

**Council Name – Sevenoaks**

## **Appendix C**

### **Monthly Diffusion Tube Data for 2011**

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## NO2 Diffusion Tube Data 2011

Tubes supplied & analysed Harwell Scientifics Triethanolamine in Acetone 50:50


Site	Distance from Kerb in Metres	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	sum	Average ugm-3	Bias Corrected
<b>SEVENOAKS</b>																
3	Garvock Drive. Sev	0.0	26.1	21.1	22.6	14.5	10.5	9.4	11.2	9.9	10.3	12.9	#	###	14.9	13.5
2	High Street. South 1 Sev	1	90.5	74.7	68.2	68.3	63.5	62.8	62.6	54.6	69	69.2	84	###	69.8	63.8
27	High Street. South 2 School Sev	3	70.5	59.9	48.9	50.1	32.2	46.7	38.7	41.2	54.8	52.3	49.2	###	49.5	45.0
28	High Street North 2 Sev Senoc	1	73.1	61.6	51.3	46.3	44.1	#	52.7	49.2	46	50.4	54.7	###	52.9	48.2
29	High Street North 3 Seal Hollow Jcn	2	53.8	41	39.9	35.3	23.1	27.2	31	20.2	28.1	35.3	#	###	33.5	30.5
48	London Road 73 Sev	1.5	51.2	43	48.2	40	#	36.2	33.8	28.2	35.9	42	46.7	###	40.5	36.9
49	London Road 20 Sev	2	55.9	46.4	51.4	41.4	31.2	27.6	35.9	27.6	29	42.8	50	###	39.9	36.3
51	London Road 130 Sev	0.5	66.2	51.5	56.4	46.4	38.1	36.7	43.1	35.4	32.8	50.6	54.5	###	46.5	42.3
89	London Road 133	0.5	55.3	44.6	50	42.3	31.1	30.2	29.9	28.1	30.6	43.4	48.5	###	39.5	35.9
52	London Road 142 Sev	2	65.8	49	69.6	49.5	42.8	37.6	42.2	37.3	27.2	43.7	#	###	46.5	42.3
77	Amherst Hill (Montreal Ave)	1	63.9	52.7	69.4	58.7	#	42.6	48.9	41.2	34.6	54.1	63.5	###	53.0	48.2
87	Bradbourne Vale Road South	2.5	78.9	78	73.2	60.1	51.8	61.9	35	53.1	55.7	64.7	69.5	###	62.0	56.4
88	Bradbourne Vale Road North	1.5	58.3	54.5	55.7	44.2	32.9	35.6	19.1	34.3	35.6	48.4	54.6	###	43.0	39.1
90	4A St Johns Hill	1.5	67.4	73.8	53.5	48.7	32.8	30.9	20.2	29.8	33.1	47.4	62.7	###	45.5	41.4
91	St Johns Egdean Walk	1.5	41.2	36.5	38.8	25.4	16.9	16.6	12.5	14.5	14.8	28.2	36.8	###	25.7	23.3
<b>BAT &amp; BALL</b>																
23	Bat & Ball. 1 Ferrari	4	63.5	49	60.7	52.8	39.6	38	22.2	#	32.3	51.7	59.3	###	46.9	42.7
30	Bat & Ball 2 Otford Rd	3	62.1	48.9	55.2	41.3	25.2	33.7	21.1	33.5	38.2	48.8	47.4	###	41.4	37.7
31	Bat & Ball 3 Seal Rd	2	92	56.6	73.7	59.9	41.5	59.4	36.3	56.7	61.6	#	68	###	60.6	55.1
32	Bat & Ball 4 St Johns	1.5	91.7	69.7	90.9	65.7	39.8	55.7	33.6	53.3	52.3	71.9	85.7	###	64.6	58.8
<b>RIVERHEAD</b>																
5	Riverhead 2. North West	0.5	69.4	63.7	#	64.7	47.7	56.1	56	48.7	50.1	59.3	70.4	###	58.6	53.3
6	Riverhead 3. East	3	78.2	63.9	62.3	61.2	46.3	48.7	50	43.9	45.3	56.2	63.3	###	56.3	51.2
42	62 London Road Riverhead	2	68.9	53.6	57.2	50.1	35.4	45.4	35.9	39.8	43	53.6	55.4	###	48.9	44.5
76	Worships Hill/Witches Lane	2	59.9	44.1	56.5	36.9	34.7	39.9	24.9	35.4	31.8	47.3	49.2	###	41.9	38.1
<b>SEAL</b>																
7	High Street. East 1 Seal.	1	62.9	71.2	65.2	59.1	48.3	49.2	35.2	48.9	54.1	66.1	69.9	###	57.3	52.1
33	High Street. East 2 Pizza, Seal	1.5	74.3	65.3	70	54.2	46	47.9	33	44.3	47.4	55.5	55	###	53.9	49.0
8	High Street. West 1 Garage Seal.	3	55.1	50.3	42.9	39.7	33.3	31	21.5	34.2	28.1	41.8	50.9	###	39.0	35.5
34	High Street. West 2 Seal	2	51.5	43.3	51.2	40.6	26.9	42.5	19.8	35.8	37.4	44.8	50.5	###	40.4	36.8
35	Seal Hollow Rd Jcn with A25	2.5	58.8	54.4	58	48.9	26.4	41.9	28.6	36.4	41.5	46.3	51.9	###	44.8	40.8
<b>DUNTON GREEN</b>																
43	London Rd Miners Dunton Green	2	57.8	47.9	52.1	40.3	27.3	29.3	29	28	30.6	40	49.5	###	39.3	35.7
54	57 London Rd Dunton Green	2	56.4	58.1	40.4	50.1	42.5	44.1	14	31.6	35.7	42.1	44.3	###	41.8	38.0
57	193 London Rd Dunton Green	2	52.4	45	48.7	41.6	33.1	31.6	31.9	31.1	37.1	47.6	48.9	###	40.8	37.1
<b>BESSELS GREEN</b>																
74	Westerham Road	2	66.3	54.7	57.3	48	#	39.7	41.1	38.5	36.9	53.5	65.8	###	50.2	45.7
86	59 Westerham Rd	1.8	65.7	61.1	66.1	43.8	38.6	44.9	54.3	46.4	41.8	62.2	69	###	54.0	49.1
<b>EYNSFORD</b>																
96	High Street	1	50	34.8	49.2	32.4	26.2	25.2	28.2	28.2	25.4	27.3	34.4	###	32.8	29.9

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SUNDRIDGE																	
71	A25 204 Main Rd	Sundridge	2	62.7	52	52.7	35.4	33.9	36.4	34.9	36.3	40.2	44.5	49.3	###	43.5	39
92	8 Chevening Rd		1.5	50.5	41.2	34.8	33.9	29.5	30.6	33.7	29.3	31.6	37.4	38.8	###	35.6	32
BRASTED																	
12	Station Rd.	M25 Brasted.	7	83.3	53.9	53.6	56.3	53.1	46	44	50.3	42.2	48.8	44.4	###	52.4	47
85	Chart Ln	Brasted	2.2	79.4	68.6	72.4	58.4	48.2	46.1	57	46.1	53.3	63.5	76.5	###	60.9	55
84	West End	Brasted	1.4	53.6	45.2	47	38.3	25.6	35.4	29.6	32.7	32.7	41.3	34.7	###	37.8	34
WESTERHAM																	
24	High Street	Westerham	1.5	73.6	61.7	72.1	55.2	37.4	40.9	54.7	42.8	34.3	38.2	49.9	###	51.0	46
25	Vicarage Hill	Westerham	1.5	51.3	42.6	47.5	35.8	29.6	30.4	32.1	30.6	21.2	35.8	38.4	###	35.9	32
36	Market Square	Westerham	1	63.3	66.7	58.8	62	44.6	61.5	47.4	54.7	50.4	64.7	73.7	###	58.9	53
75	London Road 2	Westerham	3	50.4	45.3	48.2	36.2	25.9	29	27.7	29.3	29.5	34.5	41.3	###	36.1	32
SWANLEY																	
39	Batholomew Way 2	Swanley	2	68.4	58.3	55.2	51.8	36.7	39.5	46.8	39.1	36.5	54.9	57.4	###	49.5	45
40	London Road 1	Swanley	0.5	83.7	62.1	77.2	60.5	38.8	39.9	63.1	39.8	38.2	53.5	75.7	###	57.5	52
41	London Road 2 (Bus)	Swanley	2	47	60.8	54.9	50.7	40.9	41.8	37.5	37.7	49.7	62	62.1	###	49.6	45
13	London Road/Wested Ln	Swanley	4	66.2	52.4	65.6	52.6	30.9	32.5	38.5	33	32.3	48.2	55.1	###	46.1	42
14	Wadard Terrace	Button St. Swanley	10	61.3	62.1	#	47.8	33.1	44	33.2	38.1	38.6	46.8	51.6	###	45.7	41
81	Farningham Hill Rd		1	57.1	55.4	43.4	39.3	#	45.1	34.2	20.4	#	49	46.6	###	43.4	39
83	Birchwood Rd - Jessamine		1.2	71.5	74.2	64.9	66.6	56.6	60.7	55.9	62.6	60.8	58	61.9	###	63.1	57
93	Birchwood - Pucknells		2	53	42.2	47.6	#	25.5	19.5	33.2	25.6	22.4	34.1	47.7	###	35.1	31
95	Birchwood Rd - Malvern		3	59.8	50.4	59.4	46.7	30.2	35.2	33.7	37.1	31.8	41.4	50.8	###	43.3	39
94	Birchwood Junction	London Rd	2	72.3	52.5	60.8	42.5	30.5	34.4	31.6	32.8	37.7	49.9	64.2	###	46.3	42
FARNINGHAM																	
26	Farningham Hill	(A20)	5	71.4	50	45	57.5	37.4	41.1	41.6	33	33.7	55.4	66.8	###	48.4	44
WEST KINGSDOWN																	
67	Brands Hatch Road/Ash Road		1	66.1	45.1	37.5	32.9	27.1	39	28.5	31.1	33.8	44.5	42.2	###	38.9	35

 Data collection not started

 # Tube Missing

 Exceeding 40ugm-3 annual mean Objective

 Data excluded - suspicious.

 Exceeding 60ugm-3 one hour and 40ugm-3 annual mean Objectives

 Within 10% of 40ugm-3 objective



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### Bias Factors

Nitrogen dioxide diffusion tubes are supplied and analysed by ESG Scientifics at Didcot. This laboratory is UKAS accredited.

The tubes were prepared by spiking acetone:triethanolamine (50:50) onto grids prior to the tubes being assembled.

The lab confirms it follows the procedures set out in the it is ranked 'Good' in the WASP intercomparison scheme.

The tubes have been compared with the reference method by two triplicate co-location studies with the chemiluminescent NOX analysers at Greatness and at Bat & Ball.

The R & A Helpdesk Database gives a national Bias Factor of  $0.75 \text{ ug/m}^{-3}$

The locally calculated Bias Factor is  $0.91 \text{ ug/m}^{-3}$

### Discussion of Choice of Factor to Use

Local and national Bias Adjustment Factors are available and for 2011. Studies used in the national factor calculation give bias factors varying between 0.57 and 0.94. Our bias factor falls into this range.

Local factor of 0.91 used as this directly relates to local conditions.

### Local DT Bias Factor for 2008

#### Data

##### NITROGEN DIOXIDE DIFFUSION TUBE BIAS CORRECTIONS 2011

Greatness

	TUBE 1	TUBE2	TUBE3	TUBE AVERAGE		BIAS	Values in $\text{ugm}/-3$
					MONTH AVERAGE		
2011							
JAN	19.7	31.2	37.9	44.4	24.9	0.56	0.56
FEB	27.4	25.5	29.4	27.4	22.2	0.81	0.81
MAR	29.4	29.4	27.2	28.7	26.4	0.92	0.92
APR	21	21.9	20.2	21.0	23	1.09	1.09
MAY	14	13.6	14.7	14.1	12.5	0.89	0.89
JUNE	14.2	13.2	13.5	13.6	11	0.81	0.81
JULY	8.7	7.1	9.6	8.5	14.4	1.70	1.70
AUG	13.1	13.2	14.3	13.5	11.5	0.85	0.85
SEPT	14.5	13.7	14.3	14.2	12.7	0.90	0.90
OCT	21.4	17.4	20.8	29.8	20.3	0.68	0.68
NOV	25.1	24.3		16.5	23.2	1.41	1.41
DEC				0.0		#DIV/0!	
							1.33

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Bat & Ball

2011	TUBE 1	TUBE2	TUBE3	TUBE AVERAGE	Bat & Ball MONTH AVERAGE	BIAS	
JAN	48.7	34.1	46.9	64.9	34.2	0.53	0.53
FEB	47.6	45.9	47.2	46.9	31.8	0.68	0.68
MAR	43	45.5	47.1	45.2	34.4	0.76	0.76
APR	36.4	37.2	38.3	37.3	32.9	0.88	0.88
MAY	30.9	30.9	33.3	31.7	21.2	0.67	0.67
JUNE	37.9	38	37.7	37.9	20.6	0.54	0.54
JULY	18.3	16.1	20.2	18.2	22.6	1.24	1.24
AUG	27.7	31	30.5	29.7	21.3	0.72	0.72
SEPT	35.7	37.5	31.2	34.8	24	0.69	0.69
OCT	44.9	46.5	46.1	45.8	32.6	0.71	0.71
NOV	41.1	45.7	38.9	41.9	35.5	0.85	0.85
DEC				0.0		#DIV/0!	1.03

Average Bias with suspicious results removed

0.94 minus 1.70 and 1.41 values  
 0.88 minus 1.24 value  
 0.91

**AEA Diffusion Tube Precision and Accuracy Spread Sheet in LAQM Tools Results for 2011 Bias Assessment of above Data**

<b>Accuracy</b>		(with 95% confidence interval)
<b>WITH ALL DATA</b>		
Bias calculated using 11 periods of data		
Bias factor A	0.92 (0.81 - 1.05)	
Bias B	9% (-5% - 23%)	
<b>Diffusion Tubes</b>		
Mean:	20	$\mu\text{gm}^{-3}$
Mean CV (Precision):	7	
<b>Automatic Mean:</b>		
	18	$\mu\text{gm}^{-3}$
Data Capture for periods used: 95%		
<b>Adjusted Tubes</b>		
Mean:	18 (16 - 21)	$\mu\text{gm}^{-3}$

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**Final Page**

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