Annual Progress Report (APR)

2018 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

December 2018

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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 canyoning effect of high buildings within the effected streets.

Perth and Kinross Council (PKC) have declared two air quality management areas (AQMA), one covering the whole of Perth City and another encompassing the high street corridor running through Crieff.

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.

Crieff ‘s AQMA has the trunk road A85 running through it which Transport Scotland (TS) has adopted and maintains, therefore PKC are working closely with TS and this agency is represented 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 one of the worst affected streets namely, Atholl Street shows an overall downward trend.

The recorded levels of PM_{10} have decreased at Atholl Street, High Street, North Muirton and Crieff real time monitors (RTM).

PKC now monitors for $PM_{2.5}$ at all RTMs except our PM background monitor at North Muirton. However when the recommended conversion factor is applied there is an indication that there is an exceedance of $PM_{2.5,}$ at Atholl Street only.

PKC have taken the decision not to amend Perth's AQMA order to include exceedances of PM2.5 at this time until we have captured enough data to make an informed decision.

PKC have secured Scottish Government (SG) funding to install a FIDAS at the North Muirton background RTM to allow $PM_{2.5}$ monitoring. This upgrade is imminent.

Actions to Improve Air Quality

The main core action for Crieff has been the development of the draft AQAP which has been approved by Stakeholder Group members and PKC's Environment and Infrastructure (E&I) committee, the plan is being prepared to go out for external consultation in early 2019.

The further assessment for Crieff 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 are those targeting the reduction of local vehicle movements and to encourage the uptake of 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, 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.

Perth and Kinross Council and SUSTRANS have provided the provision of Cycle Shelters and Scooter Racks at various Perth and Kinross Schools; identified through the individual school's travel plans.

Local Priorities and Challenges

The main challenge is still 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
Draft AQAP out for external consultation in January 2019.

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/

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1. Local Air Quality Management

This report provides an overview of air quality in Perth and Kinross during 2017. 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 to improve air quality and any progress that has been made.

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

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

2. Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

A summary of AQMAs declared by Perth and Kinross Council can be found in

Table 2.1 Further information relating to declared or revoked AQMAs, including maps of AQMA boundaries, are available online at:

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

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.pkc.gov.uk/media/35448/2009-Air-Quality-Action-Plan/pdf/Perth_and_Kinross_Air_Quality_Action_Plan
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	The Action Plan is in the progress of being developed. A Steering Group has been established with Transport Scotland (TS) and TACTRAN being members. The draft

AQMA Name	Pollutants and Air Quality Objectives	City / Town	Description	Action Plan
			stopping at the junction of Galvemore Street and Lodge Street and north up to Comrie Street to the Y-Junction at Coldwells Road and the mid-point of Comrie street. The AQMA takes in the whole of the buildings along East High Street/High Street/West High Street and Comrie Street.	Action Plan has undergone internal consultation, including TS. The draft AQAP has been submitted to PKC's Environment & Infrastructure and authorised for external consultation early in 2019.

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

Perth & Kinross Council has taken forward a number of measures during the current reporting year of 2017 in pursuit of improving local air quality.

Details of all measures completed, in progress or planned are set out in Table 2.2.

The key completed measures are:

Perth

An Active Travel Strategy for Perth and Kinross has been approved by committee Active Travel Strategy Action Plan

'Perth on the Go' held an active travel day on the 6th August 2017 to promote active travel throughout Perth & Kinross.

Scottish Government funding continues to support year on year the post for an IBike officer and other active travel projects such as the '*Challenge Fund'* and bike maintenance within schools throughout Perth and Kinross.

'Clean Air Day'

PKC have incorporated E-Bikes as part of the pool fleet for staff use within Perth City Centre and have held trial days for staff and councillors. HR have also promoted the '*On your Bike'* programme which managed to get funding and is working with the Bike Station to promote Cycling with PKC Staff such as promoting the Essential Cycling skills quick guide published by Cycling Scotland.

ECS Quick Guide.pdf

Ebike trials were also carried out to promote '*Clean Air Day'* on the 20th June 2018 and a Cyclehoop rack was also positioned outside the council buildings to show how many bikes can be stored in the same space that one single car takes up.

Crieff

The Crieff Draft Action Plan has Environment and Infrastructure committee approval and will now go out for external consultation in January 2019. Although the plan has not been finalised, PKC has been very proactive and has undertaken a full traffic and parking survey; the traffic data will update the existing traffic model for Crieff. The updated model will then be utilised to model measures such as changing junction priorities and to determine the effect any new measures will have on air quality.

We have also been working in collaboration with SEPA and the Planning Advisory Service (PAS) to pilot an AQ draft technical placemaking guide. On street engagement was undertaken during Crieff's monthly Market and a workshop for stakeholders was held at the Crieff Community Campus. PKC are awaiting the final report from PAS.

Progress on the following measures has been slower than expected due to procurement issues with regards to PKC Ecostars. It took most of 2017 to agree the allocation of this project with TRL through procurement and it was hoped that more headway could have been made this year, however for new contracts TRL will now only accept Terms and Conditions (T&Cs) agreed in line with those concluded with

Edinburgh City Council. PKC's Procurement team established that the use of any framework created by another authority i.e. the "Edinburgh" framework agreement for ECO Stars had to be approved by the Tayside Procurement Consortium (TPC) steering group. Approval has been granted by TPC, however before the new contracts can be signed the previous T&Cs must be terminated by mutual consent and PKC are awaiting termination letter from TRL.

Notwithstanding our PKC fleet has already been assessed as part of this project and received a 5 star rating.

SG funding for the installation of a Crieff/Comrie bus shelter was obtained to encourage further bus usage. The shelters have been purchased at a cost of £8k but negotiations with BEAR Scotland in terms of installation are ongoing and should be concluded shortly either in the locations proposed or within the Crieff area.

Progress with PKC's Corporate Travel Plan has not progressed significantly due to resource constraints. To overcome this issue a full time graduate has been employed for 12 months to take this plan forward.

PKC expects the following measures to be completed over the course of the next reporting year:

- Review of Perth's AQAP
- Final AQAP for Crieff
- Corporate Travel Plan for PKC
- Ecostars
- AQ Supplementary Guidance

Table 2.2 – Progress on Measures to Improve Air Quality - Perth AQAP

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 center.	PKC Transport Planning Planning & Development 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. .	PKC Regional Modelling Predicted a (-) 16.70% reduction in NO_2 at Atholl Street hotspot.	Stage 1 A85/A9 has now been completed and is open to connect with Bertha Park. Stage 2 scoping and screening EIA assessments have been undertaken and noise and AQ assessments will be undertaken.	2022	Comments relating to target pollution reductions (link to Action Plan for more details).
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, lift share, 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	An Active Travel Strategy for Perth and Kinross has been approved at committee. Shaping Perth's Transport Future 2011 and the wider regional document published Transport Strategy for Perth Shaping Perth's Transport Future. 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.	EH continue to attend meetings with PKC's transport planning team for projects such as Perth City Centre Traffic, Shaping Perth's Transport Future and Perth Public Transport Interchange Study.	Transport Colleagues have acknowledged that the LTS needs to be reviewed in line with 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. 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. European Funding is being sought and planning permission in principle submitted for a hydrogen refuelling station South east of Broxden P&R 18/00482/IPL and a solar array for an electricity supply to support electric vehicle charging points to meet much of the energy requirements of the proposed Broxden Low Carbon Transport HUB.	Ongoing 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 programme.	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 the FQP.	
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 Corporate Travel Plan (CTP). 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 CTP. A working group has been set up to develop the CTP and a graduate employed to progress.	Ongoing	PKC at present 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) for 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 lift share. 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	

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 kilometers avoided in the AQMA and report reduction in emissions of NOx and PM10.	Medium	SG grant funding allows for the continued support for green travel plans. The road network team promotes Cycling, walking (WoW) initiatives.	ongoing	Hands up survey 2017 determined that the percentage of Perth primary pupils regularly cycling to school is 6.6% and 6.5% pupils scooted or skated to school.
		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 Lift share including PKC and PRI, SSE and Aviva with stalls within workplaces. Participation in national Lift share week and leaflet promotion through employers.	ongoing	
		Promoting travel alternatives	Green Travel Plans for new development. We will continue to seek travel plans from large development 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.

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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 Stratos UTM Common Database has been installed and a main link has been secured.	Ongoing	We will continue to review managing traffic within AQMA.
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 the delivery of the Local Development Plan (LD), and provide evidence that air quality considerations have been formalized within the LDP.	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: http://www.pkc.gov.uk/ldp2 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	Complete the 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	2018 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.	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	

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10.	Procurement and Air Quality	Vehicle fleet efficiency	Air Quality will be formally considered in tendering processes for new PKC vehicles. 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 tender arises 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 are bought, Euro Standards will be reported and an estimation of impact of specifying a more stringent standard will be reported.	Small – Medium	PKC have introduced E-bikes as part of our poll vehicles use within Perth City Centre. PKC 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	PKC are continually looking to incorporate new electric charging points throughout the region. The PKC region covers is vast and the range of electric vehicles is taken into consideration when reviewing fleet vehicle replacement.

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11.	Eco-driver training	Vehicle fleet efficiency	PKC will seek to expand the existing provision of eco driver training utilizing the former 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 Certificate of Professional Competence (CPC) training package which will be delivered on an ongoing basis.	PKC	Expanded programme by 2011 then ongoing	2011-Ongoing	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 calculations 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. PKC have 4 Trainers to deliver the 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.	Ongoing	PKC continues to deliver Drivers CPC Programme to PKC and Angus staff.

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	Set up vehicle group MPG indicators	Vehicle fleet efficiency	MPG Key Performance Indicators (KPIs).	PKC	2016/17	2017/19	MPG KPIs	Small	Cleansing database and fuel information cultural change to ensure accurate mileages and machine hours are accurately recorded at each fueling event.	2018/19	Fleet KPIs 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 with better use of Council pool vehicles.	Small	As part of the Council's Vehicle Fleet Utilisation and Optimisation Review all Council fleet vehicles are to be 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	

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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 circa 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 continues to develop the website and apps to provide and enhance public transport information Scotland-wid**e.**	Ongoing	

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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.

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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	

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									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 new 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 fulfil our statutory duties.	PKC	Ongoing	Ongoing	Monitoring data will be provided in the annual progress report as will the progression of measures within AQAP.	Small	PKC upgraded RTMs to allow monitoring of PM2.5s.	Ongoing	

PKC take on board the comments made at the time of the 2017 APR with regards to the above Perth AQAP and the need to review the measures within the Action Plan. PKC secured 2018/19 SG funding to undertake such a review before the 2019 APR submission.

2.3 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.

2.3.1 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.

A Corporate Travel Plan group was formed with the initial task to develop a Corporate Travel Plan. Several meetings were undertaken to establish the short and long term aims of the plan and to identify priority measures and actions. The group established that due to resource constraints, a graduate should be employed for a 12 month period to develop this plan.

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

The Scottish Government expects any Scottish local authority which has or is currently developing a Sustainable Energy Action Plan to ensure that air quality considerations are covered.

Perth and Kinross Council have signed Scotland's Climate Change Declaration and are participating in a carbon Management Programme run by the Carbon Trust. http://www.pkc.gov.uk/article/17923/Climate-change-and-energy

Perth and Kinross's capacity for the installation of renewable energy schemes has increased by 44% over the last five years and has 3.15% of the nations installed microgeneration capacity.

http://www.pkc.gov.uk/media/13053/Renewables-Installed-Capacity-/pdf/RenewableInstalledCapacity.pdf?m=636118891999370000

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

- Renewables and Low Carbon Energy

  http://www.pkc.gov.uk/media/39833/PKCRenewableSG-Draft/pdf/PKCRenewableSG-Draftv1-31

  Public Consultation was undertaken in August 2017 and the final document is awaiting committee approval.

Also to support the planning and development of low carbon energies projects within Perth & Kinross a heat map was commissioned by PKC in partnership with Fife Council and SG.

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 2017. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at:
http://www.scottishairquality.co.uk/latest/summary?view=la

Maps showing the location of the monitoring sites are provided in 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 71 sites during 2017. Table A.2 in Appendix A shows the details of the sites.

Monitoring site maps for real time monitors and diffusion tube locations are in the process of being uploaded onto PKC's GIS system and therefore not available for the 2018 APR but should be for 2019 APR.

3.2 Individual pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for annualisation and bias. Further details on adjustments are provided in Appendix C.

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 2017 dataset of monthly mean values is provided in Appendix B.

Table A.4 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 Street shows no exceedance of the annual mean standard with a concentration of 40µg/m^3, a decrease from 45µg/m^3 in 2016. This is part of an overall downward trend shown in Figure 1. There was one exceedance of the hourly mean in 2017 with 220µg/m^3 recorded on one occasion.

The other automatic monitors were below the annual mean standard and the hourly standard for 2017. It should however be noted that the data capture for 2017 for the Crieff automatic monitor was only 66%, below the 85% rate required for comparison with the objectives. This was due to the analysers being switched off for a period to protect them while a problem with the air conditioning unit was resolved.

Diffusion tube monitoring shows exceedances at 4 locations which are all within Perth, down slightly from 2016. All exceedances were within the Perth AQMA.

It should be noted that over the period from November – December 2017 there were unusually high readings across the diffusion tube monitoring network, this may have resulted in a slighlty lower bias adjustment value than would otherwise have been generated which in turn will impact upon our bias adjusted results. It has not been possible to establish a reason for these higher readings, however the laboratory which conducted the anlaysis have confirmed there were no known issues with their equipment or procedures.

3.2.2 Particulate Matter (PM_{10})

Table A.5 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 Street for this pollutant shown on Figure 4. In 2017 the annual mean was recorded as 17µg/m^3 down slightly from the 18µg/m^3 recorded in 2016. High Street remained at 13µg/m^3, the same value which has been recorded for the two previous years, whilst Crieff decreased from 16µg/m^3 to 11µg/m^3. It should be noted that the data capture for the High Street location was 76%, however this is because the analyser was changed to FIDAS to allow $PM_{2.5}$ monitoring in October. When data capture for the PM_{10} and $PM_{2.5}$ are added together

the total is 98% and therefore comparisons with the objective can confidently be made. The Muirton background monitor dropped back down to 9µg/m^3 from 10µg/m^3 in 2016.

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

There were 4 exceedances for this objective at Atholl Street, where a maximum value of 53µg/m^3 was recorded and one at High Street where a maximum value of 52µg/m^3 was recorded. This is an increase from 2016 where no exceedances of this objective were recorded. No exceedances were recorded at Crieff or at the background monitor in Muirton.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.7 in Appendix A compares the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years with the air quality objective of 10µg/m^3.

Monitoring of $PM_{2.5}$ began at three locations within Perth and Kinross in 2017. Monitoring at High Street began in October and the annual mean is recorded as 7µg/m^3. At Atholl Street and Crieff monitoring only began in December; the annual mean values are 8µg/m^3 and 6µg/m^3 respectively. No $PM_{2.5}$ data is available for the Muirton site, although monitoring is scheduled to begin here in 2018.

As the available monitoring data only covers a very short period of time which may not be representative of the whole year, the conversion calculation described in method 2 of annex B in TG.16 has been used to provide estimates from $PM_{2.5}$ based on the PM_{10} data – See Table 3.1

Table 3.1 – PM_{10} to $PM_{2.5}$ Conversion

PM_{10} to $PM_{2.5}$ Conversion		
Monitoring Site	PM_{10} Annual Mean	TG.16 Adjustment (0.7) – $PM_{2.5}$
Atholl St	17	11.9
High St	13	9.1
Muirton	10	7
Crieff	11	7.7

This shows a predicted exceedance at Atholl Street but not at any of the other monitoring locations, although it should be noted that the Crieff monitor is not sited at

the worst case location and therefore the $PM_{2.5}$ is expected to be higher than shown above.

PKC have taken the decision not to amend Perth or Crieff AQMA orders to include exceedances of PM2.5 at this time, until we have captured enough data to make an informed decision.

3.2.4 Sulphur Dioxide (SO_2)

Not currently monitored.

3.2.5 Carbon Monoxide, Lead and 1, 3-Butadiene

Not currently monitored.

4. New Local Developments

Residential developments

- Scone 16/02127/IPM (approved) - provision for 700 houses due to impact on AQ at Bridgend, Perth. Permission was granted for 100 houses prior to the construction of the CTLR, with the remaining houses being constructed after the CTLR.
- Luncarty17/00847/IPM (pending decision) - an AQ impact assessment was submitted and due to small increases in NO_2, PM_{10} & $PM_{2.5}$ (less than 1%) AQ was not determined to be an issue.

4.1 Road Traffic Sources

Cross Tay Link Road (CTLR)

Construction of the new A85/A9 interchange, Planning Application 15/00036/FLL and 16/01290/FUL (revised design), which forms the first phase of the Cross Tay Link Road (CTLR), has begun. The air quality implications of this were assessed through the Environmental Statement and determined that the link road would not raise levels of NO_2 or PM_{10} within Perth City centre. However, dust nuisance was a cause for concern throughout the construction stage therefore a number of mitigation measures were conditioned.

A DMRB stage 1 & 2 assessment has been submitted for the project and a scoping request has been submitted for Stage 3 for CTLR from the A9 over the River Tay to the A93 & A94 North of Scone. Air quality modelling for the EIA is also to be undertaken for all identified receptors in the DMRB Stage 2 with additional indicative receptors at the proposed Bertha Park and Scone Highfield housing developments.

A9 Dualling

For each proposed project stage of the A9 dualling PKC are to be consulted throughout each individual DMRB Stages 1, 2 & 3 and EIA reports for Noise and AQ.

- 17/00082/CONSUL Killiecrankie to Glengarry (stage3)
- 17/00087/CONSUL Pitlochry to Killiecrankie (stage3)
- 17/00064/CONSUL Glengarry to Dalwhinnie (stage 3)
- 17/00027/CONSUL Killiecrankie to Glengarry (stage 3)

4.2 Other Transport Sources

No new sources identified.

4.3 Industrial Sources

No new sources identified.

4.4 Commercial and Domestic Sources

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

Table 4.1 Planning applications for biomass boilers 50kW - 20MW

Biomass Developments				
Planning Ref	Location	Thermal Output (kW)	In AQMA	DA Required
16/02177/FLL	Murthly	301	N	N
17/01200/FLL	Fossoway	130	N	N
17/01025/FLL	Charles St, Perth	500	Y	Y
17/00363/FLL	Dunkeld	500	N	Y
17/01464/FLL	Blairgowrie	2x990	N	N
17/00663/FLL	Methven	5x999	N	Y*
17/00198/FLM	Bertha Pk, Perth	995	N	Y*
17/00753/FLL	Grandtully		N	N
17/00742/FLL	Dunkeld		N	N

* Detailed assessment proactively carried out

4.5 New Developments with Fugitive or Uncontrolled Sources

No new sources identified.

5. Planning Applications

16/02127/IPM for 700 houses in North Scone; this application has the potential to impact on the Perth AQMA, particularly at Bridgend, although the development itself is outside the AQMA. The development will take place in 2 phases with the first 100 houses built prior to the construction of the CTLR, and the remaining 600 houses built afterwards. It was recommended that the traffic data be screened for the first phase of the development in order to determine whether a formal AQ assessment was required. Based on this screening the change in annual average daily traffic did not meet the threshold level at which an AQ assessment would be required.

17/00847/IPM, an application for a mixed use development at Luncarty. An AQ assessment was carried out; however this identified only a very small increase on NO_2, PM_{10} and $PM_{2.5}$.

As a result there was no objection to the development on air quality grounds.

17/00946/IPM, an application for the formation of a business park in Auchterarder. A condition has been recommended requiring that an AQ assessment be carried out.

17/00939/IPM, an application for a mixed use development on Perth Road, Blairgowrie. The development is to include residential properties (approximately 400 units), employment land, community facilities and infrastructure. EH advised that the development could not be supported until AQ has been considered.

17/00669/FLM, an application for 48 dwelling houses on Gannochy Road, Perth. The outcome of an AQ assessment has determined that the development will have a negligible impact on local AQ.

16/02217/FLM, an application for 102 dwelling houses at Wester Tomaknock, Crieff. A Traffic Impact Assessment indicated that the impact of the development on the A85 trunk road (AQMA) would not be substantial and therefore an AQ assessment was not required.

17/00838/FLM, an application for 71 dwelling houses at Moyness Park, Blairgowire. As there are currently no AQ concerns in Blairgowrie there was no objection to the development on AQ grounds.

17/00924/SCOP, scoping for change of use of a former hospital to form flats and erection of 70 residential dwelling houses. AQ is a major consideration as the application site is within Perth AQMA.

6. Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

Perth and Kinross Council's air quality monitoring continued to show exceedances around the city centre for NO_2. However, the downward trend continues with a further decrease at Atholl Street since 2016, including no exceedance at the Atholl Street RTM. No NO_2 exceedances were identified within the Crieff AQMA.

PM_{10} monitoring indicates no exceedances at any of the monitoring sites with all locations showing a decrease when compared to 2016. Only a very limited amount of data is available for $PM_{2.5}$ and this is therefore considered insufficient to make an assessment of the levels. The 0.7 conversion factor has been used which has identified only one probable exceedance at Atholl Street.

6.2 Conclusions relating to New Local Developments

A proposed development at North Scone for 700 dwelling houses was considered for the potential impact on air quality. However as the development is split into two phases with 100 houses to be built prior to the construction of the CTLR and the remaining 600 houses afterwards screening has indicated that the development is unlikely to have a significant impact on air quality within the Perth AQMA. It is anticipated that the construction of the CTLR will have a positive impact on Perth's AQMA by taking traffic away from Bridgend.

6.3 Proposed Actions

Within Perth, exceedances of NO_2 have still been identified, although there were no exceedances of $PM_{10.}$ However, PM_{10} data from one year is an insufficient basis on which to consider revoking part of the AQMA order and therefore it is proposed to continue with the Perth AQAP. Likewise while no exceedances for either NO_2 or PM_{10} were measured within the Crieff AQMA during 2017 it is proposed to continue to develop the AQAP for this area, with publication scheduled for 2018/19.

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 Street	Roadside	311680	723624	NO_2; PM_{10}; $PM_{2.5}$	Y	Chemiluminescent; TEOM/FIDAS	20.4	4.8	1.5
Perth 2	Atholl Street	Roadside	311575	723917	NO_2; PM_{10}; $PM_{2.5}$	Y	Chemiluminescent TEOM/FIDAS	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}; $PM_{2.5}$	Y	Chemiluminescent FDMS/FIDAS	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

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
P43	17 Atholl Street	R	311635	723950	NO_2	Y	2	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?
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
P54	RTM, 176 High Street	R	311689	732624	NO_2	Y	4.58	7.2	Y
P61	RTM, Atholl Street	R	311584	723931	NO_2	Y	0.9	3.7	Y
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

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?
P68	2 Atholl Street	R	311720	723955	NO_2	Y	2.5	0.8	N
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
P95	26-28 Atholl Street	K	311635	723950	NO_2	Y	2	0.78	N
P96	22 Barrack St	K	311422	723950	NO_2	Y	2.7	0.3	N
P97	St Ninians School,	R	311370	724050	NO_2	Y	3.4	3.2	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?
	Dunkeld Road								
P98	30 Edinburgh Road	R	311496	721862	NO_2	Y	37	2.5	N
P99	15 Murray Cr Perth	UB	310534	722926	NO_2	Y	2.9	2.05	N
P101	28 Dunkeld Road	R	311010	724484	NO_2	Y	5.1	2.1	N
P107	1 Glover Street	R	311200	722878	NO_2	Y	4.2	1.5	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
P102	30 Perth Road, Scone	R	313699	726058	NO_2	N	3	2	N
P55	7 West High Street, Crieff, PH7 3AF	UC	286332	721638	NO2	Y	1.83	0.45	N
P56	39 High Street, Crieff, PH7 3HT	UC	286505	721555	NO2	Y	2.34	1.2	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?
P57	62 High Street, Crieff, PH7 3HT	UC	286550	721562	NO2	Y	0.12	1	N
P58	9 East High Street, Crieff, PH7 3AF	UC	286577	721554	NO2	Y	0.36	0.3	N
P73	19 West High Street, Crieff, PH7 4AU	UC	286302	721651	NO_2	Y	0.12	1.65	N
P74	43 High Street, Crieff, PH7 3HT	UC	286517	721553	NO_2	Y	0.2	1.8	N
P75	RTM, Crieff	R	286360	721619	NO_2	Y	4.84	3.4	Y
P76	10/12 West High Street, Crieff, PH7 4DL	UC	286324	721632	NO_2	Y	0.12	2	N
P78	1 Lodge Street, Crieff, PH7 4AX	UC	286195	721691	NO_2	Y	0.12	1.78	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?
P87	Hollybush Road	BG	287028	721485	NO_2	N	8	6	N
P106	Victoria Terrace, Crieff	R	286480	721913	NO_2	N	23	1	N
P81	76 High Street, Kinross, KY13 8JA	R	311936	702187	NO_2	N	0.12	1.1	N
P82	66 High Street, Auchterarder, PH3 1BN	R	294569	712888	NO_2	N	1.6	0.65	N
P83	176 High Street, Auchterarder, PH3 1BN	R	294268	712730	NO_2	N	2.2	1	N
P92	Main Road, Ballinluig, PH9 0LG	R	297753	752576	NO_2	N	30	1	N
P94	Queen Street, Coupar Angus	UC	322232	739915	NO_2	N	2	1	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?
P105	Atholl Road, Pitlochry	R	313699	726058	NO_2	N	3	2	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.

Table A.3 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2013	2014	2015	2016	2017
High Street	R	Automatic	N/A	98	22	22	22	23	17
Atholl Street	R	Automatic	N/A	99	**48**	**45**	**49**	**45**	40
James Square	R	Automatic	N/A	66	26	23	23	26	25
42 Scott St, Perth	R	Diffusion	N/A	92	**41**	40	36	37	35
17 Speygate Perth	R	Diffusion	N/A	100	22	21	22	22	22
8 Stormont Street	UC	Diffusion	N/A	92	20	20	21	20	20
41 Mull Place	UB	Diffusion	N/A	100	13	11	12	11	11
257 Rannoch Road	UC	Diffusion	N/A	100	19	18	15	19	16
86 South Street	R	Diffusion	N/A	100	35	30	32	31	31
2 Crieff Road	R	Diffusion	N/A	58	28	27	26	27	26
37 York Place	R	Diffusion	N/A	100	39	40	40	33	31

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2017 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2013	2014	2015	2016	2017
104 South Street	R	Diffusion	N/A	100	37	34	35	33	35
45-47 South Street	R	Diffusion	N/A	100	30	29	27	27	25
135 South Street	R	Diffusion	N/A	100	36	29	33	33	32
216 South Street	R	Diffusion	N/A	100	38	35	35	35	31
10 County Place	R	Diffusion	N/A	100	**46**	**45**	**44**	**43**	**41**
17 Princes Street	R	Diffusion	N/A	92	27	26	26	26	23
51 Glasgow Road	R	Diffusion	N/A	100	33	30	28	29	28
Riggs Road	R	Diffusion	N/A	100	30	27	26	26	25
93 Main Street,	R	Diffusion	N/A	100	31	30	27	28	27
39 Main	R	Diffusion	N/A	100	**46**	**44**	**40**	38	35

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2017 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2013	2014	2015	2016	2017
Street,									
18 Main Street	R	Diffusion	N/A	100	**44**	**42**	**43**	**41**	40
76 Atholl Street	R	Diffusion	N/A	100	**47**	**42**	37	39	37
17 Atholl Street	R	Diffusion	N/A	100	**51**	**49**	**47**	**46**	**44**
Ballantine Place	UC	Diffusion	N/A	100	23	21	19	21	20
204 Crieff Road	R	Diffusion	N/A	67	33	30	29	31	25
5 East Huntingtower	R	Diffusion	N/A	100	28	25	23	25	22
2 West Bridge St	R	Diffusion	N/A	100	30	27	27	27	27
84 Dundee Road	R	Diffusion	N/A	100	33	31	28	30	28
30 Dundee Road	R	Diffusion	N/A	75	39	37	**40**	39	37

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2017 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2013	2014	2015	2016	2017
Isla Road	R	Diffusion	N/A	100	**45**	**43**	**46**	**43**	**42**
5 Charlotte Street	R	Diffusion	N/A	100	33	34	30	30	28
1 Atholl Street	R	Diffusion	N/A	100	36	35	35	33	34
2 Atholl Street	R	Diffusion	N/A	100	30	30	30	29	28
Church, Kinnoull St	R	Diffusion	N/A	100	34	31	32	34	40
134 Dunkeld Road	R	Diffusion	N/A	100	18	28	18	16	15
82 Crieff Road	R	Diffusion	N/A	100	37	16	37	34*	33
17 Main Street	R	Diffusion	N/A	100	**42**	40	36	37	34
2 Friarton Road	R	Diffusion	N/A	92	28	28	26	25	25
59 South Methven St	R	Diffusion	N/A	100	39	37	37	37	34
22 North Methven St	R	Diffusion	N/A	100	33	34	30	30	30

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2017 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2013	2014	2015	2016	2017
26-28 Atholl Street	K	Diffusion	N/A	58	N/A	N/A	N/A	40*	**43**
22 Barrack St	K	Diffusion	N/A	100	N/A	N/A	N/A	35*	33
Dunkeld Road	R	Diffusion	N/A	92	N/A	N/A	N/A	33*	31
30 Edinburgh Road	R	Diffusion	N/A	100	N/A	N/A	N/A	22*	20
15 Murray Cr Perth	UB	Diffusion	N/A	100	N/A	N/A	N/A	18*	17
28 Dunkeld Road	R	Diffusion	N/A	100	N/A	N/A	N/A	28*	26
30 Perth Road, Scone	R	Diffusion	N/A	83	N/A	N/A	N/A	24*	24
28 York Place	R	Diffusion	N/A	100	N/A	N/A	N/A	**41***	38
202 Glasgow Road	R	Diffusion	N/A	100	N/A	N/A	N/A	31*	30
1 Glover Street	R	Diffusion	N/A	92	N/A	N/A	N/A	N/A	29

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2017 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2013	2014	2015	2016	2017
7 West High Street, Crieff, PH7 3AF	UC	Diffusion	N/A	83	**47**	**44**	40	**42**	38
39 High Street, Crieff, PH7 3HT	UC	Diffusion	N/A	100	33	29	25	26	24
62 High Street, Crieff, PH7 3HT	UC	Diffusion	N/A	100	29	28	25	27	25
9 East High Street, Crieff, PH7 3AF	UC	Diffusion	N/A	100	**41**	39	36	34	34
19 West High Street, Crieff, PH7 4AU	UC	Diffusion	N/A	100	**41**	39	38	39	39
43 High Street, Crieff, PH7 3HT	UC	Diffusion	N/A	100	31	31	28	29	29

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2017 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2013	2014	2015	2016	2017
10/12 West High Street, Crieff, PH7 4DL	UC	Diffusion	N/A	92	39	36	35	34	33
1 Lodge Street, Crieff, PH7 4AX	UC	Diffusion	N/A	100	26	25	21	23	21
9 Comrie Street, Crieff, PH7 4AX	UC	Diffusion	N/A	100	N/A	N/A	N/A	21*	19
Hollybush Road	BG	Diffusion	N/A	67	8	7	6	6	7
Victoria Terrace, Crieff	R	Diffusion	N/A	83	N/A	N/A	N/A	N/A	9
76 High Street, Kinross, KY13	R	Diffusion	N/A	92	26	25	23	23	22

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2013	2014	2015	2016	2017
8JA									
66 High Street, Auchterarder, PH3 1BN	R	Diffusion	N/A	92	28	27	29	26	24
176 High Street, Auchterarder, PH3 1BN	R	Diffusion	N/A	100	23	22	20	19	15
Main Road, Ballinluig, PH9 0LG	R	Diffusion	N/A	83	N/A	N/A	17	18	15
Queen Street, Coupar Angus	UC	Diffusion	N/A	100	N/A	N/A	26*	24	21
Atholl Road, Pitlochry	R	Diffusion	N/A	92	N/A	N/A	N/A	18*	21

Notes: Exceedences of the NO_2 annual mean objective of $40\mu g/m^3$ are shown in **bold**.

NO_2 annual means exceeding $60\mu g/m^3$, 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.4 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2013	2014	2015	2016	2017
Perth 1 (High St)	Roadside	Automatic	N/A	98%	0	0	0	0	0
Perth 2 (Atholl St)	Roadside	Automatic	N/A	99%	**13**	0	0	0	**1**
Crieff (St James Sq)	Roadside	Automatic	N/A	66%	0	0	0	**4**	(0)

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.

Figure1. Annual Mean Trend for NO_2 at Atholl Street

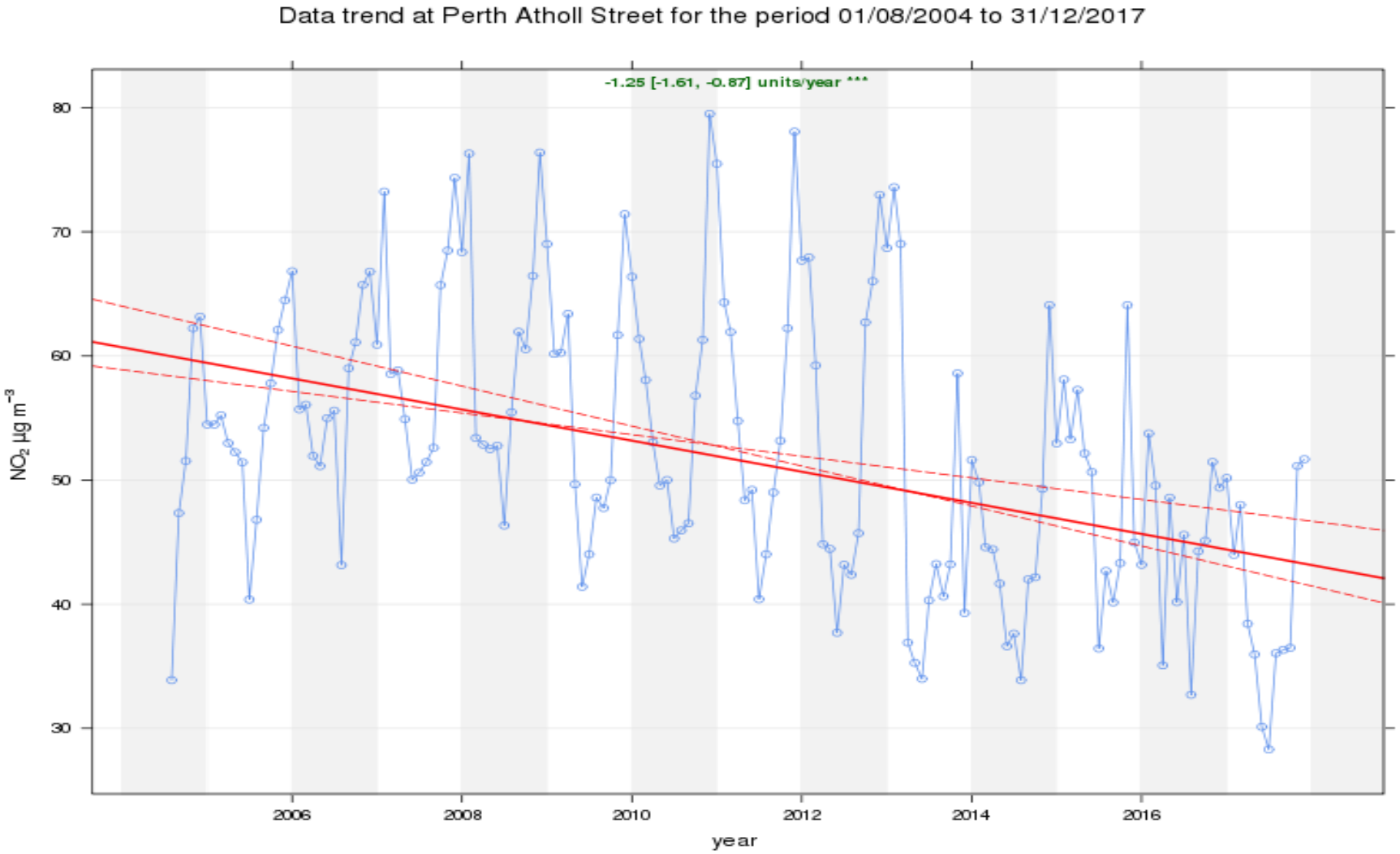


Figure 2. Annual Mean Trend for NO_2 at High Street

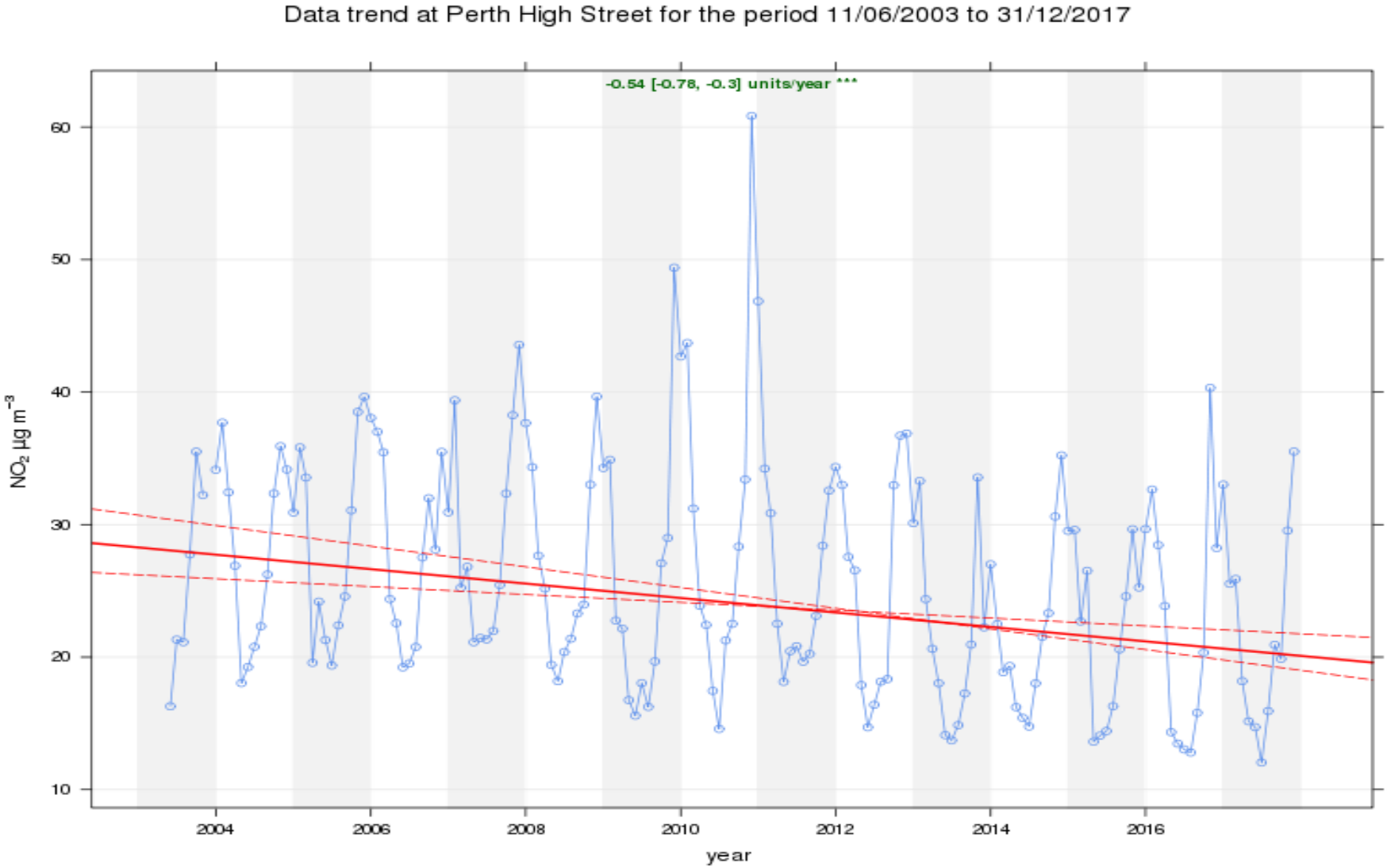


Figure 3. Annual Mean Trend for NO_2 at Crieff

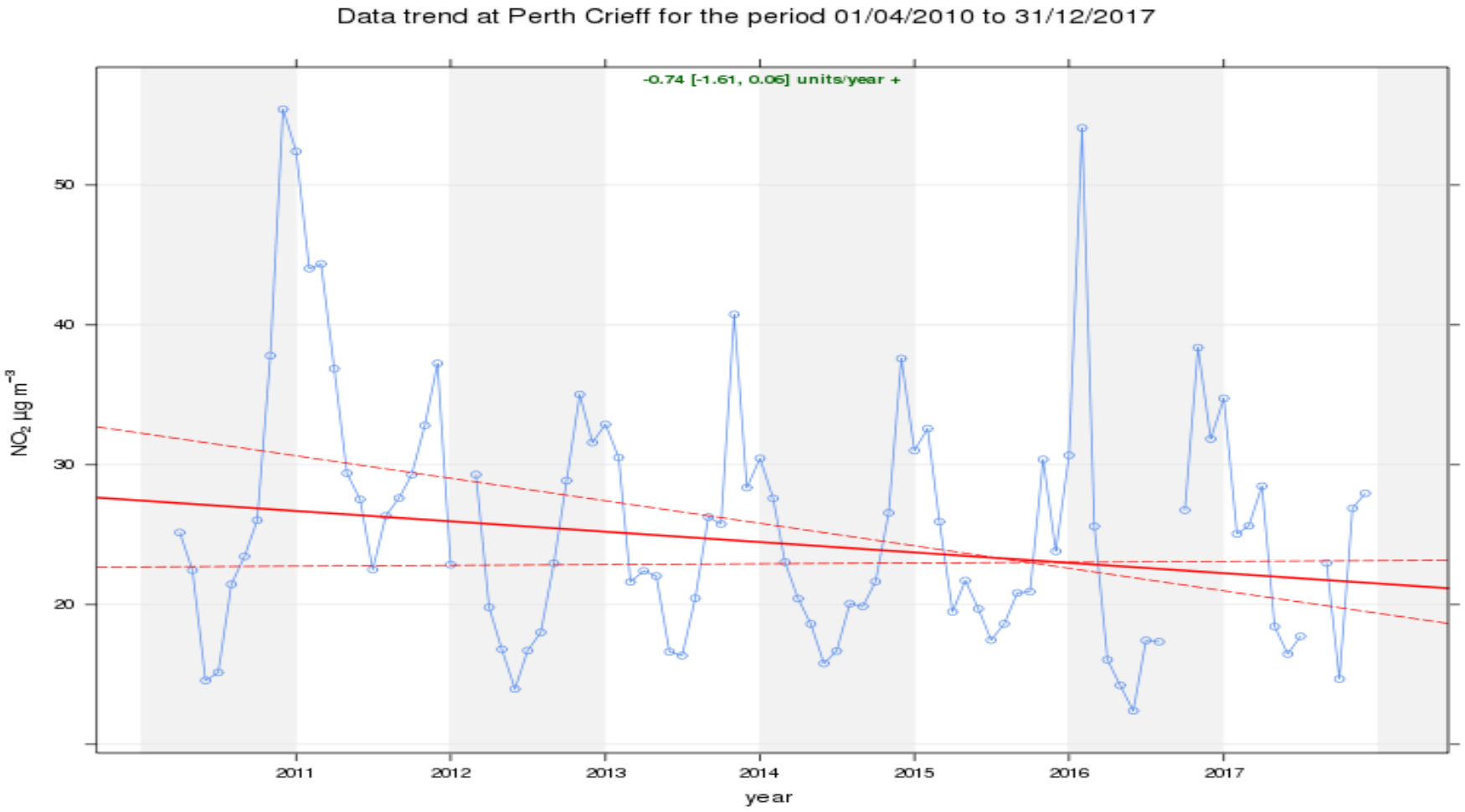


Table A.5 – Annual Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	PM_{10} Annual Mean Concentration (µg/m^3) (3)				
				2013	2014	2015	2016	2017
Perth 1 (High St)	Roadside	98	76%	16	14	13	13	13
Perth 2 (Atholl St)	Roadside	N/A	97%	**22**	**20**	**18**	**18**	17
Perth 3 (Muirton)	Background	N/A	94%	10	10	9	10	9
Crieff (St James Sq.)	Roadside	N/A	93%	16	**20**	14	16	11

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.6 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
				2013	2014	2015	2016	2017
Perth 1 (High St)	Roadside	98	76%	0	0	1	0	1
Perth 2 (Atholl St)	Roadside	N/A	97%	7	1	6	0	4
Perth 3 (Muirton)	Background	N/A	94%	0	0	0	0	0
Crieff (St James Sq.)	Roadside	N/A	93%	0	1	0	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 98.1st percentile of 24-hour means is provided in brackets.

Figure 4. PM_{10} Trend for Atholl Street

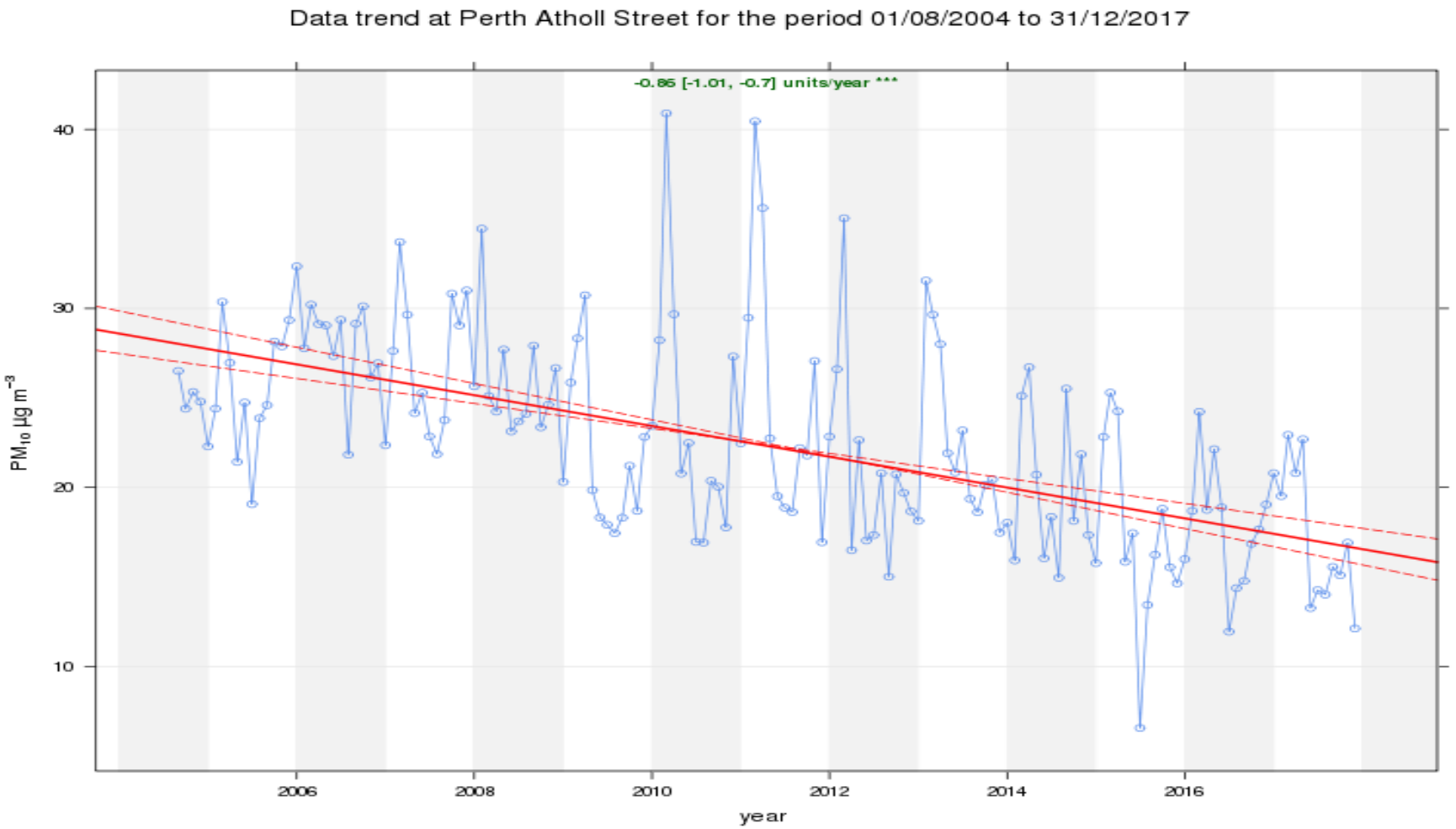


Figure 5. PM_{10} Trend for High Street

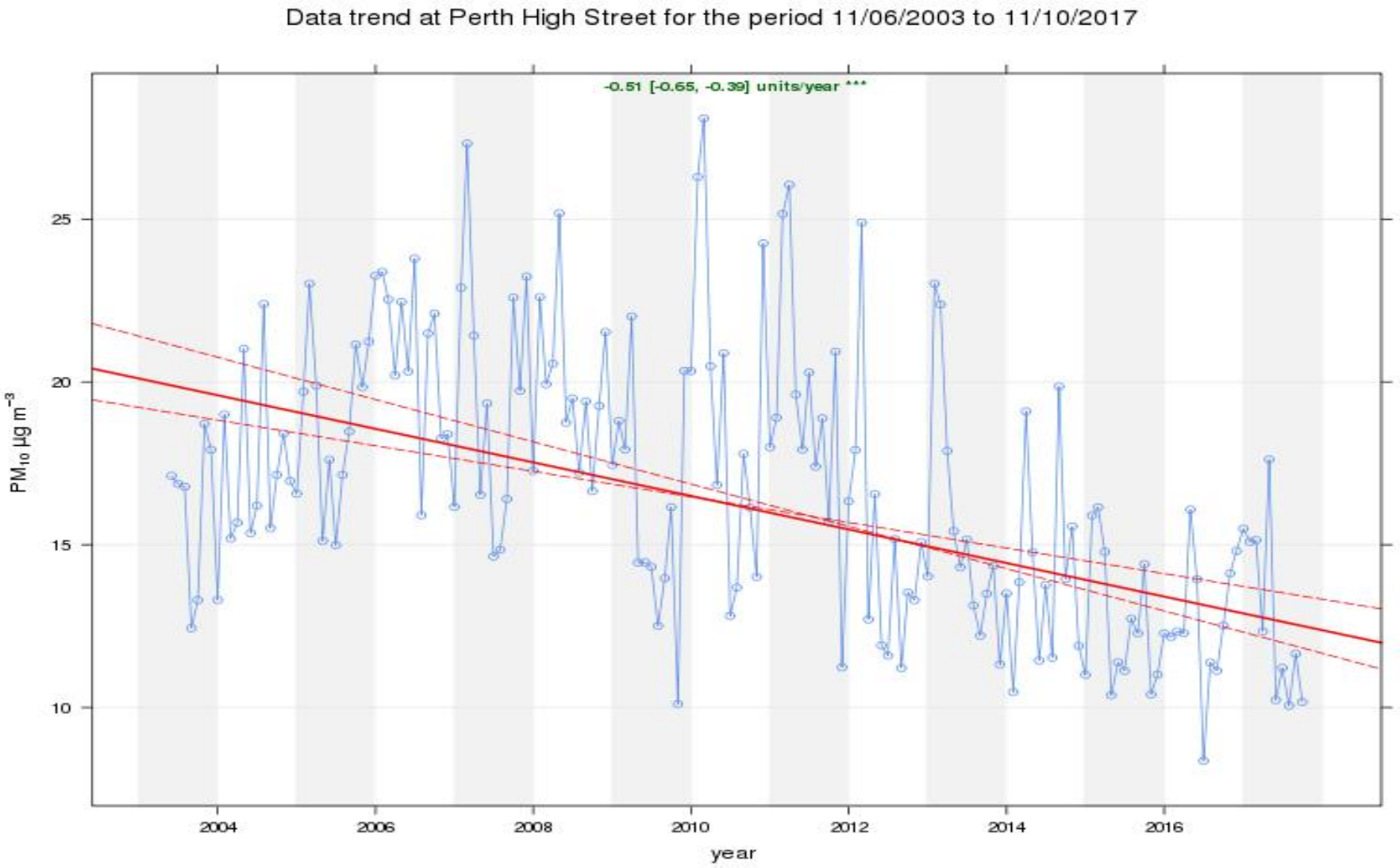


Figure 6.PM_{10} Trend for North Muirton

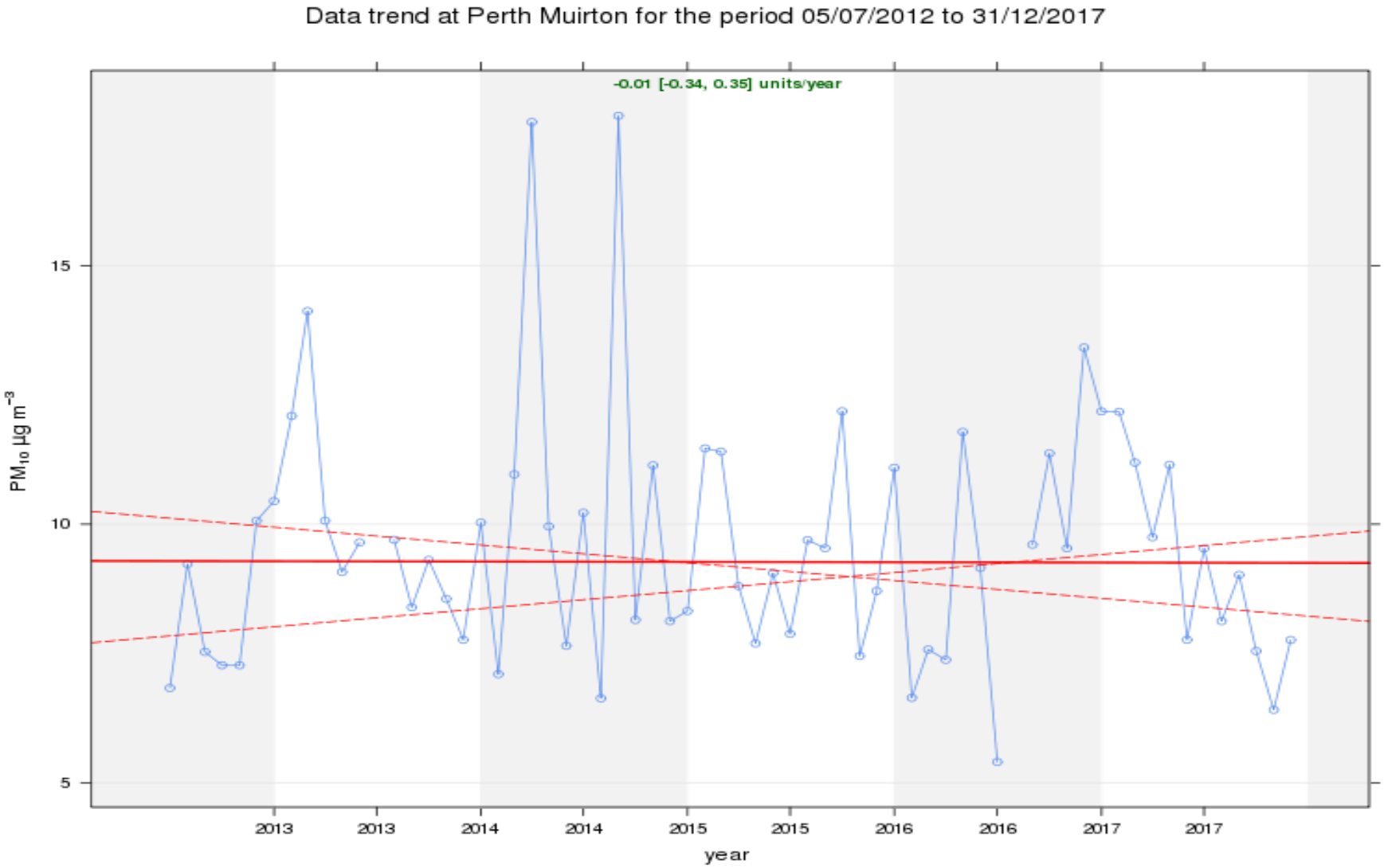


Figure 7. PM_{10} Trend for Crieff

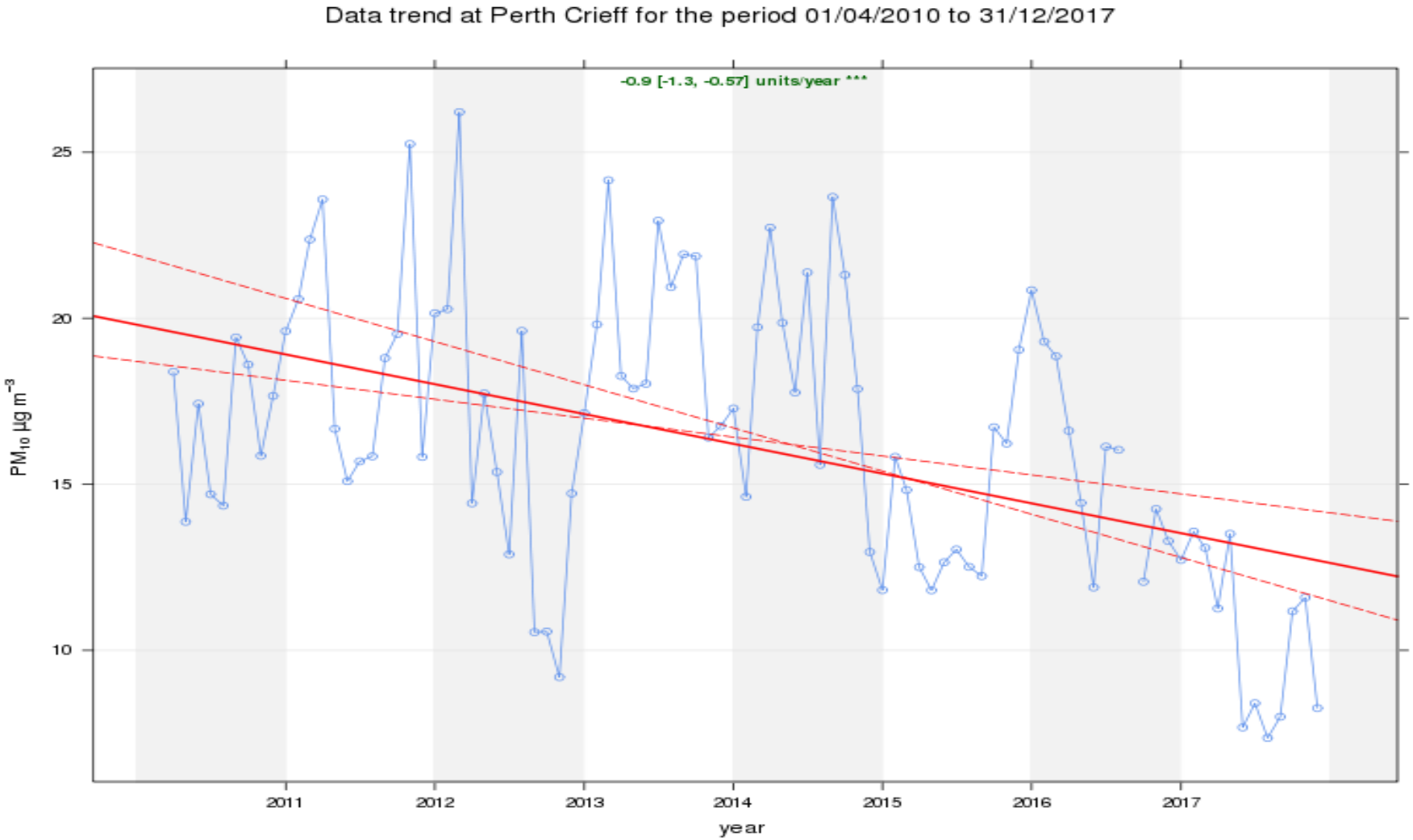


Table A.7 – Annual Mean $PM_{2.5}$ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	$PM_{2.5}$ Annual Mean Concentration ($\mu g/m^3$) (3)				
				2013	2014	2015	2016	2017
Perth 1 (High St)	Roadside	98	22%	N/A	N/A	N/A	N/A	N/A
Perth 2 (Atholl St)	Roadside	93%	8%	N/A	N/A	N/A	N/A	N/A
Crieff (St James Sq.)	Roadside	94%	8%	N/A	N/A	N/A	N/A	N/A

Notes: Exceedances of the $PM_{2.5}$ annual mean objective of $10\mu g/m^3$ are shown in **bold.**

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

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2017

Table B.1 – NO_2 Monthly Diffusion Tube Results for 2017

SITE ID	NO_2 Mean Concentrations ($\mu g/m^3$)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
42 Scott St, Perth, PH1 5PH	47.7	47.4	46.6	x	39.9	29.8	30.7	x	36.5	35.9	43.3	44.5		
42 Scott St, Perth, PH1 5PH	47.7	48.9	46.6	x	39.7	32.0	31.0	33.4	37.3	36.4	47.1	50.9	40.2	35
42 Scott St, Perth, PH1 5PH	47.0	49.6	44.9	x	35.9	32.0	31.8	31.0	36.3	35.3	47.3	50.1		
17 Speygate, Perth, PH2 8PJ	33.7	28.3	26.2	20.5	17.9	16.4	15.9	17.4	23.6	20.5	39.2	36.9	24.7	22
8 Stormont St, Perth, PH1 5NW	29.5	26.4	24.9	20.9	15.4	17.4	14.1	X	19.5	20.7	29.4	31.8	22.7	20
41 Mull Place, Perth, PH1 3DP	19.7	15.6	13	9.8	7.4	7	6.7	8.4	11.5	10.5	19.5	21.6	12.6	11
257 Rannoch Rd/Newhouse Road Roundabout, Perth, PH1 2DW	26.3	24	20.7	11.7	14.8	11.5	11.8	11.3	17.6	28.7	20.4	24.7	18.6	16
86/88 South Street, Perth, PH2 8PD	42.8	37.7	39.2	32	26.9	28.3	25.4	30.8	31.6	34.3	46.1	43.3	34.9	31
2 Crieff Road, Perth, PH1 5RT	38.8		X	X		21.3	19.9	22.4	X	26.6	35.5	38.9	29.1	26
37 York Place, Perth, PH2 8EH	44.8	41.7	40	29.8	32.7	27.1	25.1	28.7	34.7	31.8	40.9	45.5	35.2	31
104 South St, Perth, PH2 8PA	48.7	43.2	44.5	40.4	28.2	29.1	26.6	33.9	31	39.1	<0.5	107.5		
104 South St, Perth, PH2 8PA	47.7	44	41.7	36.3	29.7	28.9	26.6	33.4	31.6	36.1	51.5	50	39.6	35
104 South St, Perth, PH2 8PA	44.8	45.1	39.6	36.9	28.6	28.1	26.1	32.2	32.2	37.3	47.3	47.2		
45-47 South St, Perth, PH2 8PD	35.3	34.5	34	23.4	25.8	20.3	20.7	20.9	26.3	24.1	35	38.1	28.2	25

SITE ID	NO_2 Mean Concentrations (µg/m^3)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
135 South St, Perth, PH2 8PA	42.4	40.9	40	35.1	30.5	27.7	25.9	30.6	35.3	31.7	46.8	47.6	36.2	32
216 South Street, Perth, PH2 8NY	40.8	42.1	41.1	31.2	26.1	29.5	27.9	30	36.9	34.3	42.8	45.1	35.7	31
10 County Place, Perth, PH2 8EE	48.7	52.1	50.4	38.6	48.1	41.4	36.4	40.8	42.5	44	54.5	55.2	46.1	41
17 Princes St, Perth, PH2 8NG	37.8	29.8	29.6	23.6	20.7	20.5	18.5	22.2	25.2	24	X	39.2	26.5	23
51 Glasgow Rd, Perth, PH2 0PE	40.2	37.8	35.7	26.7	27.7	25.2	23.6	25.9	28.7	31.2	40.5	41.7	32.1	28
Riggs Rd, Perth, PH1 1PR	38.2	35.1	31.3	22.4	24.9	19.9	19.4	22.6	27.5	25.1	29.7	38.1	27.9	25
93-109 Main St, Bridgend, PH2 7HE	35.5	37.2	30.6	22.4	32	25.2	24.5	24.2	27.3	41.2	33	31.8	30.4	27
39 Main St, Bridgend, PH2 7HD	41	48.5	39.2	34.3	45.6	33.9	37.6	35.9	40.2	33.5	43.4	43.4	39.7	35
18 Main St, Bridgend, PH2 7HB	51.1	46.6	51.5	45.1	37.6	39.4	35.5	41.7	45.3	40.7	54.6	51	45	40
76 Atholl St, Perth, PH1 5NL	45.4	51.3	48.5	32.8	43.7	33.4	34.5	36.1	39	36.9	48.4	50.3	41.7	37
17 Atholl St, Perth, PH1 5NH	50.9	55.3	54.2	49.1	48.4	44.0	38.7	45.9	43.4	46.6	60.2	58.8		
17 Atholl St, Perth, PH1 5NH	53.5	53	52.6	50.1	47.9	43.9	38.9	46.2	46.8	48.1	60.1	61.3	49.6	44
17 Atholl St, Perth, PH1 5NH	52.3	54	55.5	47.4	47.1	44.3	38.2	45.8	43.7	46.5	61.1	58.6		
Ballantine Place, Perth, PH1 5RR	33.9	27.4	25.3	17	20.2	14.4	14.4	15.6	22.6	18.7	29.1	34.9	22.8	20
204 A Crieff Rd, Perth, PH1 2PE	39.6		<0.5	X	X	25	26.3	23.8	27.3	23.1	28.1	30.1	27.9	25
5 East Huntingtower, Perth, PH1 3JJ	37.3	34.1	30	16.8	23.3	17.4	17.7	20.3	25	24.3	28.7	29.9	25.4	22
2 West Bridge St, Bridgend, Perth, PH2 7HA	37.2	32.1	33.6	28.9	26.3	21.1	22.3	22.6	28.3	25.9	40.1	44.8	30.3	27

SITE ID	NO_2 Mean Concentrations (µg/m^3)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
Real Time Monitor adjacent to 176 High St, Perth, PH1 5EW	33.4	29.1	26.3	23.4	19.2	18.1	16.6	19.9	25	22.8	36.4	36.7		
Real Time Monitor adjacent to 176 High St, Perth, PH1 5EW	33.6	29.3	28.7	19.5	19.2	18.3	14.4	19.5	25.2	23.5	35.5	37.3		
Real Time Monitor adjacent to 176 High St, Perth, PH1 5EW	35.5	27.9	25.6	22	17.1	17.6	16.3	19.7	24.8	24.1	33.2	38.2		
7 West High St, Crieff	50.2	53	48.8	38.6	45.8	36.9	37.1	40.6	48.4	37.4	X	X	43.7	38
39, High St, Crieff	38.3	30.9	27.7	20.7	24	20.9	20.5	22	29.1	24.8	34	38.4	27.6	24
The Highland Trading Company, 62 High St, Crieff	34.5	34.2	30.4	25.2	26.6	21.5	21.5	23.8	29.1	25.3	31.7	34.4	28.2	25
9 East High St, Crieff	48.7	47.7	43.3	33	36.9	28.7	27.4	33.6	39	34.5	40.1	44.9	38.2	34
Atholl St, Perth, real time monitor	54.8	49	55.5	46.4	41.9	41.4	36.6	36.9	40.4	46.8	58.8	49.6		
Atholl St, Perth, real time monitor	54.8	47.8	53.7	42.5	44	42.7	37.8	46.4	39.4	44.5	58.1	57.9		
Atholl St, Perth, real time monitor	55.2	52.1	54.1	42.1	44	42.3	36.8	44.9	42.3	46.1	59.7	56.7		
84 Dundee Rd, Perth, PH2 7BA	43.7	37.5	33.4	24.2	31.8	26.3	26.3	25.9	29.8	25.4	37.3	37	31.6	28
30 Dundee Rd, Perth, PH2 7AQ	52.1	48.2	44.9	32.8	43	x	X	X	39.4	36.4	44.7	41.7	42.6	37
The Lodge, Isla Rd, Bridgend, Perth, PH2 7HG	55.5	49.6	53.4	45.5	41.9	44.3	40.4	42.3	46.8	45.6	59	50.3	47.9	42
5-7 Charlotte Street, Perth, PH1 5LW	41	39.2	38.3	25.9	32.2	25.2	26.6	24.4	30.4	29.5	36.9	37.5	32.3	28
1 Atholl Street, Perth, PH1 5NH	41	42.8	43.4	38.8	31	35.5	28.4	34.5	33.9	37.4	47.6	46.7	38.4	34
2 Atholl Street, Perth, PH1 5NP	40.4	32.6	36.2	30.2	24.3	23.8	20.7	24.8	30	29.2	45	42.6	31.7	28

SITE ID	NO_2 Mean Concentrations (µg/m^3)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
United Free Church of Scotland, Kinnoull Street, Perth, PH1 5EZ	63.8	50.9	51.5	44.5	31.7	26.7	24.3	27.9	39.6	36.6	68.3	74.8	45.1	40
134-140 Dunkeld Road, Perth, PH1 5AS	26.5	23.4	19.5	10.1	13.8	10.3	11.3	11.5	16.4	14.6	21.2	25.8	17	15
82 Crieff Road, Perth, PH1 2RP	48	42.1	36.2	34.1	32.2	31.8	27.4	32.4	34.3	34	46.3	45.9	37.1	33
CRIEFF - NEW 19 West High Street, Crieff, PH7 4AU	47.9	49.6	41.4	33.2	52.9	32.6	35.9	35.9	52.5	35.3	61.7	49.6	44	39
CRIEFF - NEW 43 High Street, Crieff, PH7 3HT	40.2	39.8	33.6	27.9	31.4	26.3	24.1	28.3	34.1	28.1	39.2	39.5	32.7	29
Crieff RTM	33.6	25.3	27.9	24.8	17.1	18.9	14.8	19.1	22.6	22.3	33	32.2		
Crieff RTM	33.4	27.4	25.9	25	17.1	19.3	16.3	19.5	22.8	21.7	33.3	33		
Crieff RTM	32.3	25.1	28.5	24.2	17.2	19.3	15.1	19.1	22.6	22.5	33.6	33		
10/12 West High Street, Crieff	43.6	41.1	41	31.4	X	33.2	29.5	34.9	39	35.1	41.4	41.3	37.4	33
1 Lodge Street, Crieff	28.1	31.5	25.2	18.3	26.3	18.5	20.4	19.5	22.4	21.5	26.8	27.9	23.9	21
17/19 Main Street Bridgend, Perth, PH2 7HD	44.6	46	42.6	30.8	43.7	31.6	35.1	31	35.5	34.8	43.1	45		
17/19 Main Street Bridgend, Perth, PH2 7HD	42.2	45.1	40.4	29.8	43.3	30.4	35	31.4	36.9	34.3	42	43.3	38.2	34
17/19 Main Street Bridgend, Perth, PH2 7HD	40.2	44	39.8	30	45.1	31.4	34.5	33.2	37.5	33.8	42.8	43.3		
76 High St, Kinross, Opticians	36.1	27.1	27.7	19.9	18.9	18.1	15.8	18.7	X	22	35.8	34	24.9	22
66 High St, Auchterarder, Ironmongers	35.3	36.4	X	21.7	24.7	21.1	20.8	21.1	27.3	30	32.5	33.2	27.6	24
176 High St, Auchterarder, Lamppost	16.2	27	21.1	13.3	18	12.8	14	12.3	16.8	16.9	21.3	20.8	17.5	15
2 Friarton Road, Perth, Lamp post	38	35.3	31.1	19.7	X	21.1	20.5	23	28.7	24.7	35.5	35.9	28.5	25

SITE ID	NO_2 Mean Concentrations (µg/m^3)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
Crieff Background, Hollybush Road, Crieff	12.6	10	3.1	X	4.3	3.9	3.4	X	5.7	X	X	22.9	8.2	7
59 South Methven Street	38.8	42.8	43	39	31.8	34.1	31.5	34.1	37.3	36.1	46	48.8	38.6	34
22 North Methven Street	38.4	37.9	37.9	31.6	27.7	25.6	24.3	28.3	34.1	31.4	42	45.1	33.7	30
Ballinluig	26.6	20.6	19.6	12.5	14.9	13.3	13.2	15.4	17.6	18.4	<0.5		17.2	15
Queen St, Coupar Angus	31.7	26.5	26	18.5	24.1	18.1	18.6	20.3	25	19.4	28.9	28.9	23.8	21
26-28 Atholl St, Perth, PH1 6NP	X	X	50.9	40.6	42.8	35.3	X	X	X	41.9	64.7	63.4	48.5	43
22 Barrack St., Perth, PH1 5RD	50.3	48.1	42.3	29.8	38.2	28.9	29.2	27.5	36.7	31.8	41.7	45.9	37.5	33
St.Ninian's School Dunkeld Rd., Perth, PH1 5RF	47.9	39.2	38.9	31.8	29.4	28.7	24	30.6	33.6	33.5	46.8	X	34.9	31
30 Edinburgh Rd, Perth, PH2 8BX	29.1	31.4	26.2	13.5	24	16.6	17.2	18.5	22.2	20.3	24.3	28.4	22.6	20
15 Murray Cres, Perth, PH2 0HU	28.5	24.4	21.5	13.3	13.3	11.5	11	12.7	18.3	15.8	26.1	29.4	18.8	17
New 9 Comrie Street, Crieff, PH7 4AX	26.2	26.8	20.7	12.9	24.6	16.2	17.4	17.4	20.1	24.6	32.5	22.9	21.9	19
Leith Buildings, 28 Dunkeld Rd, Perth, PH1 5AJ	41.8	34.7	32.3	26.7	21.5	23	20.4	24.2	29.5	25.1	40.1	39	29.9	26
New 30 Perth Road, Scone, PH2 6JJ	36.5	32.6	29.6	7.6	22.5	17	17.6	X	38.6	X	35.9	39.1	27.7	24
28 York Place, Perth, PH2 8EH	54.1	51.3	43.2	33.4	42.2	36.1	35	39.8	42.3	41.2	51.5	50	43.3	38
202 Glasgow Road, Perth, Lamp post, PH2 0NA	44.1	43.5	38.5	27.9	27.6	24.8	23.5	33.2	29.1	30.9	42.8	44.5	34.2	30
Atholl Road, Pitlochry	29.6	24.8	23.4	18.5	19.7	18.3	17.6	22.2	21.7	31	29.9	X	23.3	21
Victoria Terrace, Crieff, PH7 4AA, Bus Bays Morrison's Academy		14.7	11.5	5.5	7.1	5.1	5.1	6.4	8.8	7.1	<0.5	30.3	10.2	9

SITE ID	NO_2 Mean Concentrations ($\mu g/m^3$)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
1 Glover Street, Perth, PH2 0JP		45.6	9.1	32.6	31.2	28.5	25.3	30.2	34.3	34.5	45.6	49.8	33.3	29

(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	01/01/2017	31/01/2017	33.4	33.6	35.5	34	1.2	3	2.9	33	98	Good	Good
2	01/02/2017	28/02/2017	29.1	29.3	27.9	29	0.8	3	1.9	26	96	Good	Good
3	01/03/2017	31/03/2017	26.3	28.7	25.6	27	1.6	6	4.0	26	95	Good	Good
4	01/04/2017	30/04/2017	23.4	19.5	22	22	2.0	9	4.9	18	99	Good	Good
5	01/05/2017	31/05/2017	19.2	19.2	17.1	19	1.2	7	3.0	15	97	Good	Good
6	01/06/2017	30/06/2017	18.1	18.3	17.6	18	0.4	2	0.9	15	99	Good	Good
7	01/07/2017	31/07/2017	16.6	14.4	16.3	16	1.2	8	3.0	12	95	Good	Good
8	01/08/2017	31/08/2017	19.9	19.5	19.7	20	0.2	1	0.5	16	98	Good	Good
9	01/09/2017	30/09/2017	25	25.2	24.8	25	0.2	1	0.5	21	99	Good	Good
10	01/10/2017	31/10/2017	22.8	23.5	24.1	23	0.7	3	1.6	20	100	Good	Good
11	01/11/2017	30/11/2017	36.4	35.5	33.2	35	1.7	5	4.1	30	99	Good	Good
12	01/12/2017	31/12/2017	36.7	37.3	38.2	37	0.8	2	1.9	36	100	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

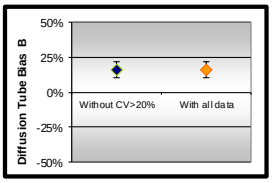
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:

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 12 periods of data	
Bias factor A	0.88 (0.84 - 0.93)
Bias B	14% (8% - 19%)
Diffusion Tubes Mean:	25 μgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	22 μgm^{-3}
Data Capture for periods used:	98%
Adjusted Tubes Mean:	22 (21 - 24) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 12 periods of data	
Bias factor A	0.88 (0.84 - 0.93)
Bias B	14% (8% - 19%)
Diffusion Tubes Mean:	25 μgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	22 μgm^{-3}
Data Capture for periods used:	98%
Adjusted Tubes Mean:	22 (21 - 24) μgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

If you have any enquiries about this spreadsheet please contact the LAQM Helpdesk at: LAQMHelpdesk@uk.bureauveritas.com

Adjustment of DUPLICATE or TRIPLICATE Tubes

AEA Energy & Environment
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	01/01/2017	31/01/2017	47.7	47.7	47.0	47.5	0.40	0.85	1.00	Good
2	02/01/2017	01/02/2017	47.4	48.9	49.6	48.6	1.12	2.31	2.79	Good
3	03/01/2017	02/02/2017	46.6	46.6	44.9	46.0	0.98	2.13	2.44	Good
4	04/01/2017	03/02/2017	x	x	x					
5	05/01/2017	04/02/2017	39.9	39.7	35.9	38.5	2.25	5.85	5.60	Good
6	06/01/2017	05/02/2017	29.8	32.0	32.0	31.3	1.27	4.06	3.16	Good
7	07/01/2017	06/02/2017	30.7	31.0	31.8	31.2	0.57	1.82	1.41	Good
8	08/01/2017	07/02/2017	x	33.4	31.0	32.2	1.70	5.27	15.25	Good
9	09/01/2017	08/02/2017	36.5	37.3	36.3	36.7	0.53	1.44	1.31	Good
10	10/01/2017	09/02/2017	35.9	36.4	35.3	35.9	0.55	1.54	1.37	Good
11	11/01/2017	10/02/2017	43.3	47.1	47.3	45.9	2.25	4.91	5.60	Good
12	12/01/2017	11/02/2017	44.5	50.9	50.1	48.5	3.49	7.19	8.66	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 Street, Perth

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

Bias calculated using 12 periods of data
Tube Precision: 4 Automatic DC: 98%
Bias factor A: 0.88 (0.84 - 0.93)
Bias B: 14% (8% - 19%)

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

Adjusted measurement (95% confidence level)
with all data

Bias calculated using 12 periods of data
Tube Precision: 4 Automatic DC: 98%
Bias factor A: 0.88 (0.84 - 0.93)
Bias B: 14% (8% - 19%)

Information about tubes to be adjusted
Diffusion Tube average: µgm^{-3}
Average Precision (CV):
Adjusted Tube average: 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	01/01/2017	31/01/2017	50.9	53.5	52.3	52.2	1.30	2.49	3.23	Good
2	01/02/2017	28/02/2017	55.3	53	54	54.1	1.15	2.13	2.86	Good
3	01/03/2017	31/03/2017	54.5	52.6	55.5	54.2	1.47	2.72	3.66	Good
4	01/04/2017	30/04/2017	49.7	50.1	47.4	49.1	1.46	2.97	3.62	Good
5	01/05/2017	31/05/2017	50.2	47.9	47.1	48.4	1.61	3.33	4.00	Good
6	01/06/2017	30/06/2017	43.9	43.9	44.3	44.0	0.23	0.52	0.57	Good
7	01/07/2017	31/07/2017	38.9	38.9	38.2	38.7	0.40	1.05	1.00	Good
8	01/08/2017	31/08/2017	45.8	46.2	45.8	45.9	0.23	0.50	0.57	Good
9	01/09/2017	30/09/2017	39.8	46.8	43.7	43.4	3.51	8.08	8.71	Good
10	01/10/2017	31/10/2017	45.3	48.1	46.5	46.6	1.40	3.01	3.49	Good
11	01/11/2017	30/11/2017	59.4	60.1	61.1	60.2	0.85	1.42	2.12	Good
12	01/12/2017	31/12/2017	56.5	61.3	58.6	58.8	2.41	4.09	5.98	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 Street, Perth

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

Bias calculated using 12 periods of data
Tube Precision: 4 Automatic DC: 98%
Bias factor A: 0.88 (0.84 - 0.93)
Bias B: 14% (8% - 19%)

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

Adjusted measurement (95% confidence level)
with all data

Bias calculated using 12 periods of data
Tube Precision: 4 Automatic DC: 98%
Bias factor A: 0.88 (0.84 - 0.93)
Bias B: 14% (8% - 19%)

Information about tubes to be adjusted
Diffusion Tube average: μgm^{-3}
Average Precision (CV):
Adjusted Tube average: 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	01/01/2017	31/01/2017	48.7	47.7	44.8	47.1	2.03	4.30	5.03	Good
2	01/02/2017	28/02/2017	43.2	44	45.1	44.1	0.95	2.16	2.37	Good
3	01/03/2017	31/03/2017	44.5	41.7	39.6	41.9	2.46	5.86	6.11	Good
4	01/04/2017	30/04/2017	40.4	36.3	36.9	37.9	2.21	5.85	5.50	Good
5	01/05/2017	31/05/2017	28.2	29.7	28.6	28.8	0.78	2.69	1.93	Good
6	01/06/2017	30/06/2017	29.1	28.9	28.1	28.7	0.53	1.84	1.31	Good
7	01/07/2017	31/07/2017	26.6	26.6	26.1	26.4	0.29	1.09	0.72	Good
8	01/08/2017	31/08/2017	33.9	33.4	32.2	33.2	0.87	2.63	2.17	Good
9	01/09/2017	30/09/2017	31	31.6	32.2	31.6	0.60	1.90	1.49	Good
10	01/10/2017	31/10/2017	39.1	36.1	37.3	37.5	1.51	4.03	3.75	Good
11	01/11/2017	30/11/2017	<0.5	51.5	47.3	49.4	2.97	6.01	26.68	Good
12	01/12/2017	31/12/2017	107.5	50	47.2	68.2	34.03	49.88	84.55	Poor Precision
13										

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

Site Name/ ID:	104 South Street, Perth

Jaume Targa, for AEA

Version 04 - February 2011

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

Bias calculated using 12 periods of data
Tube Precision: 4 Automatic DC: 98%
Bias factor A: 0.88 (0.84 - 0.93)
Bias B: 14% (8% - 19%)

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

Adjusted measurement (95% confidence level)
with all data

Bias calculated using 12 periods of data
Tube Precision: 4 Automatic DC: 98%
Bias factor A: 0.88 (0.84 - 0.93)
Bias B: 14% (8% - 19%)

Information about tubes to be adjusted
Diffusion Tube average: μgm^{-3}
Average Precision (CV):
Adjusted Tube average: 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	01/01/2017	31/01/2017	44.6	42.2	40.2	42.3	2.20	5.20	5.47	Good
2	02/01/2017	01/02/2017	46	45.1	44	45.0	1.00	2.22	2.49	Good
3	03/01/2017	02/02/2017	42.6	40.4	39.8	40.9	1.47	3.60	3.66	Good
4	04/01/2017	03/02/2017	30.8	29.8	30	30.2	0.53	1.75	1.31	Good
5	05/01/2017	04/02/2017	43.7	43.3	45.1	44.0	0.95	2.15	2.35	Good
6	06/01/2017	05/02/2017	31.6	30.4	31.4	31.1	0.64	2.07	1.60	Good
7	07/01/2017	06/02/2017	35.1	35	34.5	34.9	0.32	0.92	0.80	Good
8	08/01/2017	07/02/2017	31	31.4	33.2	31.9	1.17	3.68	2.91	Good
9	09/01/2017	08/02/2017	35.5	36.9	37.5	36.6	1.03	2.80	2.55	Good
10	10/01/2017	09/02/2017	34.8	34.3	33.8	34.3	0.50	1.46	1.24	Good
11	11/01/2017	10/02/2017	43.1	42	42.8	42.6	0.57	1.33	1.41	Good
12	12/01/2017	11/02/2017	45	43.3	43.3	43.9	0.98	2.24	2.44	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:	17/19 Main Street, Perth

Adjusted measurement (95% confidence level) Without periods with CV larger than 20%	
Bias calculated using 12 periods of data	
Tube Precision: 4	Automatic DC: 98%
Bias factor A:	0.88 (0.84 - 0.93)
Bias B:	14% (8% - 19%)
Information about tubes to be adjusted	
Diffusion Tube average:	μgm^{-3}
Average Precision (CV):	
Adjusted Tube average:	μgm^{-3}

Adjusted measurement (95% confidence level) with all data	
Bias calculated using 12 periods of data	
Tube Precision: 4	Automatic DC: 98%
Bias factor A:	0.88 (0.84 - 0.93)
Bias B:	14% (8% - 19%)
Information about tubes to be adjusted	
Diffusion Tube average:	μgm^{-3}
Average Precision (CV):	
Adjusted Tube average:	μgm^{-3}

- **QA/QC of Automatic Monitoring**

Ricardo E & E carries out the QA/QC for the automatic monitors. 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 NO_2 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

Request for information: Local Air Quality Management

Perth and Kinross Council has requested that SEPA supply the following information so that it can undertake its annual review and assessment of local air quality (see below). The findings of this assessment must be submitted to the Scottish Government at the end of June 2018 unless an extension has been agreed. The local authorities are required to consider the following pollutants: nitrogen dioxide, sulphur dioxide, PM_{10}, benzene, 1, 3-butadiene, carbon monoxide and lead.

The **Annual Report** requires that the Local Authority review its previous work and identify recent changes that may affect local air quality. These changes can be positive or negative. The assessment should identify recent monitoring data, new developments and changes to industrial/mineral activities – and this includes SEPA regulated processes. The following questions therefore relate to all processes that are regulated by SEPA.

The following questions relate to changes that have occurred since June 2017.

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.).

   ABP Abattoir, Perth – PPC- E - 20056
   In November 2017, ABP Abattoir changed the fuel for their fat plant from diesel to gas. Their refrigeration was also upgraded to increase capacity and efficiency. This involved the installation of a replacement compressor, a new condenser and the replacement of R22 gas with RS45. SEPA don't, however, have any emissions data, just some combustion rates from their boiler efficiency checks.

   Perth Crematorium - PPC/B1003134
   The site has been upgraded and fitted with mercury abatement. New cremators (and operating system), new facilities for cremulator and a heat exchanger from the cremators. The new abatement system has only been in full operation for the past 9 months or so. We don't have any annual data yet – just monthly data through.

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. Please identify any of the following potential sources of fugitive or uncontrolled particulate matter, which are new:

   - Landfill sites.
   - Quarries.
   - Unmade haulage roads on industrial sites.
   - Waste transfer stations, etc.
   - Other potential sources of fugitive particulate matter emissions.

   None

7. Are you aware of any new mineral extraction processes that are likely to have a significant impact on local air quality?

   No

8. 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

9. Are there any other sources that you would like to see included in Perth and Kinross Councils assessment?

   No

If you would like more information on the LAQM process, it can be found here: http://www.scottishairquality.co.uk/laqm.php

Examples of previous reports can be found on the Scottish Air Quality website. It also contains a great deal of information on local air quality that includes: real-time monitoring data, maps showing the location of automatic monitoring stations, historic monitoring data, the location of all air quality management areas (AQMA) and links to useful guidance: http://www.scottishairquality.co.uk/index.php

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
APR	Air quality Annual Progress Report
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

References

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

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

Active Travel Strategy for Perth and Kinross Active Travel Strategy for Perth and Kinross

Active Travel Strategy Action Plan Active Travel Strategy Action Plan

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

Perth & Kinross Council Local Development Plan adopted 2014 http://www.pkc.gov.uk/media/23633/Local-Development-Plan/pdf/Adopted_LDP_Web_Version.pdf?m=636099646768900000

Perth & Kinross Council Local Development Plan Review (2018 -2023) http://www.pkc.gov.uk/article/15042/Local-Development-Plan-Review-2018-2023-

Mains Issue Report http://www.pkc.gov.uk/article/15073/Main-Issues-Report

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

Renewable energy installation capacity Perth & Kinross http://www.pkc.gov.uk/media/13053/Renewables-Installed-Capacity-/pdf/RenewableInstalledCapacity.pdf?m=636118891999370000

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

Renewables and Low Carbon Energy http://www.pkc.gov.uk/media/39833/PKCRenewableSG-Draft/pdf/PKCRenewableSG-Draftv1-31

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