West Lothian Council

Annual Progress Report (APR)







2016 Air Quality Annual Progress Report (APR) for West Lothian Council In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

June 2016

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Report Reference number	
Date	30 June 2016

Executive Summary: Air Quality in Our Area

Air Quality in West Lothian

West Lothian Council regularly reviews and assesses air quality throughout the district to determine whether or not the air quality objectives are likely to be achieved. Air pollutants such as Nitrogen Dioxide (NO₂) and fine particulates (PM_{10}), which are mainly associated with vehicle emissions, are measured using a network of 3 continuous air quality monitoring stations located in Linlithgow, Broxburn, and Newton. There are also 20 NO₂ passive diffusion tubes located throughout West Lothian.

Linlithgow pollutant levels for PM_{10} in 2015 were lower than 2014 and below the PM_{10} Air Quality Objective. Measured NO₂ levels in Linlithgow were slightly higher in 2015 than in 2014 but still below the Air Quality Objective.

An Air Quality Management Area (AQMA) in Linlithgow was subsequently declared in April 2016 due to modelled exceedances of both NO_2 and PM_{10} at relevant receptors. The boundaries mirror those in the West Lothian Local Development Plan Proposed Plan. This includes Linlithgow, Linlithgowbridge and land allocated for development.

The 2015 Newton PM_{10} pollutant levels were lower than 2014 bringing the pollutant levels below the air quality objective. Measured NO_2 levels are still below the air quality objective level in Newton as in previous years. The main source of PM_{10} is domestic fuel combustion. An AQMA in Newton will be declared in due course due to modelled exceedances of PM_{10} at relevant receptors. This is based on 2014 monitoring data of PM_{10} .

Monitoring data from the station located in Broxburn, within the declared Broxburn AQMA, did not exceed the annual Air Quality Objective for NO_2 or PM_{10} . Furthermore, measured 2015 pollutant levels were lower than 2014 pollutant levels. However, the AQMA will remain due to the planned extensive residential development which is part of the Core Development Area (CDA) in Broxburn and Winchburgh.

Local Priorities and Challenges

- Finalise and publish the Broxburn Air Quality Action Plan (AQAP)
- Create a draft AQAP for Linlithgow and carry out further assessments of air quality
- Declare an AQMA in Newton and create a draft Newton AQAP
- Carry out PM_{2.5} monitoring at one of the automatic monitoring sites

How to Get Involved

If you would like to find out more about air quality in West Lothian please visit our Air Quality website <u>http://www.westlothian.gov.uk/article/2216/Air-Pollution</u>

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1. Local Air Quality Management

This report provides an overview of air quality in West Lothian during 2015. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Progress Report (APR) summarises the work being undertaken by West Lothian Council to improve air quality and any progress that has been made.

	Air Quality Objec	tive	Date to be
Pollutant	Concentration	Measured as	achieved by
Nitrogen	200 μg/m ³ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
dioxide (NO ₂)	40 µg/m ³	Annual mean	31.12.2005
Particulate	50 μg/m ³ , not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
Matter (PM ₁₀)	18 μg/m ³	Annual mean	31.12.2010
Particulate Matter (PM _{2.5})	10 μg/m³	Annual mean	31.12.2020
	350 μg/m ³ , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
Sulphur dioxide (SO ₂)	125 μg/m ³ , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	3.25 μg/m ³	Running annual mean	31.12.2010
1,3 Butadiene	2.25 µg/m ³	Running annual mean	31.12.2003
Carbon Monoxide	10.0 mg/m ³	Running 8-Hour mean	31.12.2003

Table 1.1 – Summary of Air Quality Objectives in Scotland

Pollutant	Air Quality Objec	Date to be	
Fonutant	Concentration	Measured as	achieved by
Lead	0.25 μg/m ³	Annual Mean	31.12.2008

2. Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12 months, setting out measures it intends to put in place in pursuit of the objectives.

A summary of AQMAs declared by West Lothian Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at <u>http://www.westlothian.gov.uk/article/2216/Air-</u> <u>Pollution</u>

A consultation on the declaration of an AQMA in Newton ended on 20 June 2016. An AQMA will be declared in July 2016.

AQMA Name			Description	Action Plan
AQMA CM1	NO ₂ and PM ₁₀ annual mean	<u>Linlithgow</u>	Encompasses the whole of Linlithgow and Linlithgow Bridge including potential new development sites.	AQAP planned for 2016/17
AQMA CM2	NO ₂ and PM ₁₀ annual mean	<u>Broxburn</u>	An area encompassing a number of properties adjacent to Greendykes Junction and along the East/West of the Main Street.	Draft Air Quality Action Plan http://www.westlothian.gov.uk /media/11766/Broxburn-Draft- Air-Quality-Action- Plan/pdf/Air_Quality_Action Plan_Broxburn1.pdf

2.2 **Progress and Impact of Measures to address Air Quality in West Lothian**

West Lothian Council has taken forward one measure during the current reporting year of 2016 in pursuit of improving local air quality. Details of all measures completed and in progress are set out in Table 2.2. More detail on these measures can be found in the AQAP relating to the <u>Broxburn AQMA</u>.

Progress on the following measures was slower than expected due to staff leaving the service which delayed the process of completing the AQAP for Broxburn.

Measure	Measure	Category	Focus	Lead Authority	Planning	Implementation	Key	Target Pollution	Progress to	Estimated	Comments
No.					Phase	Phase	Performan	Reduction in	Date	Completio	
							се	the AQMA		n Date	
							Indicator				
1	Electric Vehicle	Promoting	Building a network		June 2016	March 2017	Electric	Reduction in Air	Funding	March	Fulfills
	charging points	low emission	for low emission	Health			Vehicle	Pollution	received	2017	action
		transport	vehicles				charging		from Scottish		measure
							points		Government		15 of draft
							ordered				Broxburn
											AQAP
2	Improving links	Policy		Environmental	January	November 2016	Copy of	Reduction in Air	Funding	December	Fulfills
	with Local	guidance	Planning	Health	2016		Draft Air	Pollution	received and	2016	action plan
	Planning and	and	Guidance				Quality PG		agreement in		measure 2
	Development	development					developed		place with		of draft
	framework	control					and		external		Broxburn
							received		consultant		AQAP

Table 2.2 – Progress on Measures to Improve Air Quality

3. Air Quality Monitoring Data and Comparison with Air Quality Objectives

3.1 Summary of Monitoring Undertaken

Measured pollutant levels from all 3 automatic monitoring sites in West Lothian has generally been lower in 2015 than 2014. However, due to anticipated developments and pollutant levels still relatively close to the air quality objective levels there will be no amendments to the AQMAs or proposed AQMA.

3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how local concentrations of the main air pollutants compare with the objectives.

West Lothian Council undertook automatic (continuous) monitoring at three sites during 2015. Table A.1 in <u>Appendix A</u> shows the details of the sites. National monitoring results are available at <u>Air Quality in Scotland - latest data, forecasts and air quality information</u>

Maps showing the location of the monitoring sites are provided in <u>Appendix C.</u> Further details on how the monitors are calibrated and how the data has been adjusted are included in <u>Appendix C.</u>

3.1.2 Non-Automatic Monitoring Sites

West Lothian Council undertook non- automatic (passive) monitoring of NO₂ with 20 at 20 NO₂ diffusion tubes at various sites during 2015. Table A.2 in <u>Appendix A</u> shows the details of the sites.

Maps showing the location of the monitoring sites are provided in <u>Appendix C</u>. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in <u>Appendix C</u>.

3.2 Individual pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for annualisation and bias. Further details on adjustments are provided in <u>Appendix C</u>. Trend data from previous years can be found in <u>Appendix C</u>.

3.2.1 Nitrogen Dioxide (NO₂)

The Air Quality monitoring data for 2015 has shown that there have been no exceedances of the annual or 1 hour air quality objectives at any monitoring sites for

West Lothian Council

NO₂. However, dispersion modelling carried out in 2015/16 as part of a detailed assessment for Linlithgow has indicated that NO₂ concentrations in excess of the 40 μ g/m-3 annual mean objective occurred at one receptor in Linlithgow where the predicted NO₂ annual mean concentration is 40.6 μ g/m-3. This triggered the declaration of an AQMA in Linlithgow for NO₂.

Table A.3 in <u>Appendix A</u> compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40μ g/m-3.

With regard to diffusion tubes, the full 2015 dataset of monthly mean values is provided in <u>Appendix B.</u>

Table A.4 in <u>Appendix A</u> compares the ratified continuous monitored NO₂ hourly mean concentrations for the past 5 years with the air quality objective of $200\mu g/m^3$, not to be exceeded more than 18 times per year. There were no exceedences of this air quality objective.

3.2.2 Particulate Matter (PM₁₀)

The Air Quality monitoring data for 2015 has shown that there have been no exceedances of the PM_{10} annual air quality objective at any of the monitoring sites. However, monitoring has shown that there have been two exceedances of the 24 hour air quality objective at each of the Linlithgow and Broxburn monitoring stations.

Dispersion modelling for PM_{10} carried out in Linlithgow in 2015/16 has shown Annual mean PM_{10} concentrations in excess of the 18 µg/m-3 air quality objective occurred at 10 residential receptors in Linlithgow.

Dispersion modelling for PM_{10} carried out in Newton in 2016 (based on 2014 data) has shown there are exceedances of the PM_{10} annual mean air quality objective in most of <u>Newton</u>.

Table A.5 in <u>Appendix A</u> compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of $18\mu g/m^3$.

Table A.6 in <u>Appendix A</u> compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the 24 hour mean air quality objective of $50\mu g/m^3$, not to be exceeded more than 7 times per year.

3.2.3 Particulate Matter (PM_{2.5})

West Lothian Council currently do not monitor $PM_{2.5}$, however, funding has been granted for one new $PM_{2.5}$ monitoring instrument which will be purchased in due course.

3.2.4 Sulphur Dioxide (SO₂)

West Lothian Council does not monitor SO2.

3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

West Lothian Council does not monitor Carbon Monoxide, Lead, and 1,3-Butadiene

4. New Local Developments

4.1 Road Traffic Sources

There are no new road traffic sources at present.

4.2 Other Transport Sources

There are no new other traffic sources at present.

4.3 Industrial Sources

A planning application has been received requesting comments on an Environmental Impact Assessment (EIA) for the enlargement of a large poultry farm in Broxburn

4.4 Commercial and Domestic Sources

Planning Applications were submitted and granted for commercial biomass boilers at the properties below;

- West Lothian Civic Centre", Howden South Road, Howden, Livingston, West Lothian
- Strathbrock Partnership, 189a West Main Street, Broxburn, West Lothian
- St Kentigern's RC Academy, 60 West Main Street, Blackburn, Bathgate, West Lothian
- Westfield Primary School, Lomond View, Westfield, Bathgate, West Lothian
- James Young High School, "(A)", Quentin Rise, Dedridge, Livingston, West Lothian
- Inveralmond Community High School,50 Willowbank, Ladywell, Livingston

Screening assessments took place for each planning application and after agreement on flue height and type of biomass boiler to be installed, consent was given with conditions attached. A number of domestic stove planning applications have been submitted in 2015 and are generally approved subject to conditions on flue height.

4.5 New Developments with Fugitive or Uncontrolled Sources

There are no new developments with fugitive or uncontrolled sources at present.

5. Planning Applications

West Lothian has been subject to a number of planning applications which may affect air quality. These are listed below;

- 0489/FUL/15 220 East Main Street, Broxburn, West Lothian 190 Houses Granted subject to conditions.
- 0558/P/09 Greendykes Road, Broxburn, West Lothian 350 Houses Still to be determined
- 0080/P/16 East Main Street, Broxburn, West Lothian Retail Units & Public House/Restaurant etc – Still to be Determined
- 0020/P/16 Standhill North/South, West Main Street, Armadale, West Lothian
 19 ha residential development Still to be determined

6. Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

Linlithgow

The measured annual mean NO_2 concentration within the Linlithgow AQMA in 2015 is below the annual mean objective level. Measured concentrations at NO_2 diffusion tube locations within the AQMA were below the NO_2 annual mean objective level after bias adjustment and distance correction. The measured annual mean PM_{10} concentration within the Linlithgow AQMA in 2015 is below the annual mean objective level.

<u>Broxburn</u>

The measured annual mean NO_2 concentration within the Broxburn AQMA in 2015 is below the annual mean objective level. Measured concentrations at NO_2 diffusion tube locations within the AQMA were below the NO_2 annual mean objective level after bias adjustment and distance correction. The measured annual mean PM_{10} concentration within the Broxburn AQMA in 2015 is below the annual mean objective level. Although Broxburn NO_2 and PM_{10} concentrations are below the objective levels the AQMA will remain for NO_2 and PM_{10} due to the planned residential and commercial developments in and around the AQMA.

<u>Newton</u>

The measured annual mean NO_2 concentration within Newton in 2015 is below the annual mean objective level. Measured concentrations at NO_2 diffusion tube locations within Newton were below the NO_2 annual mean objective level after bias adjustment and distance correction. The measured annual mean PM_{10} concentration within Newton in 2015 is below the annual mean objective level.

Other Monitoring Data

<u>NO2</u>

There were no measured exceedances of the annual mean NO_2 objective at any diffusion tube monitoring sites in West Lothian. Measured NO_2 annual mean 2015 levels generally stayed at the same level as in 2014 with a slight drop in levels at the Broxburn air monitoring station. There were no measured exceedances of the 1-hour objective for NO2 at any automatic site.

<u>PM₁₀</u>

Measured PM_{10} annual mean 2015 levels were generally lower across all monitoring sites than in 2014. There were two exceedances of the 24 hour objective for PM10 at the Linlithgow automatic site. There were two exceedances of the 24 hour objective for PM_{10} at the Broxburn automatic site.

6.2 Conclusions relating to New Local Developments

Two significant new residential local developments adjacent to the Broxburn AQMA were assessed in terms of air quality. The first development was 190 residential units at 220 East Main Street, Broxburn, West Lothian. An AQIA was provided and reviewed. The dispersion modelling was re-modelled and the final conclusions were;

1. For NO₂ the maximum impact of the development traffic predicted at the receptors modelled (West Main Street receptors) is classified as 'Slight' and the

maximum predicted annual mean concentration is 36.6 μ g/m-3 which is 91% of the 40 μ g/m-3 objective.

2. For PM_{10} the impact of the proposed development traffic predicted at all of the receptors modelled is less than 0.5% of the 18 µg/m-3 Scottish PM_{10} annual mean objective – the impact is therefore classified as 'Negligible' at all receptors. The maximum predicted PM_{10} annual mean concentration with the development in 2018 is 17.9 µg/m-3, 99.6% of the 18 µg/m-3 objective.

3. Although the impact of the proposed development is classified as either 'slight' or 'negligible' on NO2 and PM10 concentrations respectively, it will increase road traffic emissions and may contribute to the cumulative impact of developments on air quality in Broxburn.

Funding towards measures in the draft Broxburn AQAP was provided by the developer for the 'slight' impact of the development on NO₂ concentrations in the Broxburn AQMA.

The second development is still currently being processed through the planning system. The application is for 350 residential units at Greendykes Road, Broxburn, West Lothian. An AQIA has been provided. The model inputs have been reviewed and remodelling has been undertaken taking into account the cumulative effect of this development and the 190 residential unit development on East Main Street, Broxburn. The conclusions are as follows;

- For NO₂ the maximum impact of the development traffic in the assumed year of completion of the development 2017; the predicated impact at the receptors (Greendykes Road receptors) modelled is classified as 'slight' and the maximum predicted annual mean concentration is 36ug/m-3 which is 90%of the 40ug/m-3 objective.
- 2. For PM₁₀ the maximum impact of the proposed development traffic predicted at the receptors modelled for a future year of 2017 is an increase of 2% of the 18 µg/m-3 Scottish PM₁₀ annual mean objective. The impact is classified as 'Moderate' at the worst case receptors both of which are within the Broxburn

AQMA. The maximum predicted PM10 annual mean concentration with the development in 2017 is 18.9 μ g/m-3 which is 105% of the 18 μ g/m-3 objective.

- 3. For $PM_{2.5}$ the maximum impact of the proposed development traffic predicted at the receptors modelled for a future year of 2017 is an increase of 2% of the 12 µg/m-3 Scottish PM_{10} annual mean objective (this was the correct PM2.5 objective at the time of submission of the air quality impact assessment but has recently changed to 10µg/m-3). Based on comparison with the 12 µg/m-3 objective, the impact is classified as 'Slight' at the worst case receptors. The maximum predicted $PM_{2.5}$ annual mean concentration with the development in 2018 is 10 µg/m-3, which is 83% of the 12 µg/m-3 objective, and 100% of the new 10 µg/m-3 objective.
- 4. Hence, the air quality impact of the proposed development is classified as 'Moderate' for PM₁₀ and 'Slight' for NO₂ and PM_{2.5}. The additional traffic will increase road traffic emissions and contribute to the cumulative impact of ongoing development on air quality in Broxburn. The modelling also indicates that there is a risk that the Scottish PM₁₀ annual mean objective will be exceeded at residential properties within the existing Broxburn AQMA, the locations where 'moderate' impacts are forecast to occur.

6.3 Proposed Actions

The monitoring data captured during 2015 has not identified any new exceedances of the objectives for any pollutants measured or identified the need for additional monitoring.

The Broxburn AQMA has been in place for 5 years and over that time the measured levels of PM_{10} and NO_2 have dropped below the objectives levels. However, new developments in this area, modelled through the planning system, may raise the current levels above the annual mean objective level for PM_{10} . The modelling has also indicated that the NO_2 annual mean would increase to a predicted 36ug.m-3. Therefore the AQMA will remain in place. An AQAP for Broxburn has been drafted and was subject to public consultation. This consultation has now ended and finalised version will be available in 2016.

The Linlithgow AQMA came into effect in April 2016. This was based on a detailed assessment of air quality undertaken in 2015 taking into account monitoring data in 2014. The next stage will be to carry out an assessment to provide the technical

justification for any proposed measures to include in an Air Quality Action Plan (AQAP). This further assessment will run in parallel with the development of the action plan for Linlithgow. The action plan will focus on effective, feasible, and proportionate measures to reduce air pollution in Linlithgow.

An AQMA for Newton will be declared for PM₁₀ in 2016 following a public consultation ending in June 2016. This is based on a detailed assessment of air quality undertaken in 2015 taking into account monitoring data from 2014. After the AQMA is declared the next stage will be to carry out an assessment to provide the technical justification for any proposed measures to include in an AQAP. This further assessment will run in parallel with the development of an action plan for Newton. The action plan will focus on effective, feasible, and proportionate measures to reduce air pollution in Newton.

Appendix A: Monitoring Results

 Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m)	Inlet Height (m)
CM1	Linlithgow High St 2	Roadside	300426	677172	NO ₂ ; PM ₁₀	Y	NOX analyser FDMS	4	1.3	2.4
CM2	Broxburn CMC	Roadside	308314	672231	NO _{2;} PM10	Y	NOX analyser FDMS	3.5	2	2.3
СМЗ	Newton CMC	Roadside	309258	677728	NO2; PM10	Ζ	NOX analyser FDMS	2	2.4	2.4

(1) 0 if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable.

Table A.2 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?
DT1	Newton	Roadside	309223	677711	NO ₂	N	3	2	Ν

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?
DT2	Broxburn WMS	Roadside	308165	672222	NO2	Y	Facade	3	Ν
DT3	Broxburn EMS	Roadside	308426	672233	NO2	Y	1.5	4	Ν
DT4	Broxburn CNC	Roadside	308314	672231	NO2	Y	3	2	Y
DT5	Broxburn EMS	Roadside	308426	672233	NO2	Y	1.5	4	Ν
DT6	Dedridge Cedric Rise	Urban Background	306403	666341	NO2	Ν	4	3	Ν
DT7	West Calder	Roadside	301758	663158	NO2	Ν	2	2	Ν

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?
DT8	Whitburn Cross	Roadside	294687	665030	NO2	Ν	Facade	3	Ν
DT9	Armadale Cross	Roadside	293842	668588	NO2	Ν	2	2	Ν
DT10	Bathgate S Bridge	Roadside	297401	668772	NO2	Ν	Facade	3	Ν
DT11	Bathgate Steelyard	Roadside	297467	668734	NO2	Ν	12	4	Ν
DT12	Bathgate King St	Roadside	297570	668586	NO2	Ν	5	4	Ν
DT13	Bathgate High St	Urban Background	297656	669298	NO2	Ν	3	10	Ν
DT14	Linlithgow High St	Roadside	300426	677172	NO2	Ν	4	1.3	Y

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?
DT15	Linlithgow H St NW	Roadside	299930	677070	NO2	Ν	Facade	1.4	Ν
DT16	Linlithgow H St SW	Roadside	299911	677052	NO2	Ν	2	2.9	Ν
DT17	Linlithgow H St NE	Roadside	300479	677148	NO2	Ν	3.4	2	Ν
DT18	Linlithgow High St SE	Roadside	300485	677125	NO2	Ν	7.5	2.2	Ν
DT19	Linlithgow High St N	Roadside	300398	677132	NO2	Ν	Facade	2.4	Ν
DT20	Linlithgow H St S	Roadside	300405	677118	NO2	Ν	Facade	3	Ν

(1) 0 if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).

(2) N/A if not applicable.

			Valid Data	Valid Data	NO ₂ Annual Mean Concentration (μg/m ³) ⁽³⁾						
Site ID	Site Type	Monitoring Type	Capture for Monitoring Period (%) ⁽¹⁾	Capture 2015 (%) ⁽²⁾	2011	2012	2013	2014	2015		
CM1	Roadside	Automatic	n/a	93	n/a	n/a	44.5(36) (3)	32.4	33		
CM2	Roadside	Automatic	n/a	99	43	45	39	28	27		
CM3	Roadside	Automatic	n/a	98	n/a	32	24	21	21		

Table A.3 – Annual Mean NO₂ Monitoring Results

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedence of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG(16) if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

			Valid Data	Valid Data	NO ₂ 1-Hour Means > 200μg/m ^{3 (3)}						
Site ID	Site Type	Monitoring Type	Capture for Monitoring Period (%) ⁽¹⁾	Capturo 2015	2011	2012	2013	2014	2015		
CM1	Roadside	Automatic	n/a	93	0	0	0	0	0		
CM2	Roadside	Automatic	n/a	99	0	0	0	0	0		
CM3	Roadside	Automatic	n/a	98	n/a	0	0	0	0		

Table A.4 – 1-Hour Mean NO₂ Monitoring Results

Notes: Exceedences of the NO₂ 1-hour mean objective $(200 \mu g/m^3 \text{ not to be exceeded more than 18 times/year)}$ are shown in **bold**.

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) If the period of valid data is less than 90%, the 99.8th percentile of 1-hour means is provided in brackets.

		Valid Data Capture	Valid Data	PM ₁₀ Annual Mean Concentration (µg/m ³) ⁽³⁾						
Site ID	Site Type	for Monitoring Period (%) ⁽¹⁾	Capture 2015 (%) ⁽²⁾	2011	2012	2013	2014	2015		
CM1	Roadside	n/a	91	13	12	13.9	18	15		
CM2	Roadside	n/a	87	18	16	16	17	15		
CM3	Roadside	n/a	88	n/a	14.7	19	22	16		

Table A.5 – Annual Mean PM₁₀ Monitoring Results

Notes: Exceedences of the PM_{10} annual mean objective of $18\mu g/m^3$ are shown in **bold**.

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) All means have been "annualised" as per LAQM.TG(16), valid data capture for the full calendar year is less than 75%. See Appendix C for details.

		Valid Data Capture for		PM ₁₀ 24-Hour Means > 50μg/m ^{3 (3)}						
Site ID	Site Type	Monitoring Period (%)	Capture 2015 (%)	2011	2012	2013	2014	2015		
CM1	Roadside	n/a	91	n/a	n/a	0	1	2		
CM2	Roadside	n/a	87	3	2	0	2	2		
CM3	Roadside	n/a	88	n/a	0	4	1	0		

Table A.6 – 24-Hour Mean PM₁₀ Monitoring Results

Notes: Exceedences of the PM₁₀ 24-hour mean objective (50µg/m³ not to be exceeded more than 7 times/year) are shown in **bold**.

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) If the period of valid data is less than 90%, the 90.4th percentile of 24-hour means is provided in brackets.

Table A.7 – Annua	Mean	PM _{2.5}	Monitoring	Results
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		Valid Data Capture		PM _{2.5} Annual Mean Concentration (µg/m ³) ⁽³⁾						
Site ID	Site Type	for Monitoring Period (%) ⁽¹⁾	Capture 2015 (%) ⁽²⁾	2011	2012	2013	2014	2015		
CM1	Roadside			n/a	n/a	n/a	n/a	n/a		
CM2	Roadside			n/a	n/a	n/a	n/a	n/a		
CM3	Roadside			n/a	n/a	n/a	n/a	n/a		

Notes: Exceedences of the PM_{10} annual mean objective of $10\mu g/m^3$ are shown in **bold**.

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) All means have been "annualised" as per LAQM.TG(16), valid data capture for the full calendar year is less than 75%. See Appendix C for details.

West Lothian Council

Appendix B: Full Monthly Diffusion Tube Results for 2015

Table B.1 – NO₂ Monthly Diffusion Tube Results for 2015

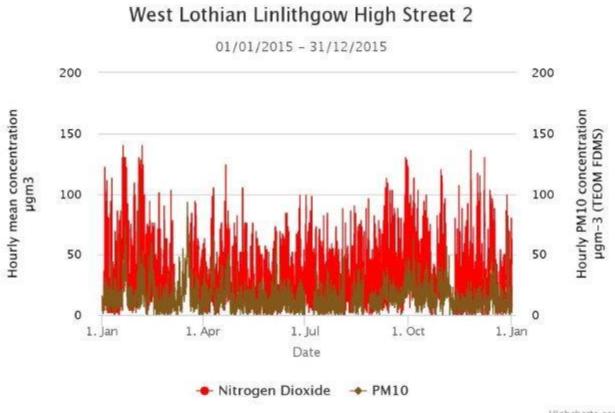
						NO ₂ N	lean Co	oncentra	ations ((µg/m³)				
													Annua	al Mean
Site ID	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted
DT1	33.8	32.8	30.7	23	18.3	25.8	23	22.9	32.9	39.8	2.0	53.1	28.5	23.1
DT2	32.5	26.4	32.8	34	27.4	26.8	22.5	27.0	31.5	40.6	32.6	31	30.5	24.7
DT3	39.5	24.5	33.5	27.5	25.9	25.3	21.7	No result	32.3	37.8	34.7	22.5	29.3	23.7
DT4	40.6	36.8	40.5	38.9	33.1	29.8	27.9	34.4	35.2	48.4	41.0	34.1	36.7	29.7
DT5	27.8	25.5	32.2	28.4	28.3	20.7	23.7	23.7	27.9	40.5	31.4	24.8	28.0	22.7
DT6	20.4	15.1	16.0	14.2	10.6	9.2	9.6	10.8	15.5	24	19.4	15	15.2	12.3
DT7	28	24.7	28.5	25.9	24	21.9	21.6	23.3	28.4	37.2	29.4	22.2	26.4	21.4
DT8	36.4	32	30.2	30.1	23.9	26.6	22	25.4	31.7	35.2	30.5	25.4	29.1	23.6
DT9	35.1	37.6	31	27.8	27.1	28.8	23.2	No result	31.5	37	34	31.5	31.1	25.2
DT10	29.5	21.3	23	21.6	14.8	15.2	13.2	17.5	20.5	30	23.5	19.8	21	17
DT11	35.5	38.3	33.5	34.2	30	26.9	22	26.1	32.2	43.5	37.8	33.6	32.8	26.6
DT12	37.3	31.7	31.5	31.9	25.2	24.8	24.7	30.4	33	44.2	33.9	32.7	31.2	25.3
DT13	15.7	14.9	12.9	11.2	8.2	7.8	5.6	9.0	10.8	17.4	15.8	14.9	12.1	9.8

						NO ₂ N	lean Co	oncentra	ations ((µg/m³)				
													Annua	al Mean
Site ID	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted
DT14	47.1	38.6	39.8	36.3	32.8	35.6	31.2	33.8	39.0	48.2	44.9	37.9	38.8	31.4
DT15	33.5	31.3	34.8	33.7	19.3	26.8	28.1	No result	32.2	42.6	36.7	25.9	32.6	26.4
DT16	43.9	47.2	43.6	38.5	36.5	34	31.7	35.4	37.9	47.9	48	38.9	40.3	32.6
DT17	36.7	36.2	34.7	31.9	27.1	27.4	21.4	No result	30.5	33.5	35.5	25.9	31	25.1
DT18	43.3	42	38.3	31.3	30.3	33.7	31.8	No result	38	45.7	46.1	39	38.1	30.9
DT19	38.4	35.2	36.6	35.9	31.1	28.9	27.4	29.5	35	42.5	38.6	29.2	34.2	27.7
DT20	44.7	44.5	36.8	37.9	34.4	35.5	31	35.6	38.1	48.4	46.6	37.5	39.4	31.9

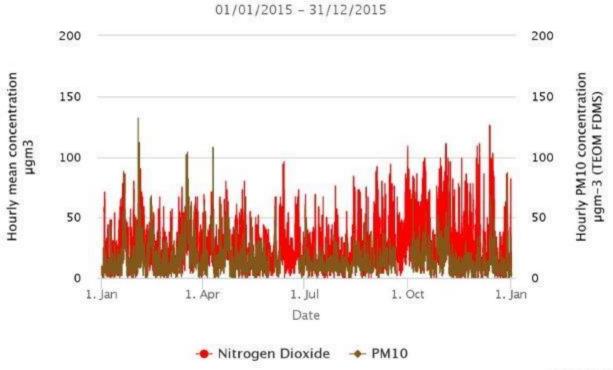
(1) See Appendix C for details on bias adjustment

Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC / Maps / Trend Graphs

Detailed dispersion modelling for Linlithgow can be found in the following link <u>http://www.westlothian.gov.uk/media/10903/2016-Linlithgow-Air-Quality-Detailed-</u> <u>Assessment-for-PM10-and-</u> <u>NO2/pdf/Linlithgow_Detailed_Assessment_Final_to_client_090316.pdf</u> Detailed dispersion modelling for Newton can be found in the following link <u>http://www.westlothian.gov.uk/media/12008/2016-Newton-Detailed-Assessment-of-</u> <u>Air-Quality/pdf/2016_02_26_Newton_Detailed_Assessment_of_Air_Quality.pdf</u>



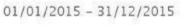
Highcharts.com

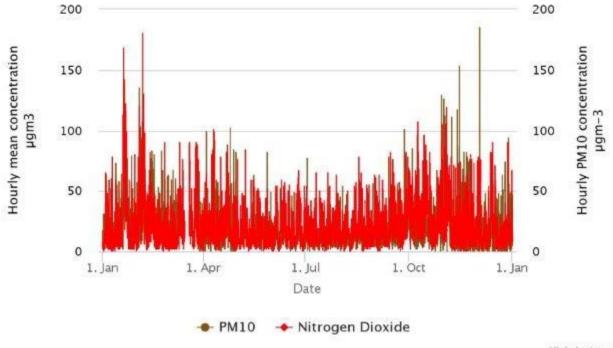


West Lothian Broxburn

Highcharts.com

West Lothian Newton





Highcharts.com

Annual AQ Results produced by Ricardo AEA

Produced by Ricardo Energy and Environment on behalf of the Scottish Government

WEST LOTHIAN LINLITHGOW HIGH ST 2 01 January to 31 December 2015

These data have been fully ratified by Ricardo Energy and Environment

POLLUTANT	PM10*+	NO ₂	NO _X
Maximum hourly mean	116 µg m- ³	140 µg m- ³	819 µg m- ³
Maximum daily mean	66 µg m-3	83 µg m-3	404 µg m-3
Average	15 µg m-3	33 µg m- ³	86 µg m- ³
Data capture	90.6 %	92.9 %	92.9 %

+ PM₁₀ instruments:

FDMS using a gravimetric factor of 1 from 1 January 2015

All gaseous pollutant mass units are at 20°C and 1013mb. Particulate matter concentrations are reported at ambient temperature and pressure.

NO_X mass units are NO_X as NO₂ µg m⁻³

Pollutant	Air Quality Regulations (2000) and Air Quality (Scotland) Amendment Regulations 2002	Exceedences	Days
PM ₁₀ Particulate Matter (Gravimetric)	Daily mean > 50 µg m ⁻³	2	2
PM ₁₀ Particulate Matter (Gravimetric)	Annual mean > 18 μg m-³	0	-
Nitrogen Dioxide	Annual mean > 40 µg m-3	0	-
Nitrogen Dioxide	Hourly mean > 200 µg m ⁻³	0	0

Produced by Ricardo Energy and Environment on behalf of the Scottish Government

WEST LOTHIAN BROXBURN 01 January to 31 December 2015

These data have been fully ratified by Ricardo Energy and Environment

POLLUTANT	PM ₁₀ *+	NO ₂	NO _X
Maximum hourly mean	132 µg m- ³	126 µg m- ³	629 µg m-3
Maximum daily mean	70 µg m-3	67 µg m-3	338 µg m- ³
Average	15 µg m-3	27 µg m-3	79 µg m-3
Data capture	86.8 %	99.4 %	99.4 %

+ PM₁₀ instruments:

+

FDMS using a gravimetric factor of 1 from 1 January 2015

All gaseous pollutant mass units are at 20°C and 1013mb. Particulate matter concentrations are reported at ambient temperature and pressure.

 NO_X mass units are NO_X as $NO_2~\mu g~m^{-3}$

Pollutant	Air Quality Regulations (2000) and	Exceedences	Days
	Air Quality (Scotland) Amendment Regulations 2002		
PM ₁₀ Particulate Matter	Daily mean > 50 µg m-3	2	2
(Gravimetric)			
PM ₁₀ Particulate Matter	Annual mean > 18 µg m-3	0	-
(Gravimetric)			
Nitrogen Dioxide	Annual mean > 40 µg m-3	0	-
Nitrogen Dioxide	Hourly mean > 200 µg m ⁻³	0	0

Produced by Ricardo Energy and Environment on behalf of the Scottish Government

WEST LOTHIAN NEWTON 01 January to 31 December 2015

These data have been fully ratified by Ricardo Energy and Environment

POLLUTANT	PM ₁₀ *+	NO ₂	NO _X
Maximum hourly mean	185 µg m- ³	180 µg m- ³	469 µg m-3
Maximum daily mean	48 µg m- ³	72 µg m-3	179 µg m-3
98.08th Percentile of daily mean	41 µg m-3	-	-
Average	16 µg m-3	21 µg m-3	42 µg m-3
Data capture	87.7 %	98.0 %	98.0 %

+ PM₁₀ instruments:

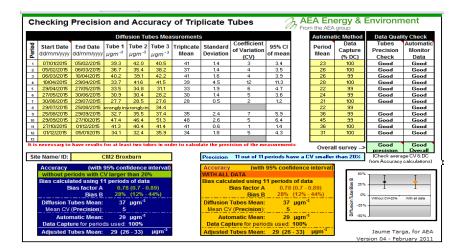
FDMS using a gravimetric factor of 1 from 1 January 2015 All gaseous pollutant mass units are at 20°C and 1013mb. Particulate matter concentrations are reported at ambient temperature and pressure.

 NO_X mass units are NO_X as $NO_2~\mu g~m^{\text{-}3}$

Pollutant	Air Quality Regulations (2000) and Air Quality (Scotland) Amendment Regulations 2002	Exceedences	Days
PM ₁₀ Particulate Matter	Daily mean > 50 µg m-3	0	0
(Gravimetric)			
PM ₁₀ Particulate Matter	Annual mean > 18 µg m-3	0	-
(Gravimetric)			
Nitrogen Dioxide	Annual mean > 40 µg m-3	0	-
Nitrogen Dioxide	Hourly mean > 200 µg m ⁻³	0	0

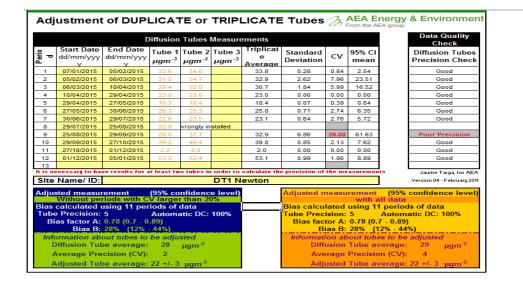
Bias adjustment factors - Linlithgow & Broxburn

Cł	necking	Precisio	on and	d Acc	uracy	of Trip	licate 1	lubes	0.		EA En m the AEA		Environm	nent
			Diffi	usion Tu	bes Mea	surements	5				Automa	tic Method	Data Quali	ty Check
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm ⁻³	Tube 2 µgm ⁻³	Tube 3 µgm ⁻³	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean		Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	07/01/2015	05/02/2015	47.2	46.3	47.9	47	0.8	2	2.0	1	36	100	Good	Good
2	05/02/2015	06/03/2015	46.8	25.2	43.9	39	11.7	30	29.1	1	41	99	Poor Precision	Good
3	06/03/2015	10/04/2015	37.6	43.0	38.9	40	2.8	7	7.0		30	54	Good	r Data Cap
4	10/04/2015	29/04/2015	36.0	36.6	36.3	36	0.3	1	0.7		31	100	Good	Good
5	29/04/2015	27/05/2015	34.4	30.7	33.3	33	1.9	6	4.7		25	99	Good	Good
6	27/05/2015	30/06/2015	34.2	37.3	35.4	36	1.6	4	3.9		29	98	Good	Good
7	30/06/2015	29/07/2015	31.0	31.4	31.2	31	0.2	1	0.5		30	99	Good	Good
8	29/07/2015	25/08/2015	34.1	32.0	33.5	33	1.1	3	2.7		30	98	Good	Good
э	25/08/2015	29/09/2015	41.9		35.5	39	4.5	12	40.7		38	98	Good	Good
10	29/09/2015	27/10/2015	48.0	51.4	45.1	48	3.2	7	7.8		46	99	Good	Good
11	27/10/2015	01/12/2015	41.3	48.8	44.7	45	3.8	8	9.3		30	100	Good	Good
12	01/12/2015	05/01/2016	40.9	37.3	35.5	38	2.7	7	6.8	1	23	99	Good	Good
13														
t is	necessary to	have results	For at lea	st two tu	bes in ore	ler to calcul	late the prec	ision of the m	easuremen	its	Overa	ll survey>	precision	Good Overall
Sit	e Name/ ID:		inlithgov				Precision	11 out of 12				than 20%	(Check avera from Acouracy	
		riods with C		than 20	%		Accuracy WITH ALL	DATA	95% conf			50% 00	·	
	Bias calcula B	ated using 1 ias factor A Bias B	0.82	s of data 2 (0.73 - 1 6 (6% - 3	0.94)			lated using 1 Bias factor A Bias B	0.85	(0.75 -	0.96)		I	ł
	Mean CV	ubes Mean: (Precision): natic Mean:	5	µgm-3			Mean C\	Tubes Mean: / (Precision): matic Mean:	7	µgm ^{<}		Diffusion Tube Bias		With all data
	Data Capt	ure for perio ubes Mean:	dsused:	99%	µgm ⁻³		Data Cap	oture for perio Tubes Mean:	ds used:	99%			Chart Area	a, for AFA
	Aujuoteu I	abee mean.	02 (2	0 00)	1.9.11		riajaoteu	rabee mean.	00 (20		- 9-1-1	Ver	rsion 04 - Feb	



As described in the Technical Guidance LAQM-TG-16 if there is more than one collocation study then the A factors should not be averaged but an approximation should be derived by averaging the B values. For example if there are two studies of 22% and 28% the average would be 25%. This is expressed as a factor, e.g 0.25, then 1 is added to this, 0.25+1.00 = 1.25. Finally take the inverse to give the bias adjustment factor 1/1.25=0.80.

We had 2 B values of 28% and 18%. Average = 23% = 0.23+1=1.23. Inverse of this is 1/1.23 = 0.81. Therefore we have a Bias adjustment factor of **0.81**.



5 0 dd/mm/yyy µgm ⁻³ µ				Diffusion	Tubes	Measure						Data Quality Check
2 05/02/2015 06/03/2015 32.6 16.5 24.6 11.38 46.37 102.26 3 06/03/2015 10/04/2015 33.0 34.1 33.6 0.78 2.32 6.99 4 10/04/2015 23.0 25.1 28.0 2.7.5 1.91 6.96 17.15 5 29/04/2015 23.0 25.2 24.1 1.56 6.45 13.98 6 27/05/2015 23.0 25.2 24.1 1.56 6.45 13.98 7 30/06/2015 23/07/2015 23.0 3.2.1 21.7 1.98 9.12 17.79 8 29/07/2015 25/05/2015 vrongly inverongly installed 0 0 0.000 0.000 10 29/09/2015 27/02/015 35.8 33.6 34.7 1.56 4.48 13.98 0.000 11 27/10/2015 31.7 30.3 31.0 0.99 3.19 8.69 0.000 12 01/12/2015 05/01/2015 31.7 30.3 31.0 0.99 3.19 8.6	ella P	dd/mm/yyy					e		cv			Diffusion Tuber Precision Check
3 06032015 1004/2015 33.0 34.1 33.6 0.78 2.32 6.99 4 1004/2015 2304/2015 23.6 27.5 1.91 6.96 17.15 5 2904/2015 27.05/2015 23.0 2.5.2 2.4.1 1.56 6.45 13.98 6 27.05/2015 20.0 2.5.2 2.4.1 1.56 6.45 13.98 7 3006/2015 23.00/6/2015 23.3 2.5.1 2.1.7 1.98 9.12 17.79 8 2907/2015 25/05/2015 32.3 issing tube	1	07/01/2015	05/02/2015	40.2	38.8		39.5	0.99	2.51	8.89		Good
4 1004/2015 29/04/2015 28.1 28.8 27.5 1.91 6.96 17.15 5 29/04/2015 27.05/2015 23.0 25.2 24.1 1.56 6.45 13.95 6 27/05/2015 23.00 25.2 24.1 1.56 6.45 13.95 6 27/05/2015 20.06/2015 20.3 23.1 25.3 2.62 10.36 23.55 7 30/06/2015 29/07/2015 20.3 23.1 21.7 1.98 9.12 17.79 0.00d 8 29/07/2015 32.5 41.0 37.8 4.60 12.18 41.30 0.00d 10 29/09/2015 29/09/2015 31.7 30.3 31.0 0.99 3.19 8.69 12 01/12/2015 04.71/2015 31.7 30.3 31.0 0.99 3.19 8.69 12 01/12/2015 04.91/2015 31.7 30.3 31.0 0.99 3.19 8.69 12 01/12/2015 04.91/2015 31.7 30.3 31.0 0.99	2	05/02/2015	06/03/2015	32.6	16.5		24.6	11.38	46.37	102.28		Poor Precision
5 29/04/2015 27/05/2015 23.0 25.2 24.1 1.56 6.45 13.98 6 27/05/2015 23.0 25.2 24.1 1.56 6.45 13.98 7 30/06/2015 23.0 23.4 27.1 25.5 2.62 10.36 25.51 7 30/06/2015 23.0 23.1 21.7 1.98 9.12 17.79 8 29/07/2015 25/08/2015 vrongly invirongly instrongly installed 0 0 000d 10 29/09/2015 27/10/2015 33.6 34.7 1.56 4.48 13.98 11 27/10/2015 31.7 30.3 31.0 0.99 3.19 8.69 12 011/2/2015 05/01/2015 31.7 30.3 31.0 0.99 3.19 8.69 13 15 DT2 Broxburn WMS DT2 Broxburn WMS Maxme Tags. for Jaume Tags. for Kilpusted measurement (95% confidence level) Mithout periods with CV larger than 20% Bias calculated using 10 periods of data Tube Precision: 5 Automatic DC: 100% Bias factor A: 0.77 (0.	3	06/03/2015	10/04/2015	33.0	34.1		33.6	0.78	2.32	6.99		Good
6 27/05/2015 30/06/2015 23.4 27.1 25.3 2.62 10.36 23.51 7 30/06/2015 23.07/2015 20.3 23.1 21.7 1.96 9.12 17.79 8 29/07/2015 25/05/2015 vrongy invrongy instated	4	10/04/2015	29/04/2015	26.1	28.8		27.5	1.91	6.96	17.15		Good
7 30/06/2015 29/07/2015 20.3 23.1 21.7 1.98 9.12 17.79 8 29/07/2015 25/06/2015 vrongy invincigy instated 1 1 1 17.79 10 29/07/2015 25/06/2015 32/06/2015 32/06/2015 32/06/2015 3 1 0 0 0 1 1 1 1 0 0 0 0 0 0	5	29/04/2015	27/05/2015	23.0	25.2		24.1	1.56	6.45	13.98		Good
8 29/07/2015 25/08/2015 vrongy neurongy installed 0 <th0< th=""> 0 0 <th0< th=""></th0<></th0<>	6	27/05/2015	30/06/2015	23.4	27.1		25.3	2.62	10.38	23.51		Good
9 25/08/2015 29/09/2015 32.3 Issing tube Image: Constraint of the second sec	7	30/06/2015	29/07/2015	20.3	23.1		21.7	1.98	9.12	17.79		Good
10 29/09/2015 27/10/2015 34.5 41.0 37.8 4.60 12.18 41.30 11 27/10/2015 01/12/2015 35.6 33.4.7 1.56 4.48 13.98 12 01/12/2015 05/01/2015 31.7 30.3 31.0 0.99 319 8.89 12 01/12/2015 05/01/2015 31.7 30.3 31.0 0.99 319 8.89 13 mecessary to have results for at least two tables in order to calculate the precision of the measurements Jacme Taga, for Yersion 04. Peters Jacme Taga, for Yersion 04. Peters Site Name/ ID: DT2 Broxburn WMS Mathematic DC: 100% With all data Bias calculated using 10 periods of data Urbe Precision: 5 Automatic DC: 100% Bias factor A: 0.77 (0.68 - 0.89) Bias factor A: 0.77 (0.68 - 0.89) Bias factor A: 0.77 (0.68 - 0.89) Bias B: 30% (13% - 47%) Bias B: 30% (13% - 47%) Bias B: 30% (13% - 47%) Information about tubes to be adjusted	8	29/07/2015	25/08/2015	vrongly in	wrongly in	stalled						
11 27/16/2015 01/12/2015 35.8 33.6 34.7 1.56 4.48 13.98 12 01/12/2015 65/01/2015 31.7 30.3 31.0 0.99 3.19 8.69 13 0 9.99 3.19 8.69 0.00d 0.00d 15 DOL <	9	25/08/2015	29/09/2015	32.3	issing tub	e						
12 01/12/2015 05/01/2015 31.7 30.3 31.0 0.99 3.19 8.89 13 13 0.99 3.19 8.89 Good 13 15 beersaag to have results for at least two tabes in order to calculate the precision of the measurements Jaume Targa, for 14 DT2 Broxburn WMS Version 04 - Fetsue 15 DT2 Broxburn WMS Version 04 - Fetsue 16 Mithout periods with CV larger than 20% 17 Bias calculated using 10 periods of data 17 Automatic DC: 100% 18 Bias factor A: 0.77 (0.68 - 0.89) 19 Bias B: 30% (13% - 47%) Information about tubes to be adjusted	10	29/09/2015	27/10/2015	34.5	41.0		37.8	4.60	12.18	41.30		Good
13 13 13 14 14 15 16 <	11	27/10/2015	01/12/2015	35.8	33.6		34.7	1.58	4.48	13.98		Good
Is necessary to have results for at least two tables in order to calculate the precision of the measurements Jaune Targa, for WHS Site Name/ ID: DT2 Broxburn WMS Without periods with CV larger than 20% Bas calculated using 10 periods of data Tube Precision: 5 Automatic DC: 100% Bias factor A: 0.77 (0.68 - 0.69) Bias B: 30% (13%, 47%) Information about tables to be adjusted	12	01/12/2015	05/01/2015	31.7	30.3		31.0	0.99	3.19	8.89		Good
Adjusted measurement (95% confidence level) Adjusted measurement (95% confidence level) Without periods with CV larger than 20% Bias calculated using 10 periods of data Bias calculated using 10 periods of data Bias factor A: 0.77 (0.68 - 0.89) Bias B: 30% (13% - 47%) Bias B: 30% (13% - 47%) Information about tubes to be adjusted Information about tubes to be adjusted Information about tubes to be adjusted												
Without periods with CV larger than 20% with all data Bias calculated using 10 periods of data Bias calculated using 10 periods of data Use Precision: 5 Automatic DC: 100% Bias factor A: 0.77 (0.68 - 0.89) Bias B: 30% (13% - 47%) Bias B: 30% (13% - 47%) Bias B: 30% (13% - 47%)	_			et le ant te					the me	45 UI 018-01	1	Jaume Targa, for AE Yersion 04 - February 20
Bias factor A: 0.77 (0.68 - 0.89) Bias factor A: 0.77 (0.68 - 0.89) Bias B: 30% (13% - 47%) Bias B: 30% (1	lias	Without per calculated (riods with C using 10 per	V larger	r than 2 data	0%		Bias calcul	lated	with a using 10	ll data period	ds of data
Information about tubes to be adjusted Information about tubes to be adjusted		as factor A:	0.77 (0.68 -	0.89)	nuc DC:	100%		Bias fact	tor A:	0.77 (0.	68 - 0.8	9)
Average Precision (CV): 6 Average Precision (CV): 10	C	Diffusion Tut	be average:	31				Informati Diffe	on at usion	out tube	es to be	adjusted 30 µgm ⁻³

					Measure						& Environm Data Quality Check
rerio d	Start Date dd/mm/yyy V		Tube 1 µgm ⁻³	Tube 2 µgm ⁻³	Tube 3 µgm ⁻³	Triplicat e Average	Standard Deviation	cv	95% CI mean		Diffusion Tub Precision Che
1	07/01/2015	05/02/2015	36.5	28.5		32.5	5.66	17.41	50.82		Good
2	05/02/2015	06/03/2015	25.0	27.7		26.4	1.91	7.25	17.15		Good
3	06/03/2015	10/04/2015	33.5	32.0		32.8	1.06	3.24	9.53		Good
4	10/04/2015	29/04/2015	33.9	34.0		34.0	0.07	0.21	0.64		Good
5	29/04/2015	27/05/2015	25.7	29.1		27.4	2.40	8.77	21.60		Good
6	27/05/2015	30/06/2015	27.5	26.1		26.8	0.99	3.69	8.89		Good
7	30/06/2015	29/07/2015	21.8	23.2		22.5	0.99	4.40	8.89		Good
8	29/07/2015	25/08/2015	27.0	vrongly in	stalled						
9	25/08/2015	29/09/2015	33.0	29.9		31.5	2.19	6.97	19.69		Good
10	29/09/2015	27/10/2015	42.8	38.5		40.7	3.04	7.48	27.32		Good
11	27/10/2015	01/12/2015	35.2	30.0		32.6	3.68	11.28	33.04		Good
12	01/12/2015	05/01/2015	22.1	22.9		22.5	0.57	2.51	5.08		Good
13											
Site	Name/ ID:			DT	3 Brox	burn EM			usurente	Ĭ	Jaume Targa, for a Version 04 - February
Bias	calculated (riods with C using 10 per	(95% co V large iods of	nfidenc r than 2 data	e level) 0%		Adjusted n Bias calcu		with a	II data	confidence lev Is of data
		0.77 (0.68 -	0.89)	atic DC:	100%		Bias fact	tor A:	0.77 (0.	68 - 0.8	
		30% (13%							30% (1		
		out tubes to									adjusted
D	iffusion Tul	be average:	30	µgm ⁻³			Diff	usion	Tube av	/erage:	30 µgm ⁻³
A	verage Pre	cision (CV):	7				Ave	rage	Precisio	on (CV):	7
								usted			

Art Date mm/yyy V /01/2015 /02/2015 /03/2015 /04/2015 /04/2015	End Date dd/mm/yyy 05/02/2015 06/03/2015 10/04/2015 29/04/2015	Tube 1 µgm ⁻³ 21.3 24.1 33.0	µgm ⁻³ 34.3 26.9	Tube 3 µgm ⁻³	e Average	Standard Deviation	сv	95% CI mean	Diffusion Tubes Precision Check
/02/2015 /03/2015 /04/2015	06/03/2015 10/04/2015	24.1	26.9		07.0				
/03/2015 /04/2015	10/04/2015				27.8	9.19	33.07	82.59	Poor Precision
/04/2015		33.0			25.5	1.98	7.76	17.79	Good
	29/04/2015		31.4		32.2	1.13	3.51	10.16	Good
/04/2015		25.0	31.7		28.4	4.74	16.71	42.57	Good
	27/05/2015	29.8	26.7		28.3	2.19	7.76	19.69	Good
/05/2015	30/06/2015	22.0	19.3		20.7	1.91	9.25	17.15	Good
/06/2015	29/07/2015	23.1	24.3		23.7	0.85	3.58	7.62	Good
/07/2015	25/08/2015	vrongly in	23.7						
/08/2015	29/09/2015	33.4	22.3		27.9	7.85	28.18	70.52	Poor Precision
/09/2015	27/10/2015	38.9	42.1		40.5	2.26	5.59	20.33	Good
/10/2015	01/12/2015	28.9	33.9		31.4	3.54	11.26	31.77	Good
/12/2015	05/01/2015	20.7	28.9		24.8	5.80	23.38	52.10	Poor Precision
me/ ID:						-		asuremen	ts Jaume Targa, for AE. Version 04 - February 20
hout per	riods with C	V large	r than 2	e level))%		- 1		with a	ull data
ecision:	5	Automa	atic DC:	100%		Tube Prec	ision:	5	Automatic DC: 100%
Bias B:	28% (12% -	44%)				В	ias B:	28% (1	2% - 44%)
ation abo	out tubes to	he adju	sted			Informat			
	08/2015 09/2015 10/2015 12/2015 12/2015 me/ ID: measur nout per ulated t ecision: actor A: Bias B:	08/2015 29/09/2015 09/2015 27/10/2015 10/2015 01/12/2015 12/2015 05/01/2015 arg to have results for a me/ ID: E measurement nout periods with C ulated using 11 periods on: 5 actor A: 0.78 (0.7 - 0 Bias B: 28% (12%)	08/2015 29/09/2015 33.4 09/2015 27/10/2015 38.9 10/2015 01/12/2015 28.9 12/2015 05/01/2015 20.7 arg to have results for at least two DT5 Brochout periods with CV larger measurement (95% consult exists) notat periods with CV larger ulated using 11 periods of existion: 5 Automa 0.78 (0.7 - 0.89) Bias B: 28% (12% - 44%)	08/2015 29/09/2015 33.4 22.3 09/2015 27/10/2015 38.9 42.1 10/2015 01/12/2015 28.9 33.9 12/2015 05/01/2015 20.7 28.9 arg to have results for at least two tubes in me/ ID: DT5 Broxburn measurement (95% confidence to to the periods with CV larger than 2/2 ulated using 11 periods of data ccision: 5 Automatic DC: cetor A: 0.78 (0.7 - 0.89) Bias B: 28% (12% - 44%)	08/2015 29/09/2015 33.4 22.3 09/2015 27/10/2015 38.9 42.1 10/2015 01/12/2015 28.9 33.9 12/2015 05/01/2015 20.7 28.9 arg to have results for at least two tubes in order to me/ ID: DT5 Broxburn East M measurement (95% confidence level) rout periods with CV larger than 20% ulated using 11 periods of data action: 5 Automatic DC: 100% Bias B: 28% (12% - 44%)	08/2015 29/09/2015 33.4 22.3 27.9 09/2015 27/10/2015 38.9 42.1 40.5 10/2015 01/12/2015 28.9 33.9 31.4 12/2015 05/01/2015 20.7 28.9 24.8 arg to have results for at least two tubes in order to calculate the me/ ID: DT5 Broxburn East Mains Indu measurement (95% confidence level) 004 periods with CV larger than 20% ulated using 11 periods of data 20:5 Automatic DC: 100% actor A: 0.78 (0.7 - 0.89) Bias B: 28% (12% - 44%) 28 28	08/2015 29/09/2015 33.4 22.3 27.9 7.85 09/2015 27/10/2015 38.9 42.1 40.5 2.26 10/2015 01/12/2015 28.9 33.9 31.4 3.54 12/2015 05/01/2015 20.7 28.9 24.8 5.80 arg to have results for at least two tubes in order to calculate the precision of me/ ID: DT5 Broxburn East Mains Industrial Est: Mains Industrial Est: measurement (95% confidence level) nout periods with CV larger than 20% ulated using 11 periods of data Bias calcu Tube Preceits and the prec	08/2015 29/09/2015 33.4 22.3 27.9 7.85 28.18 09/2015 27/10/2015 38.9 42.1 40.5 2.26 5.59 10/2015 01/12/2015 28.9 33.9 31.4 3.54 11.26 12/2015 05/01/2015 20.7 28.9 24.8 5.80 23.38 arg to have results for at least two tubes in order to calculate the precision of the me measurement (95% confidence level) notat periods with CV larger than 20% ulated using 11 periods of data Adjusted measu usits 0.78 (0.7 - 0.89) Bias B: 28% (12% - 44%) Bias B: 28% (12% - 44%) Bias B: 28%	B8/2015 29/09/2015 33.4 22.3 27.9 7.85 28.48 70.52 09/2015 27/10/2015 38.9 42.1 40.5 2.26 5.59 20.33 10/2015 01/12/2015 28.9 33.9 31.4 3.54 11.26 31.77 12/2015 05/01/2015 20.7 28.9 24.8 5.80 23.38 52.10 arg to have results for at least two tubes in order to calculate the precision of the measurement new ID1: DT5 Broxburn East Mains Industrial Estate Adjusted measurement with a 20% ulated using 11 periods of data 20.7 0.80) Bias calculated using 11 precision: 5 Bias B: 28% (12% - 44%) D0% D7.8 (0.7 - 0.78 (0.7 - 0.89)) Bias B: 28% (12% - 44%) Bias B: 28% (12% - 44%)

1 2 3 4	Start Date dd/mm/yyy v 07/01/2015 05/02/2015 06/03/2015	End Date dd/mm/yyy V 05/02/2015			Tube 3	Triplicat					
2 3 4	05/02/2015	05/02/2015		µgm -3	µgm ⁻³	e Average	Standard Deviation	cv	95% CI mean		Diffusion Tube Precision Chec
3 4			19.6	21.1		20.4	1.06	5.21	9.53		Good
4	06/02/2015	06/03/2015	17.4	12.7		15.1	3.32	22.08	29.86		Poor Precision
	00/03/2015	10/04/2015	16.7	15.3		16.0	0.99	6.19	8.89		Good
5	10/04/2015	29/04/2015	14.1	14.3		14.2	0.14	1.00	1.27		Good
	29/04/2015	27/05/2015	10.0	11.2		10.6	0.85	8.00	7.62		Good
6	27/05/2015	30/06/2015	9.2	9.1		9.2	0.07	0.77	0.64		Good
7	30/06/2015	29/07/2015	9.4	9.7		9.6	0.21	2.22	1.91		Good
8	29/07/2015	25/08/2015	vrongly in	10.8							
9	25/08/2015	29/09/2015	14.8	16.2		15.5	0.99	6.39	8.89		Good
10	29/09/2015	27/10/2015	24.8	23.2		24.0	1.13	4.71	10.16		Good
11	27/10/2015	01/12/2015	19.2	19.6		19.4	0.28	1.46	2.54		Good
12	01/12/2015	05/01/2015	15.9	14.1		15.0	1.27	8.49	11.44		Good
13											
		ve results for a	it least t v				precision of	the me	asuremen	ts	Jaume Targa, for Al
Site N	Name/ ID:				D 16 De	edridge					Version 04 - February 2
djust	ed measur	ement	(95% co	nfidenc	e level)		Adjusted m	neasu			confidence leve
		riods with C			0%				with a		
		ising 11 per					Bias calcu				
	Precision:			atic DC:	100%		Tube Preci		-		atic DC: 100%
Bias		0.78 (0.7 - 0 28% (12%					Bias fact		28% (1		
1											
		out tubes to									adjusted 15 uam ⁻³
		e average: cision (CV):		µgm ⁻³					Tube av Precisio		P.9

		C	Diffusion	Tubes	Measure	ements					Data Quality Check
rerio d	Start Date dd/mm/yyy V	End Date dd/mm/yyy v	Tube 1 µgm ⁻³	Tube 2 µgm ⁻³		Triplicat e Average	Standard Deviation	cv	95% Cl mean		Diffusion Tubes Precision Chec
1	07/01/2015	05/02/2015	28.9	27.0		28.0	1.34	4.81	12.07		Good
2	05/02/2015	06/03/2015	22.8	26.6		24.7	2.69	10.88	24.14		Good
3	06/03/2015	10/04/2015	29.7	27.2		28.5	1.77	6.21	15.88		Good
4	10/04/2015	29/04/2015	24.9	26.8		25.9	1.34	5.20	12.07		Good
5	29/04/2015	27/05/2015	24.2	23.7		24.0	0.35	1.48	3.18		Good
6	27/05/2015	30/06/2015	19.6	24.2		21.9	3.25	14.85	29.22		Good
7	30/06/2015	29/07/2015	20.5	22.7		21.6	1.56	7.20	13.98		Good
8	29/07/2015	25/08/2015	23.3	vrongly in	stalled						
9	25/08/2015	29/09/2015	28.6	28.2		28.4	0.28	1.00	2.54		Good
10	29/09/2015	27/10/2015	37.9	36.5		37.2	0.99	2.66	8.89		Good
11	27/10/2015	01/12/2015	29.5	29.2		29.4	0.21	0.72	1.91		Good
12	01/12/2015	05/01/2015	23.1	21.2		22.2	1.34	6.07	12.07		Good
13											
Site	Name/ ID:			D	T 7 We	st Calder]	Jaume Targa, for AE Version 04 - February 2
\dju	sted measu Without pe	rement <mark>riods with C</mark> using 11 per	(95% co V large	nfidenc r than 20 dete	e level) D%		Adjusted n Bias calcu		with a	ill data	confidence leve
Tube	Precision:		Automa	atic DC:	100%			ision:	5 Č	Autom	atic DC: 100%
ы		28% (12%							28% (1		
Int		out tubes to		etod							adjusted
		be average:		µgm ⁻³							27 µgm ⁻³
			21	pynn			Dilli	asion	i ube u	renaye.	- μgm
E		cision (CV):	6				Ave	rage	Precisio	n (CM)	6

	2		г		Tubes	Measure	ements				Data Quality
			End Date					Standard		95% CI	
	d d	dd/mm/yyy					e		cv		Precision Chec
	1	07/01/2015		34.2	38.5			3.04	8.36	27.32	Good
	_										
b c											
											
7 30002015 2022 21 0 21 0 <th0< th=""> <th0< th=""> 0 <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<></th0<></th0<>											
a) 20072015 20042015 2											
	8			26.0	24.8				3.34		
	-										
13-bit entrand in the interaction of a least two data in outron of solution on participation of the measurement of											
Site Name/ ID: DT3 Whitburn Cross Wrate Archausy Mithout periods with CV larger than 20% Adjusted measurement (WS) confidence level in the calculated with CV larger than 20% Adjusted measurement (WS) confidence level in the calculated with SI larger than 20% Bis calculated with TV periods of data Bis calculated with SI benefated 20 Bis calculated with SI benefated 20 Bis calculated with SI benefated 20 Bis calculated with SI benefated 20 Bis calculated with SI benefated 20 Bis calculated with SI benefated 20 Bis calculated with SI benefated 20 Bis calculated with SI benefated 20 Adjusted Table average 23 vi. 3 pgm2 Adjusted Table average 23 vi. 3 pgm2 Adjusted Table average 23 vi. 3 pgm2 Adjusted Table average 23 vi. 3 pgm2 Diffusion Tubes Measurements Start Date in the second 20 Bis calculated with SI benefated 20 2 Start Date in the second 20 Diffusion Tubes Measurements Start Date in the second 20 Bis calculated with SI benefated 20 2 Start Date in the second 20 Diffusion Tubes Measurements Start Date in the second 20 Bis calculated with SI benefated 20 2 Start Date in the second 20 Diffusion Tubes Measurements Cond 20 Bis calculated with SI benefated 20 2 Start Date in the second 20 Diffusion Tubes Measurements	13										
Diffusion Diffusion <thdiffusion< th=""> <thdiffusion< th=""> <th< td=""><td></td><td></td><td>ve results for a</td><td>it least tw</td><td></td><td></td><td></td><td></td><td>the me</td><td>asurements</td><td></td></th<></thdiffusion<></thdiffusion<>			ve results for a	it least tw					the me	asurements	
Links calculated using 11 periods of data the calculated using 11 periods of data The Precision : 5 A Advance to Decision : 5 Advance to Decision :											
Links calculated using 11 periods of data the calculated using 11 periods of data The Precision : 5 A Advance to Decision : 5 Advance to Decision :	Adjus	Sted measur Without per	iement riods with C	(95% co V large	nfidenc than 20	e level))%		Adjusted n	neasu		
Bios factor 1: 07.8 (0.7 - 0.89) Bios factor 1: 07.8 (0.7 - 0.89) Bios factor 1: 07.8 (0.7 - 0.89) Bios factor 1: 07.8 (0.7 - 0.89) Bios factor 1: 07.8 (0.7 - 0.89) Bios factor 1: 07.8 (0.7 - 0.89) Average Precision (CV): 0 Dimension about tubes to be adjusted Dimension about tubes to be adjusted Average Precision (CV): 0 Dimension about tubes to be adjusted Dimension about tubes to be adjusted Adjusted Tube average: 23 + 4.3 pgm ² Dimension about tubes to be adjusted Dimension about tubes to be adjusted Adjusted Tube average: 23 + 4.3 pgm ² Diffusion Tube Measurements Diffusion Tube Measurements Diffusion Tube Measurements Adjusted Tube average: 23 + 4.3 pgm ² Diffusion Tube Measurements Diffusion Tube Measurements Diffusion Tube Measurements Adjusted Tube average: 24 + 4.3 pgm ² Diffusion Tube Measurements Diffusion Tube Measurements Diffusion Tube Measurements Adjusted Tube average: 24 + 4.3 pgm ² Diffusion Tube Measurements Diffusion Tube Measurements Diffusion Tube Measurements Diffusion Tube Measurements Adjusted Tube average: 24 + 4.3 pgm ² Diffusion Tube Measurements	Bias	calculated i	using 11 per	iods of	data					using 11 pe	eriods of data
Bits B: 20% (12% 44%) Bits B: 20% (12% 44%) Diffusion Tube average: 28 pgm ³ Average Precision (CV): 6 Adjusted Tube average: 28 pgm ³ Average Precision (CV): 6 Adjusted Tube average: 23 + 1.3 pgm ³ Adjusted Tube average: 23 + 1.3 pgm ³ Adjusted Tube average: 23 + 1.3 pgm ³ Comparison for the Average Precision (CV): 6 Adjusted Tube average: 23 + 1.3 pgm ³ Adjusted Tube average: 23 + 1.3 pgm ³ Comparison for the Average Precision (CV): 6 Adjusted Tube average: 23 + 1.3 pgm ³ Adjusted Tube average: 23 + 1.3 pgm ³ Triplicat for the Average Precision (CV): 6 Adjusted Tube average: 23 + 1.3 pgm ³ Adjusted Tube average: 23 + 1.3 pgm ³ Triplicat for the Average Precision (CV): 6 Adjusted Tube average: 23 + 1.3 pgm ³ Adjusted Tube average: 14 pgm ³ pgm ³ Figlicat for the Average Precision (CV): 5 Adjusted Tube average: 14 pgm ³ Adjusted Tube average: 14 pgm ³ pgm ³ Figlicat for the Average Precision (CV): 5 Adjusted Tube average: 14 pgm ³ Adjusted Tube average: 14 pgm ³ pgm ³ Figlicat for the Average Adjusted Tube average: 24 pgm ³ Adjusted Tube average: 14 pgm ³ pgm ³ Figlicat for the Average Adjusted Tube average: 24 pgm ³ Adjusted Tube average: 14 pgm ³					atic DC:	100%					
Information about tube average: 20 g gm ³ Arrange Precision (CV): 6 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 6 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 6 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 6 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 6 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 6 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 6 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 6 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 6 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 6 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 6 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 6 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 6 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 6 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 6 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 6 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 6 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 6 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 6 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 6 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 6 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 6 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 6 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 6 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 7 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 7 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 7 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 7 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 7 Adjusted Tube average: 21 4.2.3 g gm ³ Arrange Precision (CV): 7 Adjusted Tube average: 21 4.2.3	ы										
Adjusted Tube average ?2 + / 3 gm² Adjusted Tube average ?2 + / 3 gm² Adjusted Tube average ?2 + / 3 gm² Adjusted Tube average ?2 + / 3 gm² Adjusted Tube average ?2 + / 3 gm² Adjusted Tube average ?2 + / 3 gm² Adjusted Tube average ?2 + / 3 gm² Adjusted Tube average ?2 + / 3 gm² Adjusted Tube average ?2 + / 3 gm² Adjusted Tube average ?2 + / 3 gm² Adjusted Tube average ?2 + / 3 gm² Adjusted Tube average ?2 + / 3 gm² Adjusted Tube average ?2 + / 3 gm² Tube ? Tube ? Tube ? Adjusted Tube average ?2 + / 3 gm² Adjusted Tube ? Adjusted Tube ? Adjusted Tube ? A 10042015 20042015 12 a 2 a 2 a 1 a 2 a 1 a 1 a 2 0 a 4 4 4 a 7 a 1 3 a 2 0 a 4 4 4 a 7 a 1 3 a 2 0 a 4 4 4 a 7 a 1 3 a 2 0 a 4 4 4 a 7 a 1 3 a 2 0 a 4 4 a 4 a 7 a 1 3 a 2 0 a 4 a 4 a 7 a 1 3 a 2 0 a 4 a 4 a 7 a 1 3 a 2 0 a 4 a 4 a 7 a 1 3 a 2 0 a 4 a 4 a 7 a 1 3 a 2 0 a 4 a 4 a 7 a 1 3 a 2 0 a 4 a 4 a 7 a 1 3 a 0 a 4 a 4 a 7 a 1 3 a 4 a 2 a 1 a 1 a 1 a 1 a 1 a 1 a 1 a 1 a 1	Infe				sted						
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Bias B: 28% (12% - 44%) Bias B: 28% (12% - 44%) Information about tubes to be adjusted Information about tubes to be adjusted	Adj p p 1 2 3 4 5 6 7 8 9 10 11 12 13 10 11 12 13 8 5 16 7 8 9 10 11 12 13 8 9 10 11 12 13 8 9 10 10 10 10 10 10 10 10 10 10 10 10 10	Start Date dd/mm/yyy v 07/01/2015 05/02/2015 06/03/2015 29/04/2015 29/04/2015 29/04/2015 29/07/2015 29/07/2015 29/09/2015 01/12/2015	Cof DUP End Date dd/mm/yyy v 05/02/2015 06/03/2015 10/04/2015 29/04/2015 29/04/2015 29/04/2015 25/08/2015 25/08/2015 25/08/2015 25/08/2015 01/12/2015 05/01/2015 05/01/2015 ver results for a	iffusion μgm -3 38.6 32.1 31.3 24.1 25.1 24.7 vrongly in 30.1 insing tub 28.6 33.0 t least tw (95% coo V larger iods of f	Tubes Tubes <t< td=""><td>Measure μgm⁻³</td><td>Average 37.3 31.7 31.5 31.9 25.2 24.8 24.7 33.1 32.5 calculate the</td><td>Standard Deviation 1.84 0.57 0.21 0.78 1.56 0.42 0.00 4.17 7.50 0.71 7.50 0.71 e precision of treet Adjusted n Bias calcu</td><td>CV 4.93 1.78 0.67 2.44 6.17 1.71 0.00 12.62 22.11 2.18 the me</td><td>95% Cl mean 16.52 5.08 1.91 6.99 13.98 3.81 0.00 37.48 67.34 6.35 37.48 67.34 6.35 erement () with all duals</td><td>Data Quality Check Diffusion Tuber Precision Check Good Good Good Good Good Good Good Goo</td></t<>	Measure μgm ⁻³	Average 37.3 31.7 31.5 31.9 25.2 24.8 24.7 33.1 32.5 calculate the	Standard Deviation 1.84 0.57 0.21 0.78 1.56 0.42 0.00 4.17 7.50 0.71 7.50 0.71 e precision of treet Adjusted n Bias calcu	CV 4.93 1.78 0.67 2.44 6.17 1.71 0.00 12.62 22.11 2.18 the me	95% Cl mean 16.52 5.08 1.91 6.99 13.98 3.81 0.00 37.48 67.34 6.35 37.48 67.34 6.35 erement () with all duals	Data Quality Check Diffusion Tuber Precision Check Good Good Good Good Good Good Good Goo
Information about tubes to be adjusted Information about tubes to be adjusted	Adj 1 2 3 4 5 6 7 7 8 9 10 11 12 13 4 5 6 7 7 8 9 10 11 12 5 6 7 8 9 10 11 12 3 4 5 6 6 7 7 8 9 10 10 10 10 10 10 10 10 10 10	Start Date dd/mm/yyy y 07/01/2015 05/02/2015 10/04/2015 29/04/2015 29/07/2015 29/07/2015 29/07/2015 29/07/2015 29/07/2015 29/07/2015 27/10/2015 27/10/2015 cessarg to hav Name/ ID: sted measure Without per calculated	Cof DUP End Date dd/mm/yyy y 05/02/2015 06/03/2015 10/04/2015 27/05/2015 27/05/2015 29/09/2015 25/08/2015 29/09/2015 27/10/2015 05/01/2015 29/09/2015 05/01/20	iffusion Tube 1 μgm -3 38.6 32.1 31.6 32.1 34.6 24.1 25.1 24.1 25.1 24.1 25.1 24.1 25.1 24.1 25.1 24.1 25.1 24.1 25.1 24.1 25.1 24.1 25.1 24.1 25.1 24.1 25.1 24.1 25.1 30.1 Issing tab 28.6 33.0 Varget 695% coo V larget iods of	Tubes Tubes <t< td=""><td>Measure μgm⁻³</td><td>Average 37.3 31.7 31.5 31.9 25.2 24.8 24.7 33.1 32.5 calculate the</td><td>Standard Deviation 1.84 0.57 0.21 0.78 1.56 0.42 0.00 4.17 7.50 0.71 e precision of treet Adjusted n Bias calcut Tube Prec</td><td>CV 4.93 1.78 0.67 2.44 1.71 0.00 12.62 22.11 12.62 22.11 12.62 22.11 12.62 12.18 140 me</td><td>95% Cl mean 16.52 5.08 1.91 6.99 13.96 3.81 0.00 </td><td>Data Quality Check Diffusion Tuber Precision Check Good Good Good Good Good Good Good Goo</td></t<>	Measure μgm ⁻³	Average 37.3 31.7 31.5 31.9 25.2 24.8 24.7 33.1 32.5 calculate the	Standard Deviation 1.84 0.57 0.21 0.78 1.56 0.42 0.00 4.17 7.50 0.71 e precision of treet Adjusted n Bias calcut Tube Prec	CV 4.93 1.78 0.67 2.44 1.71 0.00 12.62 22.11 12.62 22.11 12.62 22.11 12.62 12.18 140 me	95% Cl mean 16.52 5.08 1.91 6.99 13.96 3.81 0.00 	Data Quality Check Diffusion Tuber Precision Check Good Good Good Good Good Good Good Goo
Diffusion Tube average: 30 µgm ⁻³ Diffusion Tube average: 31 µgm ⁻³	Adj 1 2 3 4 5 6 7 7 8 9 10 11 12 13 4 5 6 7 7 8 9 10 11 12 5 6 7 8 9 10 11 12 3 4 5 6 6 7 7 8 9 10 10 10 10 10 10 10 10 10 10	Start Date dd/mm/yyy v 07/01/2015 06/03/2015 20/04/2015 27/05/2015 29/04/2015 29/07/2015 29/07/2015 29/07/2015 29/09/2015 20/09/2015 20/00/200/00/2015 20/00/2005 20/00/2000 20/00/2000 20/	Cof DUP End Date dd/mm/yyy v os/02/2015 06/03/2015 10/04/2015 29/04/2015 29/04/2015 29/07/2015 29/07/2015 29/07/2015 01/12/2015 05/01/2015 05/01/2015 05/01/2015 eresults for a cement riods with C using 11 per 5 0,78 (0,7 - 0	iffusion Tube 1 μgm ⁻³ 38.6 32.1 31.3 24.1 25.1 24.7 vrongly in 30.1 ising tub 28.6 33.0 tleast tw (95% cov V large iod of Automa .89)	Tubes Tubes <t< td=""><td>Measure μgm⁻³</td><td>Average 37.3 31.7 31.5 31.9 25.2 24.8 24.7 33.1 32.5 calculate the</td><td>Standard Deviation 1.84 0.57 0.21 0.78 1.56 0.42 0.00 4.17 7.50 0.71 7.50 0.71 9 precision of treet Adjusted n Bias calcu Tube Prec Bias fac</td><td>CV 4.93 1.78 0.67 2.44 6.17 1.71 0.00 12.62 22.11 2.18 the me assu</td><td>95% Cl mean 16.52 5.08 1.91 6.99 13.98 3.81 0.00 0.00 37.46 6.73 67.34 6.35 67.34 6.35 esuments rement (1 with all dusing 11 pe 5 Au 0.78 (0.7 - 0.000)</td><td>Data Quality Check Diffusion Tubes Precision Check Good Good Good Good Good Good Good Goo</td></t<>	Measure μgm ⁻³	Average 37.3 31.7 31.5 31.9 25.2 24.8 24.7 33.1 32.5 calculate the	Standard Deviation 1.84 0.57 0.21 0.78 1.56 0.42 0.00 4.17 7.50 0.71 7.50 0.71 9 precision of treet Adjusted n Bias calcu Tube Prec Bias fac	CV 4.93 1.78 0.67 2.44 6.17 1.71 0.00 12.62 22.11 2.18 the me assu	95% Cl mean 16.52 5.08 1.91 6.99 13.98 3.81 0.00 0.00 37.46 6.73 67.34 6.35 67.34 6.35 esuments rement (1 with all dusing 11 pe 5 Au 0.78 (0.7 - 0.000)	Data Quality Check Diffusion Tubes Precision Check Good Good Good Good Good Good Good Goo
	Adj 	Start Date dd/mm/yyy v 07/01/2015 05/02/2015 10/04/2015 29/04/2015 29/04/2015 29/07/2015 29/07/2015 29/07/2015 29/07/2015 27/10/2015 01/12/2015 01/12/2015 01/12/2015 01/12/2015 sted measure Without per calculated Precision: as factor A: Bias B: ormation abb	Cof DUPI End Date dd/mm/yyy v 05/02/2015 06/03/2015 10/04/2015 27/05/2015 30/06/2015 29/09/2015 25/08/2015 25/08/2015 25/08/2015 01/12/20	iffusion Tube 1 µgm ⁻³ 38.6 32.1 31.6 32.1 31.6 32.1 24.7 24.7 vrongly in 30.1 Issing tub 28.6 33.0 (95% co V largen iods of Automa .89) -44%) be adju	Tubes Tube 2 µgm ⁻³ 36.0 31.3 31.3 24.5 24.7 30.4 38.0 44.2 39.2 32.0 o tubes in DT12 E nfidenc r than 20 data atic DC:	Measure μgm ⁻³	Average 37.3 31.7 31.5 31.9 25.2 24.8 24.7 33.1 32.5 calculate the	Standard Deviation 1.84 0.57 0.21 0.78 1.56 0.42 0.00 4.17 7.50 0.71 4.17 7.50 0.71 e precision of treet Adjusted n Bias calcu Tube Prec Bias factor Bias factor	CV 4.93 1.78 0.67 2.44 12.62 22.11 12.62 22.11 2.18 the me reasult ision: tor A: as B: on ab	95% Cl mean 16.52 5.08 1.91 6.99 13.98 3.81 0.00 37.48 6.35 67.34 6.35 67.34 6.35 40 0.73 80 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Data Quality Check Diffusion Tuber Precision Checl Good Good Good Good Good Good Good Goo

		D)iffusion	lubes	Measure	ements					Check
d	Start Date dd/mm/yyy V	End Date dd/mm/yyy v	Tube 1 µgm ⁻³	Tube 2 µgm ⁻³	Tube 3 µgm ⁻³	Triplicat e Average	Standard Deviation	cv	95% CI mean		Diffusion Tub Precision Che
1	07/01/2015	05/02/2015	13.4	17.9		15.7	3.18	20.33	28.59		Poor Precisio
2	05/02/2015	06/03/2015	12.8	16.9		14.9	2.90	19.52	26.05		Good
3	06/03/2015	10/04/2015	13.1	12.7		12.9	0.28	2.19	2.54		Good
4	10/04/2015	29/04/2015	10.6	11.7		11.2	0.78	6.98	6.99		Good
5	29/04/2015	27/05/2015	8.6	7.8		8.2	0.57	6.90	5.08		Good
6	27/05/2015	30/06/2015	7.6	7.9		7.8	0.21	2.74	1.91		Good
7	30/06/2015	29/07/2015	6.2	5.0		5.6	0.85	15.15	7.62		Good
8	29/07/2015	25/08/2015	9.0	vrongly in	stalled						
9	25/08/2015	29/09/2015	11.0	10.6		10.8	0.28	2.62	2.54		Good
10	29/09/2015	27/10/2015	18.0	16.8		17.4	0.85	4.88	7.62		Good
11	27/10/2015	01/12/2015	15.9	15.6		15.8	0.21	1.35	1.91		Good
12	01/12/2015	05/01/2015	14.3	15.5		14.9	0.85	5.69	7.62		Good
13											
	Name/ ID:	ve results for a				e High S	-	the me	asuremen	ts	Jaume Targa, for Version 04 - Februar
Bias (Tube	Precision:	using 11 per	iods of Automa	data data atic DC:			Bias fac	ision: tor A:	using 11 5 0.78 (0.1	Autom 7 - 0.89)	atic DC: 100%
Bias o Tube Bia Info D A	calculated of Precision: as factor A: Bias B: ormation ab offusion Tul verage Pre djusted Tul	using 11 per 5 0.78 (0.7 - 0 2.8% (12% - out tubes to be average: ccision (CV): be average:	iods of 6 Automa .89) - 44%) be adju 12 7 9 +/- 1	data atic DC: sted µgm ⁻³ µgm ⁻³	100%		Tube Prec Bias fac Bi Bias Diff Ave Adj	ision: tor A: ias B: fon ab usion rage usted	using 11 5 0.78 (0. 28% (1 28% (1 out tube Tube av Precisio Tube av	Autom Autom 7 - 0.89) 2% <u>- 44</u> es to be verage: on (CV): verage:	atic DC: 100% %) adjusted 12 μgm ⁻² 8 10 +/- 1 μgm ⁻² & Environm
Bias of Tube Bia D A A A	calculated u a Precision: as factor A: Bias B: ormation B: Diffusion Tul werage Pre djusted Tul	using 11 per 5 0.78 (0.7 - 0 28% (12% - out tubes to be average: cision (CV): be average: t of DUPI	iods of Automa (89) 44%) be adju 12 7 9 +/- 1	data atic DC: sted µgm ⁻³ µgm ⁻³ FE or	100% TRIPI	ements	Tube Prec Bias fac Informati Diff Ave Adj	ision: tor A: ias B: fon ab usion rage usted	using 11 5 0.78 (0. 28% (1 28% (1))))))))))))))))))))))))))))))))))))	Autom Autom 7 - 0.89) 2% <u>- 44</u> es to be verage: on (CV): verage:	atic DC: 100% %) adjusted 12 µgm ⁻¹ 8 10 +/- 1 µgm ⁻² & Environm Data Qualit Check
Bias o Tube Bia Info D A	calculated of Precision: as factor A: Bias B: ormation ab offusion Tul verage Pre djusted Tul	using 11 per 5 0.78 (0.7 - 0 28% (12% - 0 out tubes to be average: cision (CV): be average: t of DUPI	iods of 6 Automa .89) - 44%) be adju 12 7 9 +/- 1	data atic DC: sted µgm ⁻³ µgm ⁻³ FE or	100%	ements	Tube Prec Bias fac Bi Bias Diff Ave Adj	ision: tor A: ias B: fon ab usion rage usted	using 11 5 0.78 (0. 28% (1 28% (1 out tube Tube av Precisio Tube av	Autom Autom 7 - 0.89) 2% <u>- 44</u> es to be verage: on (CV): verage:	atic DC: 100% %) adjusted 12 μgm ⁻¹ 8 10 +/- 1 μgm ⁻¹ & Environm Data Qualit
Bias of Tube Bia D A A A	calculated u e Precision: as factor A: Blas B: ormation ab biffusion Tul vverage Pre djusted Tul ustment Start Date dd/mm/yyy	using 11 per 5 0.78 (0.7 - 0 28% (12% out tubes to be average: cision (CV): be average: t of DUPI	iods of a Automa (89) (44%) be adju 12 7 9 +/- 1 LICAT	data atic DC: ygm ⁻³ ygm ⁻³ TE or Tubes 1 Tube 2	100% TRIPI Measure Tube 3	ements Triplicat e	Tube Prece Bias fac Bias fac Bias fac Bias Diff Ave Adj E Tubes	ision: tor A: ias B: ion ab usion trage usted	using 11 5 0.78 (0.1 28% (1 0000 tube Tube av Precisic Tube av Precisic Tube av 95% CI	Autom Autom 7 - 0.89) 2% <u>- 44</u> es to be verage: on (CV): verage:	atic DC: 100% %) 12 µgm ⁻² 8 10 +/- 1 µgm ⁻² & Environm Data Qualit Check Diffusion Tub
Adj	calculated u a Precision: as factor A: Bias B: prmation abbi- liffusion Tul werage Pre- djusted Tul ustment Start Date dd/mm/yyy v	using 11 per 5 0.78 (0.7 - 0 28% (12% - out tubes to caverage: scision (CV): be average: t of DUP! End Date dd/mm/yy	iods of Automa (39) - 44%) be adju 12 7 9 +/- 1 LICAT	data atic DC: ygm ⁻³ ygm ⁻³ FE or Tubes 1 ygm ⁻³	100% TRIPI Measure Tube 3	ements Triplicat e Average	Tube Prece Bias fac Bias fac Bias fac Bias Differmati Differmati Adj E Tubes Standard Deviation	ision: tor A: ias B: on ab usion trage usted	using 11 5 0.78 (0.) 28% (1) 28% (1) 7 Ube av Precisio Tube av Precisio Tube av 95% CI mean	Autom Autom 7 - 0.89) 2% <u>- 44</u> es to be verage: on (CV): verage:	atic DC: 100% %) adjusted 12 µgm ⁻² 8 10 +/- 1 µgm ⁻² & Environm Data Qualit Check Diffusion Tub Precision Che
	calculated u e Precision: as factor A: Bias B: ormation ab biffusion Tul werage Pre adjusted Tul ustment Start Date dd/mm/yyy v v 07/01/2015	using 11 per 5 0,78 (0.7 - 0 28% (12% - 0 out tubes to be average: cision (CV): be average: t of DUPI End Date dd/mm/yyy V 05/02/2015	iods of Automa Automa (89) - 44%) be adju 12 7 9 +/- 1 	data atic DC: sted μgm ⁻³ μgm ⁻³ ΓΕ οΓ Tubes I μgm ⁻³ 30.6	100% TRIPI Measure Tube 3	Triplicat e <u>Averaqe</u> 33.5	Tube Prece Bias fac Bias fac Bias fac Bias Bias Adj Tubes Standard Deviation 4.10	ision: tor A: ias B: ion ab usion rrage usted CV	using 11 5 0.78 (0.) 28% (1) out tube Tube av Precision Tube av AEA E rom the Af 95% CI mean 36.85	Autom Autom 7 - 0.89) 2% <u>- 44</u> es to be verage: on (CV): verage:	atic DC: 100% %) adjusted 12 µgm ⁻² 8 10 +/- 1 µgm ⁻² & Environm Data Qualit Check Diffusion Tub Precision Che Good
Adj	calculated u a Precision: as factor A: Bias B: prmation ab biffusion Tul werage Pre dijusted Tul ustment Start Date dd/mm/yyy V 07/01/2015 05/02/2015	using 11 per 5 0,78 (0,7 - 0 28% (12% - cut tubes to be average: cision (CV): be average: t of DUPI End Date dd/mm/yyy v v os/02/2015 06/03/2015	iods of Automa .89) - 44%) be adju 12 7 9 +/- 1 	data atic DC: μgm ⁻³ μgm ⁻³ ΓΕ or Tubes 2 μgm ⁻³ 30.6 32.4	100% TRIPI Measure Tube 3	Triplicat e Average 33.5 31.3	Tube Precc Bias fac B Informati Diff Ave Adj E Tubes Standard Deviation 4.10 1.56	ision: tor A: ias B: ion ab usion rrage usted CV 12.24 4.97	using 11 5 0.78 (0.) 28% (1 28% (1 0ut tube Tube av Precisic Tube av Precisic Tube av 95% CI mean 36.85 13.98	Autom Autom 7 - 0.89) 2% <u>- 44</u> es to be verage: on (CV): verage:	atic DC: 100% %) adjusted 12 µgm ⁻¹ 8 10 +/- 1 µgm ⁻¹ & Environm Data Qualit Check Diffusion Tub Precision Che Good Good
Adj	calculated u a Precision: as factor A: Bias B: prmation abbi- liffusion Tul werage Pre- djusted Tul Start Date dd/mm/yyy V 05/02/2015 06/03/2015	using 11 per 5 0,78 (0.7 - 0 28% (12% - 0 out tubes to be average: cision (CV): be average: t of DUPI End Date dd/mm/yyy V 05/02/2015 06/03/2015	iods of Automa Automa (89) - 44%) be adju 12 7 9 +/- 1 	data atic DC: sted µgm ⁻³ µgm ⁻³ FE OF Tubes Tubes Tubes 32.4 30.6 32.4 31.5	100% TRIPI Measure Tube 3	Triplicat e Average 33.5 31.3 34.8	Tube Prece Bias fac Bias fac Bias fac Bias fac Bias fac Adj Tubes Standard Deviation 4.10 1.56 4.67	CV	using 11 5 0.78 (0 28% (1 28% (1 0ut tube Tube av Precisic Tube av Precisic Tube av 95% CI mean 36.85 13.98	Autom Autom 7 - 0.89) 2% <u>- 44</u> es to be verage: on (CV): verage:	atic DC: 100% %) adjusted 12 µgm ⁻¹ 8 10 +/- 1 µgm ⁻¹ & Environm Check Diffusion Tub Precision Che Good Good
Bias of Tube Bia Info D A A A A A A A d J u P 1 2 3 4	calculated u e Precision: as factor A: Blas B: ormation ab biffusion Tul werage Pre ddjusted Tul ustment Start Date dd/mm/yyy v v 07/01/2015 06/03/2015 10/04/2015	using 11 per 5 0,78 (0.7 - 0 28% (12% - out tubes to be average: cision (CV): be average: t of DUPI End Date dd/mm/yyy V 05/02/2015 06/03/2015 10/04/2015	iods of Automa Automa (39) - 44%) be adju 12 7 9 +/- 1 - - - - - - - - - - - - - - - - - -	data atic DC: sted µgm ⁻³ µgm ⁻³ FE or Tubes I Tubes 1 Tubes 2 µgm ⁻³ 30.6 32.4 31.5 31.4	100% TRIPI Measure Tube 3	Average 33.5 31.3 34.8 33.7	Tube Prece Bias fac Bias fac Bias fac Biastrophysics Differentiation Adj Tubes Standard Deviation 4.10 1.56 4.67 3.25	CV 12.24 4.97 13.41 9.65	using 11 5 0.78 (0.) 28% (1 28% (1 0ut tube 1ube ax Precisio Tube ax Precisio Tube ax Precisio Tube ax Precisio Tube ax 95% CI mean 36.85 13.98 41.93 29.22	Autom Autom 7 - 0.89) 2% <u>- 44</u> es to be verage: on (CV): verage:	atic DC: 100% %) adjusted 12 µgm ⁻² 8 10 +/- 1 µgm ⁻² & Environm Data Qualit Check Diffusion Tub Precision Che Good Good Good Good

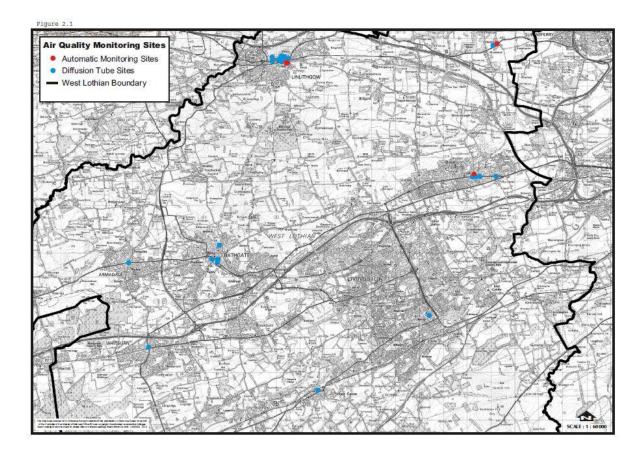
ö	29/07/2015	25/08/2015	vrongiy in	vrongiy in	stalled							
9	25/08/2015	29/09/2015	31.3	33.0		32.2	1.20	3.74	10.80		G	ood
10	29/09/2015	27/10/2015	46.9	38.2		42.6	6.15	14.46	55.27		G	boo
11	27/10/2015	01/12/2015	38.1	35.3		36.7	1.98	5.39	17.79		G	ood
12	01/12/2015	05/01/2015	ube missir	25.9								
13												
It is no	It is necessary to have results for at least two tubes in order to calculate the precision of the measurements Jaume Targa, for A										larga, for AEA	
Site	Name/ ID:		רס	15 Linl	lithgow	High Str	eet NW				Version 04	- February 2011
Bias Tube Bi	sted measur Without per calculated us Precision: as factor A: Bias B: prmation ab Diffusion Tul Average Pre	riods with C using 11 per 5 0.78 (0.7 - 0 28% (12% out tubes to be average:		Informat Diff Ave	lated ision: tor A: ias B: ion ab usion erage	with a using 11 5 0.78 (0. 28% (1	Il data period Autom 7 - 0.89) 2% - 44 es to be reage:	ls of data atic DC: %) adjusted 33 10	a 100% / µgm ⁻³			

Diffusion Tubes Measurements Data Quality Check											
d	Start Date dd/mm/yyy V		Tube 1 µgm ⁻³	Tube 2 µgm ⁻³		Triplicat e Average	Standard Deviation	cv	95% Cl mean		Diffusion Tube Precision Chec
1	07/01/2015	05/02/2015	45.4	42.4		43.9	2.12	4.83	19.06		Good
2	05/02/2015	06/03/2015	46.2	48.1		47.2	1.34	2.85	12.07		Good
3	06/03/2015	10/04/2015	45.2	41.9		43.6	2.33	5.36	20.97		Good
4	10/04/2015	29/04/2015	35.2	41.7		38.5	4.60	11.95	41.30		Good
5	29/04/2015	27/05/2015	32.4	40.5		36.5	5.73	15.71	51.46		Good
6	27/05/2015	30/06/2015	39.0	29.0		34.0	7.07	20.80	63.53		Poor Precision
7	30/06/2015	29/07/2015	30.6	32.7		31.7	1.48	4.69	13.34		Good
8	29/07/2015	25/08/2015	34.1	36.6		35.4	1.77	5.00	15.88		Good
9	25/08/2015	29/09/2015	40.5	35.2		37.9	3.75	9.90	33.67		Good
10	29/09/2015	27/10/2015	45.7	50.1		47.9	3.11	6.50	27.95		Good
11	27/10/2015	01/12/2015	49.9	46.0		48.0	2.76	5.75	24.78		Good
12	01/12/2015	05/01/2015	40.0	37.7		38.9	1.63	4.19	14.61		Good
13											
Site	Name/ ID:	ve results for a	D	Ր16 Linl	ithgow	High Str	eet SW				Jaume Targa, for A Version 04 - February 2
Adjusted measurement (95% confidence level) Without periods with CV larger than 20% Adjusted measurement (95% confidence level) Bias calculated using 11 periods of data Bias calculated using 11 periods of data Bias calculated using 11 periods of data Tube Precision: 5 Automatic DC: 100% Tube Precision: 5 Automatic DC: 100%											
Bias factor A: 0.78 (0.7 - 0.89) Bias B: 28% (12% - 44%) Information about tubes to be adjusted									%)		
		e average: cision (CV):		µgm ⁻³					Tube av Precisio		P.9

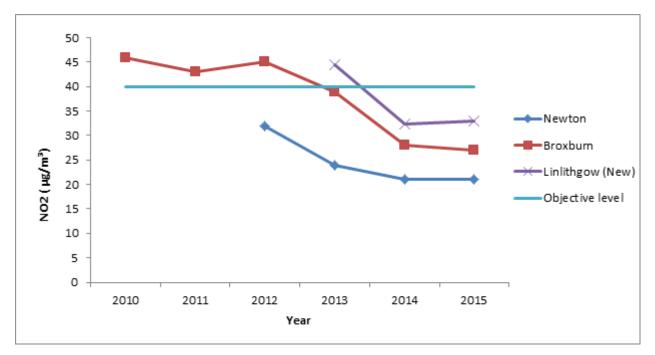
)iffusion	Tubes	Measure	ements					Data Quality
	Start Date	End Date				Triplicat					Check
	dd/mm/yyy	dd/mm/yyy	Tube 1	Tube 2	Tube 3	e	Standard	cv	95% CI		Diffusion Tube
Ľ	v	v	µgm -3	µgm -3	µgm ⁻³	Average	Deviation		mean		Precision Chec
1	07/01/2015	05/02/2015	41.7	31.6		36.7	7.14	19.49	64.17		Good
2	05/02/2015	06/03/2015	38.0	34.3		36.2	2.62	7.24	23.51		Good
3	06/03/2015	10/04/2015	35.0	34.3		34.7	0.49	1.43	4.45		Good
4	10/04/2015	29/04/2015	31.0	32.9		32.0	1.34	4.21	12.07		Good
5	29/04/2015	27/05/2015	24.2	30.0		27.1	4.10	15.13	36.85		Good
6	27/05/2015	30/06/2015	27.5	27.3		27.4	0.14	0.52	1.27		Good
7	30/06/2015	29/07/2015	21.4	21.3		21.4	0.07	0.33	0.64		Good
8	29/07/2015	25/08/2015		vrongly in	stalled		0.01				
9	25/08/2015	29/09/2015	31.1	29.8		30.5	0.92	3.02	8.26		Good
10	29/09/2015	27/10/2015	32.7	34.3		33.5	1.13	3.38	10.16		Good
11	27/10/2015	01/12/2015	33.7	37.3		35.5	2.55	7.17	22.87		Good
12	01/12/2015	05/01/2015	26.4	25.4		25.9	0.71	2.73	6.35		Good
13	01/12/2013	03/01/2013	26.4	20.4		23.5	0.71	2.15	0.55		3000
	ecessary to ha	ve results for a	t least t v	o tubes in	order to	calculate the	precision of	the me	asuremen	ts	Jaume Targa, for Al
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dju	sted measur Without per	ement	(95% co V large	nfidenc	e level)		Adjusted m	neasu		(95% II data	confidence leve
	calculated u				570		Bias calcu	lated			
	e Precision:			atic DC:	100%		Tube Preci				atic DC: 100%
Bi	ias factor A:	0.78 (0.7 - 0					Bias fact				
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Infe	ormation ab			sted							adiusted
	Diffusion Tub			µgm ⁻³					Tube av		
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	Average Pre							_			. 0
											: 24 +/- 3 µgm ⁻³
٩dj	justment				TRIP						/ & Environm
Adj	justment	of DUP		TE or							y & Environm Data Quality
	Start Date	t of DUP		TE or Tubes	Measure	ements Triplicat	E Tubes	B			A Environm Data Quality Check
	Start Date dd/mm/yyy	of DUP	LICA Diffusion Tube 1	TE or Tubes Tube 2	Measur Tube 3	ements Triplicat e	E Tubes		AEA E From the A		A Environme Data Quality Check Diffusion Tube
q	Start Date dd/mm/yyy V	E of DUP	LICA Diffusion Tube 1 µgm ⁻³	TE or Tubes Tube 2 µgm ⁻³	Measure	ements Triplicat e Average	Tubes Standard Deviation	Эл cv	AEA E From the A 95% CI mean		A Environme Data Quality Check Diffusion Tube Precision Chec
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1 2	Start Date dd/mm/yyy V 07/01/2015 05/02/2015	E of DUP End Date dd/mm/yyy V 05/02/2015 06/03/2015	LICA ⁻ Diffusion Tube 1 <i>µgm⁻³</i> 41.6 41.5	ΓΕ οΓ Tubes Tube 2 μgm ⁻³ 44.9 42.4	Measur Tube 3	Triplicat e Average 43.3 42.0	Standard Deviation 2.33 0.64	CV 5.40 1.52	AEA E From the A 95% CI mean 20.97 5.72		A Environme Data Quality Check Diffusion Tube Precision Chec Good Good
1 2 3	Start Date dd/mm/yyy v 07/01/2015 05/02/2015 06/03/2015	E of DUP End Date dd/mm/yyy v 05/02/2015 06/03/2015 10/04/2015	LICA ⁻ Diffusion Tube 1 µgm ⁻³ 41.6 41.5 37.3	Tubes Tube 2 <i>µgm⁻³</i> 44.9 42.4 39.2	Measur Tube 3	Triplicat e Average 43.3 42.0 38.3	Standard Deviation 2.33 0.64 1.34	CV 5.40 1.52 3.51	AEA E From the A 95% CI mean 20.97 5.72 12.07		y & Environme Data Quality Check Diffusion Tube Precision Chec Good Good Good
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Adjustment of DUPLICATE or TRIPLICATE Tubes AEA Energy & Environmen											
		E)iffusion	Tubes	Measure	ements					Data Quality Check
Perio d	Start Date dd/mm/yyy v	End Date dd/mm/yyy v	Tube 1 µgm ⁻³	Tube 2 µgm ⁻³		Triplicat e Average	Standard Deviation	cv	95% CI mean		Diffusion Tubes Precision Check
1	07/01/2015	05/02/2015	38.8	37.9		38.4	0.64	1.66	5.72		Good
2	05/02/2015	06/03/2015	36.5	33.8		35.2	1.91	5.43	17.15		Good
3	06/03/2015	10/04/2015	35.9	37.2		36.6	0.92	2.52	8.26		Good
4	10/04/2015	29/04/2015	35.7	36.0		35.9	0.21	0.59	1.91		Good
5	29/04/2015	27/05/2015	30.0	32.1		31.1	1.48	4.78	13.34		Good
6	27/05/2015	30/06/2015	28.4	29.3		28.9	0.64	2.21	5.72		Good
7	30/06/2015	29/07/2015	29.0	25.7		27.4	2.33	8.53	20.97		Good
8	29/07/2015	25/08/2015	29.5	vrongly in	stalled						
9	25/08/2015	29/09/2015	35.3	34.6		35.0	0.49	1.42	4.45		Good
10	29/09/2015	27/10/2015	37.7	47.2		42.5	6.72	15.82	60.35		Good
11	27/10/2015	01/12/2015	38.3	38.9		38.6	0.42	1.10	3.81		Good
12	01/12/2015	05/01/2015	30.7	27.7		29.2	2.12	7.26	19.06		Good
13	ecessare to ha								I	l	L
	Name/ ID:	ve results ror a				v High St	-	the me	asureniei		Jaume Targa, for AEA Version 04 - February 2011
Adjusted measurement (95% confidence level) Without periods with CV larger than 20% man											
	calculated						Bias calcu				
	Precision:			atic DC:	100%		Tube Precision: 5 Automatic DC: 100%				
BI	as factor A:	0.78 (0.7 - 0 28% (12%					Bias factor A: 0.78 (0.7 - 0.89)				
Int	ormation ab			otod			Bias B: 28% (12% - 44%) Information about tubes to be adjusted				
	Diffusion Tul			µgm ⁻³					Tube av		
				hðiu -							Pg
	Average Pre	· · · · ·							Precisio		
A	djusted Tul	be average:	27 +/- 3	µgm ⁻³			Adj	usted	Tube av	verage:	27 +/- З µgm ⁻³

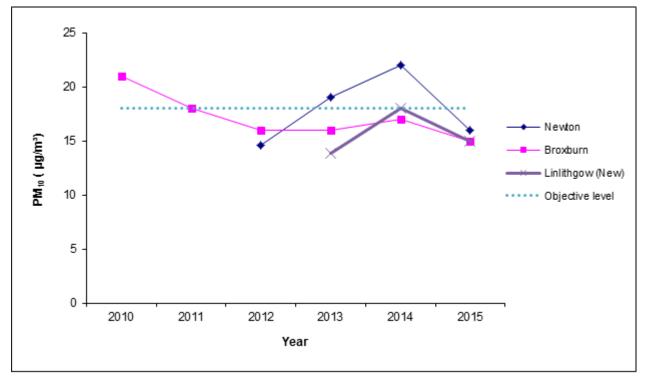
Adjustment of DUPLICATE or TRIPLICATE Tubes AEA Energy & Environmen											
									Data Quality Check		
Perio d	Start Date dd/mm/yyy V	End Date dd/mm/yyy V	Tube 1 µgm ⁻³	Tube 2 µgm ⁻³			Standard Deviation	сv	95% CI mean		Diffusion Tubes Precision Check
1	07/01/2015	05/02/2015	49.0	40.3		44.7	6.15	13.78	55.27		Good
2	05/02/2015	06/03/2015	43.2	45.7		44.5	1.77	3.98	15.88		Good
3	06/03/2015	10/04/2015	36.8	36.8		36.8	0.00	0.00	0.00		Good
4	10/04/2015	29/04/2015	35.7	40.1		37.9	3.11	8.21	27.95		Good
5	29/04/2015	27/05/2015	34.6	34.1		34.4	0.35	1.03	3.18		Good
6	27/05/2015	30/06/2015	37.0	34.0		35.5	2.12	5.98	19.06		Good
7	30/06/2015	29/07/2015	31.5	30.4		31.0	0.78	2.51	6.99		Good
8	29/07/2015	25/08/2015	vrongly in	35.6							
9	25/08/2015	29/09/2015	36.9	39.3		38.1	1.70	4.45	15.25		Good
10	29/09/2015	27/10/2015	50.8	45.9		48.4	3.46	7.17	31.13		Good
11	27/10/2015	01/12/2015	47.2	45.9		46.6	0.92	1.97	8.26		Good
12	01/12/2015	05/01/2015	37.5	37.4		37.5	0.07	0.19	0.64		Good
13		ve results for a									
	Name/ ID:						et South	the me	asuremen		Jaume Targa, for AE/ Version 04 - February 20
		riods with C		r than 20	e level) D%				with a	II data	
		using 11 per			1000		Bias calcu				
	Precision:	5 0.78 (0.7 - 0	Automa	atte DC:	100%		Tube Precision: 5 Automatic DC: 100%				
ы		28% (12%					Bias factor A: 0.78 (0.7 - 0.89)				
les f		out tubes to		eted			Bias B: 28% (12% - 44%)				
		be average:		µqm ⁻³			Information about tubes to be adjusted Diffusion Tube average: 40 ugm ⁻⁵				
				µgm -							P.9
		cision (CV):							Precisio		
A	djusted Tul	be average:	31 +/- 4	µgm ⁻³			Adj	usted	Tube av	/erage:	:31 +/-4 μgm ⁻³



NO2 Trend Data graph



PM10 Trend Data Graph



Glossary of Terms.

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
APR	Air quality Annual Progress Report
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO ₂	Sulphur Dioxide

References

Broxburn Air Quality Action Plan (AQAP)

LAQM Policy Guidance PG(S) (16)

LAQM Technical Guidance (TG16)