Name	B. Fiser
Date of Analysis	20/08/2015	**Date of Report**	27/08/2015

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

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LABORATORY ANALYSIS REPORT

REPORT NUMBER	**X4230R**
CUSTOMER	**Golder Associates UK Ltd Attenborough House Browns Lane Business Park Stanton-on-the-Wolds Nottinghamshire NG12 5BL**
GRADKO LAB REFERENCE	**GMSJ1158-1163**
DESPATCH NOTE No.	**24700**
DATE SAMPLES RECEIVED	**18.08.2015**
BOOKING IN REF.	**X4230**

IDENTIFICATION AND ESTIMATION (SEMI-QUANTITATIVE ANALYSIS) OF TOP 10 VOC ON TENAX DIFFUSION TUBES BY GC/MS

Analysis has been carried out in accordance with in-house method GLM 13

Tube Number	**GRA 07511*** **
Exposure Time(mins)	**41640**
Sample ID	**Northeast**

Top 10 VOC	**ng on tube**	**µgm^{-3}***	**ppb in air***
Compound A	414.91		4.98
2-Ethylhexyl salicylate +	394.57	47.38	4.74
2-Butenedioic acid (E)-, bis(2-ethylhexyl) ester +	388.14	63.38	4.66
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	265.54	33.16	3.19
Compound B	183.27		2.20
Compound C	182.77		2.19
Benzoic acid +	178.34	10.45	2.14
Cyclohexadecane +	145.34	15.64	1.75
Cyclotetradecane +	97.47	9.18	1.17
1-Hexadecene +	78.80	8.48	0.95

Tube Number	**GRA 11868*** **
Exposure Time(mins)	**41640**
Sample ID	**Northeast**

Top 10 VOC	**ng on tube**	**µgm^{-3}***	**ppb in air***
Compound A	705.12		8.47
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	226.28	28.26	2.72
Compound B	126.93		1.52
Cyclohexadecane +	48.65	5.23	0.58
Nonanal** +	46.82	3.19	0.56

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Benzaldehyde**	44.40	2.26	0.53
Acetophenone**	27.03	1.56	0.32
Naphthalene	23.16	1.42	0.28
Acetic Acid	22.90	0.66	0.28
Benzoic acid +	20.70	1.21	0.25

Tube Number GRA 11019***
Exposure Time(mins) 41640
Sample ID Northeast

Top 10 VOC	ng on tube	µgm^{-3}*	ppb in air*
Cyclohexadecane +	482.77	51.94	5.80
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	301.30	37.63	3.62
Isopropyl Myristate +	234.18	19.57	2.81
Hexadecane, 2,6,10,14-tetramethyl- +	217.81	29.50	2.62
2-Butenedioic acid (E)-, bis(2-ethylhexyl) ester +	94.70	15.47	1.14
2-Ethylhexyl salicylate +	55.05	6.61	0.66
Benzaldehyde**	43.80	2.23	0.53
1-Hexadecene +	39.84	4.29	0.48
Benzoic acid +	36.78	2.15	0.44
Naphthalene	36.60	2.25	0.44

Tube Number GRA 07330
Exposure Time(mins) 41650
Sample ID Southeast

Top 10 VOC	ng on tube	µgm^{-3}*	ppb in air*
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	463.64	57.89	5.57
Benzoic acid +	188.02	11.02	2.26
Compound A	156.63		1.88
1,1'-Binaphthalene, 5,5',6,6',7,7',8,8'-octahydro- +	151.66	19.08	1.82
Cyclohexadecane +	104.07	11.19	1.25
Nonanal** +	103.84	7.08	1.25
Decanal** +	88.59	6.64	1.06
Nonanoic acid +	53.24	4.04	0.64
5,9-Undecadien-2-one, 6,10-dimethyl-, (E)-	47.01	4.38	0.56
2-Phenacyl-quinoxaline +	43.04	5.13	0.52

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LABORATORY ANALYSIS REPORT

Tube Number	**GRA 11026**
Exposure Time(mins)	**41660**
Sample ID	**Southwest**

Top 10 VOC	**ng on tube**	**µgm^{-3}***	**ppb in air***
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	257.28	32.11	3.09
2,2'-Binaphthalene, 5,5',6,6',7,7',8,8'-octahydro- +	158.52	19.94	1.90
Cyclohexadecane +	89.40	9.61	1.07
Diethyl Phthalate +	40.36	4.30	0.48
Benzaldehyde**	38.90	1.98	0.47
Benzoic acid +	38.23	2.24	0.46
Isopropyl Myristate +	36.56	3.05	0.44
2-Phenacyl-quinoxaline +	36.09	4.30	0.43
Hexane, 3-methyl-	31.37	1.51	0.38
Benzene	30.11	1.13	0.36

Tube Number	**GRA 11002**
Exposure Time(mins)	**41670**
Sample ID	**Northwest**

Top 10 VOC	**ng on tube**	**µgm^{-3}***	**ppb in air***
Diethyl Phthalate +	113.10	12.05	1.36
2,5-Cyclohexadiene-1,4-dione, 2,5-diphenyl-	64.01	7.99	0.77
Cyclohexadecane +	59.35	6.38	0.71
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	43.39	5.79	0.52
Nonanal** +	33.39	2.28	0.40
Benzaldehyde**	23.62	1.20	0.28
Hexadecanal +	22.21	2.56	0.27
Naphthalene	21.35	1.31	0.26
Compound A	19.96	0.00	0.24
Acetophenone**	16.46	0.95	0.20

Uptake Rates:

All compounds: 2.00 ng.ppm^{-1}.min^{-1}.

Identification and estimation results for ng on tube are calculated by reference to toluene and toluene-d8 Internal standard.

+ These compounds are not covered by our UKAS accredited flexible scope.

****Compounds may be an artifact due to reaction of ozone with the Tenax sorbent.**

Acetic Acid may be an artifact due to the breakdown of Tenax sorbent.

Unable to identify compounds A,B and C. Library did not contain matches for mass spectrum.

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***Samples from North east location 1,2,3 were mixed up. The labels on the tubes did not match tube numbers on diffussion sheet.
Exposure times were calculated from start and finish times given on the exposure sheet.

		Date of Analysis	01.09.2015
Analysts Name	Mariella Angelova	Date of Report	02.09.2015

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Concentrations in µg/m^3							All Tubes			Triplicate Tubes		
Sample Location	North East 1	North East 2	North East 3	South East	South West	North West	Min	Max	Average	Mean	Standard Deviation	CV
Exposed from	15/07/2015	15/07/2015	15/07/2015	15/07/2015	15/07/2015	15/07/2015						
Exposed to	13/08/2015	13/08/2015	13/08/2015	13/08/2015	13/08/2015	13/08/2015						
Date samples received	18/08/2015	18/08/2015	18/08/2015	18/08/2015	18/08/2015	18/08/2015						
NO_2	14.75	14.61	14.79	18.15	9.19	10.52	9.19	18.15	13.67	14.72	0.09	0.64
NOx	19.75	22.98	23.39	25.65	14.64	15.65	14.64	25.65	20.34	22.04	1.99	9.05
NO	5.00	8.37	8.60	7.49	5.45	5.13	5.00	8.60	6.67	7.32	2.02	27.52