2017 Annual Progress Report (APR)

2017 Air Quality Annual Progress Report (APR) for
Perth and Kinross Council

In fulfilment of Part IV of the
Environment Act 1995

Local Air Quality Management

October 2017

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Executive Summary: Air Quality in Our Area

Air Quality in Perth and Kinross

The air quality within Perth and Kinross is generally good; however there are a few hotspot areas within Perth City Centre and Crieff. The main pollutants of concern are Nitrogen Dioxide NO_2 and Particulate Matter PM_{10} from vehicle emissions, which cannot escape due to the cannoning effect of high buildings within these streets.

Perth and Kinross Council (PKC) have declared two air quality management areas (AQMA), one covering the whole of Perth City and one for Crieff a corridor of High Street.

The decision to declare the whole of Perth City an AQMA was made so that the air quality issues could be addressed holistically throughout the city.

The Crieff AQMA has the trunk road A85 running through it which Transport Scotland (TS) adopt and maintain, therefore PKC are working closely with TS, and a representative sits on the Stakeholder Group formed to develop the Air Quality Action Plan (AQAP).
Perth and Kinross Council also work in close partnership with Tactran, this includes a regional Transport Partnership with Angus, Dundee, Stirling and Perth and Kinross. The partnership has developed a regional travel information portal for visitors and residents http://www.tactranconnect.com/

There are still exceedances in some areas of Perth City for NO_2, however Atholl Street shows an overall downwards trend.

The levels for PM_{10} remain the same at both Perth High Street and Atholl Street real time monitors (RTM), however our background RTM at North Muirton showed a slight increase. PM_{10} levels at the Crieff (RTM) showed an increase of 2 ugm^{-3} from 2015 PM_{10} levels.

At present PKC do not monitor for $PM_{2.5}$, however when the recommended conversion factor is applied there is an indication that there are exceedances in $PM_{2.5,}$ where there are exceedances in PM_{10} in Perth and Crieff.

PKC are in the process of converting the RTMs in Atholl Street and Crieff to enable $PM_{2.5}$ monitoring to ensure future $PM_{2.5}$ data is more accurate for future reporting purposes.

Actions to Improve Air Quality

The main core action for Crieff has been the development of the draft AQAP, the final draft is awaiting approval from the Steering Group members before going out for external consultation and Committee approval.

The further assessment indicated that the proportion of emissions are mostly from cars and HGVs and queuing traffic within the AQMA, so the key actions and implementing measures for the AQAP should be those targeting the reduction of local vehicle movements and to encourage the up take towards more sustainable modes of transport such as improving local bus services and improving bus shelter infrastructures.

Perth and Kinross Council have on going actions to encourage green travel plans within local schools and businesses. The Scottish Government and Smarter Choices and Smarter Places grant funding allows the Council to continue the employment of a full time Bikeability and Cycle Monitoring Officer to implement the ongoing programme of cycling training within schools throughout Perth and Kinross.

PKC and Sustrans have provided the provision of Cycle Shelters and Scooter Racks at various Perth and Kinross Schools; identified through the individual schools travel plans. Examples below:

Arngask Primary School Cycle Shelter and Scooter Rack

Blackford Primary School Scooter Rack

Since the installation of the cycle and scooter facilities at the schools there has been an increase in the number of children cycling or scooting to school. See Table 2.2

The feedback from the schools is positive and the initiative encourages pupils/parents to shift to sustainable modes of active travel.

City of Perth Early Learning Childhood Centre

"I am happy to give a bit of feedback on the bike pod. It is really helpful to us. The children enjoy its presence and have chosen the colour. We keep our balance and 2 wheeler bikes in there and having the pod really helps us to deliver the Play on Pedals program effectively which supports a child's learning to cycle before school. Parents are also involved in this and our intention is to encourage use of bikes out with nursery as well. The pod is a good sturdy and secure item that helps us to be confident that the bikes are safe, well maintained and easily available. Kind Regards, Steve Rivers, ***Centre Leader*** *– City of Perth Early Childhood Centre."*

Local Priorities and Challenges

The main challenge is the projected growth of Perth City over the coming years and therefore PKC are addressing issues such as traffic congestion and Air Quality through the Perth City Plan (2015-2035) and Perth Transport Future Reports: http://www.pkc.gov.uk/smartgrowth and http://www.pkc.gov.uk/transportfutures

The main priority for Crieff is to have the final draft AQAP concluded for consultation and committee approval.

How to Get Involved

For further information on air quality within Perth and Kinross visit the PKC air quality website at http://www.pkcairquality.org.uk/

List of Figures

1. Local Air Quality Management

This report provides an overview of air quality in Perth and Kinross Council during 2016. 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 Perth and Kinross Council to improve air quality and any progress that has been made.

1.1 Table 1.1 – Summary of Air Quality Objectives in Scotland

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Nitrogen dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	18 µg/m^3	Annual mean	31.12.2010
Particulate Matter ($PM_{2.5}$)	10 µg/m^3	Annual mean	31.12.2020
Sulphur dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	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
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) ideally within 12 months, setting out measures it intends to put in place in pursuit of the objectives.

A summary of AQMAs declared by Perth and Kinross Council can be found in Error! Reference source not found. Further information related to declared AQMAs, ncluding maps of AQMA boundaries are available online at

https://uk-air.defra.gov.uk/images/aqma_maps/Perth.pdf for Perth and for Crieff, which is not available on Defra site, but on Scottish Air Quality site at http://www.scottishairquality.co.uk/assets/aqma-maps/Perth02.pdf

2.2 Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	Description	Action Plan
Perth AQMA	• NO_2 annual mean • PM_{10} annual mean	Perth	The whole area of Perth City was designated an AQMA in 2006	Perth and Kinross Air Quality Action Plan 2009 http://www.pkcairquality.org.uk/documents/PerthandKinrossAirQualityActionPlan.pdf
Crieff AQMA	• NO_2 annual mean • PM_{10} annual mean	Crieff	From the point at the Y-Junction at Perth Road and Dollerie Terrace, follow the A85 east to East High Street, the Cross, High Street, James Square then on to West High Street stopping at the junction of Galvemore Street and Lodge Street and north up to Comrie Street to the Y-Junction at Coldwells Road and mid-point of Comrie street. The AQMA takes in the whole buildings along East High Street/High Street/West High Street and Comrie Street.	The Action Plan is in the progress of being developed. A Steering Group has been established with Transport Scotland being a member. The draft Action Plan is at the final stage of internal consultation.

2.3 Progress and Impact of Measures to address Air Quality in Perth and Kinross Council

Perth and Kinross Council has taken forward a number of measures during the current reporting year of 2016 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. More detail on these measures can be found in the air quality Action Plan relating to each AQMA.

Key completed measures are:

Crieff

PKC have contracted consultants Ricardo Energy & Environment to facilitate the development of the Crieff AQAP, the draft action plan is awaiting final consultation with the Steering Group.

Although the AQAP for Crieff is still being developed, PKC have been proactive and have taken forward several measures within Crieff, such as improvements to local bus services and shelters, all with grant funding from Scottish Government.

Perth

- **Green Travel Planning Measures –** Walking and cycling initiatives and projects such as school travel plans, school challenge fund, walk to school week and cycling training initiatives such IBike and Bikeability, which are measures that are taken forward by PKC year on year, depending on funding available.

Table 2.2 I-Bike Perth & Kinross Survey Results 2016-17: below shows the data collected at schools through the Sustrans Hands up Survey results

Measure To		1	0	0	0	0	0
Static Year:	0	1	2	3	4	5	6
% dropout	0%	0%	100%	100%	100%	100%	100%
Schools:	3	3	0	0	0	0	0
Year:	0	1	x	x	x	x	x

Q1. How do you usually (most often) travel to school?														
	Baseline Percent-age	Post Year 1 Percent age	Post Year 2 Percent age	Post Year 3 Percent age	Post Year 4 Percent age	Post Year 5 Percent age	Post Year 6 Percent age	Baseline Frequency	Post Year 1 Frequency	Post Year 2 Frequency	Post Year 3 Frequency	Post Year 4 Frequency	Post Year 5 Frequency	Post Year 6 Frequency
Bike	5.4%	10.3%	#N/A	#N/A	#N/A	#N/A	#N/A	3191	812	0	0	0	0	0
Walking	38.4%	40.3%	#N/A	#N/A	#N/A	#N/A	#N/A	22699	3171	0	0	0	0	0
Scoot/Skate	3.0%	15.6%	#N/A	#N/A	#N/A	#N/A	#N/A	1781	1226	0	0	0	0	0
Car	17.7%	12.3%	#N/A	#N/A	#N/A	#N/A	#N/A	10443	970	0	0	0	0	0
Park & Stride	7.8%	13.1%	#N/A	#N/A	#N/A	#N/A	#N/A	4589	1030	0	0	0	0	0
Bus	27.3%	8.3%	#N/A	#N/A	#N/A	#N/A	#N/A	16139	651	0	0	0	0	0
Train or Other	0.5%	0.2%	#N/A	#N/A	#N/A	#N/A	#N/A	272	15	0	0	0	0	0
Total Responses	100.0%	100.0%	#N/A	#N/A	#N/A	#N/A	#N/A	59114	7876	0	0	0	0	0

- **Social Marketing Campaign –** Perth on the GO **http://www.pkc.gov.uk/article/18393/Perth-on-the-Go** and Crieff on the GO **http://www.pkc.gov.uk/article/18394/Crieff-on-the-Go** are social marketing campaigns that promote active and sustainable travel choices. The On the Go projects are behavioural changing programmes that PKC conceives as long-term, depending on funding available year on year.

- **Cross Tay Link Road (CTLR) –** The final preferred route has been approved by PKC in December 2016. A planning application will be submitted once full funding for the project is determined. The delivery of the CTLR will ensure the long term sustainable development of Perth City whilst reducing congestion and improving air quality.

- **Transport Planning and Infrastructure** – PKC continue to roll out and expand our Electric Vehicle (EV) charging network across Perth and Kinross. Working in partnership with Transport Scotland, Charge Place Scotland and The Office for Low Emission Vehicles (via Dundee City Council) charging hubs have been installed at Kinross, Pitlochry, Blairgowrie and an extensive hub developed at Broxden Park and Ride. Further funding has been secured for 2017/18 for rapid charging points on Mill Street Perth which is part of the Councils Regeneration City Project.

Perth and Kinross expects the following measures to be completed over the course of the next reporting year:

- **AQ Supplementary Planning Guidance –** PKC commissioned Ricardo Energy & Environment to develop the AQ Planning Guidance, which will be adopted and become a statutory document with the Perth & Kinross Local Development Plan 2019. The AQ Planning Guidance draft document is near completion and will then be presented to committee for approval to be used as a guidance document for planners/developers until adopted with the LDP 2019; when it will have statutory status.

- **Regional Model for Perth and Kinross Area –** Consultants Ricardo Energy & Environment have developed a regional scale model which includes all the main road transport emission sources in Perth, Crieff and other areas of interest within the PKC region. PKC IT and Ricardo are to incorporate the model layers within PKC GIS and Location Centre systems. The model will allow a more consistent air quality evidence base for determining planning applications for developers and Environmental Health as internal consultees to planning. This modelling tool can also be utilised to assess the impact of major developments on existing air quality.

  The model cautiously predicted a reduction across Perth and Kinross by 2020 for NO2 due to the emergence of cleaner vehicle emissions; these predicted concentrations, which indicate compliance with national objectives, are used as the base year for further modelled scenarios.

  Further to the above the model predicted an additional reduction in NO_2 concentrations at Perth City hotspots (Atholl Street and Bridgend of up to 16%), when the scenario of the proposed Cross Tay Link Road is applied.

- **Transport Planning and Infrastructure** – PKC proposes to develop the Low Carbon Transport and Active Travel Hubs (2018-2020). The project will be delivered over two phases through matched funding from European Regional Development Fund.

  Phase one is an innovative Low Carbon Travel Hub to be located at the key strategic site, Broxden Park and Ride. The hub will provide refuelling facilities for a range of alternative fuels and transport modes including EV charging Points with battery storage facilities that are charged by wind and solar PV generation, Hydrogen Refuelling Station and Public Information Kiosk with real time travel and visitor information.

Phase two is an Active Travel Hub to be located within Perth City centre in line with the Rail and Bus Station redevelopment project. The hub will be the focal point for walking and cycling routes with a public information centre, bike hire, bike storage facilities, Car club vehicles with parking and EV charging stations.

The Low Carbon Transport and Travel Hubs will contribute towards the goals and initiatives of Shaping Perth's Future – A Transport Strategy for Perth 'Shaping Perth's Transport Future:A Transport Strategy for Perth and the Wider Region' [1Mb]

The following measure did not go ahead due to budgetary constraints; the SG funding was redirected with SG approval towards the development of a Corporate Travel Plan.

- **Better Access to Public Transport -** For 2016/17 the Public Transport Unit (PTU) wanted to install the provision of real time information (RTI) at key interchange points in central Perth and Crieff, taking advantage of the RTI data that is available for the vast majority of local bus services in Perth and Kinross. The Council also looked at installing roadside signage at a further twenty locations. The two main bus stops on Crieff (High Street) would also have been provided with signage, together with a number of other key interchange points in Perth City Centre (Mill Street and South Street).

2.4 Table 2.3 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
1.	Cross Tay Link Road (CTLR)	Transport Planning and Infrastructure	New crossing of the Tay linking the A9 to the A94 north of Scone, including package of associate bus priority, cycle and pedestrian measures 'locking in the benefits' to Perth city centre	PKC Tactran Transport Scotland		2009- ongoing to circa 2022	It is not possible at this stage to assign a quantitative indicator. We will report outputs of feasibility work/air quality assessments as they arise and update timescales as appropriate	High	The DMRB Stage 2 has now been completed and the final route defined. The final DMRB2 has gone to committee and final route has been approved a Planning Application will now be submitted	2022	Awaiting Formal Financial Commitment

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
2.	Integrate AQ into Regional Transport Strategy (RTS)	Policy guidance and development control	Ensure that this AQAP is integrated into the delivery of the RTS	PKC Tactran	2009/10	2009/10 and as RTS is delivered	We will report annually on our meetings with Tactran and provide a discussion as to how the AQAP is influencing delivery of the RTS	Medium - High	AQ considerations are influencing RTS delivery, in the past 5 years PKC and Tactran continue to work in conjunction to ensure AQ is considered in the RTS and projects such as freight consolidation, park and ride, liftshare, walking and cycling initiatives. The RTS was refreshed in 2015 Regional Transport Strategy 2015-2036	Ongoing	

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
3.	Integrate AQ into Local Transport Strategy (LTS)	Policy and guidance development control	Ensure that the AQAP is integrated into the delivery of the LTS	PKC	LTS published in 2010 on going implementation of the schemes	Ongoing	We will comment on any specific air quality provisions contained in the LTS	Medium - High	Transport Strategy for Perth Shaping Perth's Transport Future Shaping Perth's Transport Future 2011 and the wider region document published The LTS preferred strategy is one of an integrated approach and air quality is one of the Strategy objectives. http://www.pkc.gov.uk/article/17627/Transport-planning-Policy-and-strategy To work towards meeting national air quality standards and prevent further breach and exceedances and to reduce transport emissions	Environmental Health continue to attend meetings with PKC transport planning team for project such as Perth City Centre Traffic, Shaping Perth's Transport Future and Perth Public Transport Interchange Study.	Transport Colleagues have acknow-ledged that the LTS needs to be reviewed in line of CAFS.

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
4.	Park & Ride	Transport planning and infrastructure	Operate existing Park & Ride (PR) Schemes Perth PR (Broxden) Scone PR Kinross PR Walnut Grove PR Planning Permission 15/01808/FLM approved And maintain high levels of usage. We will carry out intermittent surveys to assess vehicles using the sites	PKC	2009 - ongoing	Ongoing	Annual usage statistics A calculator of avoided NOx /PM10 will be provided	Medium	An Electric Hub has been developed at the Broxden PR with the installation of 3'Rapid' DC/AC chargers 3'Fast' AC chargers servicing 12 EV parking bays	Ongoing	No data from Stagecoach as they advised that there has been problems with data collection

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
5.	Bus Quality Improvements	Transport planning and infrastructure	Bus Strategy 7 Quality Bus Partnerships	Tactran PKC	2009-2040	More specific timescales are available in Tactran's RTS Delivery plan/capital and revenue programmes	Shift to alternative modes- this will be monitored by Tactran as part of the evaluation process of their RTS Delivery Plan	Medium	Continued improvements involving PKC, Tactran and bus operators and improvements on bus shelter facilities and interchanges. Continued review of timetables which are amended to reflect demand and fares revised: passengers now benefit by being able to use Stagecoach network tickets(Dayrider and Megarider)	Ongoing	

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
6.	Freight Improvements	Freight and delivery management	Establish a Tactran –wide Freight Quality Partnership (FQP), in liaison with freight interests and Councils drawing upon established guidance, to help deliver cost effective packages of freight related interventions across the region.	Tactran PKC	Ongoing to 2024	Ongoing to 2024 More specific timescales are available in Tactran's RTS delivery plan/capital and revenue programmes	PKC will seek regular updates from Tactran on progress and report on these annually	High	A Tactran –wide freight quality partnership has been formed including members from PKC, Scottish Enterprise and the private freight sector. PKC and Dundee's EH managers are members of the Freight Quality Partnership. AQ is integrated into the Freight Quality partnership	EH continue to attend meetings to ensure AQ is integrated into FQP	

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
		Freight and delivery management	Development of a freight consolidation scheme or commercial delivery strategy	Tactran PKC	Feasibility work subject to funding, will be carried out in Years 1 and 2 of this AQAP	On going	Initially we will report on feasibility work as and when it is carried out. If developed we could use the number of vehicle km avoided to calculate emission savings	Medium-High	Feasibility 2010 recommended trial scheme EU & SG funding secured 2012. Tendering failed to identify a suitable private sector operator. Meetings held to establish a local business to take up the scheme. A Dundee Social Enterprise company was developing a detailed business plan to introduce a consolidation centre within the Perth and Dundee area. However there has been no progress on this	Not Known	Tactran have taken the lead on this project.

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
7.	Travel Planning	Promoting travel alternatives	PKC Staff Travel Plan; including encouraging Flexible working, car/lift sharing/ alternative modes, salary sacrifice bicycle scheme	PKC	Initiated year two of this AQAP	On going	Activity data will be collected by survey to support the working of the PKC GTP. A base survey of staff travel habits will also be carried out. We will estimate vehicle km avoided in the AQMA and report emissions of NOx and PM10	Medium	The 2010 Travel Plan is now being reviewed in line with CAFs PKC has received SG funding to produce a Corporate Travel Plan(CTP) A subgroup from the AQ Corporate Working Group has been setup to develop the CTP.	Ongoing	PKC still promotes the salary sacrifice scheme to staff and Walk to Work Week and lift share via staff intranet.

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
		Promoting travel alternatives	We will work with regional partners to further encourage development and employee use of Green Travel Plans (GTP) in our large employers within Perth& Kinross	Tactran (through the sustainable Travel Liaison Group) PKC	2009	2009 then ongoing	Activity data will be sought from the main employers as to the journeys avoided from their GTPs. If this is provided will estimate vehicle km avoided in the AQMA and report reduction in emissions of NOx and PM10	Medium	Tactran has been represented on SSE's Travel Plan Steering group and provided advice and promotional material. Perth College has also been given information and support of use of liftshare. Aviva, PRI and Murray Royal Hospitals have been given advice and guidance in travel planning process and PRI provided with grants for travel planning measures Promotion of travel plan implementation software, Tactran travel knowhow to support businesses developing and implementing travel plans	Ongoing	No base line has been developed

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
		Promoting travel alternatives	We will continue to support schools developing Green Travel Plans (GTP) through our school co-ordinator and collect activity data to assess their use through our school co-ordinators	PKC	2009 then ongoing	Ongoing	Survey data will be requested from PKC schools as to the journeys avoided from their GTPs. We will estimate vehicle km avoided in the AQMA and report reduction in emissions of NOx and PM10	Medium	SG grant funding allows for the continued support for school green travel plans. Road network Team promotes Cycling, walking, WoW initiatives.	Ongoing	The percentage of pupils regularly[1] cycling to school in 2016/17 Doubled and five times as many pupils scooted or skated to school. Also the number of pupils who would like to travel to school by car went from 20% to less than 2%.
		Promoting travel alternatives	Regional/PKC car and Lift Share schemes- there is both a wider scheme, and one specific to PKC employees. We will improve use of PKC scheme through our own GTP	Tactran PKC	2009 then ongoing	Ongoing	Activity data will be collected annually from both schemes and we will estimate vehicle km avoided in the AQMA and report reduction in emission of NOx and PM10	Small-Medium	Continued promotion of Liftshare including PKC and PRI, SSE and Aviva with stalls within workplaces. Participation in national Liftshare week and leaflet promotion through employers	Ongoing	

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
		Promoting travel alternatives	Green Travel Plans for new developments. We will continue to seek travel plans from large developments under existing planning arrangements	PKC	2009 then ongoing	Ongoing	Number of GTPs and estimation of specified in reporting year	Low	This is a continual process through planning and is requested by Transport Planning Team who are internal consultees for planning	Ongoing	GTP are requested through the planning process
8.	Traffic Management	Traffic Management	Keep "City Traffic Management Review" under continual review our traffic and Environmental teams will liaise regularly to discuss the effects of component measures of City Centre Traffic Management Review (CCTMR) on Air Quality	PKC	Ongoing as required	Ongoing	We will report annually on any changes to the CCTMR and how we anticipate this effecting air quality	Medium	A new Stratos UTM Common Database was installed and a main link has been secured	Ongoing	We will continue to review traffic management within our AQMA.

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
9.	Planning and Air Quality	Policy Guidance and Development Control	Consider air quality as an issue for the Local Development Plan	PKC	2014	2014-2017	It is not possible to assign a quantitative indicator. We will report on delivery of the Local Development Plan, and provide evidence that air quality considerations have been formalized within it.	Medium	PKC Local Development Plan http://www.pkc.gov.uk/media/23633/Local-Development-Plan/pdf/Adopted_LDP_Web_Version The current LDP is under review and AQ will be considered within the new plan for the whole region, not just AQMAs. The review will be in line with CAFs. The reviewed LPD should be completed and adopted by 2019	2019-24	

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
		Policy guidance and development control	Investigate development of supplementary planning guidance (SPG) on Air Quality This will include results of regional air quality modelling currently being undertaken by Ricardo E&E	PKC	2014	2017 Non Statutory	It is not possible to assign a qualitative indicator. We will report progress on the development of the plan	Small	PKC have produced a new draft AQ SPG which will be linked with the new revised LDP (2019) and will therefore become a statutory document. However the draft SPG will be approved before the new LDP is adopted. Therefore the SPG will be a non-statutory document, in the interim.	2019 to be adopted in line with new LDP and become a statutory document	
		Policy guidance and development control	Consider air quality in planning decisions and formalise decision making process/interaction with Environmental Health. This can relate not only to new transportation sources, but also new biomass installations or industrial sources	PKC	Ongoing	Ongoing as required	It is not possible to assign a qualitative indicator. We will report on cases where air quality was a consideration in the reporting period, and any outcomes of any decisions made.	Low	Environmental Health will continue to check the weekly planning list and comment on applications which may adversely impact on local air quality. 2015/16 EH commented on 10 biomass installations. The AEA/EPUK screening tools are used to assess applications.	Ongoing	

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
10.	Procurement and Air Quality	Vehicle fleet efficiency	Air Quality will be formally considered in tender process for new PKC vehicle. PKC currently specify stringent Euro Standards than necessary. A fleet survey will be necessary in the short term to establish the baseline for improvements	PKC	Fleet Survey in year 1 of AQAP, then ongoing as tenders arise as part of the standards specification	Ongoing	If vehicles are replaced like for like, the number will be reported annually, with Euro standards and that of the vehicle replaced. This will feed into an emissions calculation and the saving in NOx and Pm10 will be reported annually. If additional vehicles bought, Euro Standards will be reported and an estimation of impact of specifying a more stringent standard will be reported	Small – Medium	PKC since 2014 have installed electric point's at all council operation depots. PKC continue to replace Euro Standard vehicles with newer Euro 6 vehicles or electric vehicles where appropriate.	Ongoing	Due to the vast areas that PKC region covers, the range electric vehicles has to be taken into consider-ation when reviewing fleet vehicle replace-ments. PKC are continually looking to incorporate new electric charging points throughout the region.

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
11.	Eco-driver training	Vehicle fleet efficiency	PKC will seek to expand the existing provision of eco driver training utilising formed training team to develop and add an eco-training course into existing modular training syllabus. The eco-driving module will become part of our regular driver CPC training package which will be delivered on an ongoing basis	PKC	Expanded programme by 2011 then ongoing	2011	PKC intend to assess drivers after they have completed the training. The outcomes of these assessments (i.e. the fuel saving per driver) will allow simple calculation of avoided emissions of NOx and PM10	Small	The eco-module also forms part of future training for all council drivers as part of the driver assessment programme, which will also cover the driver's responsibilities on legislation and what pre-use vehicle checks need to be carried out and documented	Ongoing	PKC have 4 Trainers to deliver Drivers CPC Programme. PKC now run an in house, Service need, LGV Training Centre. PKC have a Qualified LGV driving instructor to deliver LGV Training to staff PKC continues to deliver Drivers CPC Programme to PKC Staff and Angus.

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
	Set up vehicle group MPG indicators	Vehicle fleet efficiency	MPG Key Performance Indicators (KPIs)	PKC	2016/17	2017/19	MPG KPI'S	Small	Cleansing database and fuel information cultural change to ensure accurate mileages and machine hours are accurately recorded at each fueling event	2018/19	Inaccurate figures due to improper mileage readings Fleet KPI are being reviewed and PKC are undertaking the installation of telematics systems into small fleet vehicles
	Better utilisation of the small vehicle fleet by installing telematics	Vehicle fleet efficiency	Small Vehicle Fleet	PKC	2016/17	2017 to 2019	Less grey fleet mileage better use of Council pool vehicles	Small	Funding secured through the transformation project Outline Business Case As part of the Council's Vehicle Fleet Utilisation and Optimisation Review all Council fleet vehicles are to installed with tracking systems. The telematics systems will allow PKC to analyse the usage and identify improved utilisation of pool and operational vehicle fleet.	2020	

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
12.	Provision of Travel Information	Public Information	Develop, promote and maintain a comprehensive Travel Information System, covering all modes and users and make this information available in on-line formats. Delivered through Tactran's reginal Travel Information Strategy	Tactran PKC	Study and develop strategy by 2011 specific measures on going to cira 2018	2018	We will liaise with Tactran and report annually on the findings of the feasibility work. As initiatives are implemented we will report progress on these individually	Medium	A web-based regional travel information database and journey planner (Tactran connect) developed in May 2010. Further developments have included provision of information for logistics sector/lorry drivers. The website went under a branding, public awareness and modernisation review in 2014 Traveline Scotland in partnership with PKC continue to develop the website and apps to provide enhance public transport information Scotland-wide	Ongoing	

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
13.	Signage	Public Information	Investigate the potential of variable message signage linked to pollution monitoring system	PKC	Feasibility work by 2011	2016/17	We will report annually the findings of any feasibility work that is carried out and develop the measure further based on the findings	Medium	PKC Public Transport team carried out a feasibility study to install the provision of RTI and signage at certain locations within the Perth and Kinross area. The RTI feasibility study was for travel information only SG funding was secured. However due to budgetary cuts the ongoing costs of maintaining the system after installation could not be met.	2017	SG agreed that allocated grant funding could be redirected toward the development of a PKC Corporate Travel Plan

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
14.	Alternative Modes	Promoting Travel Alternatives	Work closely with Tactran to aid delivery of the Walking and Cycling Strategy for the region to ensure walking and cycling are part of an integrated transport system	Tactran PKC	Initial Study -20019/10 Ongoing liaison /review	Ongoing liaison/review	We will liaise with Tactran annually and report progress with individual measures implemented under the Strategy	Medium	Cycle training and bike repair training provided to staff. SG funding attained this year again for a number of walking/cycling initiatives including training and safety events. PKC match funds the IBike Project within schools. Perth/Crieff on the Go delivers cycle/walking route maps and bus timetables to local residents and travel planning through school initiatives. Bikeability Officer employed with SG funding. PKC are in the process of producing a Business case for the Low Carbon Transport and Active Travel Hubs. The project will be carried out in two phases through match funding from ERDF and Tay	Ongoing	

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
									City Deal. The second phase is for an Active Travel Hub which will be based and coordinated around the development of the Perth Rail and Bus Station redevelopment project within Perth City. The hub will have storage and hire facilities for cycles and a Car sharing club. The hub will be the focal point of an integrated walking and cycling network to help improve transport links.	2020	
15.	Better access to public transport (note: access to service, not person access to individual buses)	Transport Planning and Infrastructure	Work with planning colleagues to assess provision of public transport at new and existing developments	PKC	2009-Ongoing	Ongoing	We will report on findings of reviews and any improvements made to the existing public transport network and new developments that have given public transport facilities	Small	Improvements to be carried out on the Comrie to Crieff route with the addition of bus shelters.	Ongoing	
16.	Idling Emission Reduction	Promoting Low Emission Transport	Enforce Vehicle Idling Regulations	PKC	Feasibility Study 2010	No Progress	Number of vehicles subject to enforcement	Small	No Progress	No Progress	

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
17.	Roadside Emission Testing	Promoting Low Emission Transport	Authorised Personnel to carry out roadside testing	PKC and Police	Feasibility Study involving surrounding Local authorities by end 2010	No Progress	Number of vehicles subject to enforcement	Small	No Progress	No Progress	
18.	LAQM Marketing	Public Information	Enhance existing provisions of publicity materials and ensure they reach their target audience Organise publicity initiatives in schools large employers, public sector	PKC		Commence 2009 - Ongoing	Publication of materials, events held website statistics	Small-Medium	PKC are now responsible for updating and maintaining the AQ Website www.pkcairquality.org.uk/ PKC's Social Marketing Campaign Perth & Crieff on the Go allowed further promotional work within schools and businesses funding permitting	Ongoing	
19.	LAQM Monitoring and Reporting	Statutory Duties LAQM	PKC will continue to monitor and report air pollution within Perth and Kinross to meet and fulfill our statutory duties	PKC	Ongoing	Ongoing	Monitoring data will be provided in annual progress report as will the progression of measures within AQAP	Small	Annual Progress Report 2016 completed PKC have engaged Ricardo E&E to upgrade RTMs to allow monitoring of PM2.5s	Ongoing	

2.5 Cleaner Air for Scotland

Cleaner Air for Scotland – The Road to a Healthier Future (CAFS) is a national cross-government strategy that sets out how the Scottish Government and its partner organisations propose to reduce air pollution further to protect human health and fulfil Scotland's legal responsibilities as soon as possible. A series of actions across a range of policy areas are outlined, a summary of which is available at http://www.gov.scot/Publications/2015/11/5671/17. Progress by Perth and Kinross Council against relevant actions within this strategy is demonstrated below.

2.5.1 Transport – Avoiding travel – T1

All local authorities should ensure that they have a corporate travel plan (perhaps within a carbon management plan) which is consistent with any local air quality action plan.

Committee approval was given in 2016 for the development of an Air Quality Corporate Working Group consisting of the relevant heads of Services (Development Planning, Transport, Transport Planners, Roads and Networks, Environmental Health, Procurement and Sustainability). The group has been developed to ensure that there is a joint working approach within PKC to address AQ and the actions from CAFs.

A Corporate Travel Plan sub group has been developed with the task to prepare and develop a Corporate Travel Plan for Perth and Kinross Council.

Perth and Kinross Council have signed Scotland's Climate Change Declaration and are also participating in a Carbon Management Programme run by the Carbon Trust.

Perth and Kinross Council have developed Supplementary Planning Guidance (SG) which expands on the policies set out within the Local Development Plan (LD) (2013) the two SG documents are the Sustainable Design and Zero Carbon Development Supplementary Guidance http://www.pkc.gov.uk/media/24773/Sustainable-Design-SPG/pdf/P_K_Sustainable_Design_SPG_Corrected_Version and the new Supplementary Guidance on Renewable and Low Carbon Energy http://www.pkc.gov.uk/media/39833/PKCRenewableSG-

Draft/pdf/PKCRenewableSG-Draftv1-31 which has just under gone a public consultation period (13 July to 31 August 2017) and comments received will be considered before final document is approved.

Also to support the planning and deployment of low carbon energies projects within Perth and Kinross a heat map http://www.pkc.gov.uk/media/13502/Heat-Mapping-Report/pdf/Fife_Perth___Kinross_HEAT_MAP_report_Mar_12_web_version was commissioned by PKC in partnership with Fife Council and the SG. The Heat map helps to identify district heating opportunities in Perth and Kinross and as a starting point to develop energy master plans to inform district heating policies in the LDP.

2.5.2 Climate Change – Effective co-ordination of climate change and air quality policies to deliver co-benefits – CC2

Perth and Kinross Council have developed a draft Supplementary Placemaking Guidance 2017 http://www.pkc.gov.uk/media/39822/Placemaking-Guide-July-2017/pdf/Placemaking_Guide_July_2017 which gives advice as to how development can comply under the terms of the LDP. The consultation period for the guidance closed on the 31 August 2017, therefore comments will be considered before the final document is approved.

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

3.1 Summary of Monitoring Undertaken

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.

Perth and Kinross Council undertook automatic (continuous) monitoring at 4 sites during 2016 Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at http://www.scottishairquality.co.uk/

Maps showing the location of the monitoring sites are provided at the above link. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

Perth and Kinross Council undertook non- automatic (passive) monitoring of NO_2 at 66 sites during 2016 Table A.2 in Appendix A shows the details of the sites.

Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C. Co-ordinates of these sites are within Table A.2 below.

3.2 Individual pollutants

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

For diffusion tubes, the full 2016 dataset of monthly mean values is provided in Appendix B.

Table A. in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

The automatic monitor located in Atholl St continues to show an exceedance of the annual mean standard with a concentration of 45 µg/m^3 a decrease from 49 µg/m^3 in 2015. This is part of an overall downward trend shown in Figure 1. There was once again no exceedances of the hourly mean in 2016.

The other automatic monitors were below the annual mean standard and the hourly standard for 2016.

Diffusion tube monitoring showed exceedances at 7 locations in Perth, and 1 in Crieff in 2016, down slightly from 2015. The exceedances were all within the Perth and Crieff AQMAs.

Particulate Matter (PM_{10})

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

There has been a general downward trend in Atholl St for this pollutant shown on figure x, it was recorded as 18ugm^{-3} last year the same as 2015. High St also remained the same at 13ugm^{-3} whilst Crieff increased slightly from 14ugm-3 to 16ugm-3. This may be linked to a recorded increase at the background monitor in Muirton which rose from 9ugm^{-3} to 10ugm^{-3} last year.

Table A. in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the air quality objective of 50µgm^{-3}, not to be exceeded more than 7 times per year.

There were no exceedances at any monitor for this objective.

3.2.2 Particulate Matter ($PM_{2.5}$)

This pollutant is not yet monitored in the Perth and Kinross area however there are plans to begin monitoring in 2017 at some of our hotspots.

Based upon method 2 of Annex B within TG.16, the undernoted table shows the derivation of $PM_{2.5}$ from PM_{10}.

Table 3.1 – PM10 to PM2.5 Conversion

PM_{10} to $PM_{2.5}$ Conversion		
Monitoring Site	Annual Mean (ugm-3)	TG.16 adjustment (0.7)
Atholl St	**18**	**12.6**
High St	13	9.1
Muirton	10	7.0
Crieff	16	11.2

This shows a predicted exceedance at Atholl St and a probable exceedance in Crieff as the monitor is not located in a worst case location.

These AQMAs are currently declared for breaches of the annual mean standards for NO_2 and PM_{10}, but not $PM_{2.5}$ therefore it is our intention to amend our AQMA order, to include this pollutant for both Crieff and Perth

3.2.3 Sulphur Dioxide (SO_2)

Not currently monitored.

3.2.4 Carbon Monoxide, Lead and 1, 3-Butadiene

Not currently monitored.

4. New Local Developments

4.1 Road Traffic Sources

Construction of the new A85/A9 interchange which forms the first part of the Cross Tay Link Road has begun the air quality implications of this were assessed at the planning stage and not thought to lead to an unacceptable rise in NO_2 or PM pollution.

The project to convert the A9 into a dual carriageway may increase pollution at some receptors; the assessment of this is awaited.

4.2 Other Transport Sources

No new sources identified.

4.3 Industrial Sources

SEPA have confirmed there are no changes to SEPA regulated activities which require further assessment, see Appendix D

4.4 Commercial and Domestic Sources

Table 4.1 below shows planning applications for biomass boilers, between the sizes of 50kW and 20MW. No areas of significant solid fuel burning or CHP plants were identified

Table 4.1 Biomass Boiler Applications in 2016

Biomass Developments				
Planning Ref	Location	Thermal Output (kW)	In AQMA	DA required
16/00503/FLL	Tulloch P.S Perth	160	Y	N*
16/00504/FLL	Kinross P.S Kinross	199	N	N*
16/00752/FLL	Ardler	110	N	N
16/00752/FLL	Kettins	750	N	N
16/01229/FLL	Crieff	500+400	N	N
16/01589/FLL	Weem	251	N	Y**
16/00276/FLL	Pitlochry	200	N	Y**
15/02151/FLL	Blairgowrie	100	N	N
15/02127/FLL	Blairgowrie	191	N	N
15/02009/FLL	Scotlandwell	80	N	N

*Detailed Assessment proactively carried out by Ricardo Energy and Environment

** Applications withdrawn

4.5 New Developments with Fugitive or Uncontrolled Sources

None identified

5. Planning Applications

- 16/00401/FLM for 200 houses at Ainslie Place, Perth within the AQMA. An AQA was conducted which showed an imperceptible increase in NO_2 and PM_{10} in terms of the then current Environmental Protection UK guidance.

- 16/00696/FLM renewal of the consent for a supermarket on the site of the former Perth Mart adjacent to the AQMA. EH recommended refusal on air quality ground, the decision is pending.

- 16/01062/FLL an application to convert a shop to 5 flats on Atholl St, introducing new receptors on a street currently exceeding both NO_2 and PM_{10} annual mean standards. Application approved with a condition requiring fixed ventilation from the rear.

- 16/01348/IPM and application for 200 houses on the same site as 16/00696/FLM above. The impact was deemed negligible on receptors locally.

- 16/01162/FLL conversion of a church to 21 flats on Atholl St again introducing receptors to an exceeding road. Conditions recommended for mechanical ventilation but application was withdrawn on unrelated grounds.

- 16/00087/FLL as above new residential receptors on Atholl St. Approved with conditions regarding mechanical ventilation.

6. Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

Perth and Kinross Councils air quality monitoring continued to show exceedances around the city centre for NO_2. The downward trend continues with a reduction at Atholl St after the increase in 2015 and for the diffusion tubes in the main. All exceedances are within the 2 AQMAs of Perth & Crieff.

PM_{10} levels remained the same at both city centre monitors but the background monitor in Muirton showed a slight increase last year compared to 2015. The Crieff PM_{10} real time monitor showed an increase of $2ugm^{-3}$ last year compared to 2015. We have no $PM_{2.5}$ monitoring as yet in the area, therefore the 0.7 conversion factor has been applied and this shows exceedance of this standard in both Perth and Crieff

6.2 Conclusions relating to New Local Developments

6.3 Proposed Actions

There are still exceedances of NO_2 and PM_{10} within Perth and Crieff, therefore it is proposed to continue with the Perth AQAP and continue to develop the Crieff plan this year.

$PM_{2.5}$ would also appear to be above the new $10ugm^{-3}$ based upon the ratio given in TG.16. Due to this we propose amending our AQMA Order for both Perth and Crieff to include this pollutant. This may require some alteration of the AQAP for Perth; however measures tackling this pollutant will be broadly similar as exist for NO_2 and PM_{10}

7. 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) (2)	Inlet Height (m)
Perth 1	High St	Roadside	311680	723624	NO_2; PM_{10}	Y	Chemiluminescent; TEOM	20.4	4.8	1.5
Perth 2	Atholl St	Roadside	311575	723917	NO_2; PM_{10}	Y	Chemiluminescent TEOM	22.3	2.3	1.5
Perth 3	Muirton	Background	310658	725658	PM_{10}	Y	FDMS	N/A	N/A	2
Crieff 1	James Sq.	Roadside	286363	721614	NO_2; PM_{10}	Y	Chemiluminescent FDMS	9.5	5.3	1.5

(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 Perth

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?
P1	42 Scott St Perth	R	311690	723500	NO_2	Y	3	2.5	N
P2	17 Speygate Perth	R	312020	723411	NO_2	Y	2.9	2.05	N
P5	8 Stormont Street	UC	311586	723993	NO_2	Y	10	1.7	N
P6	41 Mull Place	UB	310510	725767	NO_2	Y	6	1.7	N
P7	257 Rannoch Road	UC	308925	724287	NO_2	Y	8.3	2.1	N
P13	86 South Street	R	311847	723453	NO_2	Y	0	2.6	N
P20	2 Crieff Road	R	311057	724395	NO_2	Y	0	1.9	N
P29	37 York Place	R	311253	723517	NO_2	Y	8	4.1	N
P30	104 South Street	R	311798	723457	NO_2	Y	0	2.4	N
P31	45-47 South Street	R	311917	723466	NO_2	Y	0	3.5	N

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?
P32	135 South Street	R	311698	723483	NO_2	Y	0	4.6	N
P33	216 South Street	R	311582	723475	NO_2	Y	0	2.5	N
P34	10 County Place	R	311510	723480	NO_2	Y	2	3	N
P35	17 Princes Street	R	311932	723422	NO_2	Y	1.5	1.8	N
P36	51 Glasgow Road	R	310776	723556	NO_2	Y	7.2	2.6	N
P37	Riggs Road	R	310856	723581	NO_2	Y	10	1.9	N
P38	93 Main Street,	R	312263	724167	NO_2	Y	1	7	N
P39	39 Main Street,	R	312253	724019	NO_2	Y	7	2.1	N
P40	18 Main Street	R	312244	723965	NO_2	Y	1	2.4	N
P41	76 Atholl Street	R	311465	723941	NO_2	Y	1	2.5	N
P42	26-28 Atholl Street	K	311635	723950	NO_2	Y	2	0.3	N

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?
P43	17 Atholl Street	R	311635	723950	NO_2	Y	2	3	N
P45	Ballantine Place	UC	311097	724358	NO_2	Y	4	1.7	N
P46	204 Crieff Road	R	309328	724878	NO_2	Y	11.5	2	N
P47	5 East Huntingtower	R	308274	724895	NO_2	N	5.5	1.8	N
P51	2 West Bridge St	R	312235	723927	NO_2	Y	12.5	3.7	N
P62	84 Dundee Road	R	312504	722929	NO_2	Y	1	1.7	N
P63	30 Dundee Road	R	312413	723252	NO_2	Y	1.5	1.4	N
P64	Isla Road	R	312228	724118	NO_2	Y	1	1.4	N
P65	5 Charlotte Street	R	311943	723865	NO_2	Y	3.3	2	N
P67	1 Atholl Street	R	311691	723939	NO_2	Y	1	2.3	N
P68	2 Atholl Street	R	311720	723955	NO_2	Y	2.5	0.8	N

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?
P69	Church, Kinnoull St	R	311660	723908	NO_2	Y	3	2.6	N
P71	134 Dunkeld Road	R	310615	724958	NO_2	Y	7.8	1.5	N
P72	82 Crieff Road	R	310331	724552	NO_2	Y	1	2.4	N
P79	17 Main Street,	R	312262	723976	NO_2	Y	0	3.3	N
P86	2 Friarton Road	R	311790	721398	NO_2	Y	4.5	2.0	N
P89	59 South Methven St	R	311547	723544	NO_2	Y	0	3.2	N
P90	22 North Methven St	R	311539	723797	NO_2	Y	0	3	N
P96	22 Barrack St	K	311422	723950	NO_2	Y	2.7	0.3	N
P97	Dunkeld Road	R	311370	724050	NO_2	Y	3.4	3.2	N
P98	30 Edinburgh Road	R	311496	721862	NO_2	Y	37	2.5	N
P99	5 Murray Cr Perth	UB	310534	722926	NO_2	Y	2.9	2.05	N

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?
P101	28 Dunkeld Road	R	311010	724484	NO_2	Y	5.1	2.1	N
P103	28 York Place	R	311186	723506	NO_2	Y	12	2.4	N
P104	202 Glasgow Road	R	310158	722635	NO_2	Y	5.5	1.5	N

(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.

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?
P55	7 West High Street, Crieff, PH7 3AF	UC	286321	721639	NO_2	Y	0	0.4	N
P56	39, High Street, Crieff, PH7 3HT	UC	286509	721555	NO_2	Y	0	1.2	N
P57	62, High Street, Crieff, PH7 3BS	UC	286542	721563	NO_2	Y	0	1	N
P58	9 East High Street, Crieff, PH7 3AF	UC	286575	721553	NO_2	Y	5	0.3	N
P73	19 West High Street, Crieff, PH7 4AU	UC	286302	721651	NO_2	Y	0	2.5	N
P74	43 High Street, Crieff, PH7 3HT	UC	286517	721553	NO_2	Y	0	1.4	N
P76	10/12 West Street, Crieff, PH7 4DL	UC	286324	721632	NO_2	Y	0	2	N

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?
P78	1 Lodge Street, Crieff, PH7 4AX	UC	286195	721691	NO_2	Y	0	2.2	N
P87	Background Hollybush Rd	UB	287028	721485	NO_2	N	40	N/A	N
P100	9 Comrie Street, Crieff, PH7 4AX	UC	286271	721553	NO_2	Y	0	2.7	N

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?
P81	76 High Street, Kinross, KY13 8JA	R	311936	702187	NO_2	N	0.5	1.3	N
P82	66 High Street, Auchterarder, PH3 1BN	R	294569	712888	NO_2	N	1.7	0.5	N
P83	176 High Street, Auchterarder, PH3 1AS	R	294268	712730	NO_2	N	3	0.5	N
P91	Main St, Glenfarg, PH2 9NT	R	313584	739915	NO_2	N	25	1	N
P92	Main Road, Ballinluig PH9 0LG	R	297753	752576	NO_2	N	30	1	N
P93	26 Allan St, Blairgowrie, PH10 6AD	UC	317898	745319	NO_2	N	2	1	N
P94	Queen St Coupar Angus	UC	322232	739915	NO_2	N	3	2	N

P102	30 Perth Rd Scone	R	313699	726058	NO_2	N	3	2	N
P105	Atholl Rd Pitlochry	R	293864	758196	NO_2	N	3	2	N

Table A.3 – Annual Mean NO_2 Monitoring Results Real Time Monitors

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2012	2013	2014	2015	2016
Perth 1 (High St)	Roadside	Automatic	N/A	94%	26	22	22	22	23
Perth 2 (Atholl St)	Roadside	Automatic	N/A	99%	**54**	**48**	**45**	**49**	**45**
Crieff (St James Sq.)	Roadside	Automatic	N/A	84%	23	26	23	23	26

Table A.4 – Annual Mean NO_2 Monitoring Results Diffusion Tubes Perth

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2012	2013	2014	2015	2016
P1 (42 Scott St)	R	Diffusion	N/A	94%	**44**	**41**	**40**	36	37
P2 (17 Speygate)	UC	Diffusion	N/A	100%	25	22	21	22	22
P3 (15 Murray Cr)	UB	Diffusion	N/A	50%	21	18	17	16	16*
P5 (8 Stormont St)	UC	Diffusion	N/A	100%	23	20	20	21	20
P6 (41 Mull Pl)	UB	Diffusion	N/A	100%	14	13	11	12	11

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2015 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2012	2013	2014	2015	2016
P7 (257 Rannoch Rd)	UC	Diffusion	N/A	83%	20	19	18	15	19
P13 (86 South St)	R	Diffusion	N/A	100%	39	35	30	32	31
P19 (School Dunkeld Rd)	R	Diffusion	N/A	25%	36	32	31	30	27*
P20 (2 Crieff Rd)	R	Diffusion	N/A	100%	30	28	27	26	27
P28 (28 York Pl)	R	Diffusion	N/A	42%	**44**	**44**	38	34	33*
P29 (37 York Pl)	R	Diffusion	N/A	83%	39	39	**40**	**40**	33
P30 (104 South St)	R	Diffusion	N/A	100%	**41**	37	34	35	33
P31 (45-47 South St)	R	Diffusion	N/A	92%	31	30	29	27	27
P32 (135 South St)	R	Diffusion	N/A	100%	39	36	29	33	33
P33 (216 South St)	R	Diffusion	N/A	100%	**40**	38	35	35	35
P34 (10 County Pl)	R	Diffusion	N/A	100%	**51**	**46**	**45**	**44**	**43**
P35 (17 Princes St)	R	Diffusion	N/A	100%	29	27	26	26	26
P36 (51 Glasgow Rd)	R	Diffusion	N/A	100%	35	33	30	28	29
P37	R	Diffusion	N/A	100%	30	30	27	26	26

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2015 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2012	2013	2014	2015	2016
(Riggs Rd)									
P38 (93 Main St)	R	Diffusion	N/A	100%	31	31	30	27	28
P39 (39 Main St)	R	Diffusion	N/A	100%	**48**	**46**	**44**	**40**	38
P40 (18 Main St)	R	Diffusion	N/A	100%	**47**	**44**	**42**	**43**	**41**
P41 (76 Atholl St)	R	Diffusion	N/A	100%	**55**	**47**	**42**	37	39
P42 (26-28 Atholl St)	K	Diffusion	N/A	42%	**52**	**47**	**43**	**41**	**46***
P43 (17 Atholl St)	R	Diffusion	N/A	100%	**55**	**51**	**49**	**47**	**46**
P44 (22 Barrack St)	K	Diffusion	N/A	50%	**47**	**43**	34	34	36*
P45 (Ballantine Pl)	UC	Diffusion	N/A	100%	26	23	21	19	21
P46 (204 Crieff Rd)	R	Diffusion	N/A	100%	35	33	30	29	31
P47 (5 East Huntingtower)	R	Diffusion	N/A	100%	25	28	25	23	25
P48 (30 Edinburgh Rd)	R	Diffusion	N/A	100%	26	25	24	21	23*
P51 (2 West Bridge St)	R	Diffusion	N/A	100%	32	30	27	27	27
P62 (84 Dundee Rd)	R	Diffusion	N/A	100%	34	33	31	28	30

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2015 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2012	2013	2014	2015	2016
P63 (30 Dundee Rd)	R	Diffusion	N/A	100%	39	39	37	**40**	39
P64 (Isla Rd)	R	Diffusion	N/A	100%	**49**	**45**	**43**	**46**	**43**
P65 (Charlotte St)	R	Diffusion	N/A	100%	33	33	34	30	30
P67 (1 Atholl St)	R	Diffusion	N/A	100%	**41**	36	35	35	33
P68 (2 Atholl St)	R	Diffusion	N/A	100%	33	30	30	30	29
P69 (Church Kinnoull St)	R	Diffusion	N/A	100%	37	34	31	32	34
P70 (28 Dunkeld Rd)	R	Diffusion	N/A	42%	36	30	28	28	25*
P71 (134 Dunkeld Rd)	R	Diffusion	N/A	100%	19	18	28	18	16
P72 (82 Crieff Rd)	R	Diffusion	N/A	50%	**40**	37	16	37	34*
P79 (17 Main St)	R	Diffusion	N/A	100%	**40**	**42**	**40**	36	37
P86 (2 Friarton Rd)	R	Diffusion	N/A	100%	30	28	28	26	25
P88 (202 Glasgow Rd)	R	Diffusion	N/A	33%	**41**	**40**	37	34	31*
P89 (59 South Methven St)	R	Diffusion	N/A	83%	**41**	39	37	37	37
P90	R	Diffusion	N/A	100%	**45**	33	34	30	30

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2015 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2012	2013	2014	2015	2016
(22 North Methven St)									
P95 (26-28 Atholl St)	K	Diffusion	N/A	43%	N/A	N/A	N/A	N/A	**40***
P96 22 Barrack St	K	Diffusion	N/A	50%	N/A	N/A	N/A	N/A	35*
P97 St Ninians School	R	Diffusion	N/A	50%	N/A	N/A	N/A	N/A	33*
P98 30 Edinburgh Rd	R	Diffusion	N/A	50%	N/A	N/A	N/A	N/A	22*
P99 15 Murray Crescent	UB	Diffusion	N/A	50%	N/A	N/A	N/A	N/A	18*
P101 28 Dunkeld Rd	R	Diffusion	N/A	43%	N/A	N/A	N/A	N/A	28*
P103 28 York Place	R	Diffusion	N/A	50%	N/A	N/A	N/A	N/A	**41***
P104 202 Glasgow Rd	R	Diffusion	N/A	43%	N/A	N/A	N/A	N/A	31*

Table A.5 – Annual Mean NO_2 Monitoring Results Diffusion Tubes Crieff

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2012	2013	2014	2015	2016
P55 7 West High St Crieff	UC	Diffusion	N/A	75%	**52**	**47**	**44**	**40**	**42**
P56 39 High St Crieff	UC	Diffusion	N/A	92%	35	33	29	25	26
P57 62 High St Crieff	UC	Diffusion	N/A	100%	31	29	28	25	27
P58 9 East High St Crieff	UC	Diffusion	N/A	58%	**41**	**41**	39	36	34
P73 19 West High St Crieff	UC	Diffusion	N/A	100%	**42**	**41**	39	38	39
P74 43 High St Crieff	UC	Diffusion	N/A	93%	32	31	31	28	29
P76 10 West High St Crieff	UC	Diffusion	N/A	100%	39	39	36	35	34
P77 9 Comrie St Crieff	UC	Diffusion	N/A	50%	21	22	21	19	21*
P78 1 Lodge St Crieff	UC	Diffusion	N/A	92%	26	26	25	21	23
P87 Near Hollybush Rd Crieff	UB	Diffusion	N/A	83%	N/A	8	7	6	6
P100 9 Comrie St Crieff	UC	Diffusion	N/A	50%					21*

Table A.6 – Annual Mean NO_2 Monitoring Results Diffusion Tubes Other

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2012	2013	2014	2015	2016
P81 76 High St Kinross	R	Diffusion	N/A	75%	N/A	26	25	23	23
P82 66 High St Auchterarder	R	Diffusion	N/A	100%	29	28	27	29	26
P83 176 High St Auchterarder	R	Diffusion	N/A	92%	24	23	22	20	19
P91 Main St Glenfarg	R	Diffusion	N/A	33%	N/A	N/A	14	18	22*
P92 Ballinluig	R	Diffusion	N/A	92%	N/A	N/A	N/A	17	18
P93 26 Allan St Blairgowrie	UC	Diffusion	N/A	75%	N/A	N/A	N/A	14	13
P94 Queen St Coupar Angus	UC	Diffusion	N/A	100%	N/A	N/A	N/A	26*	24
P102 32 Perth Rd Scone	R	Diffusion	N/A	50%					24*
P105 Atholl Rd Pitlochry	R	Diffusion	N/A	17%					18*

Notes: Exceedances of the NO_2 annual mean objective of 40µg/m3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 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.

Table A.7 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2012	2013	2014	2015	2016
Perth 1 (High St)	Roadside	Automatic	100%	94%	0	0	0	0	0
Perth 2 (Atholl St)	Roadside	Automatic	100%	99%	**25**	13	0	0	0
Crieff (St James Sq)	Roadside	Automatic	100%	84%	0	0	0	0	4

Notes: Exceedances of the NO_2 1-hour mean objective (200µg/m^3 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 85%, the 99.8th percentile of 1-hour means is provided in brackets.

Figure 1 Annual Mean Trend for NO_2 at High St

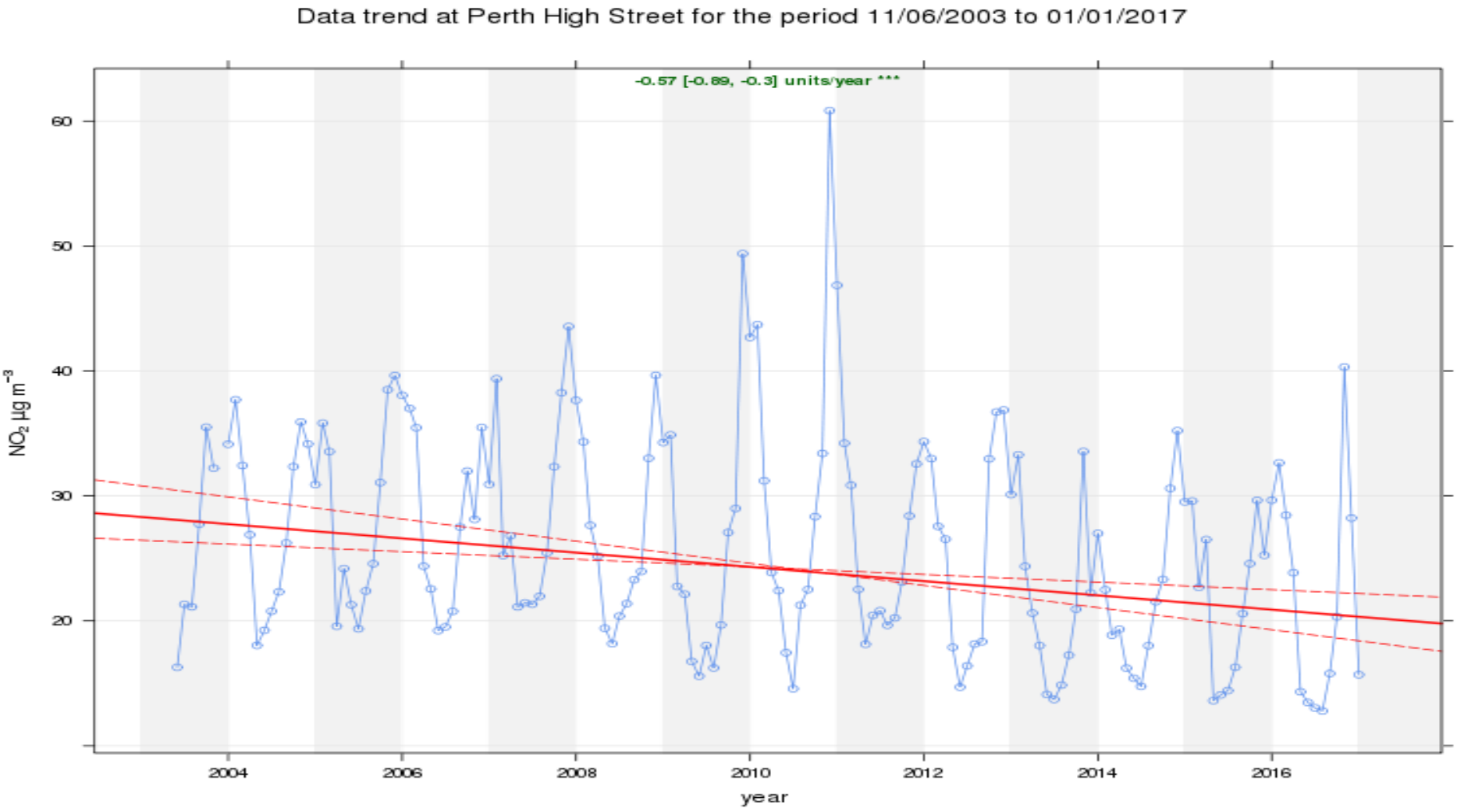


Figure 2 Annual Mean Trend for NO_2 at Atholl St

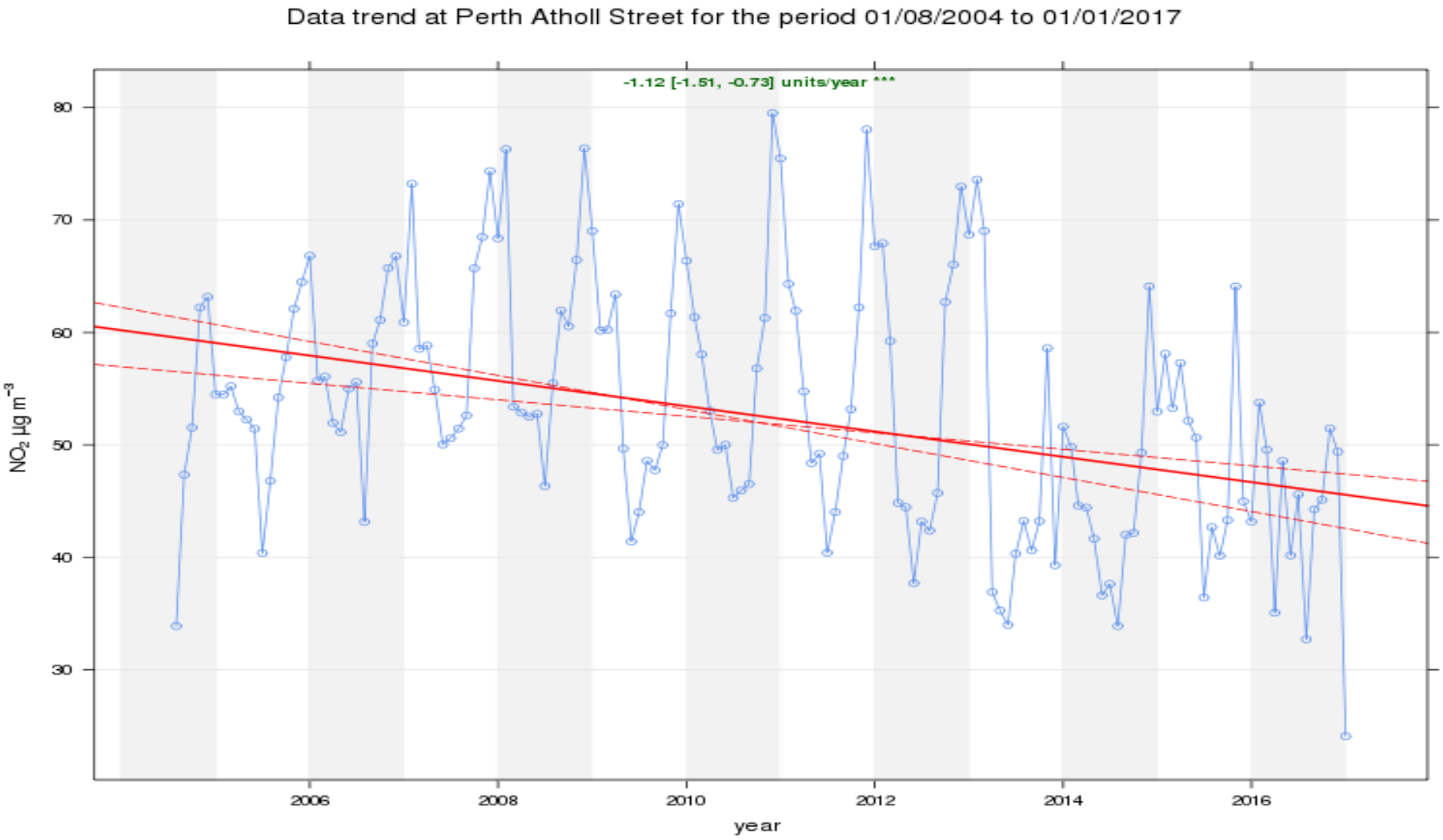


Figure 3 Annual Mean Trend for NO_2 at Crieff

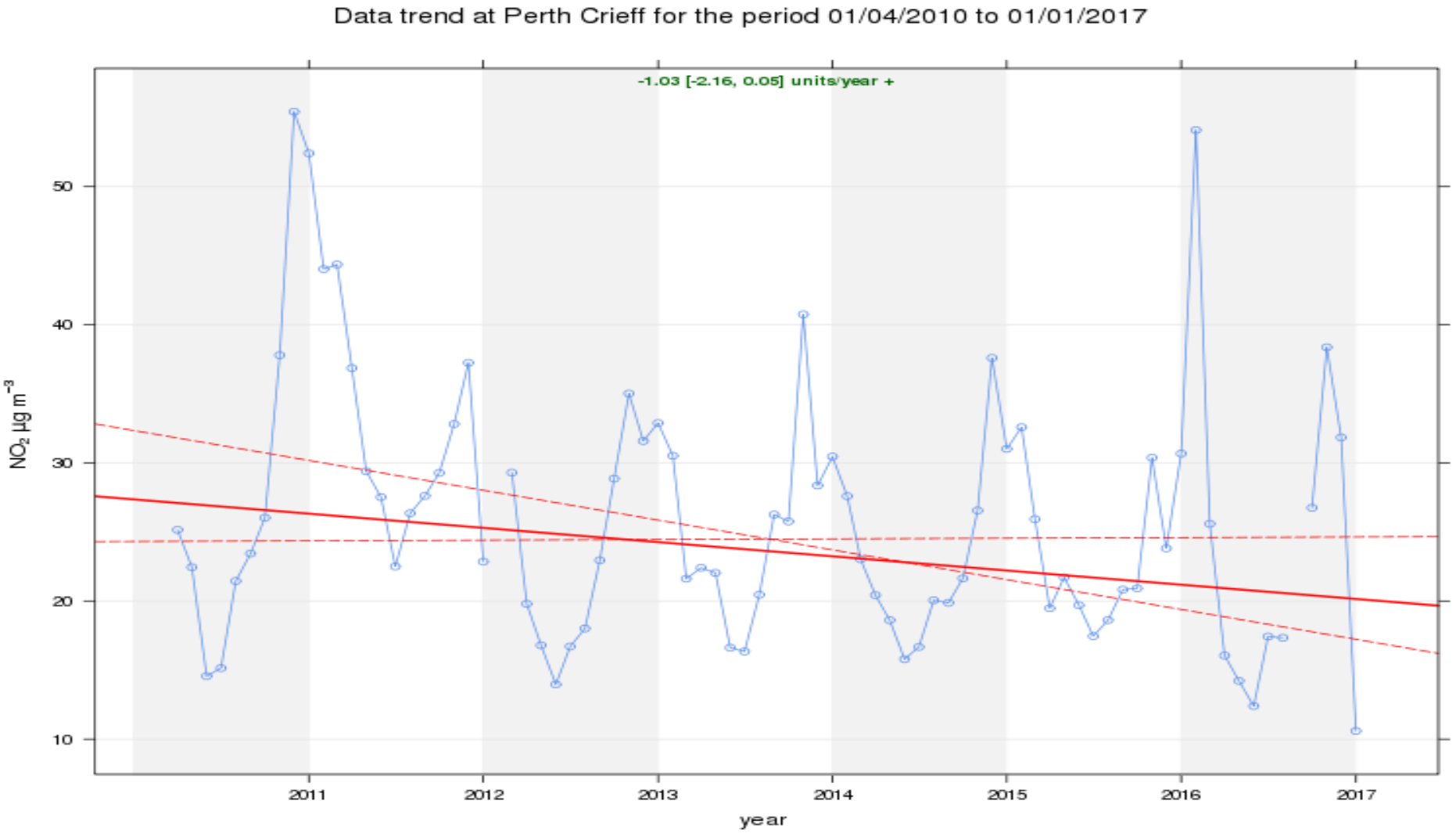


Table A.8 – Annual Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	PM_{10} Annual Mean Concentration (µg/m^3) (3)				
				2012	2013	2014	2015	2016
Perth 1 (High St)	Roadside	100%	98%	15	16	14	13	13
Perth 2 (Atholl St)	Roadside	100%	95%	**21**	**22**	**20**	**18**	**18**
Perth 3 (Muirton)	Background	100%	73%	8	10	10	9	10
Crieff (St James Sq.)	Roadside	100%	75%	19	16	**20**	14	16

Notes: Exceedances of the PM_{10} annual mean objective of 18µg/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.

Table A.9 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
				2012	2013	2014	2015	2016
Perth 1 (High St)	Roadside	100%	98%	2	0	0	1	0
Perth 2 (Atholl St)	Roadside	100%	84%	**11**	7	1	6	0
Perth 3 (Muirton)	Background	100%	93%	0	0	0	0	0
Crieff (St James Sq.)	Roadside	100%	96%	1	0	1	0	0

Notes: Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 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 85%, the 90.4th percentile of 24-hour means is provided in brackets.

Figure 4 Annual Mean Trend for PM_{10} at High St

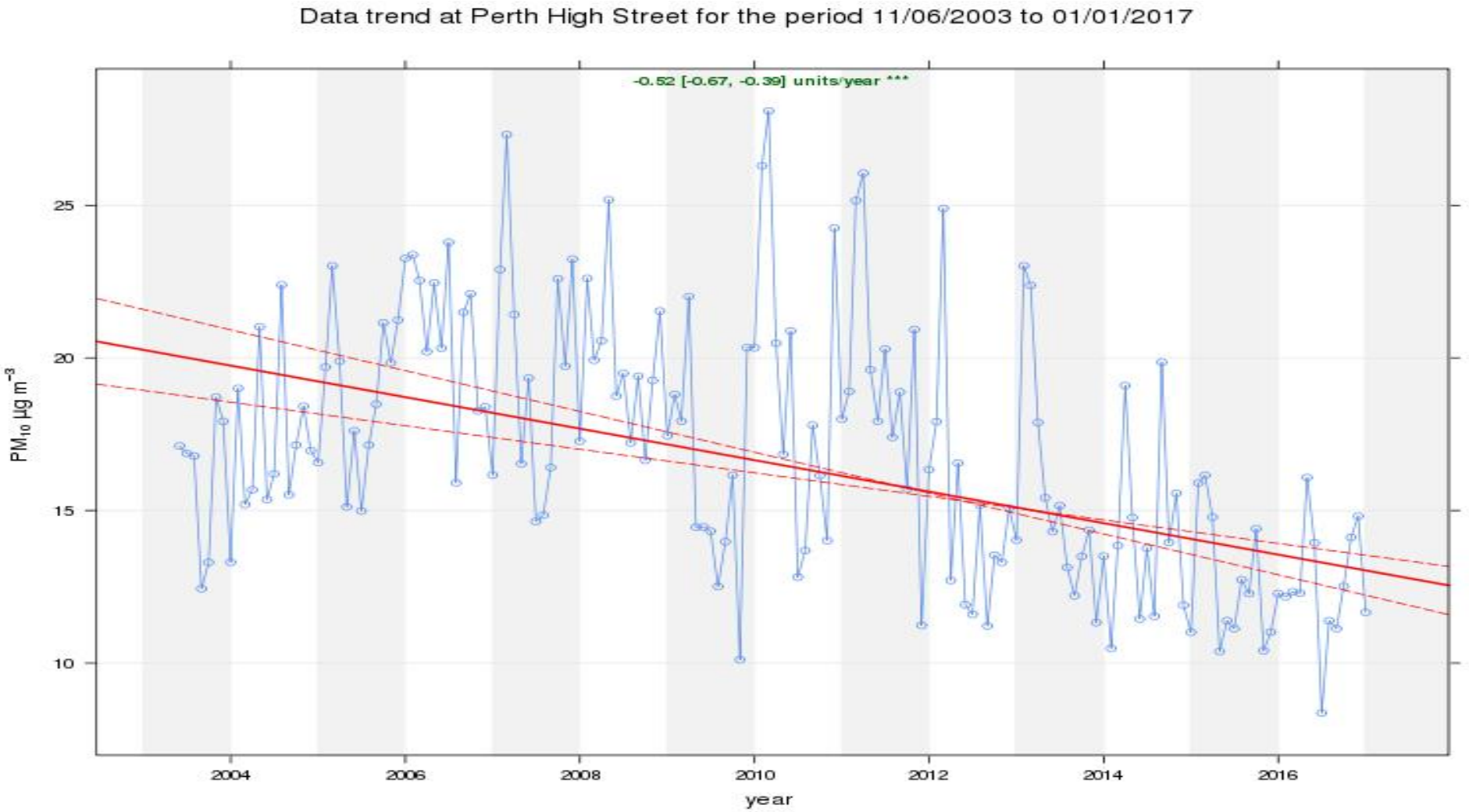


Figure 5 Annual Mean Trend for PM_{10} at Atholl St

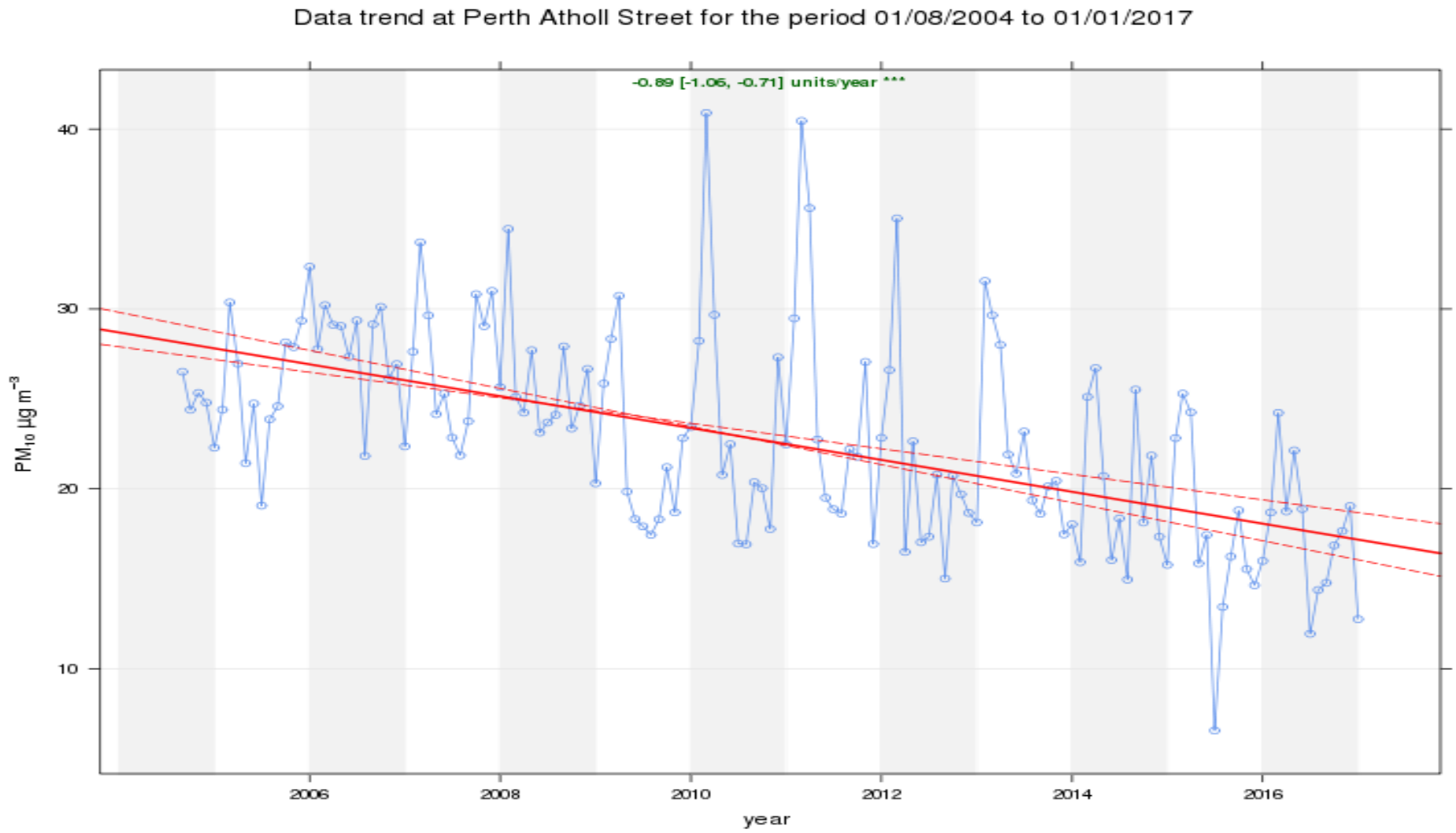


Figure 6 Annual Mean Trend for PM_{10} at Crieff

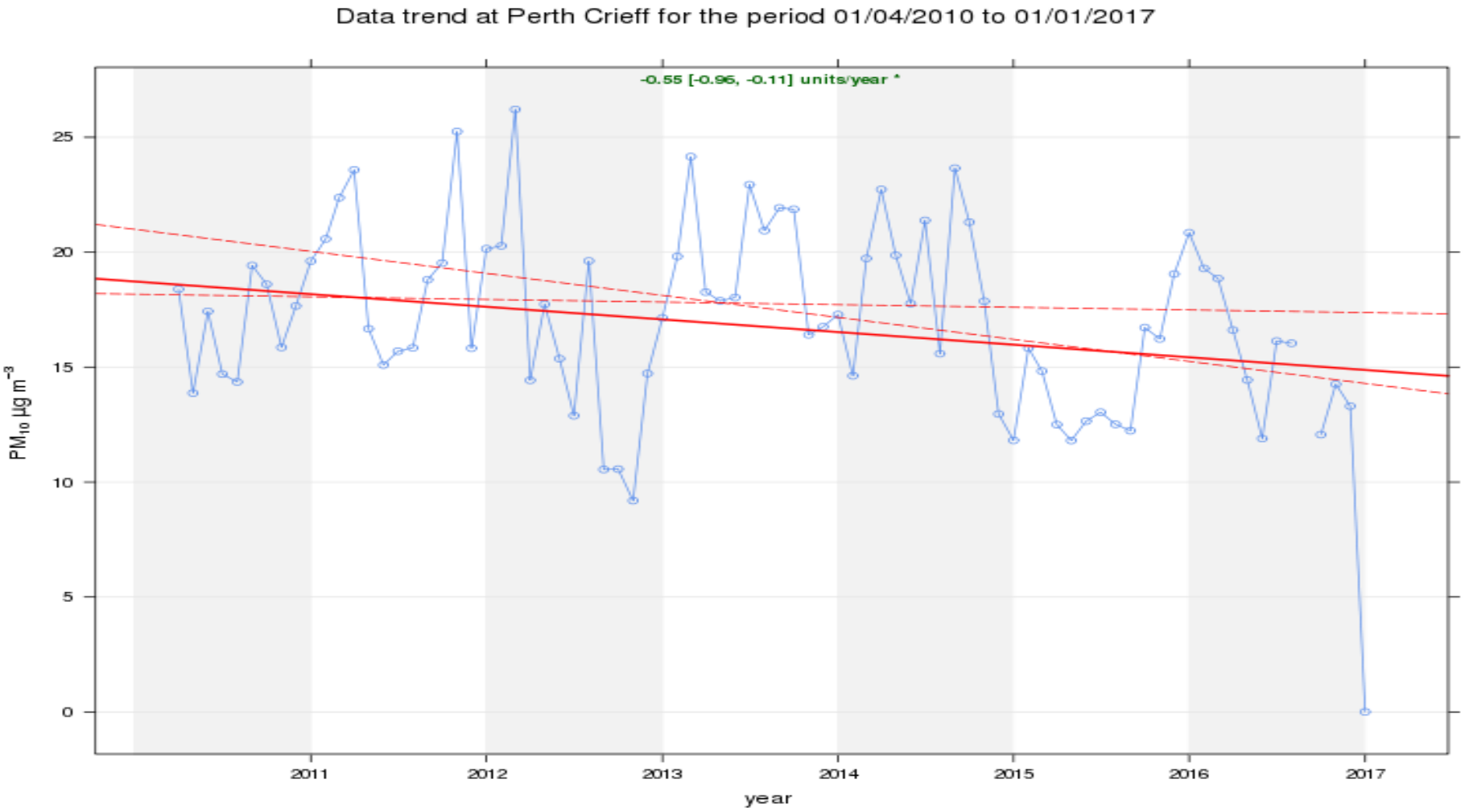
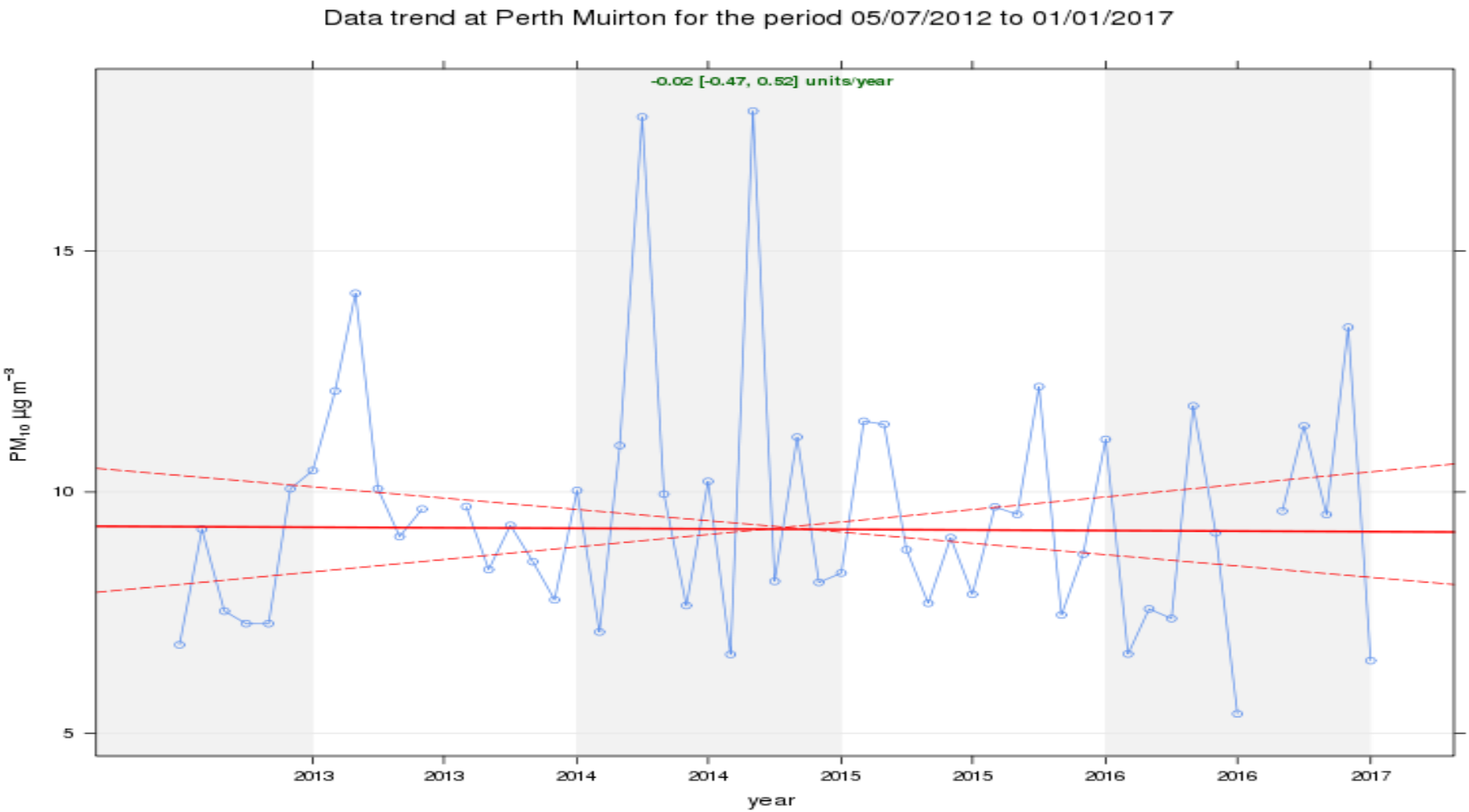


Figure 7 Annual Mean Trend for PM_{10} at Muirton



Appendix B: Full Monthly Diffusion Tube Results for 2016

Table B.1 – NO_2 Monthly Diffusion Tube Results for 2016

		Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16
Perth 1 L	42 Scott St, Perth, PH1 5PH	47.8	47.6	7.5	40.2	38	37.3	30.8	33.9	36.4	51.7	43.8	44.2
Perth 1 C	42 Scott St, Perth, PH1 5PH	39.2	44.1	48.1	43.4	38.6	41.5	27.5	33.4	36.6	74.1		
Perth 1 R	42 Scott St, Perth, PH1 5PH	41.9	44.5	42.8	33.4	38.4	39.9	30.8	31.2	36.6	42.2	43.6	41.7
P 2	17 Speygate, Perth, PH2 8PJ	32	29.1	27.5	20.6	17.4	15.4	18.7	17.6	19.2	23	32.9	29.2
P 3	15 Murray Cres, Perth, PH2 0HU (Height Changed Now P99)	23.8	22.4	20	13	12.7	11						
P 5	8 Stormont St, Perth, PH1 5NW	28.1	31.2	24	14.9	16.2	13.3	19.3	15.8	23.3	17.8	28.7	30.5
P 6	41 Mull Place, Perth, PH1 3DP	17.4	18.5	15.3	8.1	7.4	5.7	7.8	7.2	11.2	10.9	20.3	17.9
P 7	257 Rannoch Rd/Newhouse Road Roundabout, Perth, PH1 2DW	25.2	22.4	21.2	14.9	15	15.8			14.9	22.8	27.7	21.5
P13	86/88 South Street Perth PH2 8PD	39.6	35.9	35.9	28.1	30.8	24.9	30.6	27.3	32.2	30.9	42.7	39.6
P 19	St Ninian's School ,Dunkeld Rd, Perth, PH1 5RF(Height Change Now P97)	37.3	44.7	37									
P 20	2 Crieff Road Perth PH1 5RT	36.3	41.2	33.7	24.3	26.9	22	21.1	21.1	26.6	27.3	40.6	34.9
P28	28 York Place Perth PH2 8EH(Height Change Now P103)	44.9	48.2	38.2	32.8	33.6							
P29	37 York Place Perth PH2 8EH	41.4	51.5	43.8	30.9		30.9	22.6	26.9	32	40.4		36.1
P30 L	104 South St, Perth, PH2 8PA	38.2	45.3	40	32.6	33.2	25.3	32.8	31.6	35.5	31.9	46.8	44.8
P30 C	104 South St, Perth, PH2 8PA	40.4	48.6	36.6	31.9	31.4	27.9	34.3	30	33.5	33.7	43.4	47.6
P30 R	104 South St, Perth, PH2 8PA	43.1	49.7	36.3	26.2	29.5	26.3	32.8	29.5	34.3	34.3	44.9	45.8
P31	45-47 South St, Perth, PH2 8PD	41.7	33.4		27.7	26.5	25.8	19.5	23.4	24	32.5	38.2	31.9
P32	135 South St, Perth, PH2 8PA	38	43.9	39.6	38.1	30.8	29.2	28.5	29.5	29.7	36.1	47.3	41.2
P33	216 South Street Perth PH2 8NY	44.3	45.1	43.8	34.9	34.3	35	31	31.8	36.4	35.5	45.3	41.3
P34 L	10 County Place, Perth, PH2 8EE	51.3	54.8	44.4	36.2	44.3	37.8	45.1	41	53.5	38.4	55.8	56.8
P35	17 Princes St, Perth, PH2 8NG	31.4	35.3	31.7	24.9	22.6	18.7	23.6	23.6	27.6	25.8	40.6	33.5
P36	51 Glasgow Rd, Perth, PH2 0PE	35.3	40.6	39.2	22.8	26.7	25.8	23.4	24.8	28.4	31.9	43.4	38.1

P37	Riggs Rd, Perth, PH1 1PR	28.3	35.1	34.7	21.5	26.3	21.3	20.3	21.3	25.4	29.3	37.2	34
P38	93-109 Main St Bridgend, PH2 7HE	32.2	32	31.9	33.2	27.3	32.8	23.4	23.8	29.7	41.6	31.3	30.3
P39	39 Main St, Bridgend, PH2 7HD	42.5	41.7	44	41.3	47.8	45.1	33	35.7	39.2	45.4	44.1	41
P40	18 Main St, Bridgend, PH2 7HB	45.3	53.3	50.9	40.2	38.6	36.1	44.1	40	41.9	40.4	56.1	46.9
P41	76 Atholl St, Perth, PH1 5NL	46.8	49.7	47.3	48.5	36.3	45.1	26.7	34.7	37.1	47.1	48	42.1
P42	26-28 Atholl St, Perth, PH1 6NP (Height Change Now P95)		52.1	53.3	44.3	40	42.7						
P43 L	17 Atholl St, Perth, PH1 5NH	49	57.9	49.1	44.7	47.8	43	39.2	45.3	53.5	46.4	60.2	60
P43 C	17 Atholl St, Perth, PH1 5NH	53.8	60.9	56.5	46.2	45.8	43.5	49.7	44.5	52.5	46.4	60.2	61
P43 R	17 Atholl St, Perth, PH1 5NH	48.8	48.8	49.3	48.5	50.1	43.2	47.2	41.2	47.9	45.8	56.8	55.5
P44	22 Barrack St, Perth, PH1 5RD (Height Change Now P96)	42.1	45.1	43.6	36	34.3	33.6						
P45	Ballantine Place, Perth PH1 5RR	28.7	29.3	25.4	21.7	19.5	17.9	12.3	14.2	16.4	24.8	35.5	27.6
P46	204 A Crieff Rd, Perth, PH1 2PE	36.3	38.8	36.1	30.6	30.4	29.1	22.8	25.6	28.4	45	41.4	34.6
P47	5 East Huntingtower, Perth, PH1 3JJ	27.1	31.2	30.3	24.5	27.9	28.1	17.6	22.2	24.3	32.1	34.8	28.2
P48	30 Edinburgh Rd, Perth, PH2 8BX	31.6	26.7	28.5	21.3	23.2	23.5						
P51	2 West Bridge St, Bridgend, Perth, PH2 7HA	31.4	40.8	32.3	24.9	24.6	26.6	24.6	22.4	23.5	29.9	40.7	32.6
P54L	Real Time Monitor adjacent to 176 High St, Perth PH1 5EW	32.8	31.2	29.3	25.1	19.5	17.1	17.4	17.6	21.5	23.8	37.5	31.1
P54C	Real Time Monitor adjacent to 176 High St, Perth PH1 5EW	29.8	32.6	28.1	23.6	18.7	16.6	19.8	18.5	21.7	22.6	35.8	32.4
P54R	Real Time Monitor adjacent to 176 High St, Perth PH1 5EW	26.1	31.4	28.5	24.7	18.3	16.9	18.1	18.7	22.5	26.1	35.3	29.7
P55	7 West High St, Crieff	41.9	49.7		43.5	43.5	45.6	36	40.6			64.2	42.6
P56	39, High St, Crieff	28.7	35.1	26.9	24.6	21.7	26.7	21.9	24.5		28.5	41.4	28.4
P57	The Highland Trading Company, 62, High St, Crieff	33.4	39.4	32.3	29.3	24	28.2	21.9	26.4	23	31.1	39.9	29.4
P58	9 East High St, Crieff	40.6	46.4						37.2	39.7	39	54.4	41
P61L	Atholl St, Perth real time monitor	42.9	51.7	51.5	41.7	43.7	38.8	46.8	39.8	46.4	41	56.8	57.8
P61C	Atholl St, Perth real time monitor	49.9	56	52.9	42.8	40.6	39.4	45.5	42.3	53	40.4	59.1	56.8
P61R	Atholl St, Perth real time monitor	39.6	55.2	53.5	38.5	24.7	38.5	46.8	41.4	47.6	38.8	56.1	56.5
P62	84 Dundee Rd, Perth PH2 7BA	36.9	36.9	36.5	33.4	28.7	32	26.9	26.7	30.9	35.5	38.9	31.3
P63	30 Dundee Rd, Perth PH2 7AQ	44.5	41	42.8	42.3	42.9	44.5	35.1	37.1	40.5	45.4	47.8	40.9
P64	The Lodge, Isla Rd, Bridgend, Perth PH2 7HG	32.2	56.4	56.1	44.7	44.9	39.4	46.4	44.1	45.3	47	54.7	55.9
P65	5-7 Charlotte Street, Perth PH1 5LW	31	37.1	33.3	31.7	33.6	34.6	22.4	27.1	29.4	35.3	36.5	36.4

P67	1 Atholl Street, Perth PH1 5NH	41.2	46.2	39.2	30.9	30.2	25.6	36.7	30.2	31.7	30.1	41.1	47.6
P68	2 Atholl Street, Perth PH1 5NP	39.6	42.9	37.8	27	25.2	21.7	25.2	24.4	26.4	26	37.7	38.1
P69	United Free Church of Scotland, Kinnoull Street, Perth PH1 5EZ	31	41.9	36.5	33.6	26.5	23.6	26.9	28.3	32.7	39.2	63.9	56.2
P70	Leith Buildings, 28 Dunkeld Rd, Perth PH1 5AJ(Change Height Now P101	32.4	36.3	31.7	26		23						
P71	134-140 Dunkeld Road, Perth PH1 5AS	22.2	21.3	21.2	13.2	12.5	13.8	9.6	11.1	13.6	20.2	26.4	21.9
P72	82 Crieff Road, Perth PH1 2RP			44.4					32.2	35	36.1	49.3	45
P73	CRIEFF - NEW 19 West High Street Crieff,PH7 4AU	48.2	46	37.2	44.9	38.2	48.6	32.6	33.6	37.3	48.9	57.5	37.2
P74	CRIEFF - NEW 43 High Street Crieff,PH7 3HT	31.8	34.1	32.1	25.9	24.6	27.2		30.2	31.9	36.2	42.6	32.4
P75L	Crieff RTM	27.7	34.5	24.2	18.9	17	14.5	19.3	22.8	18.2	19.2	34	28.9
P75C	Crieff RTM	27.1	33.4	26.3	18.3	13.7	14		19.4	16.8	21.7	30.6	28.9
P75R	Crieff RTM	20.5	30.4	26	18.7	17	13.7	20.1	19.6	19.9	20.2	33.8	29.2
P76	10/12 West High Street, Crieff	33.4	41	38.2	34.5	33.2	35.3	32.8	37.4	38.9	37.9	47.8	37.8
P77	9 Comrie Street, Crieff	30	22.4	20.8	20.3	21.1	24.7						
P78	1 Lodge Street, Crieff	22	28.5	23.2	20.3	X	43.9	16	19.8	21.4	33.6	29.1	22.5
P79 L	17/19 Main Street Bridgend Perth PH2 7HD	40.8	44.7	41.4	44.3	42.7	45.5	30.6	32.4	38.2	47.3	45.3	35.9
P79 C	17/19 Main Street Bridgend Perth PH2 7HD	39	46.8	42.4	40.2	41.9	44.8	30	29.1	39.1	45	22.6	34.6
P79 R	17/19 Main Street Bridgend Perth PH2 7HD	42.7	41.7	37.6	43.4	42.7	44.8	31.8	31	37.1	42.2	47.8	37.7
P81	76 High St Kinross Opticians				23.6	20.3	25.1	19.5	19.3	22.5	23.8	41.7	31.1
P82	66 High St Auchterarder Ironmongers	27.5	38.6	33.1	23.4	25.6	17.9	22.3	19.7	26.3	31.5	40.2	32.9
P83	176 High St Auchterarder Lamppost	24.8	25.4	23.6	18.1	18.5		11.7	14.4	16.3	25.7	28.4	22.2
P86	2 Friarton Road Perth Lamp post	22.8	33.6	29.5	22.1	25.2	23.5	17.9	21.1	27.1	31.9	40.6	32.9
P87	Crieff Background Hollybush Road Crieff	6.8	9.6	6.7	4.9	3.9	3.8	3.5		5.1	6.3	12.8	
P88	202 Glasgow Road Perth Lamp post(Height Change Now P104)	48	47.8	41.6	29.4								
P89	59 South Methven Street	44.7	49.9	42.2	35.5			35.7	31.6	38.9	32.3	48.5	46.8
P90	22 North Methven Street	37.5	43.1	39.2	28.5	27.7	22.7	24.4	25.6	30.5	26.1	42.9	40.2
P91	Glenfarg (Removed)			23.2	17	16.4	20.2						
P92	Ballinluig	24.6	23.4	20	15.1	15	15.6		16.2	16.9	18.8	24.5	24.6

P93	26 Allan Street. Blairgowrie	19.1	17.9	15.7	10.9	12.5	10		9.6	15.4	12.1		
P94	Queen St Coupar Angus	27.1	29.8	27.7	25.3	23	25.8	17.4	19.7	22.5	29.1	31.9	27.6
P95	26-28 Atholl St, Perth, PH1 6NP							36.3		35	46.8	63.9	51.4
P96	22 Barrack St.Perth,PH1 5RD							27.7	29.8	32.8	42	49.8	43.2
P97	St.Ninian's School Dunkeld Rd. Perth PH15RF							27.5	29.1	37.4	32.7	43.6	41.7
P98	30 Edinburgh Rd, Perth, PH2 8BX							16.2	16.8	24.1	27.1	33.5	26
P99	15 Murray Cres, Perth, PH2 0HU							11.3	12.1	16.7	19.4	30.8	25.2
P100	New 9 Comrie Street Crieff PH7 4AX							14.6	17.2	21.3	27.9	30.4	22
P101	Leith Buildings, 28 Dunkeld Rd, Perth PH1 5AJ							22.6	24	24.5	28.9	39.7	X
P102	New 30 Perth Road Scone PH2 6JJ							19.3	18.5	22	23.8	39.7	30.3
P103	28 York Place Perth PH2 8EH							33.2	36.1	47.1	44.8	56.8	46.1
P104	202 Glasgow Road Perth Lamp post PH2 0NA								27.7	31.2	35.3	49.7	35.9
P105	Atholl Road Pitlochry											30.8	29.5
P106	Victoria Terrace, Crieff PH7 4AA Bus Bays Morrison's Academy												
P107	1 Glover Street Perth PH2 0JP												

(1) See Appendix C for details on bias adjustment

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

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality 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	01/01/2016	31/01/2016	32.8	29.8	26.1	30	3.4	11	8.3	30	99	Good	Good
2	01/02/2016	29/02/2016	31.2	32.6	31.4	32	0.8	2	1.9	33	100	Good	Good
3	01/03/2016	31/03/2016	29.3	28.1	28.5	29	0.6	2	1.5	28	100	Good	Good
4	01/04/2016	30/04/2016	25.1	23.6	24.7	24	0.8	3	1.9	24	99	Good	Good
5	01/05/2016	31/05/2016	19.5	18.7	18.3	19	0.6	3	1.5	14	98	Good	Good
6	01/06/2016	30/06/2016	17.1	16.6	16.9	17	0.3	1	0.6	13	96	Good	Good
7	01/07/2016	31/07/2016	17.4	19.8	18.1	18	1.2	7	3.1	13	44	Good	or Data Captu
8	01/08/2016	31/08/2016	17.6	18.5	18.7	18	0.6	3	1.5	13	100	Good	Good
9	01/09/2016	30/09/2016	21.5	21.7	22.5	22	0.5	2	1.3	16	99	Good	Good
10	01/10/2016	31/10/2016	23.8	22.6	26.1	24	1.8	7	4.4	20	100	Good	Good
11	01/11/2016	30/11/2016	37.5	35.8	35.3	36	1.2	3	2.9	40	98	Good	Good
12	01/12/2016	31/12/2016	31.1	32.4	29.7	31	1.4	4	3.4	28	99	Good	Good
13													
											Overall survey -->	Good precision	Good Overall DC

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

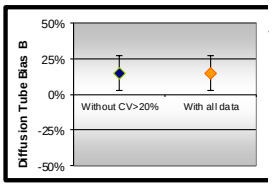
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	High St

Precision	12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 11 periods of data	
Bias factor A	0.92 (0.83 - 1.04)
Bias B	9% (-4% - 21%)
Diffusion Tubes Mean:	26 µgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	24 µgm^{-3}
Data Capture for periods used:	99%
Adjusted Tubes Mean:	24 (21 - 27) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 11 periods of data	
Bias factor A	0.92 (0.83 - 1.04)
Bias B	9% (-4% - 21%)
Diffusion Tubes Mean:	26 µgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	24 µgm^{-3}
Data Capture for periods used:	99%
Adjusted Tubes Mean:	24 (21 - 27) µgm^{-3}



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Version 04 - February 2011

Adjustment of DUPLICATE or TRIPLICATE Tubes

AEA Energy & Environmen
From the AEA group

Diffusion Tubes Measurements										Data Quality 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 Average	Standard Deviation	CV	95% CI mean	Diffusion Tubes Precision Check
1	01/01/2016	31/01/2016	40.8	39	42.7	40.8	1.85	4.53	4.60	Good
2	02/01/2016	01/02/2016	44.7	46.8	41.7	44.4	2.56	5.77	6.37	Good
3	03/01/2016	02/02/2016	41.4	42.4	37.6	40.5	2.53	6.26	6.29	Good
4	04/01/2016	03/02/2016	44.3	40.2	43.4	42.6	2.15	5.05	5.35	Good
5	05/01/2016	04/02/2016	42.7	41.9	42.7	42.4	0.46	1.09	1.15	Good
6	06/01/2016	05/02/2016	45.5	44.8	44.8	45.0	0.40	0.90	1.00	Good
7	07/01/2016	06/02/2016	30.6	30	31.8	30.8	0.92	2.98	2.28	Good
8	08/01/2016	07/02/2016	32.4	29.1	31	30.8	1.66	5.37	4.11	Good
9	09/01/2016	08/02/2016	38.2	39.1	37.1	38.1	1.00	2.63	2.49	Good
10	10/01/2016	09/02/2016	47.3	45	42.2	44.8	2.55	5.70	6.34	Good
11	11/01/2016	10/02/2016	45.3		47.8	46.6	1.77	3.80	15.88	Good
12	12/01/2016	11/02/2016	35.9	34.6	37.7	36.1	1.56	4.32	3.87	Good
13										

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Site Name/ ID:	Main St

Jaume Targa, for AEA

Version 04 - February 2011

Adjusted measurement (95% confidence level)
Without periods with CV larger than 20%

Bias calculated using 11 periods of data
Tube Precision: 4 Automatic DC: 99%
Bias factor A: 0.92 (0.83 - 1.04)
Bias B: 9% (-4% - 21%)

Information about tubes to be adjusted
Diffusion Tube average: 40 μgm^{-3}
Average Precision (CV): 4
Adjusted Tube average: 37 +/- 4 μgm^{-3}

Adjusted measurement (95% confidence level)
with all data

Bias calculated using 11 periods of data
Tube Precision: 4 Automatic DC: 99%
Bias factor A: 0.92 (0.83 - 1.04)
Bias B: 9% (-4% - 21%)

Information about tubes to be adjusted
Diffusion Tube average: 40 μgm^{-3}
Average Precision (CV): 4
Adjusted Tube average: 37 +/- 4 μgm^{-3}

Adjustment of DUPLICATE or TRIPLICATE Tubes

AEA Energy & Environmen
From the AEA group

Diffusion Tubes Measurements									
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Average	Standard Deviation	CV	95% CI mean
1	01/01/2016	31/01/2016	38.2	40.4	43.1	40.6	2.45	6.05	6.10
2	01/02/2016	29/02/2016	45.3	48.6	49.7	47.9	2.29	4.78	5.69
3	01/03/2016	31/03/2016	40	36.6	36.3	37.6	2.06	5.46	5.11
4	01/04/2016	30/04/2016	32.6	31.9	26.2	30.2	3.51	11.61	8.72
5	01/05/2016	31/05/2016	33.2	31.4	29.5	31.4	1.85	5.90	4.60
6	01/06/2016	30/06/2016	25.3	27.9	26.3	26.5	1.31	4.95	3.26
7	01/07/2016	31/07/2016	32.8	34.3	32.8	33.3	0.87	2.60	2.15
8	01/08/2016	31/08/2016	31.6	30	29.5	30.4	1.10	3.61	2.73
9	01/09/2016	30/09/2016	35.5	33.5	34.3	34.4	1.01	2.92	2.50
10	01/10/2016	31/10/2016	31.9	33.7	34.3	33.3	1.25	3.75	3.10
11	01/11/2016	30/11/2016	46.8	43.4	44.9	45.0	1.70	3.78	4.23
12	01/12/2016	31/12/2016	44.8	47.6	45.8	46.1	1.42	3.08	3.52
13									

Data Quality Check
Diffusion Tubes Precision Check
Good
Good
Good
Good
Good
Good
Good
Good
Good
Good
Good
Good

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Jaume Targa, for AEA

Version 04 - February 2011

Site Name/ ID:	104 South St

Adjusted measurement (95% confidence level)
Without periods with CV larger than 20%

Bias calculated using 11 periods of data
Tube Precision: 4 Automatic DC: 99%
Bias factor A: 0.92 (0.83 - 1.04)
Bias B: 9% (-4% - 21%)

Information about tubes to be adjusted
Diffusion Tube average: 40 μgm^{-3}
Average Precision (CV): 4
Adjusted Tube average: 37 +/- 4 μgm^{-3}

Adjusted measurement (95% confidence level)
with all data

Bias calculated using 11 periods of data
Tube Precision: 4 Automatic DC: 99%
Bias factor A: 0.92 (0.83 - 1.04)
Bias B: 9% (-4% - 21%)

Information about tubes to be adjusted
Diffusion Tube average: 40 μgm^{-3}
Average Precision (CV): 4
Adjusted Tube average: 37 +/- 4 μgm^{-3}

Adjustment of DUPLICATE or TRIPLICATE Tubes

AEA Energy & Environmen
From the AEA group

Diffusion Tubes Measurements										Data Quality 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 Average	Standard Deviation	CV	95% CI mean	Diffusion Tubes Precision Check
1	01/01/2016	31/01/2016	47.8	39.2	41.9	43.0	4.40	10.24	10.93	Good
2	01/02/2016	29/02/2016	47.6	44.1	44.5	45.4	1.92	4.22	4.76	Good
3	01/03/2016	31/03/2016		48.1	42.8	45.5	3.75	8.25	33.67	Good
4	01/04/2016	30/04/2016	40.2	43.4	33.4	39.0	5.11	13.09	12.69	Good
5	01/05/2016	31/05/2016	38	38.6	38.4	38.3	0.31	0.80	0.76	Good
6	01/06/2016	30/06/2016	37.3	41.5	39.9	39.6	2.12	5.36	5.27	Good
7	01/07/2016	31/07/2016	30.8	27.5	30.8	29.7	1.91	6.42	4.73	Good
8	01/08/2016	31/08/2016	33.9	33.4	31.2	32.8	1.44	4.37	3.57	Good
9	01/09/2016	30/09/2016	36.4	36.6	36.6	36.5	0.12	0.32	0.29	Good
10	01/10/2016	31/10/2016	51.7		42.2	47.0	6.72	14.31	60.35	Good
11	01/11/2016	30/11/2016	43.8		43.6	43.7	0.14	0.32	1.27	Good
12	01/12/2016	31/12/2016	44.2		41.7	43.0	1.77	4.12	15.88	Good
13										

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Jaume Targa, for AEA

Version 04 - February 2011

Site Name/ ID:	42 Scott St

Adjusted measurement (95% confidence level)
Without periods with CV larger than 20%

Bias calculated using 11 periods of data
Tube Precision: 4 Automatic DC: 99%
Bias factor A: 0.92 (0.83 - 1.04)
Bias B: 9% (-4% - 21%)

Information about tubes to be adjusted
Diffusion Tube average: 40 μgm^{-3}
Average Precision (CV): 4
Adjusted Tube average: 37 +/- 4 μgm^{-3}

Adjusted measurement (95% confidence level)
with all data

Bias calculated using 11 periods of data
Tube Precision: 4 Automatic DC: 99%
Bias factor A: 0.92 (0.83 - 1.04)
Bias B: 9% (-4% - 21%)

Information about tubes to be adjusted
Diffusion Tube average: 40 μgm^{-3}
Average Precision (CV): 4
Adjusted Tube average: 37 +/- 4 μgm^{-3}

Adjustment of DUPLICATE or TRIPLICATE Tubes

AEA Energy & Environmen
From the AEA group

Diffusion Tubes Measurements										Data Quality 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 Average	Standard Deviation	CV	95% CI mean	Diffusion Tubes Precision Check
1	01/01/2016	31/01/2016	49	53.8	48.8	50.5	2.83	5.60	7.03	Good
2	01/02/2016	29/02/2016	57.9	60.9	48.8	55.9	6.30	11.28	15.65	Good
3	01/03/2016	31/03/2016	49.1	56.5	49.3	51.6	4.22	8.16	10.47	Good
4	01/04/2016	30/04/2016	44.7	46.2	48.5	46.5	1.91	4.12	4.75	Good
5	01/05/2016	31/05/2016	47.8	45.8	50.1	47.9	2.15	4.49	5.35	Good
6	01/06/2016	30/06/2016	43	43.5	43.2	43.2	0.25	0.58	0.63	Good
7	01/07/2016	31/07/2016	39.2	49.7	47.2	45.4	5.48	12.09	13.63	Good
8	01/08/2016	31/08/2016	45.3	44.5	41.2	43.7	2.17	4.98	5.40	Good
9	01/09/2016	30/09/2016	53.5	52.5	47.9	51.3	2.99	5.82	7.42	Good
10	01/10/2016	31/10/2016	46.4	46.4	45.8	46.2	0.35	0.75	0.86	Good
11	01/11/2016	30/11/2016	60.2	60.2	56.8	59.1	1.96	3.32	4.88	Good
12	01/12/2016	31/12/2016	60	61	55.5	58.8	2.93	4.98	7.28	Good
13										

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Jaume Targa, for AEA

Version 04 - February 2011

Site Name/ ID:	17 Atholl St

Adjusted measurement (95% confidence level)
Without periods with CV larger than 20%

Bias calculated using 11 periods of data
Tube Precision: 4 Automatic DC: 99%
Bias factor A: 0.92 (0.83 - 1.04)
Bias B: 9% (-4% - 21%)

Information about tubes to be adjusted
Diffusion Tube average: 40 μgm^{-3}
Average Precision (CV): 4
Adjusted Tube average: 37 +/- 4 μgm^{-3}

Adjusted measurement (95% confidence level)
with all data

Bias calculated using 11 periods of data
Tube Precision: 4 Automatic DC: 99%
Bias factor A: 0.92 (0.83 - 1.04)
Bias B: 9% (-4% - 21%)

Information about tubes to be adjusted
Diffusion Tube average: 40 μgm^{-3}
Average Precision (CV): 4
Adjusted Tube average: 37 +/- 4 μgm^{-3}

- **QA/QC of Automatic Monitoring**

Ricardo E & E carries out the QA/QC for the automatic monitors and they are calibrated annually and meet the criteria for national network.

- **QA/QC of Diffusion Tube Monitoring**

The Workplace Analysis Scheme for Proficiency (WASP) is an independent analytical performance testing scheme, operated by the Health and Safety Laboratory (HSL). WASP formed a key part of the former UK NO2 Network's QA/QC, and remains an important QA/QC exercise for laboratories supplying diffusion tubes to Local Authorities for use in the context of Local Air Quality Management (LAQM). The laboratory participants analyse four spiked tubes, and report the results to HSL. HSL assign a performance score to each laboratory's result, based on their deviation from the known mass of nitrite in the analyte.

This has been replaced by the AIR-PT scheme January to February and July to August 2016 were rated as 100%, other months were not available.

Appendix D Correspondence with SEPA

Hi, Martin/Kirsty please find enclosed the information requested in relation to SEPA-regulated activities.

1. Are you aware of any changes that have been made to any Part A or B processes that will result in a positive or negative effect on the local air quality? (This includes: change of fuel, increased or decreased emissions rates, changes to stack heights, the introduction of a new process etc.).
    - Sisters Poultry Limited Chicken Factory in Coupar Angus (PPC/E/00200065) has installed a wet scrubber on site to act as odour abatement on the emissions from their de-feathering plant.

2. Are you aware of any SEPA regulated process that has increased its emissions to air by more than 30%?
    - No.

3. Are you aware of any new industrial or new commercial developments that are likely to have a significant impact on the local air quality?
    - No.

4. Are you aware of any Part A or B processes that have ceased to operate?
    - No.

5. Are you aware of any new petrol stations with an annual throughput of over 2000 cubic metres of petrol?
    - No.

6. Are you aware of any new mineral extraction processes that are likely to have a significant impact on the local air quality?
    - No.

7. Are you aware of any new poultry units that house >400 000 birds (with mechanical ventilation), >200 000 birds (with natural ventilation) or >100 000 turkeys?
    - No.

8. Are there any sources that you would like to see included in the Council's assessment?
    - No.

Cheers

Graham

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1 ream of paper = 6% of a tree and 5.4kg CO2 in the atmosphere
3 sheets of A4 paper = 1 litre of water

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

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Spreadsheet of Bias Adjustment Factors accessed at http://laqm.defra.gov.uk/documents/Diffusion_Tube_Bias_Factors_v04_11_v6.xls

UK National Air Quality Information Archive, accessed at http://uk-air.defra.gov.uk/

Air Quality Detailed Assessment. 2004, AEA Technology plc, Report AEAT/ENV/R1708 Issue 1

Air Quality Updating and Screening Assessment 2006, AEA Technology plc Report AEAT/ENV/R2256 issue 2

Further Assessment of Air Quality 2007 AEA Technology plc Report AEA/ED49360001 issue 1

Perth & Kinross Council Progress Report 2007, 2008, 2010 2011 & 2013

Perth & Kinross Council Updating and Screening Assessment 2012

Regional Transport Strategy http://www.tactran.gov.uk/documents/TACTRANRTS-FinalNov2008.pdf

National Transport Strategy
http://www.scotland.gov.uk/Publications/2006/12/04104414/0

Scotland's Climate Change Declaration (SCCD) Perth and Kinross Council's first annual progress report http://www.keepscotlandbeautiful.org/sustainability-climate-change/sustainable-scotland-network/climate-change-reporting/201415-submitted-reports/?cid=15383

Perth and Kinross Local Climate Impacts Profile (LCLIP)
http://www.pkc.gov.uk/NR/rdonlyres/E590425C-2665-4D13-B8DD-B70C659B3080/0/PerthandKinrossLocalClimateImpactProfile2008_w.pdf

HSL (on behalf of Defra and the Devolved Administrators), WASP – Annual Performance Criteria for NO2 Diffusion Tubes used in Local Air Quality Management (LAQM), 2008 onwards, and Summary of Laboratory Performance in Rounds 117-124 (http://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html) April 2015

Smart Growth for Perth http://www.pkc.gov.uk/smartgrowth

Perth Transport Futures http://www.pkc.gov.uk/transportfutures