Annual Progress Report (APR)

THE CITY OF EDINBURGH COUNCIL

2017 Air Quality Annual Progress Report (APR) for
City of Edinburgh Council

In fulfilment of Part IV of the
Environment Act 1995

Local Air Quality Management

July 2017

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Executive Summary: Air Quality in Our Area

Air Quality in Edinburgh

Edinburgh has declared six Air Quality Management Areas (AQMAs), five for the pollutant nitrogen dioxide (NO_2) and one for fine particulates (PM_{10}). The maps of the AQMAs are available online at; http://www.edinburgh.gov.uk/airquality

An AQMA is required when a pollutant fails to meet air quality standards which are set by the Scottish Government. Road traffic is by far the greatest contributor to the high concentrations of NO_2 in the city. However, the AQMA at Salamander Street declared for PM_{10} is due to sources other than traffic. Emissions from dust generating activities associated with operations at Leith Docks are a contributory factor.

Earlier assessment work has shown that the NO_2 contribution from each vehicle class is different within the AQMAs. For example, cars were shown to contribute the most at Glasgow Road AQMA, with buses having the largest impact along some routes in the Central AQMA (London Road, Gorgie Road/Chesser, Princes Street) and HGVs having a significant impact at Bernard Street. Therefore, to improve air quality, it will be necessary to keep all motor vehicle classes under review.

Analysis of the monitoring for NO_2 in 2016 shows the annual mean objective continues to be exceeded in some locations within all the current AQMAs and therefore they remain valid. There is however a downward trend of NO_2 with concentrations decreasing.

In respect to PM_{10}, data from all monitoring locations in 2016 meets the UK National Objectives as well as the tighter Scottish objectives, including, Salamander Street, for the first time since monitoring began in 2009. It is considered that relocation of industry is one reason why concentrations meet. The City of Edinburgh Council is in the process of developing an Action Plan in conjunction with SEPA, Forth Ports and relevant stakeholders to review and assess the different processes and mechanisms to ensure that the continuing degree of improvement is sustained, especially since residential development is proposed in the area.

In November 2015, the Scottish Government published a document called Cleaner Air for Scotland – The road to a healthier future (CAfS). This is a national strategy to improve local air quality and Councils are expected to work in partnership with Transport Scotland, Scottish Environment Protection Agency and Health Boards to

help deliver a number of key actions. Two of which, are the development of a National Modelling Framework and a National Low Emission Framework. This work will set the scene for local authorities to adopt vehicle access restriction schemes such as Low Emission Zones and will ensure that there is a consistent approach across the country.

The Scottish Government has committed to having an LEZ in place by the end of 2018 and is looking for a local authority to come forward as an early adopter. This is two years ahead of the proposed CAfS timeframe.

In response to this, the City of Edinburgh Council has sent a letter to the Transport Minister confirming that they would like to be considered for establishing a Low Emission Zone, should funding and resource be made available.

Actions to Improve Air Quality

The main actions in the Council's Air Quality Action Plan and Local Transport Strategy to improve air quality are;

- promoting cleaner transport, especially buses via a voluntary means,
- adoption of a fleet recognition efficiency scheme for reducing emissions from heavy goods vehicles,
- improving traffic flow and easing congestion by use of intelligent traffic signalling, and;
- promoting model shift away from car use by means of an Active Travel Action Plan.

Steady progress has been achieved over the years with respect to improvements in the bus fleets which operate in the city. Lothian buses (Transport for Edinburgh) are the principle provider of bus services in the city; by the end of 2017 it is expected that 75% of the main fleet will be Euro 5 or better. The company continues to use the cleanest buses on the high frequency services which pass through the AQMAs.

Lothian buses also replaced their Euro 2 standard City Tour buses with Euro 6 standard vehicles in September 2016. The City Tour Fleet has a high presence in the Central AQMA. There is a significant reduction in emissions of NO_x and particulates from the Euro 6 vehicles compared with Euro 2 vehicles. Reductions have been calculated to be in the range of 95% to 99%. Carbon emissions will be reduced by

40% and the new vehicles are quieter, thereby they provide additional benefits with respect to climate change and noise pollution.

Lothian buses are in the process of installing electric charging infrastructure to support the operation of electric buses in the city.

Other bus operators in the city have also improved their fleets. All Euro 3 standard vehicles have now been removed from the Stagecoach fleet and 83% of the fleet are Euro 5 or better. As of July 2016, Citylink had one Euro 3 vehicle operating in Edinburgh and 86% of the fleet are Euro 5 or better.

First West Lothian (formerly First East Scotland) services into Edinburgh have been scaled back and Lothian buses have taken over several of their routes. All Euro 3 standard buses have been eradicated from the fleet and 48 Euro 6 vehicles are now operating in Edinburgh.

A new traffic signalling system (Microprocessor Optimised Vehicle Actuation (MOVA)) was installed at Newbridge Roundabout which became fully operational in April 2016. This was designed to improve traffic flow and vehicle delay times in the Glasgow Road AQMA and thus reduce exhaust emissions. Results show that there has been a significant reduction in waiting time on the A8 westbound corridor and NO_2 concentrations measured at the junction area show overall improvement, with just one location at the roundabout exceeding the annual average. The concentration at this site location has decreased from 45µ/m^3 to 41µ/m^3.

Transport Scotland approached the City of Edinburgh Council with respect to re-designing lane integration from the M9 off-slip onto the A8 at Newbridge roundabout. Recommendations have been made to Transport Scotland to carry out an air quality impact assessment in relation to the proposals to ensure there is no adverse impact on air quality.

ECOSTARS Edinburgh a fleet efficiency and recognition scheme has been successful in assisting the city council encourage emission improvement from the goods and passenger transport sector operating in the city. We have observed yearly increases in membership and to date the scheme has attracted 154 operators and a total of 7,061 vehicles are registered.

The Council produced an Active Travel Action Plan (ATAP) in 2010, which was updated in 2015. This aims to deliver significant increases in the number of

pedestrian and cycling journeys travelled within Edinburgh. As well as bringing health benefits the ATAP will assist in encouraging modal shift away from car use. The plan has set targets of 35% for walking and 10% for cycling for all trips in the city by 2020. A core element of the plan is the development of the 'QuietRoutes' cycle network which enables people to travel around the city on safer routes away from the busier roads. Several major and smaller cycling and pedestrian schemes have been delivered and other schemes are in progress.

Segregated Cycle Lanes

Segregated Infrastructure – Buccleuch Street: Innocent Tunnel to the Meadows link

Scottish Household Survey 2015 and Edinburgh Bike Life report indicate that cycling to work by Edinburgh residents increased from 4.9% in 2011 to 7.3% during 2014/15. Statistics for 2016 are not yet available.

Additional cycle and pedestrian counters have been installed across the city to monitor progress which is being made towards achieving the set targets.

To encourage residents to purchase electric vehicles many public accessible charging points have been installed across the city and the Council has seen an increase in the number of charging sessions and amount of power used. Transport Scotland has become a partner with the city council to assist the funding of an on-street pilot electric charging scheme to provide fourteen units at seven locations in the Marchmont area of the city. The units should be available for use by the end of 2017, subject to Traffic Regulation Order consultations.

In September 2015, the new Borders Railway became operational, linking Edinburgh to Midlothian and Tweedbank. It is anticipated that there will be air quality benefits due to commuter model shift from road to rail. Passenger numbers exceeded original estimates and from September 2015 to March 2016 there were almost 700,000 using the service.

In December 2015, the city council took a decision to proceed with Stage 1 of the Tram extension to Newhaven (Leith). A draft business case report has been completed which will go to Committee for approval later this year.

Local Priorities and Challenges

Edinburgh is a major centre of employment and attracts a substantial amount of commuter traffic as well as local traffic. The 2011 Census identified that car journeys are still the most popular mode of transport to work accounting for 46% of all journeys into or within the city.

Continuing economic growth in the city and wider region presents a challenge for air quality. It has been estimated from the recent Census figures that if the recent trend continues Edinburgh's population would grow by 28.2% to reach 619,000 at 2037. Consequently, there will be an inevitable demand for all modes of transport and supported infrastructure.

The 2016 Edinburgh Local Development Plan details a number of aims in assisting with meeting these challenges -

Aim 1: support the growth of the city's economy,

Aim 2: help increase the number, and improve the quality, of new homes being built,

Aim 3: help ensure that the citizens of Edinburgh can get around easily by sustainable transport modes to access jobs and services,

Aim 4: look after and improve our environment for future generations in a changing climate, and;

Aim 5: help create strong, sustainable and healthier communities, enabling all residents to enjoy a high quality of life.

Infrastructure is key to the delivery of these aims and the strategies of the LDP. An Action Programme to support the Plan sets out how the infrastructure, and services required for the growth of the city, will be delivered.

Edinburgh will need to manage economic growth with its neighbouring Councils in a sustainable manner to ensure that air quality is safe for its residents and visitors and does not breach the standards set by the Scottish Government.

Priorities for the Council in terms of air quality, in 2017/2018, will be to;

- Revise the current Air Quality Action Plan (2008) in conjunction with the Local Transport Strategy and CAfS,
- Work towards the implementation of an LEZ should Edinburgh be selected as an early adopter by the Scottish Government,
- Produce an Air Quality Action Plan for Salamander Street AQMA with relevant stakeholders, and;
- Work with the Council's partners and neighbouring local authorities, in a holistic and multi-disciplinary way, to ensure sustainable economic growth which supports the Cleaner Air for Scotland Strategy and has the best outcome for local air quality.

How to Get Involved

Individual decisions can make a big difference to improving air quality for example, rethinking your journey to lower your pollution footprint.

Further information on how you can help improve air quality can be found by clicking on the link below:

http://www.scottishairquality.co.uk/what-can-i-do/

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1. Local Air Quality Management

This report provides an overview of air quality in Edinburgh during 2016. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether the air quality objectives are likely to be achieved. Where an exceedance is considered likely the City of Edinburgh Council 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 the City of Edinburgh Council 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
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 the City of Edinburgh Council can be found in Table 2.1.

Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at http://www.edinburgh.gov.uk/airquality .

Edinburgh has declared six AQMAs in total, five are due road traffic sources of nitrogen dioxide and one is related to different sources of particles (PM_{10}) including industrial and fugitive emissions, road traffic and re-suspended road dust.

Table 2.1 – Description of Declared Air Quality Management Areas

Central AQMA	**Declared 31/12/2000**
Includes area of city centre and main arterial routes leading into the centre. Exceedances mostly in locations where there are street canyons, high percentage of bus movements and congested traffic. Residential properties at basement, ground, first, second, third, and fourth level, 2 – 4 metres from road edge. Busy shopping areas include Princes Street, George Street, Dalry/Gorgie Rd, Leith Walk, North Bridge, West Port, Grassmarket, London Road and Easter Road. Upwards road gradient Leith Walk, North Bridge (south bound) and West Port. **Source of pollutant** – traffic.	
Pollutant	**Amendments**
NO_2	**09/03/2009** Extended to include West Port – Amended to cover hourly breach as well as annual breach of NO_2 air quality objective. **26/04/2013** Extended to include Gorgie Road / Chesser, Grassmarket/Cowgate and London Road/Easter Road **2015** Extended to include Angle Park Terrace and Clerk Street/Nicolson Street areas
	Continued overleaf/…

St John's Road AQMA	Declared 31/12/2006
Part of the A8 route at Corstorphine area. Residential properties at ground, first, second, third and fourth floor level within 2m of kerb edge. Street canyon effect in part. Busy shopping area. Congested flat road with high percentage of bus movements. **Source of pollutant** – traffic.	
Pollutant	**Amendments**
NO_2	**09/03/2009** Amended to cover hourly breach as well as annual breach of NO_2.

Great Junction Street AQMA	Declared 09/03/2009
The full length of road to the depth of the building facades, including the Ferry Road Junction area. Residential properties at first, second, third and fourth floor level. Street canyon, congested traffic and busy shopping area. Receptors close to road edge. High percentage of bus movements. **Source of pollutant** - traffic	
Pollutant	**Amendments**
NO_2	**26/04/2013** Extended to include Bernard Street, Commercial Street and North Junction Street.

Glasgow Road AQMA	Declared 26/04/2013
Part length of A8, between Newbridge Roundabout and Ratho Station, to the depth of the building facades. **Source of pollutant** – traffic.	
Pollutant	
NO_2	

Inverleith Row AQMA	Declared 26/04/2013
The road comprising the junction of Inverleith Row and Ferry Road, to the depth of building facades. **Source of pollutant** – traffic.	
Pollutant	
NO_2	

Salamander Street AQMA	Declared 20/01/2017
A section of the A199 including Salamander Street, Baltic Street, Bernard Street, and part of Seafield Road; an area to the north east as far as the East Sands of Leith and south of Baltic Street, extending to Queen Charlotte Street and Links Place **Source of pollutant** industrial, fugitive emissions, traffic, re suspended road dust	
Pollutant	
PM_{10}	

2.2 Progress and Impact of Measures to address Air Quality in Edinburgh

The City of Edinburgh Council has taken forward a number of measures during the current reporting year of 2016/2017 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.18.

More details on these measures can be found in the following Air Quality Action Plans (AQAPs):

Action Plan for Area Designated 31st December 2000 (July 2003)[1]

Air Quality Action Plan (Revised 2008)

http://www.edinburgh.gov.uk//download/downloads/id/321/air_quality_action_plan

The City of Edinburgh Council's, 'Transport 2030 Vision', provides an overarching 20-year strategy for the future development of transport in Edinburgh from 2010. Its ambition is 'to make Edinburgh's transport system one of the most environmentally friendly, healthiest and most accessible in northern Europe'. This document provides the framework which shapes the Local Transport Strategy (LTS).

http://www.edinburgh.gov.uk//download/downloads/id/355/transport_2030_vision

There are several key policies identified in Edinburgh's Local Transport Strategy 2014 to 2019 (LTS) which contribute towards improving air quality.

http://www.edinburgh.gov.uk/download/downloads/id/3525/local_transport_strategy

Many other significant policy issues are contained in separate local action plans:

Active Travel Plan (2016 Refresh).
http://www.edinburgh.gov.uk/downloads/file/7316/active_travel_action_plan_2016_refresh

Public and Accessible Transport Action Plan

http://www.edinburgh.gov.uk//download/downloads/id/357/public_and_accessible_transport_action_plan

The Council also has a framework for sustainable development of the city until 2020 and a Sustainable Energy Action Plan 2015 (Section 2.3).

http://www.edinburgh.gov.uk//download/downloads/id/1632/sustainable_edinburgh_2020_action_plan_2012-2014

http://www.edinburgh.gov.uk//download/downloads/id/6756/sustainable_energy_action_plan_easy_read.pdf

Scotland's low emission strategy, Cleaner Air for Scotland -The road to a healthier future (CAfS) was launched in November 2015 by the Scottish Government. This strategy aims to deliver more effective and efficient policy direction and guidance combined with several 'actions' which local authorities, agencies and other partners will be expected to support to achieve the required reduction in emissions by 2020.

http://www.scottishairquality.co.uk/assets/documents/news/Cleaner_Air_for_Scotland_Nov_2015.pdf

The City of Edinburgh Council is working in close partnership with Scottish Environment Protection Agency (SEPA), Transport Scotland and the Scottish Government to assist in the development of the National Modelling Framework (NMF). The traffic data for Edinburgh has been collected and the local model is being developed. The NMF is a key element in CAfS and this will provide quantitative evidence for assessment criteria which will be included in the National Low Emission Framework (NLEF).

Key completed measures from the AQAP and LTS are set out below including outcomes if known:

2.2.1 Completed measures

Transport Planning and Infrastructure projects

Tramline 1

The Tram operates from Edinburgh Airport to a temporary stop at York Place in the city centre. Trams became operational on 30th May 2014. Passenger numbers have increased each financial year since 2014/15. See Table 2.2.

Table 2.2 Tram passenger numbers for each financial year

Year relates to financial year	Number of passengers
April 2014 to March 2015*	4.1 million
April 2015 to March 2016	5.3 million
April 2016 to March 2017	5.8 million

* Incomplete year as Edinburgh Tram became operational at the end of May 2014.
Data obtained from Department of Transport light rail and tram statistics.

The business case for the Tram extension to Leith has been completed and will be considered by the City Council at committee later this year.

Rail improvements

In recent years, new rail lines have been constructed which serve the Edinburgh area. It is anticipated that air quality benefits to the city are being delivered due to commuter model shift from road to rail.

Borders rail link

The thirty-mile rail-link between Galashiels in the Scottish Borders to Edinburgh Waverley Station was reinstated and became operational in September 2015.

Airdrie- Bathgate- Edinburgh rail links

The above new rail line became operational in 2010.

Newcraighall - Portobello - Edinburgh- Fife rail links

Edinburgh to Newcraighall rail link became operational in 2002. In 2013, an additional platform at Brunstane (Portobello/Joppa) was constructed.

Alternatives to private vehicle use

Park and Rides

Edinburgh has several Park and Ride locations around the periphery of the city boundary, and is served by Park and Rides in East and Mid Lothian and Fife as shown in Table 2.3 (overleaf). The current number of spaces available has the potential to reduce the two-way daily work commuter traffic by 11,280 vehicles if operated at maximum capacity.

Newcraighall and Wallyford also have rail accessibility and Ingliston is connected to Edinburgh Tram service. Ingliston Park and Ride has seen an increase (22%) in usage from 2015 to 2017 as detailed in Table 2.4.

Usage for the other park and ride sites was not known at time of reporting.

Land has now been acquired at Hermiston for development of the Park and Ride extension. This would more than double the current capacity to provide 1000 spaces.

Table 2.3 – Park and Ride sites serving Edinburgh.

Park and Ride Site	Total Number of Parking Spaces
Wallyford, East Lothian*	321
Hermiston	450
Sheriffhall, Midlothian	561
Newcraighall*	565
Straiton	600
Ingliston**	1082
Ferrytoll, Fife	1040
Halbeath, Fife	1021
Total	**5640**

* Rail connections also accessible ** Tram accessible

Table 2.4 – Ingliston Park and Ride usage from 2015 to 2017

Period	January to June 2015	January to June 2016	January to June 2017
No. of vehicles parking	85,000	101,000	104,155

Traffic Management

Newbridge Roundabout (Glasgow Road AQMA)

The 'non-cable linked fixed- time' traffic signalling which controlled Newbridge Roundabout was replaced in 2015 with a Microprocessor Optimised Vehicle Actuation (MOVA) system, following a feasibility study which looked at a few options.[2]

The modelled emission reductions for NOx, PM_{10} and CO_2 were as follows for the afternoon peak period, 47%, 29% and 43%. The vehicle queue length for the pm afternoon period on the A8 approach was estimated to reduce from 790m to 72m.

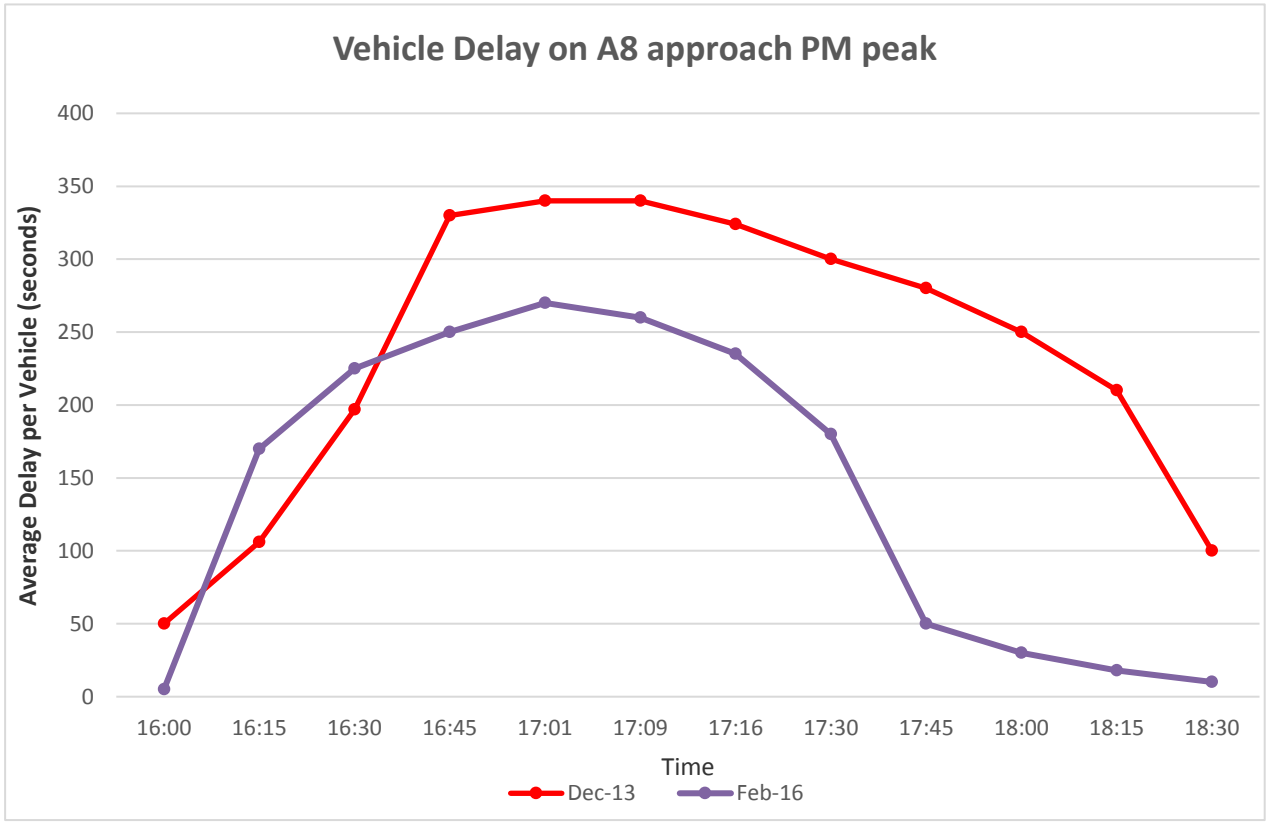
This system became fully operational in April 2016

Vehicle time delays have been assessed pre-and post-installation of MOVA. Results show that there has been a significant reduction in waiting time on the A8 westbound corridor. For example, an average of 4 minutes and 10 seconds' delay per vehicle is saved between 17:45 to 18:00, thereby leading to reduced idling and less and stop/start events.[3]

The concentrations of nitrogen dioxide measured at the junction area of the roundabout show an overall improvement, site ID 58 (eastbound carriage) has decreased from 45 µg/m^3 to 41 µg/m^3 and site ID16 (westbound carriage) has decreased from 40 µg/m^3 to 37 µg/m^3. Site ID15a measured at the façade on the eastbound carriage has decreased from 39µg/m^3 to 33µg/m^3. However, data from the air quality monitoring station has shown an increase from 26µg/m^3 to 28µg/m^3, but these concentrations are well below the air quality objective.

A graph illustrating the average delay per vehicle pre-and post MOVA is shown in Figure 2.1.

Figure 2.1 – Average delay per vehicle (westbound pm peak) on A8 Glasgow Road



Reduction of speed limits, 20mph zones

The City of Edinburgh Council has introduced a 20mph speed limit across the city which will be phased in over a period of eighteen months. Phase one and phase two have been completed. The last phase will be completed by the end of January 2018.

The project extends the 20mph to the city centre, main shopping streets and residential areas while retaining a strategic network of roads at 30mph and 40mph.

This has been introduced primarily for road safety reasons and will improve travelling conditions across the city for both walking and cycling, which will encourage modal shift. However, at this time, there is uncertainty with respect to any direct improvements in air quality.

Promoting Travel Alternatives

See Active Travel Plan - section 2.3.

Vehicle Fleet Efficiency

Driver training and ECO driving aids

The Council obtained Scottish Government air quality grant funding in 2010/2011 to trial a telematics system, and assess the delivery of fuel efficiencies through improved vehicle and driver management. The trial was carried out on a collaborative basis with the system provider Masternaut (Cybit) UK Ltd.

Fifteen vehicles which operate within AQMAs were selected for the trial. The analysis report showed overall positive outcomes as summarised in Table 2.5.[4]

Table 2.5 – Changes observed following Eco- Driving instruction

Parameter measured between Benchmark and Go live	Percentage Change
Decrease in average miles	30.5%
Reduction in average idling time	26.5%
Reduction in harsh events	18.5%
Improvement in MPG	4.3%
Reduction in average weekly fuel litres	4.1%
Reduction in CO_2 output	4.2%

In March 2017, a report went to the Council's Finance and Resource Committee seeking approval to install a telematics system in all council vehicles with a view to providing data which would enable effective management of the fleet and contribute to the Council's wider aims of air quality improvement and carbon reduction targets. With this information, Fleet Services, propose to address engine idling, reduce size of the fleet, and determine the potential for alternative fuel vehicles such as electric or dual hybrid systems.

The business case for a telematics system has now been approved by the Council and it is anticipated that the fleet will be fitted with a system within 6 months.

2.2.2 Ongoing measures.

Vehicle fleet efficiency

Promoting low emission public transport

All bus companies operating in Edinburgh continue to improve their fleet, but it has not been possible to achieve the draft Voluntary Emissions Reduction Partnership (VERP) target of 100% Euro 5 by October 2015. It is recognised that substantial financial support is needed to deliver continuing improvement.

The Green Bus and Bus Operators Grant are being revised. Funding has been reduced this year, but will be reviewed from 2018. Should buses be integral to a vehicle access restriction zone it is essential that adequate funding for bus replacement and retrofit technology is provided.

Lothian Buses (Transport for Edinburgh (TfE)

Lothian buses are the main service provider in the urban areas of Edinburgh with a total of 728 vehicles in service. Significant improvements have been achieved since 2006 with the assistance of Scottish Government funding shown in Table 2.6. The yearly improvement is illustrated in Table 2.7.

Table 2.6 – Number of older vehicles retrofitted and number of new buses purchased

Technology	2011	2012	2013	2014	2015	2016	2017
Retro fit using SCRT (EMINOX) Euro 3 to Euro 5/6 (EEV standard)	43 (A)						
Hybrid double deck vehicles Euro 5 standard	15 (B)						
Hybrid single deck vehicles Euro 5 standard		10 (C)					
Double deck EEV standard	60 (D)						
Single deck EEV standard		5 (D)					
Hybrid single deck vehicles Euro 6 standard			20 (E)	20 (F)			
Hybrid double deck vehicles Euro 6 standard					20 (G)	*20(H)	
Single deck vehicles Euro 6							*15(D)
Double deck vehicles Euro 6				25 (D)		55 (D)	*45(D)
Double Deck vehicles Euro 6							
Electric							
Euro 4 to 5 upgrades via engine management alteration				26 (D)	49 (D)		

A Lothian Buses contributed to total cost of £500,000 (Lothian Buses £243,000, CEC £50,000 and Scottish Government £207,000)

B Total cost £5M (Scottish Government £1M Green Bus Fund (1)

C Total cost £2.65M (Scottish Government £750,000 Green Bus Fund (2)

D Lothian Buses self-funding

E Scottish Government £1.5M Green Bus Fund (3)

F Scottish Government £1.05M Green Bus Fund (4)

G Scottish Government £1.5M Green Bus Fund (5)

H Scottish Government £1.5M Green Bus Fund (6)

* Ordered and waiting for delivery

Table 2.7– Euro Standard of service bus fleet (Lothian Buses 2006 to 2017)

Euro Standard	Base 2006	Sept 2010	Oct 2011	Aug 2012	May 2013	May 2014	March 2015	May 2016	March 2017
Pre-Euro	63 10%	0	0	0	0	0	0	0	0
Euro 1	33 5%	0	0	0	0	0	0	0	0
Euro 2	202 32%	64 10%	7 1%	12 2%	0	0	0	0	0
Euro 3	317 52%	307 52%	257 43%	254 42%	251 41%	273 43%	233 36%	222 33%	228 31%
Euro 4	0	79 13%	79 13%	81 13%	81 13%	75 12%	55 9%	6 1%	6 1%
Euro 5	0	136 23%	141 23%	141 23%	141 23%	147 23%	186 29%	258 39%	258 36%
EEV (5/6)	0	1 0.1%	117 20%	117 19%	142 23%	146 23%	104 16%	85 13%	85 11%
Euro 6						1 <1%	65 10%	97 14%	151 21%
Total	**615**	**587**	**601**	**605**	**615**	**642**	**643**	**668**	**728**

Data provided by Lothian Buses, March 2017

As part of a £6.5 million investment, all Euro 2 standard City Tour buses, which have a high presence in the city centre area of the Central AQMA, have been replaced with 30 Euro 6 Standard vehicles. The buses started operating in September 2016. See Table 2.8. NO_x and PM_{10} emission reductions have been calculated at between 95% and 99% and carbon emissions at 40%. This will result in a significant improvement in terms of air quality and climate change. The new buses are also quieter and therefore will be beneficial with respect to noise pollution.

Table 2.8 – Euro Standard of City Tour Bus fleet (Lothian Buses) 2010 to 2017

Euro Standard (Lothian Bus)	Sept 2010	Oct 2011	Aug 2012	May 2013	May 2014	Mar 2015	Sept 2016	Mar 2017
Pre-Euro	9	0	0	0	0	0	0	0
Euro 1	0	0	0	0	0	0	0	0
Euro 2	37	45	38	38	44	44	0	0
Euro 3	0	0	1	1	1	1	0	0
Euro 4	0	0	0	0	0	0	0	0
Euro 5	0	1	1	1	2	2	0	0
Euro 6	0	0	0	0	0	0	30	30
Total	**47**	**46**	**40**	**40**	**47**	**47**	**30**	**30**

Data provided by Lothian Buses, March 2017

Lothian Buses also introduced 25 Euro 6 standard double deck vehicles into the fleet at the end of 2016 for route 22. These buses significantly reduce emissions compared to the existing fleet. NO_x and PM_{10} emission savings are calculated at 80-98% and carbon emissions savings at 25%.

Lothian Buses deploy their highest Euro standard vehicles on high-frequency services and those routes which transit AQMAs e.g. Airlink100 and service 22 which both pass through the central AQMA and St Johns Road and Great Junction Street AQMAs respectively. The number 36 bus service route is comprised of Euro 6 hybrid standard vehicles, which operate in the central AQMA.

The deployment of Euro 5 standard buses or better in AQMAs is shown in Table 2.9 The City Tour Fleet which became Euro 6 at the end of September 2016 also has a high presence in the Central AQMA.

Table 2.9 – Deployment of Euro 5 standard or better Lothian Buses (TfE) in AQMAs.

Service Number	Euro bus standard March 2017
Central AQMA	
30, 12, 24, 36	Euro 6 hybrid single deck
34	Euro 6 hybrid double deck
3, 22, Airlink100	Euro 6 double deck
10	Euro 5 hybrid double deck
1	Euro 5 hybrid single deck
26	Euro 5
Tour bus fleet	Euro 6
St John's Road AQMA	
Airlink100	Euro 6 double deck
12	Euro 6 hybrid single deck
26	Euro 5
31	Euro 5
Great Junction St AQMA	
22	Euro 6
10	Euro 5 hybrid
Inverleith Row AQMA	
21	E3 SCRT and Euro 5
23	Euro 5 EEV
27	Euro 5 EEV

Data provided by Lothian Buses, March 2017

Lothian Buses continue to be committed to reducing the emissions from their fleet and to invest in low emission vehicles as part of their fleet replacement strategy. Currently 68% of the bus fleet is Euro 5 or better. By the end of 2017, 75% of the main service bus fleet will be Euro 5 or better.

During 2016, Lothian Buses formed East Coast Buses, a wholly owned subsidiary, following a rescue package of services previously operated by First in East Lothian. East Coast Buses is also included in the fleet replacement strategy.

Lothian buses are in the process of installing electric charging infrastructure to support the operation of electric buses in the city.

First West Lothian

Following a review First West Lothian (formally First East Scotland) operate 156 buses from Livingston and Falkirk using two routes which pass along the A8 through Glasgow Road and St Johns Road AQMA and the A71. The fleet standard is shown in Table 2.10.

Table 2.10 – First West Lothian fleet currently operating in Edinburgh

Euro Standard	2011	2013	2014	2015	2017
Euro 1	23 (7%)	0	0	0	0
Euro 2	149 (45%)	0	0	0	0
Euro 3	116 (35%)	75 (69%)	53 (52%)	84 (54%)	0
Euro 4	33 (10%)	24 (22%)	31 (30%)	32 (21%)	43 (27%)
Euro 5	9 (3%)	10 (9%)	18 (18%)	37 (24%)	65 (42%)
Euro 6					48 (31%)
Total vehicles	**330**	**109**	**102**	**153**	**156**

Data provided by First West Lothian buses, March 2017

First West Lothian, serving Edinburgh now has 48 Euro 6 vehicles in the fleet, all Euro 3 vehicles have been eradicated and 73% are of a Euro 5 Standard or better.

Stage Coach Ltd

There are 60 buses in the Stagecoach fleet operating on services into the centre of Edinburgh. These services pass through the Queensferry Road corridor and St Johns Road AQMA and the 747 Airport Service from Fife goes along the Glasgow Road AQMA. The majority (83%) of the Stagecoach fleet into Edinburgh are now

Euro 5 or better. All Euro 3 vehicles have been eliminated from the fleet and Euro 4 vehicles have been significantly reduced. The current Euro class status of the Stagecoach fleet operating in Edinburgh is shown in Table 2.11.

Currently the five vehicles which pass through St Johns Road corridor are Euro 5 and by the end of September they will be Euro 6 standard.

By the end of 2018, Stagecoach are expecting to have replaced the 10 Euro 4 vehicles with 10 Euro 6 engine vehicles.

Table 2.11 – Stagecoach Fleet operating in Edinburgh 2012 to 2016

Euro Standard	2012	2013	2014	2015	2016	2017
Euro 1	0	0	0	0	0	0
Euro 2	2 (5%)	0	0	0	0	0
Euro 3	4 (10%)	4 (10%)	8 (14%)	5 (9%)	0	0
Euro 4	27 (69%)	27(64%)	33(59%)	34 (59%)	10 (17%)	10 (17%)
Euro 5	6 (15%)	11 (26%)	15 (27%)	19 (33%)	38 (63%)	34 (56%)
Euro 6	-	-	-	-	12 (20%)	16 (27%)
Total vehicles	**39**	**42**	**56**	**58**	**60**	**60**

Data provided by Stagecoach, March 2017

Citylink (No update as of (30/06/2017)

Citylink operate several 'inter-city' type coach services between destinations across Scotland. The services are subcontracted to a range of different bus operators, consequently many of the vehicles are not directly owned by Citylink. There are 51 buses operating on services entering Edinburgh, the majority (86%) were Euro 5 standard or better as of 2016. The Citylink-managed fleet operating into the city, as of 2016, is shown in Table 2.12

Table 2.12 – Citylink fleet operating in Edinburgh 2015 to 2016

Euro Standard	May 2015	July 2016
Euro 1	0	0
Euro 2	0	0
Euro 3	2 (4%)	1 (2%)
Euro 4	0	6 (12%)
Euro 5	43 (92%)	37 (72%)
Euro 6	2 (4%)	7 (14%)
Total	**47**	**51**

Data supplied by Citylink July 2016. Waiting for an updated-on fleet profile.

Five additional Euro 6 buses have been purchased to provide a service to Edinburgh Airport which commenced in July 2016. All services into Edinburgh pass through the Glasgow Road AQMA, St Johns Road AQMA and Central AQMA.

Fleet Efficiency recognition schemes

The freight sector has been a more demanding group for local authorities to co-ordinate. A key action for the Scottish Government and Transport Scotland under CAfS is to encourage Freight Quality Partnerships to extend their activities to consider the environmental impact of freight transport; and encourage local authorities with AQMAs to create a Freight Quality Partnership.

To persuade road freight operators to voluntarily reduce their emissions, the Council became a partner in an EU-funded project, ECOSTARS Europe through which the ECOSTARS Edinburgh scheme was established. This is a voluntary, free to join fleet recognition scheme that provides bespoke guidance on environmental best practice to operators of goods vehicles, buses and coaches whose fleets regularly serve Edinburgh area. The scheme was launched in January 2012 and to date 154 operators have joined with a total of 7,061 vehicles. Most members are goods vehicle operators (128), followed by passenger transport (21) and public sector fleets (5). Progress made with ECOSTARS Edinburgh is detailed in Table 2.13.

Table 2.13 - ECOSTARS Edinburgh – Progress from 2012 to 2017

Year	Number of vehicles in the scheme	Number of operators in the scheme
2012 (May)	1,684	14
2013 (May)	2,900	35
2014 (May)	3,525	51
2015 (June)	5,048	84
2016 (August)	6,089	129
2017 (May)	7,061	154

Additional funding has been secured to continue the scheme during 2017/18 from the Scottish Government Air Quality Action Plan grant.

Council Fleet

The Council is committed to leading by example through the acquisition of lower emission vehicles for its own fleet, as set out in Policy ENV2 of the Local Transport Strategy 2014 to 2019.

In 2014, the Council purchased 16 new electric-powered vehicles, with the assistance from the Scottish Government's Low Carbon Vehicle Procurement Support Scheme. This brings the total number of electric vehicles operated to 25. Presently, 71% of the Council's operational fleet is at Euro 5 standard or better, while 3% is full electric. The degree of ongoing Council fleet improvement is set out in Table 2.14.

Table 2.14 - Improvement in City of Edinburgh Council fleet 2003 to 2017

Euro Standard	2003	2011	2012	2013	2014	2015	2016	2017
Pre-Euro	12 1%	0	0	0	0	0	0	0
Euro 1	96 12%	0	0	0	0	0	0	0
Euro 2	374 45%	0	0	0	0	0	0	0
Euro 3	338 41%	78 8.3%	45 4.6%	38 4%	44 5%	44 5%	21 2%	15 2%
Euro 4	12 1%	627 67.1%	561 58.2%	476 50%	476 49%	183 19%	238 26%	217 25%
Euro 5	0	227 24.2%	348 36.1%	430 45%	440 45%	708 73%	532 58%	497 56%
Euro 6	0	0	0	0	0	10 1%	104 11%	128 15%
Electric	0	3 0.3%	10 1%	10 1%	11 1%	27 3%	27 3%	25 3%
Total	**832**	**935**	**964**	**954**	**971**	**971**	**921**	**882**

Data provided by CEC Fleet April 2017.

Promoting Low Emission Transport

Managing traffic emissions via Mandatory Low Emission Zone

In May 2017, the City of Edinburgh Council sent a letter to the Scottish Transport Minister affirming Edinburgh's position that it would like to be selected to implement Scotland's first LEZ, subject to funding and resources from the Scottish Government.

Promotion of electric vehicle recharging infrastructure

A number of electric charging points have been installed in Edinburgh from 2012. All public accessible charging sites can be found on the following website; http://chargeyourcar.org.uk Progress regarding installation of electric charging infrastructure is shown in Table 2.15

Table 2.15 - Electric charging infrastructure progress from 2012 to 2017

EV Infrastructure (units & sites)	2012	2013	2014	2015	2016	2017
No. of charging heads	8	14	58	89	141	148
No. of site locations	5	9	26	38	60	61

The city council is in receipt of £99,000 of grant funding from Transport Scotland to invest in additional public EV infrastructure during 2017 and replace a number of older chargers.

A site has been identified at South Queensferry (Transport Scotland Offices), which will install seven charging heads during 2017.

Transport Scotland has become a partner with the Council to assist the funding of an on-street pilot electric charging scheme to provide fourteen units at seven locations in the Marchmont area of the city. The units should be available for use by the end of 2017, subject to Traffic Regulation Order consultations.

Since 2014, data has been compiled for the number of charging sessions and amount of electricity used at locations across the city. As expected, with additional infrastructure provision and more electric vehicles in the fleet there has been an increase in usage. The amount of power in kWh and number of charging sessions per month and yearly comparisons of power used are shown in Figures 2.2 and 2.3.

Fig 2.2 Power (kWh) used and number of charging sessions per month.

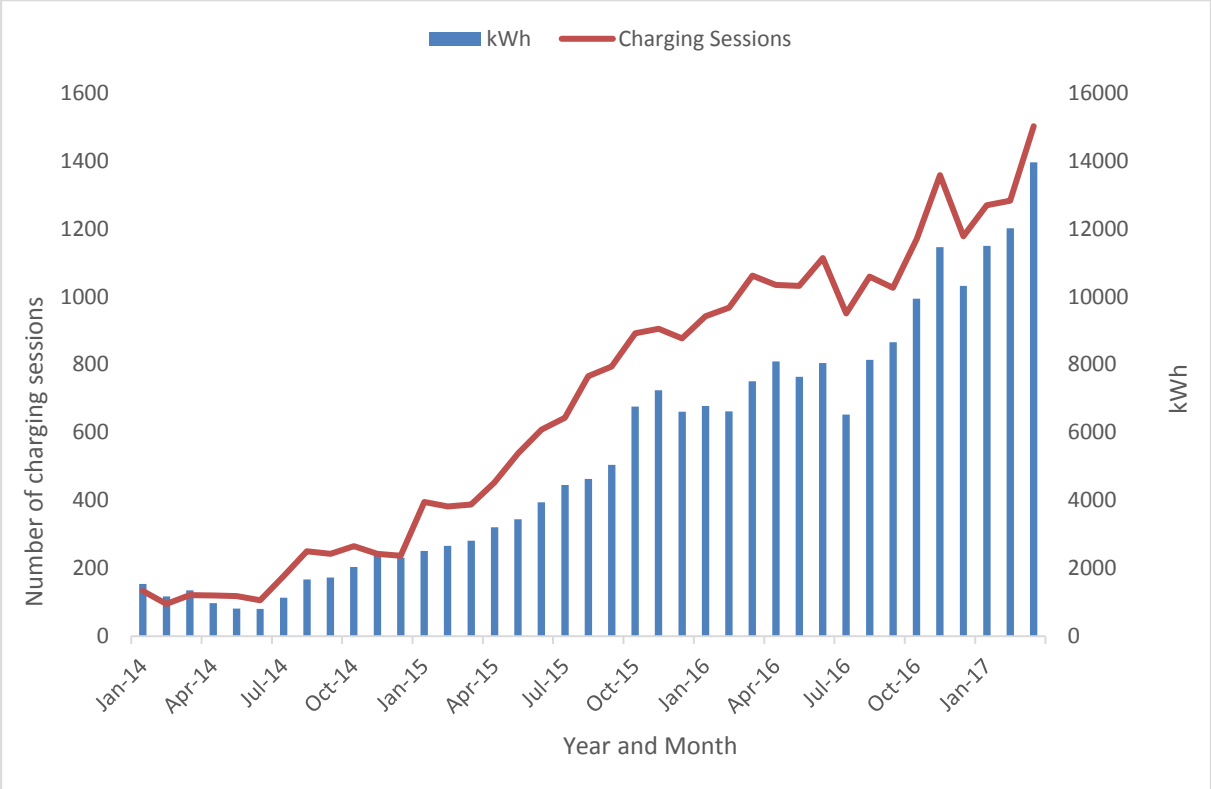
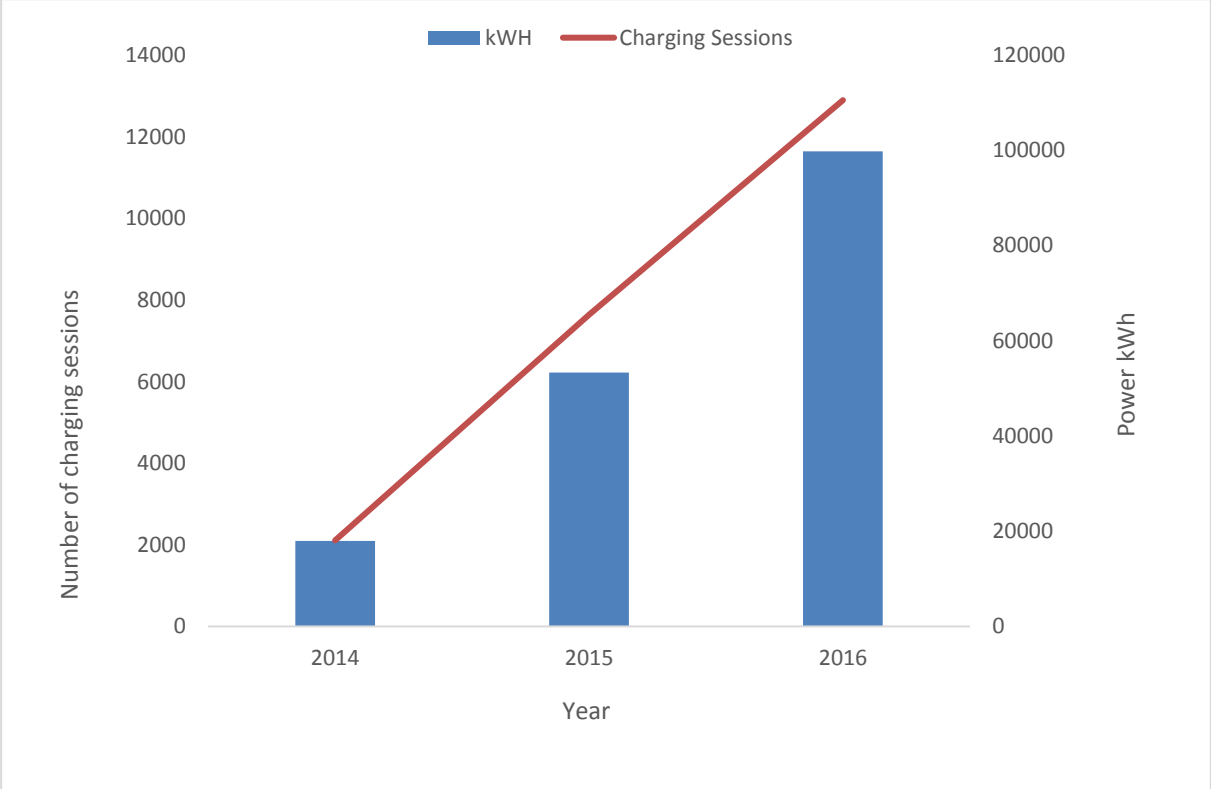


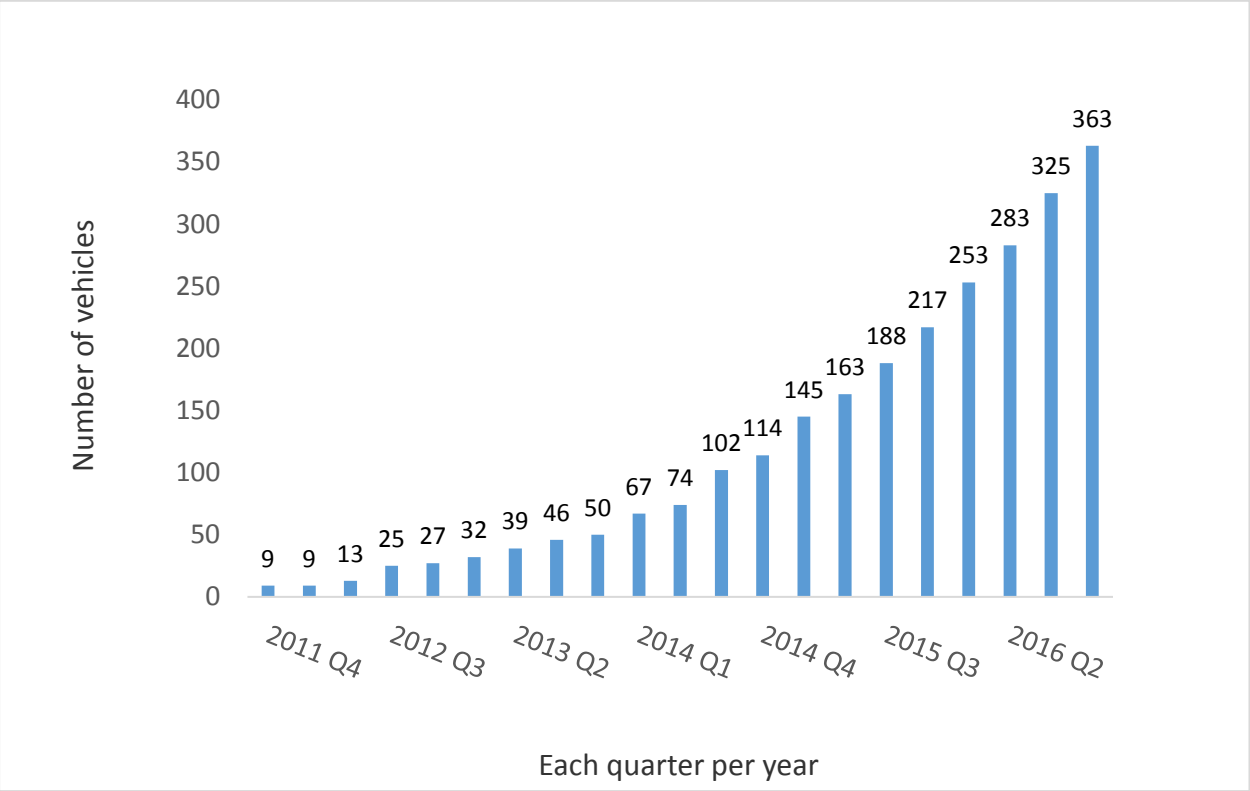
Figure 2.3 Annual power used and number of charging sessions



Data is not accessible from all the charging locations in the city and therefore usage is likely to be greater than what is represented in the above graphs.

Electric and plug in hybrid vehicles which are licensed in Edinburgh have increased from the end of 2011 to end of 2016. The total number of vehicles registered in Edinburgh at the end of 2016 was 363, which is 8.2% of the total vehicles licensed in Scotland (4,430). See Figure 2.4.

Figure 2.4 - Cumulative number of electric and plug in hybrids vehicles licensed each quarter in Edinburgh from 2011 to 2016



Plug-in cars, vans and quadricycles licensed at the end of quarter (Edinburgh) 2011-2016. Source: Department for Transport, Vehicle Licensing Statistics.

The City of Edinburgh Council's Parking Standards policy expects developers to consider provision for electric vehicle charging infrastructure throughout all types of development. This is currently being progressed through the inclusion of an informative on planning consents, rather than Section 75 Legal Agreements or use of planning conditions. It is expected that provision of electric charging points will be addressed through the revised Edinburgh Design Guidance. The document is at consultation stage. It contains a section relating to the quantity of car parking for new

developments and a requirement to install electric vehicle charge points where 10 or more car parking spaces are proposed.

The City of Edinburgh Council is developing an Electric Vehicle Framework. This will ensure that there is a more co-ordinated approach to advance a network of rapid and fast electric charging points and guarantee that appropriate mechanisms are in place for procurement, governance, asset ownership, and maintenance.

Traffic Management

Urban Traffic Control Systems (SCOOT)

Improving traffic flow and reducing idling time are measures which help to improve air quality. Split Cycle Offset Optimisation Technique (SCOOT) systems are automatically responsive to traffic flows and demand and therefore help ease congestion by providing more effective control of traffic signals.

SCOOT infrastructure is in place on many road networks in the city. However, due to ongoing utility works and road improvements, many of the inductive loops have been damaged and require repair and in several locations, the system requires validation.

It is hoped this work will be undertaken over this financial year.

Equipment has been installed at the following junctions Lothian Road/ Fountainbridge and West Port/Lady Lawson Street. This however, will initially be run on fixed time until timing options have been explored further.

SCOOT installation and validation at Bernard Street/Shore/Constitution Street/ Salamander Street/Seafield Place was completed in June 2017.

SCOOT has been operational at Portobello High Street junction from Fishwives' Causeway to Bellfield Street since November 2016. The NO_2 concentrations are considered borderline at this location.

Current SCOOT status for the AQMAs is detailed in Table 2.16.

SCOOT systems outwith AQMAs have been installed in the following areas:

- Morningside Road (Holy Corner to Comiston Road and Greenbank Crescent)
- Ferry Road/Pilton Drive
- Pilton Drive/Morrisons
- Ferry Road/East Fettes Avenue

- Dalkeith Road/ East Preston Street to Prestonfield
- Portobello High Street junctions from Fishwives' Causeway to Bellfield Street

Table 2.16 SCOOT status in AQMAs 2017

SCOOT Status	Locations
Central AQMA	
Operational Some loop damage noted which will be repaired over the coming months	Gorgie Road, Chesser Avenue, Balgreen Road
Operational Some loop damage noted which will be repaired over the coming months	Gorgie Road, Westfield Avenue and Robertson Avenue
Operational Some loop damage noted which will be repaired over the coming months.	Ardmillan Triangle including Gorgie Road/ Dalry Angle Park Terrace, Slateford
Infrastructure installed, but loop repairs and re-validation required.	The Bridges, London Road, Easter Road Nicholson Street, Clerk Street/ South Clerk Street
Loops and validation required Scheme is on hold due to Leith Cycle scheme. New options will be devised during design phase to address traffic congestion issues.	Roseburn
Unlikely to be re-installed due to Tram priority.	Queen Street, Princes Street, Haymarket, Leith Walk, St Andrews Square
Not installed Equipment installed and timings are being refined at West Port/Lady Lawson Street.	Grassmarket, Cowgate West Port
Temporary modifications as route will be part of diversion route due to Leith Street closure 2017.	London Road/Easter Road/Montrose Terrace/Abbey Lane and Marionville
St John's Road AQMA	
Infrastructure installed. Cabling work, configuration and revalidation required. Expected completion date September 2017	St Johns Road, Corstorphine Manse Road / St Johns Road
Great Junction Street AQMA	
Operational	Bernard Street/Shore/Salamander Street/Seafield/Craigentinny North
Inverleith Row/ Ferry Road junction	
Infrastructure installed Loop repairs and validation required	Inverleith Row (Goldenacre) Ferry Road

Other Action Plan Initiatives

Controlled Parking Zones

Controlled Parking Zones (CPZs) enable on-road parking spaces to be used by residents and therefore reduce opportunity for car commuting into the city centre. The boundary of Edinburgh's Controlled Parking Zone (CPZ) was substantially extended in 2006-2007 and covers the central core of the city.

An alternative form of CPZ, a Priority Parking Zone (PPZ) was trialled in the south-central area of the city during 2010. The operational times of the PPZ were aligned with peak travel periods and, as with the standard CPZs aim to deter commuter travel. The trial delivered positive outcomes and has been made permanent. Thus, several new areas in the city have been designated PPZs. The areas are shown in Table 2.17

Table 2.17- Priority Parking Zones within City of Edinburgh Council

Code	Area	Implementation Date
B1	South Grange /Newington	September 2011
B2	South Morningside	March 2013
B3	Arboretum/Kinnear/Inverleith	March 2013
B4	Craigleith	November 2013
B5	Blinkbonny	March 2014
B6	Netherliberton/Blackford	March 2014
B7	Priestfield	November 2014
B8	Craiglockhart	November 2014
B9	Murrayfield	May 2015
B10	Telford	April 2017

A new zone at Telford, north of the city came into effect 24th April 2017.

Introduction of new and extensions to existing CPZs or PPZs are kept under regular review by the Council. Locations of residential CPZs and PPZs can be downloaded from the following website;

http://www.edinburgh.gov.uk/info/20083/parking_permits/577/parking_permit_map

The Council also operates a tiered pricing scheme for residential parking permits based on CO_2 emissions and engine size. Work undertaken for 2015 Air Quality Action Plan progress showed that there had been an element of behaviour change with residents moving towards the purchase of smaller engine vehicles producing less CO_2.[5]

However, to obtain improvements in NO_x and particle emissions it would require the Council to adopt a system which encouraged the purchase of low emission vehicles with respect to these pollutants.

Progress on the following measures has been slower than expected due to:

- Inadequate staff resources (Transport) to take further SCOOT improvements and repair work required on existing systems.
- No current commitment for financial support for the expansion of Hermiston Park and Ride.

The City of Edinburgh Council expects the following measures to be completed over the course of the next reporting year:

- Continue to work with Lothian bus to improve fleet standard and support installation of electric charging infra structure to enable operation of electric buses in the city,
- Continue ECOSTARS scheme,
- Commence the roll out of telematics across the Council Fleet,
- Complete outstanding SCOOT repair work,
- Install seven EV charging heads,
- Develop an Electric Vehicle Framework for Edinburgh,
- Continue support for Active Travel Action Plan,
- Develop new Corporate Travel Plan,
- SEPA to complete Edinburgh local air quality model under National Model Framework (CAfS), in conjunction with the City of Edinburgh Council,
- Develop Air Quality Action Plan for Salamander Street with relevant Stakeholders,
- Work towards implementation of a LEZ - this will depend on Scottish Government and funding availability, and;
- Review the Air Quality Action Plan (2008).

Table 2.18 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
1	Promoting low emission public transport	Vehicle fleet efficiency	Reduce bus emissions via voluntary agreements with bus companies	CEC Citywide Planning and Transport	2009-2011	Euro 4 by 2012 Euro 5 by 2015 Formal agreement not reached due to being onerous in absence of financial support		NOx Central 59% St John's 48% Gt Junct 61%	TTR study Completed **Lothian Bus** Main Service E3= 31% E4= 1% E5= 36% E5/6=11%% E6= 21% **728 vehicles** Tour E6 = 100% **30 vehicles** 2016 purchased 20 Hybrid DD 55 DD E6 2017 ordered 12 SD E6 55 DD E6 **First West** E4= 27% E5 = 42% E6 = 31% **156 vehicles**	On going 2017 end 75% E5 or better	LB bus aim to be E5 Or better by 2020 Other bus companies unable to predict improvements Reductions NOx and PM_{10} 95% - 99% All E3 Replaced with E6

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
1a	Implementation of an LEZ	Promoting Low emission transport	Manage bus emissions and potentially emissions from other vehicle classes	CEC in conjunction with Scottish Government , Transport Scotland		CAfS LEZ to be in place by 2020		Will be determined by outcomes of NMF and NLEF under CAfS	Frameworks being progressed by Scottish Government	SG expect an early adopter to have LEZ in place by 2018	Letter submitted to Transport Minister for Consideration May 2017
2	Fleet efficiency and recognition Scheme ECOSTARS	Vehicle Fleet Efficiency	Manage road freight emissions	CEC in conjunction with TRL	2010-2011	2011	Recruitment figures		May 2017 154 operators and 7,061 vehicles registered	Ongoing	Additional funding secured for 2017/18
3	Cleaner council vehicles	Vehicle Fleet Efficiency	Improve emissions by ensuring highest standard for vehicle replacement	CEC Fleet		2003		Not quantified	May 2017 E3 = 2% E4 = 25% E5 = 56% E6 = 15% EV = 3% Total 881	Ongoing	Proposal to Consult on greening the fleet
3a	Eco driver training and ECO	Vehicle Fleet Efficiency	Council vehicle trial telematics system	CEC Fleet			Reduction in fuel consumption and idling	Not quantified	Report to Finance and Resource Committee March 2017 re approval to install a Telematics system for all council vehicles - required business case	Trial completed Roll out time by December 2017	Business case completed to support installation Approved by Council Leadership Team

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	Bus based Park and Rides Rail based Park and Rides * Tram based Park and Rides**	Alternative to private vehicle use Modal shift	Reduce emissions by easing congestion at peak travel times	CEC			Usage	Not quantified	Ferrytoll (1040) Ingliston** (1082) Straiton (600) N'craighall* (565) Sheriffhall (561) Hermiston (450) Wallyford* (321) Halbeath (1021	Land secured at Hermiston Lasswade Hermiston Gait for future expansion	Require funding to enable expansion
5	Differential parking	Promoting low emission vehicles	Aimed at smaller engines and low CO_2 emission vehicles	CEC				Not quantified			Requires adoption of low emission vehicles NOx and PM_{10}
6	Controlled Parking Zones Priority Parking Zones PPZ	Traffic Management	Discourage car commuting into city centre	CEC				Not quantified	Several CPZ in city centre One new PPZ introduced Total 10 PPZs surrounding city centre	0ngoing	
7	Tramline 1	Transport Planning and Infrastructure	Zero emissions at source. Encourage modal shift from car use	CEC/ TFE		Line 1 May 2014	Passenger growth	Not quantified	5.8 m Passengers 2016/17	Completed	Extension of line to Leith proposed. Business case waiting for approval

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
8	New rail line stations Aidrie Bathgate New Craighall Borders	Transport Planning and Infrastructure	Modal shift to reduce road traffic entering Edinburgh	Transport for Scotland			Passenger numbers	Not quantified	Completed 2010 2002 Sept 2015	All Completed	Passenger growth recorded
9	New cycle networks	Transport Planning and Infrastructure	Part of CECs Active Travel Plan	CEC/ Sustrans/ NHS Lothian	2010			Not quantified		On going	
9a	Promoting travel alternatives	Promotion of cycling and walking	CECs Active Travel Plan Encourage modal shift away from car	CEC/ Sustrans/ NHS Lothian				Not quantified		On going	
10a	Urban traffic control systems SCOOT	Traffic Management	Reduce waiting times and stop/starts	CEC Transport				Not quantified	Number of schemes across City New Bernard St/ Shore –	On going	Many existing schemes need repairing and re validating

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
10b	Urban traffic Control systems MOVA Newbridge	Traffic Management	Reduce idling time	CEC transport	2014	Mar 2016	Reduced NO_2 concentrations and idling times	44% NOx 26% PM_{10} 40% CO_2	Completed April 2016	Completed	Delay time reduced on Westbound A8 pm Measured NO_2 at junction all below AQO Apart from one site which decreased from 45 to 41
11	20mph speed limits across the City NEW	Traffic Management	To assist improving cycle and walking uptake by making roads safer	CEC	2015	31/07/2016 commenced		Not quantified		31/01/2018	

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 the City of Edinburgh 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. The City of Edinburgh Council is in the process of developing a new travel plan. Smarter Choices, Smarter Places funding for the current financial year is being used to progress the recruitment of a travel planning officer who will be responsible for implementing the new travel plan.

Smarter Choices, Smarter Places funding has enabled the council to co-ordinating workplace travel planning activity in large work place sites in the city since August 2015. Transport planning consultants at SWECO have been delivering this on the Council's behalf and will continue throughout 2017/18. Thirty-five workplace sites were engaged during 2015/16 and fifty-seven employer sites were engaged during 2016/17. This involved road-show events at each site and the collection of mode share survey data for each employer.

This will continue during 2017/2018 by SWECO and will be focussed on engaging using incentive – based challenges for employees to record trips by active and sustainable modes Active Travel in Summer 2017 and Spring 2018 and Autumn and Winter 2017 public transport.

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

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.

The City of Edinburgh Council has a Sustainable Energy Action Plan (SEAP). This was launched in 2015 with the aim of reducing carbon emissions across the city by 42% by 2020. The vision is that Edinburgh will transform its energy use by reducing demand and encouraging local generation. These benefits will also help to improve air quality, alleviate fuel poverty, and create local jobs and more sustainable communities.

The SEAP is currently being delivered through five programme areas. These are energy efficiency, district heating, renewables, resource efficiency and sustainable transport. One of the SEAPs key outcomes will be to reduce levels of air pollution aligning with the city's Air Quality Action Plan. Many of the key carbon reduction actions currently underway in the SEAP will have a positive impact on air quality. These include increasing the amount of electric vehicle charging infrastructure in Edinburgh; the energy retrofit of many non-domestic and domestic properties across the city; and the installation of renewable heat technologies such as air source and ground source heat pump systems.

2.3.3 Active Travel Action Plan

The Council produced an Active Travel Action Plan (ATAP) in 2010, which was updated in 2015. This aims to deliver significant increases in the number of pedestrian and cycling journeys travelled within Edinburgh. The ATAP as well as bringing health benefits will assist in encouraging modal shift away from car use. The plan has set targets of 35% for walking and 10% for cycling for all trips in the city by 2020.

A core element of the plan is the development of the 'QuietRoutes' cycle network which will enable people to travel around the city on safe routes away from the busier roads. Several major and smaller cycling and pedestrian schemes have been delivered and additional schemes are in progress.

Cycling has become a more attractive travel option due to bold measures such as the new segregated path on Buccleuch Street. This is a key link in Edinburgh's walking and cycling network and the National Cycle Network, forming a single route from the Meadows to the Innocent Railway Tunnel in Holyrood Park. This then follows an old railway route to Duddingston, Brunstane and Musselburgh, creating a major cycling corridor in the south east of the city without cyclists having to dismount or negotiate busy junctions. New crossings have been created to permit cycling, and an alleyway

was opened up, flanked by two community murals, to provide a safe and attractive route for people to make every day journeys on foot and by bike.

Segregated cycle lanes offer real protection from traffic. Being serious about road safety and encouraging more people to travel by bike makes this kind of facility crucial. As a result, further roadside segregated cycle paths are being constructed on large sections of Leith Walk. The success of these routes will hopefully continue this momentum of rolling out safer, more accessible schemes further and faster across the city.

Segregated Cycle Lanes

Segregated Infrastructure – Buccleuch Street: Innocent Tunnel to the Meadows link

To monitor outcomes there are over 20 cycle counters across the city and a network of automated pedestrian counters are now being installed in a mix of on street and off-street locations.

Progress of ATAP actions have been reviewed in 2013 and 2015. A further review is expected in late 2017. In 2018 the ATAP will be updated and extended to 2025. Increases in active travel for cycling and walking are shown in Table 2.19

Table 2.19 – ATAP progress for cycling and walking

Activity	2011 Data	2014/15 Data	2020 Target
Cycling			
% of all Edinburgh residents' trips	-	3%[b]	10%
% of trips to work by Edinburgh residents	4.9%[a]	7.3%[b]	15%
Walking			
% of all Edinburgh residents' trips	-	32%[b]	35%
% of trips to work by Edinburgh residents	18.2%[a]	20%[b]	21%
School cycling training			
% of P6/P7 children provided with on-road cycle training	-	63%	72%

[a] 2011 Census [b] Scottish Household Survey 2015 and Edinburgh Bike Life report

Analysis of travel to work data indicates that in most parts of Edinburgh walking mode share could be increased by 10% to 20%.

Statistical active travel data for 2016 was not available at the time of reporting

The City of Edinburgh Council is currently working towards improvements to bike life in the City in the following ways:

- Connecting missing links between key trip generators and sections of the QuietRoutes Network to create a safe, convenient, and seamless network,
- Planned upgrades to the city's existing QuietRoutes Network will continue to make cycling without mixing with busy a realistic travel choice,
- Committed 10% of the Roads and Transportation budget in 2017/18 to cycling and walking,
- Increase modal shift towards walking and cycling - developing a city that is attractive and safe for people on bikes, whatever their age or ability,
- Complete the City Centre West to East Link (CCWEL) - the extensive network of routes is missing a vital link along its west-east axis across the city centre. Note - there is now full council approval for the construction of this route, protected from busy traffic and integrated with prominent planned public realm enhancements; and;
- Collaborating with Sustrans in developing projects for cycle network infrastructure which aims to rebalance streets for people, especially in West Edinburgh and the city centre, with plans to transform some of the most car dominated parts of the city into safe and attractive places for pedestrians and

cyclists. Note - the City of Edinburgh Council received about a million pounds for different projects at design, feasibility and construction stages for 2017/18.

The City Centre West to East Link

Visualisation of proposed City Centre West to East Link (formerly Roseburn to Leith)

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

3.1 Summary of Monitoring Undertaken

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

3.1.1 Automatic Monitoring Sites

The City of Edinburgh Council undertook automatic (continuous) monitoring at eight sites during 2015. Table A.1 and A.2 in Appendix A shows the details of the sites and what each of them measure. National monitoring results are available at; www.scottishairqaulity.co.uk.

Maps showing the location of the monitoring sites are provided in Appendix A - Figure A.1. Further details on how the monitors are calibrated and how the data has been adjusted and distance corrected, where necessary, are included in Appendix C.

During 2016 planning permission for the Queen Street/Wemyss Place station expired and the site was decommissioned at the end of June. A new site is being developed on Nicolson Street in conjunction with DEFRA. This will form part of the national Automatic Urban and Rural Network and will hopefully be operational in the autumn. In November 2016 at St John's Road, a FIDAS 200 instrument was installed. It monitors PM_{10} and $PM_{2.5}$ at a kerbside location. The first full year of data will be reported in the 2018 Annual Progress Report. A new FIDAS particulate monitor will also be installed in or near the boundary of the newly declared Salamander Street AQMA. This will also monitor PM_{10} and $PM_{2.5}$.

3.1.2 Non-Automatic Monitoring Sites

The City of Edinburgh Council undertook non-automatic, Passive Diffusion Tube (PDT) monitoring of NO_2 at 127 sites across the city during 2016. Table A.3 in Appendix A shows the details of the sites including grid reference co-ordinates. A map showing the city-wide spatial coverage of the monitoring sites is provided in Appendix A - Figure A.2. Detailed maps are provided at the following link (Note - use 'site code' data);
https://edinburghcouncil.maps.arcgis.com/apps/webappviewer/index.html?id=dc93485b492947d0b2182c75aca4c554

Further details on Quality Assurance/Quality Control (QA/QC), bias adjustment and distance correction for the diffusion tubes are included in Appendices C and D.

Monitoring ceased at 29 sites following a review of the PDT survey at the end of 2015. Details of these sites are shown below with the individual site identification numbers (ID);

ID3a	Torphichen Street	ID72a	Seafield Road East No7
ID9b	Ocean Drive, Leith	ID73a	Portobello Road/Ramsay
ID19	Baileyfield Road	ID75a	St Colme Street
ID28e	St Leonard's No.145a	ID75b	Great Stuart Street No.7
ID31	Dalkeith Road No.187	ID75f	Great Stuart Street No.14
ID35	Dundas Street	ID78	Slateford Road/The Maltings
ID40d	Hillhouse Rd	ID79b	Fountainbridge / Grove Street
ID40f	Hillhouse Road No.118	ID80d	Balgreen Rd/School
ID45	Ferry Road No. 128	ID149	Captains Road No.150
ID46b	London Rd/Brunton Place	ID149b	Howden Hall Road No.77
ID50a	Whitehouse Road	ID149c	Howden Hall Road No 67
ID51b	Salamander Street	IDPR1	Princes Street Scot Monument
ID52	Ferry Road No. 268	IDPR2	Princes Street opposite Mound
ID55b	Inverleith Row/Summer Pl	IDPR3	Princes Street west-end
ID61	Maybury Road/Barnton		

The review also identified alternative sites for seven tubes near their original location. These include Broughton Street (ID44), Queen Street (ID33), Home Street (ID10), Morningside Road (ID8), Calder Road (ID4a), Leith Walk, Brunswick Road to Brunswick Place (ID21); and Deanhaugh Street to Raeburn Place (ID13a).

3.2 Individual pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for annualisation and bias. Additionally, data from some sites is also distance corrected to represent relevant exposure. Further details on these adjustments and calculations are provided in Appendix C and D.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.4a and A.4b in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations with the air quality objective of 40µg/m^3.

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

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

St John's Road (ID5) remains the only **automatic monitoring** data to show breaches of the objectives for NO_2, with an annual mean concentration of 53µg/m^3. There were only 5 hourly-means greater than 200µg/m^3, which means the hourly-mean objective is met, in contrast to 2015, when there were 42.

All other stations meet the Scottish and UK Air Quality objectives.

Data from Queensferry Road (42µg/m^3) is distance corrected to the facade of the residential property (relevant exposure) set back from the monitoring station, where the objective is met (32µg/m^3). Data capture was slightly below that required for a strict comparison with the objectives (83%) due to the anlaysers being switched off for safety purposes, during a period when the air conditioning was broken.

The six months of data collected at Queen Street before the site was decommissioned in July, was annualised as per the technical guidance (TG16). This resulted in an annual mean which is slightly lower than previous years (24µg/m^3). Data from St Leonard's was also annualised due to poor data capture stemming, from a leak in the sampling manifold which was an-ongoing issue from the previous year and detected Spring 2016. The resultant concentration (23µg/m^3) is slightly higher than the last available data (22µg/m^3 in 2013 and 2014).

There was good data capture from the remaining roadside locations - Salamander Street and Glasgow Road - where concentrations are well below the objective - 27µg/m^3 and 28µg/m^3 respectively.

Analysis of the **non-automatic monitoring** (PDT) results shows the annual mean objective continues to be exceeded in locations within all the current AQMAs. The AQMAs therefore remain valid.

The passive diffusion tube data collected during 2016 does not suggest breaches of the hourly mean objective for NO_2, although data from Westport (59µg/m^3), London Road/East Norton Place (57µg/m^3) and Leith Street (59µg/m^3) shows that there is potential.

There was one breach of the annual mean objective outwith the AQMAs at Queensferry Road (PDT64). This data has consistently resulted in breaches of the annual mean objective, even though adjacent monitoring, including that from the automatic analyser has always been compliant. Façade measurements concurrent with the site also meet the objective. As a part of the modelling work being undertaken by SEPA for the Cleaner Air for Scotland Strategy, a detailed computational fluid dynamic assessment will be made of the local circumstances. Discussions are also on-going with residents.

Potential exceedance of the annual mean objective is noted at a number of locations within the AQMAs, namely; Bernard Street (ID29a & ID29c), Clerk Street (ID138), Cowgate (ID48, ID48a & ID48c), Dundee Street (ID79d), Glasgow Road (ID15, ID16, ID16a & ID16b), Grassmarket (ID37b), Great Junction Street (ID30c), Haymarket Terrace (ID HT2), Leith Walk (ID20 & ID21), London Road (ID46, ID69 & ID70), Nicolson Street (ID136), Queen Street (ID33), Shandwick Place (IDSH1), Slateford Road (ID77a & ID77b), South Clerk Street (ID141) and St John's Road (ID1b).

There are also four sites outwith the AQMAs which potentially exceed the objective. Cowgate/St Mary's Street (ID48f), Duke Street (ID30f) and Fountainbridge/Tollcross (ID79 & ID79a) are all located close to the Central and Great Junction Street AQMAs.

Monitoring will continue at these sites and at Portobello Road (ID73d), where, the concentration was 36µg/m^3. A detailed assessment at this location in 2014 concluded an AQMA was not necessary.

In general, there is a slight increase in concentrations across the surveyed sites. Concentrations at both Leith Walk sites (ID20/21) increased from 33µg/m^3 to 40µg/m^3. One of the sites however was relocated at the start of 2016. Construction work on Phase 4 (Pilrig Street to McDonald Road) commenced in September 2016 and is still ongoing. Scotland Gas Networks also separately undertook a major gas main renewal project on Leith Walk, between Iona Street and Annandale Street, from August 2016 to October/November 2016. The works may have resulted in traffic congestion in the area.

Junction improvements at Easter Road and London Road were designed to be more pedestrian friendly which may be causing more queuing on Easter Road and London Road - East Norton Place. At both these locations (ID25 & 81) concentrations have

increased by six and seven microgrammes per cubic meters to 46 and 57µg/m^3 respectively. At London Road/East Norton Place there is a potential breach of the hourly objective. Traffic management is due to change again in September 2017 due to the closure of Leith Street in the city centre and the use of this junction as part of a one-way diversion system.

Leith Street will close due to the construction project associated with the St James redevelopment for approximately 44 weeks. Demolition and construction work has been on-going in the meantime which has resulted in congestion on that section of road giving reason to the high concentrations (59µg/m^3 at ID74g).

Worse-case location sites at Newbridge roundabout, on the eastbound carriageway (ID15, 15a and 58) show a reduction in concentrations. Although one (ID58), which is the result of duplicate tubes remains in exceedance of the objective (41µg/m^3). This has reduced from 45µg/m^3. There is also a reduction in the concentration of NO_2 at Glasgow Road/Ratho Station (ID16), on the westbound carriageway from 40 µg/m^3 to 37 µg/m^3. However, concentrations at two other sites in Ratho Station (ID16a and 16b) increased slightly. Monitoring will continue at all these sites. Nonetheless, it is anticipated that the reductions in high concentrations are attributable to the improvements made at the roundabout with the installation of the MOVA system which became fully operational in April 2016.

Concentrations at the recently extended Central AQMA at Dundee Street/Yeaman Place (ID79d) reduced from 42µg/m^3 to 39µg/m^3, which is below the objective. Sites outwith the AQMA further east, on Fountainbridge (ID79 & 79a) increased from 30/31µg/m^3 to 36µg/m^3. Having regard to the amount of development proposed in the area monitoring will also continue at these locations.

There was no new monitoring that was undertaken in 2016.

Monitoring will continue at most sites especially those in the AQMA. Furthermore, modelling work being undertaken by SEPA through the CAfS National Modelling Framework will also be on-going throughout 2017 and 2018.

Trends

Trend analysis has been undertaken at all the automatic monitoring locations, which all have five or more years of valid data with Glasgow Road meeting this minimum in

2016. Annual mean concentrations have therefore been plotted for successive years at St Leonard's, Gorgie Road, St John's Road, Salamander Street, Queen Street, Currie, Queensferry Road and Glasgow Road. This includes the annualised data from St Leonard's and Queen Street in 2016. Trend lines were drawn using an Excel simple regression statistical program. Analysis has also been carried out with the hourly mean data from St John's Road. Graphs are shown in Appendix A – Figures A.3a to A.3i. Table 3.1 summarises the trend analysis.

Table 3.1 Summary of Annual Mean Nitrogen Dioxide trends measured at Automatic (Continuous) Monitoring Sites

Monitoring Location	Site Type	Trend in Annual Mean NO_2 (Years)	Concentrations of NO_2
St Leonard's	Urban background	(2004 to 2016) ↘	Slightly decreasing
Currie	Suburban	(2010 to 2016) ↘	Slightly decreasing
Gorgie Road	Roadside	(1999 to 2016) ↘	Slightly decreasing
Salamander St.	Roadside	(2009 to 2016) ↘	Slightly decreasing
Queensferry Rd	Roadside	(2011 to 2016) ↘	Slightly decreasing
Queen Street	Roadside	(2006 to 2016) ↓	Decreasing
St John's Road	Kerbside	(2007 to 2016) ↓	Decreasing
Glasgow Road	Roadside	(2012 to 2016) ↔	Flat

Trend analysis of the annual mean nitrogen-dioxide concentrations at most sites shows there is a slight decrease, namely; St Leonard's, Currie, Gorgie Road, Salamander Street and Queensferry Road. There is a flattening trend at Glasgow Road, with concentrations varying between 26 and 29µg/m^3 over the five-year period.

The downward trend remains more defined at Queen Street and St John's Road in respect to annual mean concentrations. Similarly, the trend of the number of hourly exceedances at St John's Road is significantly downward.

Trend analysis with passive duiffusion tubes located within the AQMAs was also undertaken - a summary is shown in Table 3.2. Data used in the analysis as well as graphs for each AQMA is shown in Appendix A – Tables A.6 to A.10 and Figures A.4a to A.4e. Data was corrected using the relevant bias adjustment factor for each year and taken from the point of measurement (not distance corrected).

Table 3.2 Summary of Annual Mean Nitrogen Dioxide Passive Diffusion Tube Trends within the AQMAs

AQMA	Trend in Annual Mean NO_2 (Years Included)	Concentrations of NO_2
Central AQMA	(2008 to 2016) ↓	Decreasing
Great Junction Street AQMA	(2008 to 2016) ↓	Decreasing
St John's Road AQMA	(2008 to 2016) ↓	Decreasing
Glasgow Road AQMA	(2009 to 2016) ↓	Decreasing
Inverleith Row AQMA	(2011 to 2016) ↘	Slightly decreasing

There is a general trend of decreasing NO_2 concentrations observed within all the AQMAs from the passive diffusion tube data. Although, this is only slight at Inverleith Row where concentrations have been at or just breaching the objective over the past three years.

In terms of drawing conclusions from this data it has been difficult to do so due to the changes in the central Edinburgh road network and traffic data collection in recent years. In November 2016, an extensive traffic monitoring survey was undertaken as a part of the Cleaner Air for Scotland Strategy work which involved a mixture of 12-hour and 24-hour junction turn counts, ANPR cameras, and automatic traffic counts, totalling 144 survey sites. Although this data will inform the modelling work, it also provides valuable traffic analysis to assess against future years' changes.

3.2.2 Particulate Matter (PM_{10})

Table A.11 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations with the air quality objective of 18µg/m^3. in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations with the air quality objective of 50µg/m^3, not to be exceeded more than 7 times per year.

PM_{10} data from all monitoring locations in 2016 meets the UK National Objectives.

Data from Queensferry Road show a breach of the Scottish objective (19µg/m^3) however this should be treated with caution considering the poor data capture from the site (78%). Data capture at St Leonard's is also poor (79%), however the annual mean is well below the objective (11µg/m^3). St Leonard's is an urban background site and in similar circumstances to 2015 data, results from 2016 show that concentrations are akin to those at Currie (9µg/m^3 (VCM) and 10µg/m^3 local gravimetric equivalent), which is a suburban urban background.

All other sites are also below or at the objective.

Data from Salamander Street is at its lowest levels since monitoring began in 2009. It is obtained using a TEOM instrument which when corrected with the Volatile Correction Method, shows a concentration of 17µg/m^3. When corrected with the local gravimetric equivalent (x1.14) method the concentration is at the objective (18µg/m^3).

Either way, there is a significant difference in comparison to previous annual mean concentrations. It is considered that the relocation of Aggregate Industries from Bath Road to Ocean Drive behind Chancellot Mill at the end of 2015 may explain why concentrations met the Scottish Standards during 2016. The road and surrounding area is cleaner and large amounts of fine aggregate material have not been stored or handled near Bath Road/ Salamander Street.

The Council declared an AQMA at Salamander Street in January 2017 and is currently in the process of developing an Action Plan in conjunction with SEPA, Forth Ports and relevant stakeholders. The aim of this process will be to assess the different potential sources to ensure that the continuing degree of improvement is sustained, especially as residential development is proposed in this area.

A new FIDAS particulate monitor will also be installed in or near the boundary of the newly declared AQMA. This will monitor PM_{10} and $PM_{2.5}$ and help inform potential sources and spatial concentration variations.

There were no breaches of the daily mean objective (50µg/m^3 exceeded seven times throughout the year) at any of the monitoring stations.

Data capture at Glasgow Road was also below the 90% required to make a strict comparison against the air quality objectives with 85% capture. The annual mean concentration was 15µg/m^3 (VCM) and 17µg/m^3 (local gravimetric equivalent), meaning the site is below the Scottish annual mean objective.

Data from Queen Street, which was decommissioned in July 2016, is not annualised due to the lack of suitable background data.

Trends

In 2016 there were four monitoring sites with five or more full year's data which is required in order to undertake trend analysis.

The non-volatile fraction of the FDMS data for years 2004 to 2016 at St Leonard's is used to ensure a consistent approach as the TEOM instrument was replaced with a FDMS unit in 2008. It should be noted that data capture has been poor for several

year periods (2009, 2012, 2014, 2015 and 2016). At Salamander Street and Currie volatile corrected (VCM) TEOM data was used for the analysis.

Trend lines have been drawn using an Excel simple regression statistical program and graphs are shown in Appendix A - Figures A.5a to A.5d. Below is a summary.

Table 3.3 Summary of PM_{10} Annual Mean Trend Data

Monitoring Location (Type)	Trend in annual mean PM_{10} (years)	Concentrations of PM_{10}
St Leonard's (Urban background)	(2004 to 2016) ↓	Decreasing
Currie (Suburban)	(2010 to 2016) ↘	Slightly Decreasing
Queensferry Road (Roadside)	(2011 to 2016) ↘	Slightly Decreasing
Salamander Street (Roadside/Fugitive)	(2010 to 2016) ↓	Decreasing

PM_{10} trends from measured data in Edinburgh shows a downward trend (decrease in concentrations with time) at all monitoring locations. This is most distinct at Salamander Street and only slight at Queensferry Road and Currie, where at the latter, the suburban site, concentrations have been the same for the past two years. Trends are generally in keeping with the situation across Scotland. Further work for the Salamander Street Air Quality Action Plan will consider the trend within the newly declared AQMA in relation to assessing the different potential sources that will ensure the continuing degree of improvement is sustained.

Poultry Farm Detailed Assessment Summary

PM_{10} monitoring which was undertaken at Gogarburn Poultry Farm by SEPA on behalf of the Council and Scottish Government, concluded that the air quality objectives would not be breached at the worst-case location previously identified by the screening tool.[7]

The average PM_{10} concentration obtained from a Partisol unit over a yearly monitoring period (08/08/2015 to 07/08/2016) was 11.4µg/m^3. There were 4 exceedances of the 24-hr mean objective of 50µg/m^3.

All exceedances occurred during a transboundary PM_{10} event in May 2016 and are likely to have been a combination of an already raised PM_{10} background and local site contributions. A summary of monitoring data is shown in Table 3.4.

Table 3.4 Summary of PM_{10} monitoring data from 08/08/2015 to 07/08/2016

PM_{10} monitoring method	Data Capture %	Average yearly Concentration µg/m^3	Maximum Concentration µg/m^3	No. of daily exceedances of 50 µg/m^3
Partisol 2025 (measures 24-hour mean)	86%	11.4	58.6	4
B.A.M (measures 1-hourly means)	-	11.8	81	N/A

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.13a in Appendix A compares the ratified and adjusted measured $PM_{2.5}$ annual mean concentrations for the past eight years at St Leonard's with the Scottish air quality objective of 10µg/m^3. The range of concentrations has been between 6 µg/m^3 and 12µg/m^3 since 2009. In 2016 the concentration was the same as 2015 (6µg/m^3) with good data capture (92%).

In addition to the monitoring at St Leonard's, an estimation of $PM_{2.5}$ from PM_{10} data at all other relevant monitoring stations was undertaken using the nationally derived factor correction ratio of 0.7. Details are described in Table A.13b. It shows there are potential exceedances at all roadside monitoring locations in Edinburgh. Consideration was also given to the ratio of 0.63 which resulted from the $PM_{2.5}$ and PM_{10} in Scotland report[8]. Using this factor and 2016 data, all roadside locations except Glasgow Road (VCM) are estimated to fail the $PM_{2.5}$ objective.

The City of Edinburgh Council commenced roadside monitoring of $PM_{2.5}$ in November 2016 at St John's Road, hence the first full calendar year of data will not be available until the end of 2017 and assessed and reported with the 2018 Annual Progress Report. This will provide evidence as to whether an AQMA will be necessary at this roadside location and also give an insight into the ratio on a local roadside basis.

Trend analysis has been carried out for $PM_{2.5}$ monitoring at St Leonard's using an Excel simple regression statistical program and a graph is shown in Appendix A – Figure A.6. It shows that there is a general downward (decreasing concentrations) trend at this site.

3.2.4 Sulphur Dioxide (SO_2)

Table A.14 in Appendix A compares the ratified continuous monitored SO_2 concentrations since 2009 with the air quality objectives for SO_2. As in previous years, 2016 data show that there are no exceedances of any of the objectives.

3.2.5 Other pollutants monitored

The following pollutants were also monitored within the City of Edinburgh at the urban background (AURN) site at St Leonard's in 2016. The data is presented in Appendix A. The UK Government and Devolved Administrations are responsible for the review and assessment of these pollutants.

3.2.5.1 Ozone

Table A.15 in Appendix A presents the ratified continuous monitored Ozone concentrations since 2009 with the air quality objective. In 2016 there were 43 exceedances of the 8hr running mean >100μgm^{-3}.

3.2.5.2 Polycyclic Aromatic Hydrocarbons (PAHs)

There are many different PAHs; however, a component, used as a marker, is benzo (a) pyrene (B(a)P). The concentration monitored at St Leonard's complies with the UK objective in 2016. Monitoring is undertaken using a Digitel sampler. Concentrations since 2009 are shown in Table A.16 in Appendix A.

4. New Local Developments

4.1 Road Traffic Sources

Details regarding the planning applications can be found on the council's website here; http://www.edinburgh.gov.uk/info/20067/planning_applications Planning reference numbers are detailed below with each case.

A new planning application for the redevelopment of Donaldson College at West Coates proposed to increase previously consented residential development units from 137 to 203 and that 390 car parking spaces would be provided, a significant increase from consented 256 spaces (15/03780/FUL). Concerns were raised due to the additional road traffic generation. The site is directly to the north of the A8, which forms part of the Central AQMA and not far from the St Johns Road AQMA. The air quality impact assessment (AQIA) concluded that the increase in the annual mean NO_2 is to be of negligible significance at all locations within the study area except for the street canyon in Haymarket Terrace, where the impact is to be of a slight adverse significance. The application received planning permission.

An application for a proposal at Abbey Lane (16/00770/FUL) received consent to develop 139 residential units. The site has existing commercial use with parking provisions for 120 spaces. The supporting AQIA addressed the impact of the development on the nearby Central AQMA (and specifically London Road). Due to the net reduction in the number of parking spaces there were no issues raised with the development. The AQIA confirmed that the applicant would be willing to introduce electric vehicle charging points to off-set any impacts of car trips in and around the local area.

A residential development of 214 dwellings, 2 commercial units and associated parking at Bonnington Road Lane was given planning permission in November 2016 (15/05457/FUL). The site is in a mixed-use area with existing residential dwellings to the south, industrial units to the west and a depot to the east. The Water of Leith is to the north. The development site sits between two Air Quality Management Areas and as such may have an adverse effect on air quality due to the increased road traffic associated with the development. However, the findings of the AQIA submitted by the applicant conclude that the proposed development will not have a negative effect on

air quality and this was supported by the City of Edinburgh Council. An informative was attached to the permission advising that electric vehicle charging should be provided with the development.

A residential development of 157 new build homes was approved on a current open site north of Longstone Road (15/03075/FUL). An AQIA undertaken for the submission identified that no specific mitigation measures were required for the development, although it did highlight the merits of including electric vehicle charging points within the site.

Planning permission was granted for a site in Fountainbridge which was larger than a site that received Planning in Principle Permission in 2010. The 2016 approval (14/02814/PPP) was for the layout of development blocks; maximum massing and heights of the development blocks; points of pedestrian, vehicular and service vehicle access and egress etc. Due to the size, scale, location and other committed developments consented in the area, original concerns were raised in respect to the likely impact on local air quality, particularly relating to the level of parking, creation of new street canyons and construction site impacts. A detailed AQIA was carried out to address the issues. The level of car parking was reduced from 363 with the original application, to 345. The site is very well serviced in terms of public transport, walking and cycling connections. The integration of city car club spaces and electric charging points for low emission vehicles was also considered as mitigation. With these measures in place the impact on local air quality was shown not to be significant. The development will introduce buildings to the south side of Dundee Street/Fountainbridge, similar in height and mass to the existing/demolished industrial units. These were designed to reflect the consented masterplan for the north side of Fountainbridge. A wide street corridor will be maintained, in excess of the building heights on either side of the road. The AQIA modelling work assumed the section of Fountainbridge is considered as a continuous street canyon, with no breaks. The buildings introduced will not technically create a street canyon, due to the gaps between blocks of buildings on either side of the road corridor and the road width. Therefore, the assessment carried out was for the very worst case scenario and concluded that there will be no adverse impacts subject to the proposed mitigation measures being implemented.

Several major residential planning applications that had AQIAs submitted and were proposed on designated green belt were refused on appeal by the Scottish Government in 2016. Concerns about the cumulative impact of development on air quality near Drum Street (15/02905/PPP) was raised as an issue however the AQIA predicted that the impacts would be negligible and therefore it was found that there was no technical evidence which supported dismissing the appeal based on impacts on air quality, albeit there was a recognition of the link with concerns about cumulative transport impacts by the Reporter.

At Mansfield Road, Balerno (15/05133/PPP) the application sought permission in principle for a residential development of an unspecified number of dwellings (but possibly up to 150 as defined in the supporting documentation). Again, the AQIA concluded that the overall impact considering the baseline conditions was negligible. However, concerns with the assessment due to the issues with the Transport Assessment and the knock-on effect this may have on the AQIA, were raised. Additionally, the assessment highlighted that no mitigation measures would be necessary to control emissions and the construction phase was not considered. Ultimately however, the impact on the landscape character and the greenbelt designation were fundamental considerations in the refusal.

The Queensferry Crossing, under construction since June 2011, is due to open at the end of August 2017. The 1.7 miles (2.7km) structure will be the longest three-tower, cable-stayed bridge in the world and also the largest to feature cables which cross mid-span. In total, the overall *Forth Replacement Crossing* scheme is 13.7 miles (22km) long, including major motorway upgrades to the north and south of the bridge and also the first ever use in Scotland of variable mandatory speed limits to smooth traffic congestion via an Intelligent Transport System. This also controls dedicated bus lanes within the motorway hard shoulders. When the new crossing opens, the Forth Road Bridge will become dedicated for public transport use, cycling and walking. In terms of post-opening monitoring, an evaluation for major projects is carried out according to Scottish Trunk Road Infrastructure Project Evaluation (STRIPE) guidance at 1, 3 and/or 5 years after opening.

Transport Scotland approached the City of Edinburgh Council with respect to re-designing lane integration from the M9 off-slip onto the A8 at Newbridge roundabout. The Council upgraded the traffic signalling to a MOVA system early 2016 as a measure to reduce idling time and congestion on the West bound carriageway and hence improve air quality. In fact, 2016 data shows that there has been some improvement in the concentrations of NO_2. Recommendations have been made to Transport Scotland to carry out an air quality impact assessment in relation to the proposals to ensure there is no adverse impact on air quality.

4.2 Other Transport Sources

Airport

Edinburgh Airport published a 2016-2040 Masterplan which was welcomed by the City of Edinburgh Council as it provided an up-to-date context for the airport's future development consistent with national and local planning policy. This was presented to the council's Planning Committee and highlighted a number of environmental, transport and planning issues including some specifically relating to local air quality management as described below.

The Masterplan made no reference to the Glasgow Road AQMA which is part of the strategic road network serving the airport. It was recommended that the Airport take account of the impact it could have on this area.

The public transport modal share targets identified in the recently revised WETA (West Edinburgh Transport Appraisal) are a key element in the mitigation to prevent unacceptable air quality impacts and enable the already busy road network to cope with additional demand. It was considered that the Masterplan aligns with these targets and indicate measures that will be introduced over time to move towards meeting them. Nonetheless, given the significant changes in public transport availability to the airport due to the tram and Edinburgh Gateway, the City of Edinburgh Council considered that the model share percentages identified in the Masterplan could be more ambitious.

It was recommended that the Masterplan takes cognisance of the Scottish Government's national Cleaner Air for Scotland Strategy (CAfS) and works in collaboration with the City of Edinburgh Council to consider an airside Low Emission Zone.

Recommendations were also made in respect to airside freight, cargo and commercial vehicles in terms of an efficiency recognition scheme, such as ECOSTARS and the need to develop a system of electric vehicle charging to encourage up-take of these types of vehicles, especially taxis.

The Masterplan referred to the Airport Parking Strategy and said that it was due to be fully reviewed. Concerns were expressed about the proposed increases in car parking in the Masterplan and the impact this could have on the road network and on Placemaking objectives. It was considered that ways in which to make car trips to the airport less attractive, to suppress demand and assist in the modal share towards the use of public transport, would need to be included in the Masterplan.

An update to the Masterplan has been received by the City of Edinburgh Council at the time of writing. The Annual Progress Report 2018 will provide further details.

Rail

The City of Edinburgh Council has recently been approached by consultants working on behalf of the East Coast Mainline rail services at the Craigentinny and Portobello maintenance and servicing depots to initiate discussion about a new monitoring regime. An on-site meeting is to be held in July 2017. Further updates will be provided in future Annual Progress Reports.

4.3 Industrial Sources

The City of Edinburgh Council's Environmental Health services received a consultation request from SEPA regarding a Waste Management Licence at Imperial Dry Dock, Leith. It is for a 24-hour, 7 days a week ship wrecking recycling facility located just north of Ocean Terminal. The site is close to the new Salamander Street AQMA for PM_{10}, declared following the 2016 Detailed Assessment of Particles[6] which suggested that port activities relating to the handling and storage of open material at Port of Leith were a contributory factor to the elevated PM_{10} concentrations. The proposed operation could lead to an increase in fugitive or uncontrolled sources. Clarity is currently being sought on whether planning permission is required, which would allow a full assessment of the potential impacts.

A planning application for a residential proposal was refused because the proposal was contrary to Local Development Plan Policy (Env22) in terms of air quality. The

site lies within the newly declared Salamander Street AQMA, declared because concentrations of PM_{10} exceed the Scottish objective. Concerns were raised that the development would increase the number of people exposed to unacceptable levels of the pollutant and potentially be detrimental to the health of future residents. The applicant is currently appealing the decision.

4.4 Commercial and Domestic Sources

The City of Edinburgh Council issued Interim Planning Policy (2010) that discourages the installation of commercial biomass combustion installations in the city.

Over the previous year there were no new proposals for biomass units.

Planning permission for the 350kW biomass boiler at the Royal Highland Centre, Ingliston is still under consideration. As the unit is in-situ, testing of the emissions was undertaken in-stack, however this was not successful for PM_{10} as the equipment used was unable to detect the pollutant. It is likely that the installation will need to be fitted with a ceramic filter.

Combined Heat and Power (gas) units are now commonly installed in new developments. Planning applicants are advised to submit a chimney height application if they are installing any CHP or heating that is bigger than 366Kw output. This will ensure they comply with the Clean Air Act and provide the City of Edinburgh Council with upfront details on the height of the proposed flue/chimney. It should be noted that the applicants don't always take this advice on board. However, an informative is normally attached to any planning permission given to ensure this is carried out.

If a new or proposed CHP/energy plant is bigger than 1MW the City of Edinburgh Council will request that the plant be fitted with secondary abatement technology.

The primary CHP plant at the University of Edinburgh's Pleasance site comprises a single, internal combustion, spark ignition engine with an electrical power output of 1.5MWe and two 9MWth boilers supplying district heating and electric networks serving nearly 20 academic and student accommodation buildings. The installation does not include any NO_x abatement technology, having been approved, installed and part-operational in 2013. Initial screening[9] of the plant indicates a contribution from the CHP at the nearest receptor in excess of $70 \mu g m^{-3}$. Although it is recognised

the screening tool errs on the side of caution by considering the impact based on ground level release. Edinburgh University are currently considering whether modifictions can be made to the engine to ensure it operates to a low NO_x specification. The City of Edinburgh Council commenced monitoring of NO_2, in January 2017 by installing a number of passive diffusion sites in the Pleasance area at St John's Hill and Viewcraig Gardens. A full annual data set will be reported in the Annual Progress report 2018.

Smoke Control Orders cover the entire City of Edinburgh Council area. There are currently no areas where significant coal burning takes place.

4.5 New Developments with Fugitive or Uncontrolled Sources

Fugitive or uncontrolled sources relate to dust emissions, which can lead to elevated PM_{10} concentrations include major construction projects.

The Edinburgh St James project construction phase began on 17 October, with the closure of the St James Shopping Centre and the beginning of its demolition, which is anticipated to take 18 months to complete. The retail and leisure development is to complete in 2020/21. The developer installed two Turnkey airborne particulate monitors at fixed locations on the boundary of the site to monitor PM_{10} concentrations from these activities. Data, from the first quarter of 2017, shows that there is potential for the daily mean objective of PM_{10} to be beached. Discussions are on-going with the developer to see if excessively dusty activities such as crushing and handling of aggregate (stockpiling) can be undertaken off-site.

5. Planning Applications

The Second Local Development Plan (LDP), informed by responses received on the first Proposed LDP, was approved in June 2014 and submitted to Scottish Ministers at the end of May 2015 for examination. The examination report received by the City of Edinburgh Council in July 2016 made recommendations for modifications to the Plan.

An overview of the modifications, which were agreed by the Planning Committee on 5 September 2016 are summarised as follows:

- Endorsement of the LDP's spatial strategy, including its support for brownfield regeneration and the development of the city's waterfront.
- A finding that the LDP provides enough housing land overall, but that it is not currently expected to be built out quickly enough to meet SDP requirements in the short term. However, achieving that rate is not the only objective of the SDP, and it is also important to ensure that development comes forward in a planned manner which satisfactorily addresses cumulative impacts on infrastructure, such as transport and education.
- Changes to policy on infrastructure provision and other matters are necessary to ensure compliance with the SDP and national policy.

This has resulted in the LDP as Modified which was published on 16 September 2016 together with a notice stating the Council's intention to adopt the LDP in that form. The document can be found here;
http://www.edinburgh.gov.uk/info/20069/local_development_plan_and_guidance

New and improved infrastructure is key to the delivery of the aims and strategies of the LDP. An Action Programme to support the Plan sets out how the infrastructure, and services required for the growth of the city, will be delivered. It can also be found on the above link.

6. Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

Analysis of the monitoring results for **Nitrogen Dioxide (NO_2)** shows the annual mean objective continues to be exceeded in locations within all the current AQMAs. The AQMAs therefore remain valid. See summary Table 6.1 below.

Table 6.1Summary of the locations where 2016 monitoring results are at or exceed the annual mean Nitrogen Dioxide Objective

Site ID	Site address	In AQMA (NO_2)?	Data Capture (%)	Annual mean concentration µg/m³ (Adjusted for bias 0.77)
76b	Angle Park Terrace 74	Yes Central	100	**44**
76	Angle Pk/Harrison Rd	Yes Central	92	**43**
48c	Cowgate Blackfriars	Yes Central	92	**40**
48e	Cowgatehead 2	Yes Central	58	**41**
25	Easter Road/CH Shop	Yes Central	42	**46**
37a*	Grassmarket 41	Yes Central	71	**53**
HT1	Haymarket Terrace	Yes Central	75	**42**
74g	Leith Street 35	Yes Central	100	**59**
21	Leith Walk/Brunswick Rd	Yes Central	75	**40**
20	Leith Walk/McDonald Rd	Yes Central	92	**40**
67	London Rd/Earlston Pl	Yes Central	100	**41**
81	London Rd/E. Norton Pl	Yes Central	83	**57**
70	London Rd/Wolseley Terr	Yes Central	100	**40**
135	Nicolson Street 69	Yes Central	92	**46**
27	North Bridge – South	Yes Central	92	**53**
47	Princes Street Eastbound	Yes Central	100	**48**
24	Princes Street/Mound	Yes Central	75	**42**
144	South Bridge 59	Yes Central	83	**50**
3b	Torphichen Place 1	Yes Central	100	**44**
3	Torphichen Place CH	Yes Central	92	**50**
2	West Maitland Street	Yes Central	100	**42**
28d	West Port 42	Yes Central	75	**51**
28b	West Port 62	Yes Central	50	**59**
28c	West Port Opposite 50	Yes Central	75	**44**
58*	Glasgow Rd Newbridge	Yes Glasgow Road	100	**41**
15	Glasgow Rd Newbridge	Yes Glasgow Road	83	**40**
55*	Inverleith Row	Yes Inverleith Row	92	**41**
9d	Commercial Street	Yes Great Junction St	100	**42**
30	Great Junction St/FV	Yes Great Junction St	92	**42**
30c	Gt Junction Street 14	Yes Great Junction St	75	**40**

Site ID	Site address	In AQMA (NO_2)?	Data Capture (%)	Annual mean concentration µg/m^3 (Adjusted for bias 0.77)
1d	St John's Road 131	Yes St John's Road	100	**45**
ID5 #	St John's Road	Yes St John's Road	97	**53**
64	Queensferry Road 550	No	100	**44**

*Duplicate passive diffusion tubes
Automatic monitoring data from St John's Road Monitoring Stations

There was one breach of the annual mean objective outwith the AQMAs at Queensferry Road (PDT64), although adjacent, non-automatic and automatic monitoring shows the objective is met. Further detailed analysis of the localised conditions at the site will be undertaken as part of the dispersion modelling programmed under the Cleaner Air for Scotland Strategy in 2017/18.

There were a number of new locations where the hourly objective is potentially exceeded within the Central AQMA, namely Leith Street and London Road East Norton Place.

Monitoring will continue at these sites and others where concentrations are near the objectives.

In general, there is a downward trend in annual mean concentrations at all the automatic monitoring sites. Non-automatic monitoring within each AQMAs shows there is also a trend for decreasing concentrations within the AQMAs.

PM_{10} data from all monitoring locations in 2016 meets the UK National Objectives as well as the tighter Scottish objectives. For the first time, Salamander Street meets the Scottish annual objective which is a significant difference in comparison to previous annual mean concentrations. It is anticipated that relocation of industry is one reason why concentrations met. The road and surrounding area is cleaner and large amounts of fine aggregate material have not been stored or handled near Bath Road/Salamander Street.

The Council declared an AQMA for PM_{10} at Salamander Street in January 2017 and is currently in the process of developing an Action Plan in conjunction with SEPA, Forth Ports and relevant stakeholders. The aim of this process will be to assess the different potential sources to ensure that the continuing degree of improvement is

sustained especially since residential development proposed in this area. A new FIDAS particulate monitor will also be installed in or near the boundary of the newly declared AQMA. This will monitor PM_{10} and $PM_{2.5}$ and help inform potential sources and spatial concentration variations.

Monitoring of **$PM_{2.5}$** from St Leonard's confirms the objective is being met at this location. Estimations of $PM_{2.5}$ concentrations from PM_{10} monitoring data were undertaken for relevant roadside locations, using both the nationally derived correction factor (0.7) factor and the Scotland specific factor (0.63). Both these methodologies show exceedances of the objective, except Glasgow Road (VCM & Scottish factor). Although it is mandatory for local authorities in Scotland to review and assess $PM_{2.5}$ against the new tighter Scottish standard, they are not required to declare AQMAs until robust data has been gathered from the monitoring survey which is being developed. Roadside monitoring of this pollutant commenced, for the first time in Edinburgh, at St John's Road in November 2016.

Particle (PM_{10} and $PM_{2.5}$) trends from measured data in Edinburgh show a downward trend (decrease in concentrations with time) at all monitoring stations.

6.2 Conclusions relating to New Local Developments

Concentrations of NO_2 increased at Fountainbridge so monitoring will continue, particularly considering the extent of new mixed-use development in the area. The issue of potential impacts from cumulative development remains a concern for the City of Edinburgh Council.

Edinburgh University is currently exploring whether modifictions can be made to the CHP engine so it operates to a low NO_x specification. The City of Edinburgh Council has commenced monitoring of NO_2, in January 2017 by installing a number of passive diffusion sites in the Pleasance area at St John's Hill and Viewcraig Gardens. A full annual data set will be reported in the Annual Progress report 2018.

Transport Scotland is re-designing lane integration from the M9 off-slip onto the A8 at Newbridge roundabout. Recommendations have been made to Transport Scotland to carry out an air quality impact assessment in relation to the proposals to ensure there is no adverse impact on air quality.

6.3 Proposed Actions

This report has not identified any areas that require proceeding to Detailed Assessments.

The need for additional monitoring of PM_{10} has been highlighted near the boundary of the Salamander Street AQMA, hence a FIDAS instrument will be installed in the vicinity with the help of Scottish Government grant funding.

The Air Quality Action Plan for the recently declared Salamander Street AQMA will be produced with relevant stakeholders.

The existing NO_2 Air Quality Action Plan (2008) will be revised in conjunction with the Local Transport Strategy and Cleaner Air for Scotland Strategy.

The City of Edinburgh Council will work towards the implementation of an LEZ should Edinburgh be selected as an early adopter by the Scottish Government.

The council will also work in conjunction with DEFRA to commission the new Nicolson Street air quality monitoring station which will monitor NO_2 and PM_{10} at a roadside location adjacent to the A7 road.

Progress with existing and new actions is on-going and covered in detailed in Table 2.18 within the report. The following summary details several key action plan measures which will continue to be taken forward during 2017/ 2018;

- Continue to work with Lothian bus to improve fleet standard and support installation of electric charging infra structure to enable operation of electric buses in the city,
- Continue ECOSTARS scheme,
- Commence the roll out of telematics across the Council Fleet,
- Complete of outstanding SCOOT repair work,
- Install seven EV charging heads,
- Develop an Electric Vehicle Framework for Edinburgh,
- Continue support for Active Travel Action Plan,
- Develop new Corporate Travel Plan,

- SEPA to complete Edinburgh local air quality model under National Model Framework (CAfS), and;
- Consider business case for Edinburgh Trams extension to Leith.

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.	In AQMA?	Pollutants Monitored	Monitoring Technique	Distance to Relevant Exposure(1) (m)	Distance to kerb of nearest road (m)	Inlet Height (m)
ID1	**Queen Street**	Roadside	324826	674078	Yes (NO_2)	NO_2 PM_{10}	Chemiluminescent TEOM	0	5.2	2.87
ID2	**Haymarket***	Roadside	323896	673197	Yes (NO_2)	NO_2 PM_{10}	Chemiluminescent TEOM	7	9.2	N/A
ID3	**Roseburn***	Roadside	322939	673233	Yes (NO_2)	NO_2 PM_{10}	Chemiluminescent TEOM	4.9	7.6	n/a
ID4	**Gorgie Road**	Roadside	323121	672314	Yes (NO_2)	NO_2	Chemiluminescent	0	2.5	2.63
ID5	**St. John's Road**	Kerbside	320101	672907	Yes (NO_2)	NO_2 PM_{10} $PM_{2.5}$	Chemiluminescent FIDAS 200 FIDAS 200	1.35	0.5	1.98
ID6	**Currie High School**	Suburban	317595	667909	No	NO_2 PM_{10}	Chemilum TEOM	N/A	N/A	3.59 3.24

Continued overleaf/…

Site ID	Site Name	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In AQMA?	Pollutants Monitored	Monitoring Technique	Distance to Relevant Exposure(1) (m)	Distance to kerb of nearest road (m)	Inlet Height (m)
ID7	**St. Leonard's**	Urban Back-ground (AURN)	326265	673129	No	NO_2 PM_{10} $PM_{2.5}$ O_3 CO SO_2 PAH	Chemiluminescent FDMS FDMS UV absorp IR absorp UV absorp Digitalsamp	N/A	35m	3.4m 3.2m 3.1m 3.4m 3.4m 3.4m 3.4m
ID8	**Salamander Street**	Roadside	327615	676333	Yes (PM_{10})	NO_2 PM_{10}	Chemiluminescent TEOM	0	2.13m	2.86
ID9	**Queensferry Road**	Roadside	318736	674930	No	NO_2 PM_{10}	Chemiluminescent TEOM/FDMS	6.5	1.7m	2.96
ID10	**Glasgow Road**	Roadside	313103	672663	Yes (NO_2)	NO_2 PM_{10}	Chemiluminescent TEOM	0	6m	2.84

Notes for Table;

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

(2) * Historic sites

Table A.2 – Description of Automatic Monitoring Locations

Site ID	Site Name	Description of automatic monitoring location
ID1	**Queen Street**	Pavement in line with residential property located 5.2m from road edge. No buildings at rear of monitoring unit. Relevant exposure.
ID2	**Haymarket**	Now decommissioned, this monitoring site was located in a car parking bay at Haymarket Station 9.2m from the main road, set back from the façade of residential property. Not in street canyon.
ID3	**Roseburn**	Now decommissioned, it was located on footbridge over the water of Leith 7.6m from kerb edge. Set back from line of residential property. Does not take account of canyon at Roseburn Terrace.
ID4	**Gorgie Road**	Located in line with façade of adjacent residential flats on edge of children's play park. Within 2.5m of kerb edge. Not located in canyon area of street. Relevant exposure.
ID5	**St John's Road**	Pavement (kerbside) of busy shopping street. Residential properties within 2.1m of kerb edge. Takes account of junction and street canyon. Relevant exposure and worst-case location.
ID6	**Currie High School**	Located adjacent to school building at rear of school. Representative of suburban / semi-rural exposure.
ID7	**St. Leonard's**	Located in small park area adjacent to Medical centre 35m from nearest main road. Representative of urban exposure.
ID8	**Salamander Street**	Located on pavement 2.13m from road edge, in line with adjacent residential property.
ID9	**Queensferry Road**	Located on pavement 1.7m from busy road edge and adjacent bus stop. 6.5m in front of residential property.
ID10	**Glasgow Road**	Located on recreational land 6m from A8 northbound carriageway, in line with nearby residential properties.

Figure A.1 Map of the Air Quality Monitoring Stations, Edinburgh

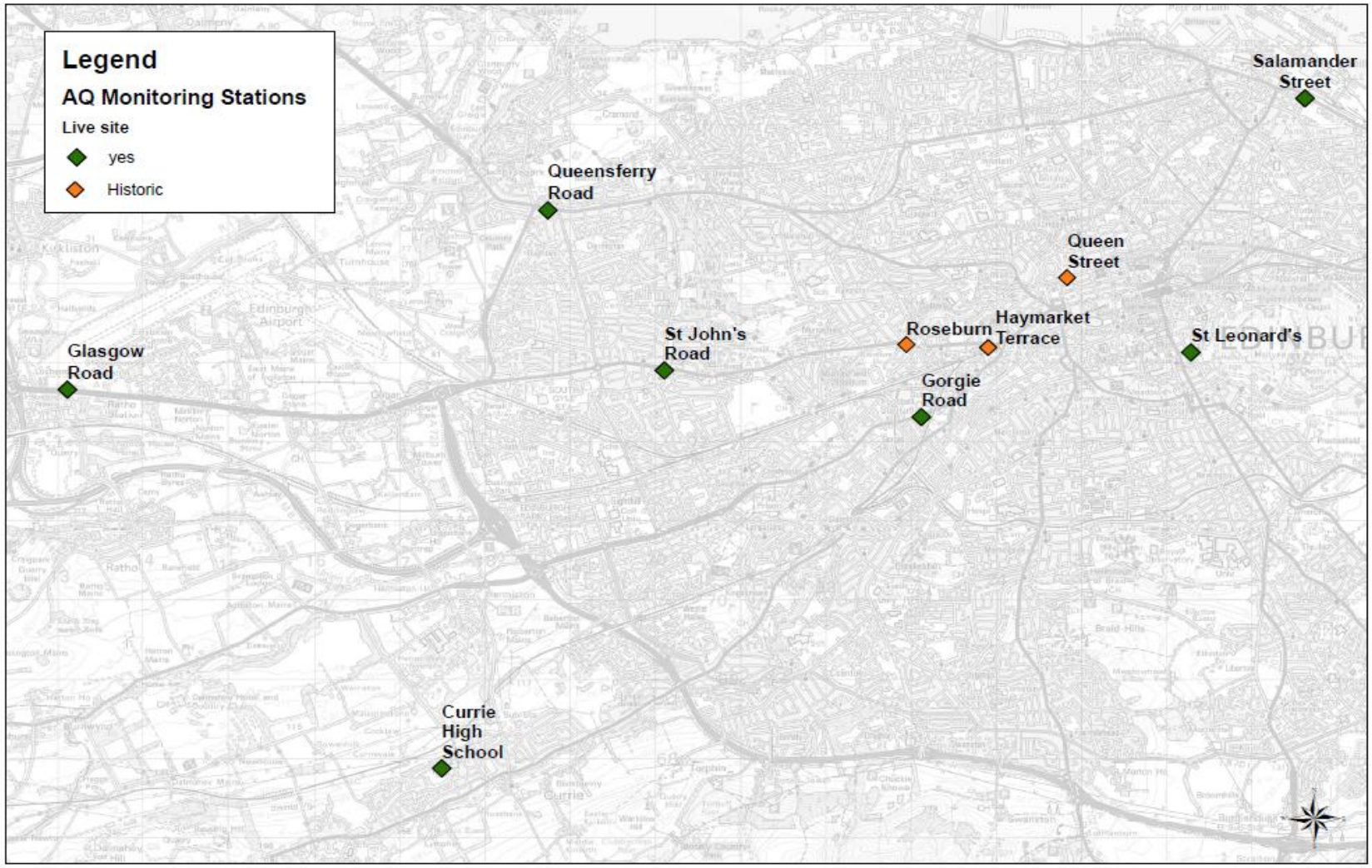


Table A.3 - Details of Non-Automatic Monitoring Sites (NO_2 Passive Diffusion Tubes)

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In NO_2 AQMA?	Distance to Relevant Exposure (m)[1]	Distance to kerb of nearest road (m)
	NORTH WEST						
57	**Glasgow Road 158**	Roadside	318185	672756	No	8.5	3.6
16a	**Glasgow Road 68 facade**	Roadside	313028	672629	Yes	0	6.2
16	**Glasgow Road 68**	Roadside	313028	672633	Yes	4.4	1.8
15a	**Glasgow Road 9**	Roadside	312702	672675	Yes	0	7.5
58	**Glasgow Road Newbridge**	Roadside	312693	672670	Yes	5.2	2.8
15	**Glasgow Road Newbridge**	Roadside	312664	672672	Yes	3.8	1.6 + 2.4 [ii]
56	**Glasgow Road /Drumbrae**	Roadside	319212	672921	No	4.6	0.57 + 2 [ii]
16b	**Glasgow Road/Ratho Station 94**	Roadside	313211	672612	Yes	0	2.9
143a	**Hamilton Place Library**	Roadside	324699	674651	No	0 play area	2.1m
41	**Hillview Terrace**	Background	320081	673232	No	N/A	1.0
55c	**Inverleith Row/Montague**	Roadside	324686	675941	Yes	1.06	2.28 + 2.0[ii]
55	**Inverleith Row/Ferry Road**	Roadside	324638	675993	Yes	0	4.65
63	**Queensferry Road 544**	Roadside	318723	674963	No	0	13.6
64	**Queensferry Road 550**	Roadside	318698	674955	No	9.2	1.49
64b	**Queensferry Road 550 Facade**	Roadside	318701	674964	No	0	11
64a	**Queensferry Road 552**	Roadside	318698	674964	No	0	10.5
62	**Queensferry Road 561**	Roadside	318810	674903	No	0	16.9
40	**Queensferry Rd/Hillhouse Rd**	Roadside	322144	674497	No	0	2.0 + 2 [ii]
13a	**Raeburn Place** [i]	Kerbside	324533	674655	No	0	2
23	**Roseburn Terrace**	Kerbside	323007	673198	Yes	2.3	0.23
1d	**St John's Road 131**	Roadside	320096	672907	Yes	0	2.1
SJ2	**St John's Road 63**	Kerbside	320436	672830	Yes	9.15	0.37

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In NO_2 AQMA?	Distance to Relevant Exposure (m)[1]	Distance to kerb of nearest road (m)
SJ3	**St John's Road 81**	Roadside	320316	672857	Yes	14.48	1.15
1b	**St John's Road IR**	Roadside	320154	672911	Yes	0	2.0
1	**St John's Road SB**	Kerbside	320122	672917	Yes	1.8	0.54
SJ1	**St John's Road/Kaimes Rd**	Kerbside	320571	672809	Yes	2.26	0.28
39	**St John's Road/Victor Park**	Roadside	319677	672991	Yes	4.15	1.6
14	**Trinity Crescent**	Roadside	324896	676991	No	4.0	2.0
	SOUTH WEST						
76c	**Angle Park Terrace 25**	Roadside	323587	672360	Yes	0	4.75
76b	**Angle Park Terrace 74**	Roadside	323527	672285	Yes	0	2.1
76	**Angle Park/Harrison Road**	Roadside	323498	672263	Yes	0	2.20
76a	**Ardmillan Terrace 22**	Roadside	323487	672287	Yes	0	2.2
80e	**Balgreen Road / Library**	Roadside	322110	672268	No	0 [Play area]	2
4a	**Calder Road** [i]	Roadside	318894	670493	No	5	12.0
79d	**Dundee Street/Yeaman Place**	Roadside	323926	672550	Yes	0	2.3
79a	**Fountainbridge 103**	Roadside	324731	672984	No	0	2.2
79	**Fountainbridge/Tollcross**	Roadside	324682	672939	No	0	3.3
80	**Gorgie Road / Delhaig**	Roadside	321967	671666	Yes	0	2.6
80b	**Gorgie Road 549**	Roadside	321724	671557	Yes	0	2.5
18	**Gorgie Road 8**	Roadside	323477	672476	Yes	0	2.4
80c	**Gorgie Road 87**	Roadside	323265	672394	Yes	0	2.5
80a	**Gorgie Road Glen Lea**	Roadside	322381	671950	Yes	0	2.6
5	**Gorgie Road/Murieston Road**	Kerbside	323484	672478	Yes	4.9	0.3
76d	**Henderson Terrace**	Roadside	323632	672449	Yes	0	1.8
11	**Lanark Road 610**	Roadside	319527	668420	No	3.7	1.5

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In NO_2 AQMA?	Distance to Relevant Exposure (m)[1]	Distance to kerb of nearest road (m)
77a	**Slateford Road 51**	Roadside	323167	672009	Yes	0	2.3
77b	**Slateford Road 93/95**	Roadside	322999	671876	Yes	0	2.6
77	**Slateford Road 97**	Roadside	322960	671846	Yes	0	2.67
	NORTH EAST						
29a	**Bernard Street/Kings Chambers**	Roadside	327137	676529	Yes	0	2.1
29c	**Bernard Street/PS**	Roadside	327135	676515	Yes	0	2.1
29	**Bernard Street/CA**	Roadside	327148	676507	Yes	0	2.2
43	**Broughton Road**	Roadside	325513	675134	No	0	2.0
9d	**Commercial Street**	Roadside	326477	676759	Yes	0	2.6
9	**Commercial Street 88**	Roadside	326879	676626	Yes	0	2.6
9a	**Commercial St/Portland Place**	Roadside	326430	676754	Yes	3.90	1.47
30f	**Duke Street**	Roadside	327106	675816	No	0	2.2
25c	**Easter Road 105/109**	Roadside	326958	674770	Yes	0	3.25
25e	**Easter Road 198**	Roadside	326999	674940	Yes	0	3.95
25d	**Easter Road/Bothwick**	Roadside	326974	674780	Yes	0	2.8
25	**Easter Road/CH Shop**	Roadside	326934	674503	Yes	0	2.3
25b	**Easter Road/Rossie Place**	Roadside	326950	674624	Yes	0	3.3
53	**Ferry Road/Bowhill Terrace 6**	Roadside	324726	676004	Yes	1.57	1.75 +2.85 [ii]
45d	**Ferry Road/North Junction Street**	Roadside	326503	674436	Yes	0	3.1
30b	**Great Junction Street 137**	Roadside	326740	676138	Yes	0	2.9
30c	**Great Junction Street 14**	Roadside	326925	675949	Yes	0	2.8
30e	**Great Junction Street/CG**	Roadside	326845	676015	Yes	0	2.7
30	**Great Junction Street/FV**	Roadside	326884	675997	Yes	0	2.8
30d	**Great Junction Street/WC**	Roadside	326757	676144	Yes	0	2.8

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In NO_2 AQMA?	Distance to Relevant Exposure (m)[1]	Distance to kerb of nearest road (m)
21	**Leith Walk/Brunswick Road** [i]	Roadside	326413	674899	Yes	0	4.5
20	**Leith Walk/McDonald Road**	Kerbside	326361	674882	Yes	0	5.6
66	**London Road/Cadzow Place**	Roadside	327468	674362	Yes	0	2.04 + 2.0[ii]
67	**London Road/Earlston Place**	Roadside	327190	674433	Yes	0	2.7
81	**London Rd/East Norton Place**	Roadside	326980	674446	Yes	0	2.5
46	**London Road/Easter Road**	Roadside	326944	674472	Yes	0	5.6
68	**Parsons Green Terrace**	Roadside	328042	674179	Yes	0	2.7
69	**London Road/Wolseley Place**	Roadside	328272	674143	Yes	0	2.62
70	**London Road/Wolseley Terrace**	Roadside	328337	674129	Yes	0	4.6
32	**Niddrie Mains Road 28**	Kerbside	328889	671649	No	4.7	0.2 + 2.4[ii]
9c	**North Junction Street**	Roadside	326448	676710	Yes	2.05	2.65
71	**Portobello High Street 185**	Roadside	330533	673850	No	0	3.0
73d	**Portobello Road/Ramsay F**	Roadside	329917	674388	No	0	3.7
51c	**Salamander Street/Baltic Street**	Roadside	327476	676418	No	0	2.25
72	**Seafield Road East 10**	Roadside	329993	674457	No	0	4.5
	SOUTH EAST						
44	**Broughton Street** [i]	Roadside	325918	674430	No	0	3.4
6a	**Bruntsfield Place 210**	Roadside	324495	672035	No	0	2.8
138	**Clerk Street 15**	Roadside	326229	672287	Yes	0	2.35 +2 [ii]
48f	**Cowgate/50 St Mary's Street**	Roadside	326198	673587	No	0	2.6
48c	**Cowgate Blackfriars**	Roadside	326047	673519	Yes	0	2.4
48a	**Cowgate/Blair Street**	Roadside	325929	673490	Yes	0	3.2
48	**Cowgate/Guthrie Street**	Roadside	325881	673471	Yes	0	4.5
48e	**Cowgatehead 2**	Roadside	325537	673405	Yes	0	1.9

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In NO_2 AQMA?	Distance to Relevant Exposure (m)[(1)]	Distance to kerb of nearest road (m)
150	**Drum Street**	Roadside	329281	668615	No	0	1.5
74f	**George Street 112**	Roadside	324880	673891	Yes	0	6.8
37a	**Grassmarket 41**	Roadside	325401	673340	Yes	0	3.4
37b	**Grassmarket 75**	Roadside	325471	673369	Yes	0	5.0
37c	**Grassmarket/Thompsons Court**	Background	325397	673377	Yes	0	21 + 2.1 [ii]
75e	**Great Stuart Street 9**	Roadside	324476	673967	No	0	7.25 +2.1[ii]
HT1	**Haymarket Terrace (North)**	Roadside	323985	673219	Yes	0	3.7
HT2	**Haymarket Terrace (South)**	Kerbside	323787	673212	Yes	1.75	0.5
10	**Home Street** [i]	Roadside	324904	672906	No	0	2
140	**Hope Park Terrace/Clerk Street**	Roadside	326323	672596	Yes	3.5	1.3
17a	**Hope Park Terrace/VS**	Roadside	326312	672614	Yes	0	5
149a	**Howden Hall Road 79**	Roadside	327383	668079	No	0	4.5
34	**India Street**	Background	324790	674341	No	N/A	0.4 + 2.1[ii]
74g	**Leith Street 35**	Roadside	325897	674051	Yes	0	3.65
38	**Melville Drive**	Roadside	325141	672733	No	10.0	2.8
42	**Midmar Drive**	Background	325105	670511	No	N/A	1.4
8	**Morningside Road** [i]	Roadside	324542	671167	No	0	3.7
49	**Morrison Street**	Roadside	324167	673249	Yes	2.4	2.2
135	**Nicolson Street 69**	Roadside	326112	673115	Yes	0	3 + 2
136	**Nicolson Street 92**	Roadside	326164	673054	Yes	0	3.74 + 2 [ii]
27	**North Bridge – South**	Roadside	325944	673670	Yes	0	3.5
47	**Princes Street (Eastbound)**	Roadside	325049	673791	Yes	6.5	9.0
24	**Princes Street/Mound**	Kerbside	325397	673869	Yes	10.2	1.0
33	**Queen Street/Hanover Street** [i]	Roadside	325467	674229	Yes	0	6.5

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In NO_2 AQMA?	Distance to Relevant Exposure (m)(1)	Distance to kerb of nearest road (m)
SH1	**Shandwick Place**	Roadside	324513	673556	Yes	0	2.5
144	**South Bridge 59**	Roadside	326020	673370	Yes	0	2.3
142	**South Clerk Street 41a**	Roadside	326367	672554	Yes	0	1.96 + 2 [ii]
141	**South Clerk Street 84**	Roadside	326383	672472	Yes	0	2.57 + 2 [ii]
75d	**St Colme Street 4**	Roadside	324646	674025	No	0	6.2
3b	**Torphichen Place 1**	Roadside	324277	673309	Yes	0	4.8
3	**Torphichen Place CH**	Roadside	324258	673295	Yes	0	2.25
2	**West Maitland Street**	Kerbside	324193	673346	Yes	5.2	0.5
28d	**West Port 42**	Roadside	325203	673250	Yes	0	2.7
28b	**West Port 62**	Roadside	325166	673242	Yes	0	1.4
28c	**West Port Opposite 50**	Roadside	325184	673261	Yes	0	3.0
36	**York Place**	Roadside	325828	674362	Yes	2.7	5.5

Notes to Table A.3;

Distance to relevant exposure not applicable (N/A) where passive diffusion tube represents background concentrations.

Distance to Relevant Exposure 0m if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the facade of a residential property).

- 0 meters if the monitoring site is at a location of exposure (e.g. representative of the façade of a residential property).

i. Site relocated in 2016 near previous site.

ii. Distance to nominal kerb, due to parking bay in front of monitoring location.

Figure A.2 Maps of PDTs City-Wide 2016

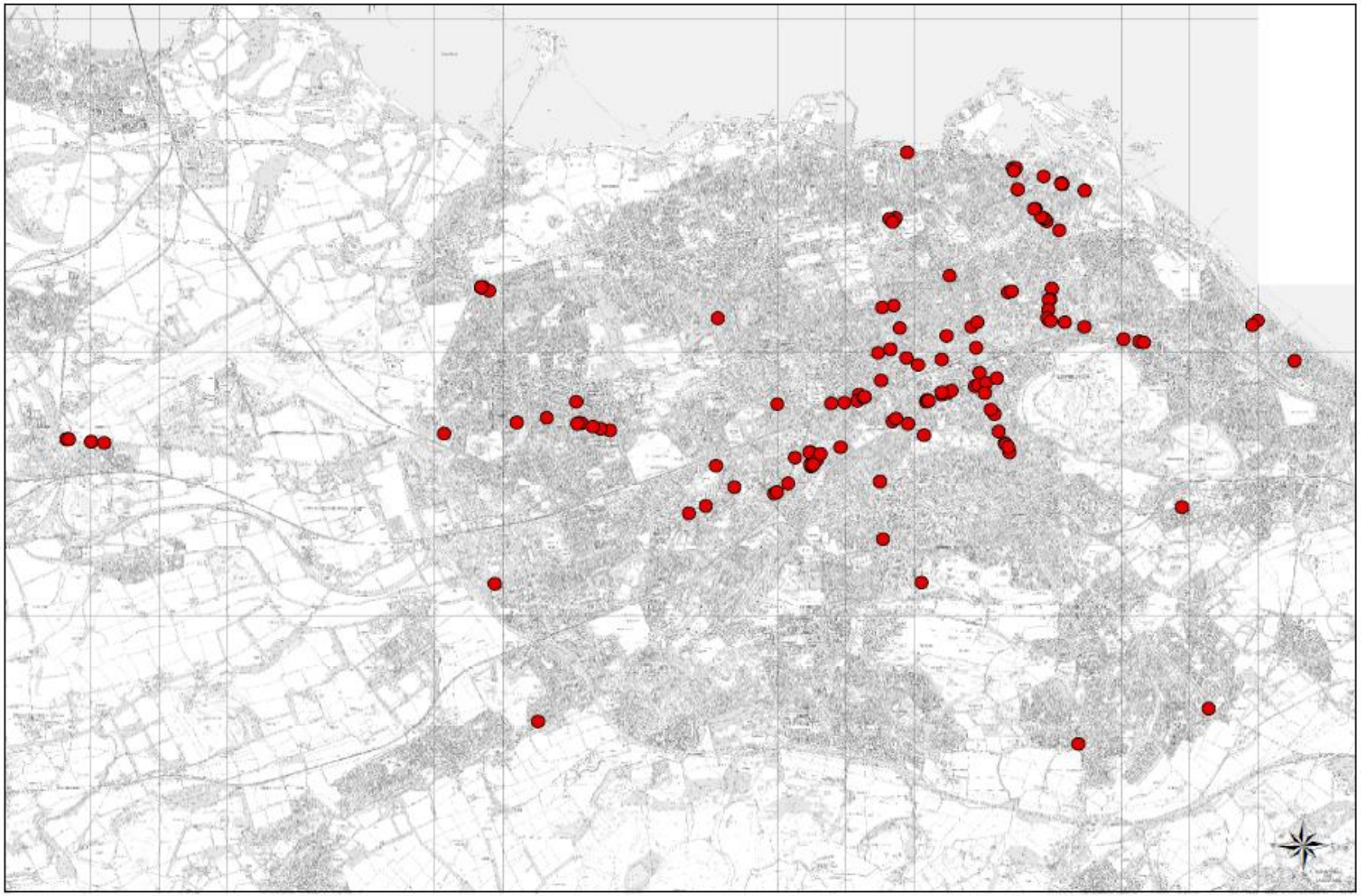


Table A.4a – Annual Mean NO_2 Monitoring Results – Automatic Data

Site ID	Site Name / Type	Within AQMA?	Data Capture 2016 % [a]	Annual Mean Concentration (µg/m^3)							
				2009	2010	2011	2012	2013	2014	2015	2016
ID1	**Queen St** Roadside	Y (NO_2)	49	33	37	29	28	28	26	27	24 [b]
ID2	**Haymarket** Roadside	Y (NO_2)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ID3	**Roseburn** Roadside	Y (NO_2)	N/A	26 (28)	30 (33)	24 [b]	N/A	N/A	N/A	N/A	N/A
D4	**Gorgie Road** Roadside	Y (NO_2)	99	38	**41**	37	39	38	34	32	33
ID5	**St John's Road** Kerbside	Y (NO_2)	97	**70**	**71**	**65**	**58**	**57**	**59**	**65**	**53**
ID6	**Currie** Suburban	N	97	N/A	10	6	8	8	7	7	7
ID7	**St Leonard's** Urban Background	N	64	24	31	25	24	22	22 [b]	N/A	23 [b]
ID8	**Salamander St** Roadside	Y (PM_{10})	92	30 [b]	30	29	30	28	27	28	27
ID9	**Queensferry Rd** Roadside	N	83	N/A	N/A	41 (29)	52 **(40)**	43(34)[b]	46 (36)	41 (33)	42 (32)
ID10	**Glasgow Road** Roadside	Y (NO_2)	99	N/A	N/A	N/A	29 [b]	27	27	26	28

Notes for Table;

In bold and red, exceedance of the NO_2 annual mean objective of 40µg/m^{3}and in bold black, result of 40µg/m^{3}shown

a Data capture for the full calendar year

N/A Data not available

b annualised mean per TG16 (valid data capture < 75%)

Data in brackets represents the estimated annual concentration at relevant receptors using the NO2 Fall Off with Distance calculator (DEFRA website, LAQM, Tools, 2013). Details are shown in Appendix D.

Table A.4b – Annual Mean NO_2 Monitoring Results – Non-Automatic (Passive Diffusion Tube Data)

Site ID	Site address	Valid Data Capture (%) 2016 (1)	Annual mean concentration (adjusted for bias) µg/m³ (2)						
			2010 Bias Adjustment Factor = 0.85	2011 Bias Adjustment Factor = 0.81	2012 Bias Adjustment Factor = 0.76	2013 Bias Adjustment Factor = 0.75	2014 Bias Adjustment Factor = 0.74	2015 Bias Adjustment Factor = 0.76	2016 Bias Adjustment Factor = 0.77
NORTH WEST									
57	Glasgow Road 158	100	36.3	36.5	36	33	33	33	32
16a	Glasgow Road 68 facade	100	-	-	-	38	36	34	36
16	Glasgow Road 68	100	**44.5**	**43.8**	**47**	**40**	**40**	**40**	37
15a	Glasgow Road 9	50	-	-	-	-	34	39	33
58*	Glasgow Rd Newbridge	100	**51.3**	**51.5**	**48**	**46**	**45**	**45**	**41**
15	Glasgow Rd Newbridge	83	37.6	**40.9**	**40**	39	37	**40**	**40**
56	Glasgow Rd /Drumbrae	100	30.7	29.5	31	30	29	26	28
16b	Glasgow Rd/Ratho Stat.	50	-	-	-	-	32	32	38
143a	Hamilton Place Library	92	-	-	-	34	35	29	33
41	Hillview Terrace	100	22.4	18.4	21	18	18	19	20
55c	Inverleith Row/Montague	100	-	28.2	32	31	29	25	28
55*	Inverleith Row/Ferry Rd	92	**44.0**	**43.8**	**46**	**43**	**40**	**41**	**41**
63	Queensferry Road 544	83	29.4	25.2	26	26	23	27	24
64	Queensferry Road 550	100	**47.5**	**43.9**	**50**	**47**	**47**	**48**	**44**
64b	Queensferry Road 550 F	100	-	-	-	-	-	36	31
64a	Queensferry Road 552	100	-	-	30	28	30	30	29
62	Queensferry Road 561	100	25.6	19.2	25	21	19	19	20
40	Queensf'y Rd/Hillhouse	83	**42.4**	34.2	**40**	37	32	32	32
13a	Raeburn Place	50	-	-	-	-	-	-	26
23	Roseburn Terrace	75	**43.2**	34.5	38	35	37	32	32
1d	St John's Road 131	100	**58.8**	**56.3**	**52**	**52**	**48**	**46**	**45**

Site ID	Site address	Valid Data Capture (%) 2016 (1)	Annual mean concentration (adjusted for bias) µg/m³ (2)						
			2010 Bias Adjustment Factor = 0.85	2011 Bias Adjustment Factor = 0.81	2012 Bias Adjustment Factor = 0.76	2013 Bias Adjustment Factor = 0.75	2014 Bias Adjustment Factor = 0.74	2015 Bias Adjustment Factor = 0.76	2016 Bias Adjustment Factor = 0.77
SJ3	St John's Road 81	92	-	-	-	-	27	27	25
SJ2	St John's Road 63	92	-	-	-	-	25	23	22
1b	St John's Road IR	100	**43.5**	38.4	**44**	**41**	37	33	36
1	St John's Road SB	83	38.6	35.1	38	36	34	31	32
SJ1	St John's Rd/Kaimes Rd	92	-	-	-	-	31	28	27
39	St John's Road/Victor Pk	83	31.1	30.0	32	35	32	30	30
14	Trinity Crescent	100	27.5	28.9	28	27	25	22	21
SOUTH WEST									
76c	Angle Park Terrace 25	92	-	-	36	32	30	30	30
76b	Angle Park Terrace 74	100	-	-	**51**	**46**	**41**	**46**	**44**
76	Angle Pk/Harrison Rd	92	**52.9**	**44.4**	**48**	**41**	**41**	38	**43**
76a	Ardmillan Terrace 22	100	-	-	32	30	27	27	31
80e	Balgreen Road / Library	83	-	-	-	37	32	34	33
4a	Calder Road	83	25.9	31.7	32	30	26	25	28
79d	Dundee St/Yeaman Pl	100	-	-	-	**46**	**41**	**42**	39
79a	Fountainbridge 103	100	-	-	39	37	34	31	36
79	Fountainbridge/Tollcross	75	**42.0**	36.3	37	36	34	30	36
80	Gorgie Road Delhaig	92	**47.4**	**42.2**	**42**	**44**	37	33	38
80b	Gorgie Road 549	92	-	-	33	34	31	28	32
18	Gorgie Road 8	92	**54.5**	**48.2**	**49**	**45**	**42**	37	38
80c	Gorgie Road 87	83	-	-	39	**40**	N/A	34	34
80a	Gorgie Road / Glen Lea	83	-	-	-	33	31	27	31
5	Gorgie Rd/Murieston Rd	92	**42.9**	**44.4**	**43**	**41**	35	34	33
76d	Henderson Terrace	92	-	-	38	35	32	32	33

Site ID	Site address	Valid Data Capture (%) 2016 (1)	Annual mean concentration (adjusted for bias) µg/m³ (2)						
			2010 Bias Adjustment Factor = 0.85	2011 Bias Adjustment Factor = 0.81	2012 Bias Adjustment Factor = 0.76	2013 Bias Adjustment Factor = 0.75	2014 Bias Adjustment Factor = 0.74	2015 Bias Adjustment Factor = 0.76	2016 Bias Adjustment Factor = 0.77
11	Lanark Road 610	100	**23.5**	**22.5**	24	22	19	20	20
77a	Slateford Road 51	100	-	-	**41**	37	35	35	36
77b	Slateford Road 93/95	100	-	-	**46**	**42**	38	38	36
77	Slateford Road 97	75	**47.6**	**38.1**	**43**	**40**	37	38	34
NORTH EAST									
29a	Bernard St	92	**44.6**	**41.9**	**40**	38	34	34	37
29c*	Bernard Street/PS	92	**49.4**	**44.6**	**44**	**42**	39	**40**	39
29	Bernard Street/CA	100	**43.7**	38.9	37	36	31	32	33
43	Broughton Road	100	39.8	34.6	37	37	35	32	34
9d	Commercial Street	100	-	-	-	-	**42**	36	**42**
9	Commercial Street 88	92	36.7	31.2	35	32	30	29	32
9a	Commercial St/Portland Pl	92	38.1	**41.0**	39	36	35	36	33
30f	Duke Street	92	-	-	-	-	-	**40**	38
25c	Easter Road 105/109	100	37.7	**41.0**	**41**	37	29	31	33
25e	Easter Road 198	75	34.2	32.0	33	27	31	24	27
25d	Easter Road/Bothwick	100	37.1	32.7	34	30	30	30	32
25	Easter Road/CH Shop	42	**49.7**	**43.6**	**45**	**41**	39	**40**	**46**
25b	Easter Rd/Rossie Place	75	39.1	35.8	35	34	31	31	35
53	Ferry Rd/Bowhill Terr	100	34.8	32.5	35	34	33	35	33
45d	Ferry Rd/North J St	92	38.3	39.6	37	34	34	37	33
30b	Gt Junction Street 137	100	39.9	**40.0**	38	36	33	38	33
30c	Gt Junction Street 14	75	**44.1**	38.4	38	39	37	34	**40**
30e	Gt Junction Street/CG	58	38.7	**41.2**	37	36	33	32	34
30	Great Junction St/FV	92	**41.8**	39.1	38	**41**	N/A	33	**42**

Site ID	Site address	Valid Data Capture (%) 2016 (1)	Annual mean concentration (adjusted for bias) µg/m³ (2)						
			2010 Bias Adjustment Factor = 0.85	2011 Bias Adjustment Factor = 0.81	2012 Bias Adjustment Factor = 0.76	2013 Bias Adjustment Factor = 0.75	2014 Bias Adjustment Factor = 0.74	2015 Bias Adjustment Factor = 0.76	2016 Bias Adjustment Factor = 0.77
30d	Gt Junction Street/WC	100	39.9	33.8	38	34	34	30	33
21	Leith Walk/Brunswick Rd	75	35.4	34.2	36	34	33	33	**40**
20	Leith Walk/McDonald Rd	92	38.1	-	35	34	32	33	**40**
66	London Rd/Cadzow Pl	58	**40.5**	-	36	34	31	32	32
67	London Rd/Earlston Pl	100	**51.3**	**45.5**	**46**	**46**	39	**42**	**41**
81	London Rd/E. Norton Pl	83	-	**51.2**	**46**	**44**	**43**	**50**	**57**
46	London Rd/Easter Rd	92	**46.2**	**40.4**	**46**	38	38	37	39
68	Parsons Green Terrace	83	36.6	31.5	33	29	28	31	31
69	London Rd/Wolseley Pl	92	**50.6**	**50.4**	**42**	**40**	**42**	**43**	38
70	London Rd/Wolseley Terr	100	**46.1**	**42.4**	**41**	**44**	38	**44**	**40**
32	Niddrie Mains Road 28	92	32.5	30.9	33	31	28	28	25
9c	North Junction Street	83	-	-	-	-	30	29	31
71	Portobello High St 185	58	39.2	36.0	32	33	32	31	31
73d	Portobello Rd/Ramsay F	100	-	-	-	38	35	38	36
51c	Salamander St/Baltic St	100	36.2	38.5	35	33	30	32	31
72	Seafield Road East 10	100	38.4	33.1	37	36	33	30	33
SOUTH EAST									
44	Broughton Street	75	35.3	32.8	34	31	31	30	33
6a	Bruntsfield Place 210	83	-	-	-	-	32	30	32
138	Clerk Street 15	100	-	-	**40**	38	38	37	39
48f	Cowgate/50 St Mary's St	92	-	-	-	-	37	37	38
48c	Cowgate Blackfriars	92	-	-	**43**	**42**	34	**41**	**40**
48a	Cowgate/Blair Street	75	37.7	31.4	**40**	35	36	34	37
48	Cowgate/Guthrie Street	92	**46.2**	**40.2**	**40**	38	33	33	38

Site ID	Site address	Valid Data Capture (%) 2016 (1)	Annual mean concentration (adjusted for bias) µg/m³ (2)						
			2010 Bias Adjustment Factor = 0.85	2011 Bias Adjustment Factor = 0.81	2012 Bias Adjustment Factor = 0.76	2013 Bias Adjustment Factor = 0.75	2014 Bias Adjustment Factor = 0.74	2015 Bias Adjustment Factor = 0.76	2016 Bias Adjustment Factor = 0.77
48e	Cowgatehead 2	58	-	-	-	39	35	**44**	**41**
150	Drum Street	92	-	-	-	-	-	27	29
74f	George Street 112	92	**43.4**	**44.7**	**47**	34	30	26	31
37a*	Grassmarket 41	71	**60.0**	**42.0**	**43**	**44**	**40**	**43**	**53**
37b	Grassmarket 75	100	-	37.1	39	37	35	36	37
37c	Grassmarket/Thompsons	100	-	-	-	27	25	27	28
75e	Great Stuart Street 9	100	-	-	-	24	23	24	24
HT1	Haymarket Terrace (North)	75	-	-	-	-	-	37	**42**
HT2	Haymarket Terrace (South)	100	-	-	-	-	-	39	39
10	Home Street	100	36.5	25.7	33	31	27	30	37
140	Hope Pk Terrace/Clerk St	75	-	-	35	35	32	32	31
17a	Hope Park Terrace/VS	100	**43.4**	37.4	39	36	35	36	34
149a	Howden Hall Road 79	92	-	-	-	-	-	30	33
34	India Street	100	22.7	23.6	23	21	20	20	21
74g	Leith Street 35	100	-	-	-	-	-	**49**	**59**
38	Melville Drive	83	27.6	27.3	29	26	23	24	23
42	Midmar Drive	92	18.4	16.1	18	15	13	15	17
8	Morningside Road	92	28.8	28.6	26	25	23	24	26
49	Morrison Street	100	**49.3**	**48.5**	**46**	**42**	36	35	39
135	Nicolson Street 69	92	-	-	**50**	**45**	**43**	**46**	**46**
136	Nicolson Street 92	83	-	-	**42**	39	39	35	38
27	North Bridge – South	92	**49.4**	**48.7**	**52**	**47**	**48**	N/A	**53**
47	Princes Street Eastbound	100	**58**	**45.3**	**45**	**50**	**50**	**42**	**48**
24	Princes Street/Mound	75	**49.3**	N/A	34	**41**	N/A	**42**	**41**

Site ID	Site address	Valid Data Capture (%) 2016 (1)	Annual mean concentration (adjusted for bias) µg/m³ (2)						
			2010 Bias Adjustment Factor = 0.85	2011 Bias Adjustment Factor = 0.81	2012 Bias Adjustment Factor = 0.76	2013 Bias Adjustment Factor = 0.75	2014 Bias Adjustment Factor = 0.74	2015 Bias Adjustment Factor = 0.76	2016 Bias Adjustment Factor = 0.77
33	Queen Street/Hanove r St	100	**56.3**	**50.0**	**49**	33	N/A	N/A	39
SH1	Shandwick Place	75	-	-	-	-	-	39	36
144	South Bridge 59	83	-	-	-	**46**	**47**	**44**	**50**
142	South Clerk Street 41a	92	-	-	**42**	**40**	36	34	37
141	South Clerk Street 84	83	-	-	**44**	**41**	38	**40**	36
75d	St Colme Street 4	92	-	-	-	31	27	26	29
3b	Torphichen Place 1	100	-	-	-	-	**45**	**42**	**44**
3	Torphichen Place CH	92	**55.6**	**55.1**	**48**	**43**	**43**	**45**	**50**
2	West Maitland Street	100	**52.4**	**55.3**	**40**	-	**43**	**42**	**42**
28d	West Port 42	75	**54.9**	**55.2**	**60**	**58**	**51**	**52**	**51**
28b	West Port 62	50	**62.4**	**57.0**	**61**	**52**	**56**	**58**	**59**
28c	West Port Opposite 50	75	**41.5**	39.0	-	39	N/A	**46**	**44**
36	York Place	83	39.0	35.4	**41**	28	33	35	32

Notes for Table A.4b (and overleaf):

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in bold and red.

Concentrations at the objective (40µg/m^3) are shown in bold black.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in bold and underlined.

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

(2) 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.

Yellow coloured cells indicate data that is distance corrected.

* Concentration is the result of duplicate tubes (2016)

Table A.5 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Name / Type	Within AQMA ?	Data Capture 2016 % [a]	Number of Hourly Means > 200µg/m^3							
				2009	2010	2011	2012	2013	2014	2015	2016
ID1	**Queen St** Roadside	Y (NO_2)	49	0	0	0	0	0	0	0	N/A
ID2	**Haymarket** Roadside	Y (NO_2)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ID3	**Roseburn** Roadside	Y (NO_2)	N/A	0	1	0 (101) [b]	N/A	N/A	N/A	N/A	N/A
ID4	**Gorgie Road** Roadside	Y (NO_2)	99	0 (130) [b]	0 (122) [b]	0	0	0 (115)	0	0	0
ID5	**St John's Road** Roadside	Y (NO_2)	97	**114**	**60**	**52**	**62**	8	1	**42** (224)	5
ID6	**Currie** Suburban	N	97	N/A	0	0	0	0	0	0	0
ID7	**St Leonard's** Urban Background	N	64	0	0	0	0	0	0 (69)	0	0 (73)
ID8	**Salamander St** Roadside	Y (PM_{10})	92	0 (144) [b]	0	0	0	0	0	0	0
ID9	**Queensferry Rd** Roadside	N	83	N/A	N/A	0	3	0 (145)	0	0	0 (142)
ID10	**Glasgow Road** Roadside	Y (NO_2)	99	N/A	N/A	N/A	0	0	0	0	0

Notes for table; a data capture for the full calendar year.

b if data capture for full calendar year is < 90%, the 99.8th percentile of hourly means is shown in brackets.

In bold and red, exceedance of the NO_2 hourly mean objective (200µg/m^3 – not to be exceeded more than 18 times per year).

Figure A.3a Trend in Automatically Measured Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) at St Leonard's

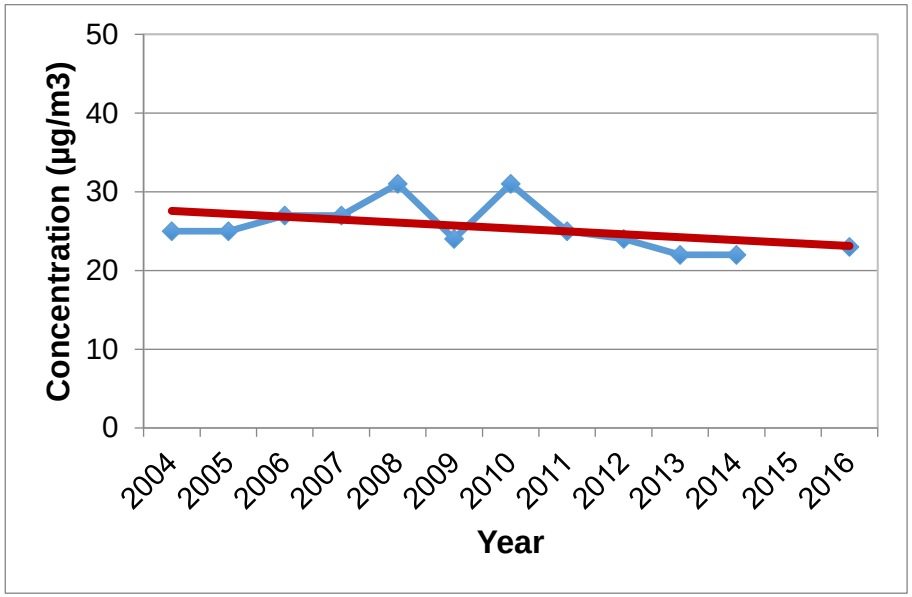


Figure A.3b Trend in Automatically Measured Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) at Gorgie Road

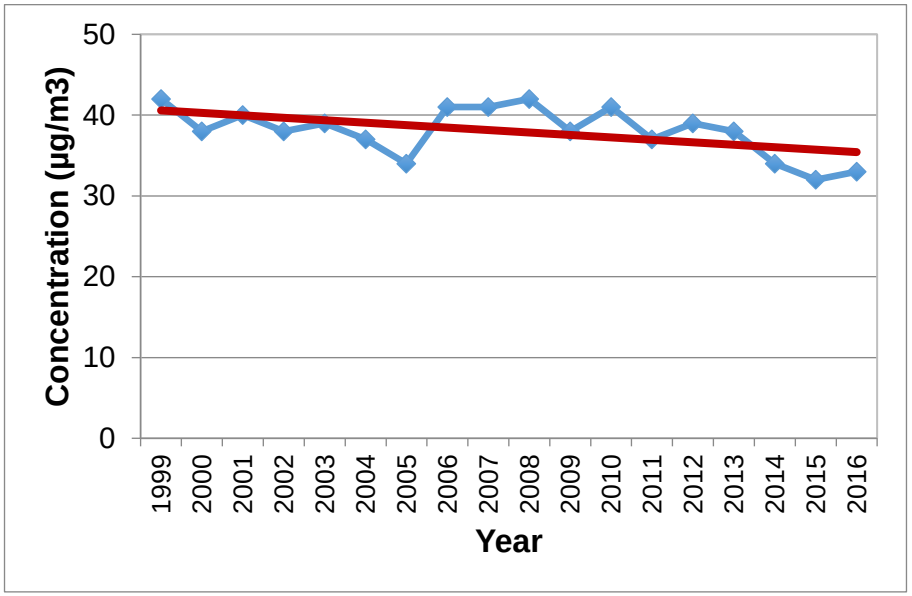


Figure A.3c Trend in Automatically Measured Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) at Queen Street

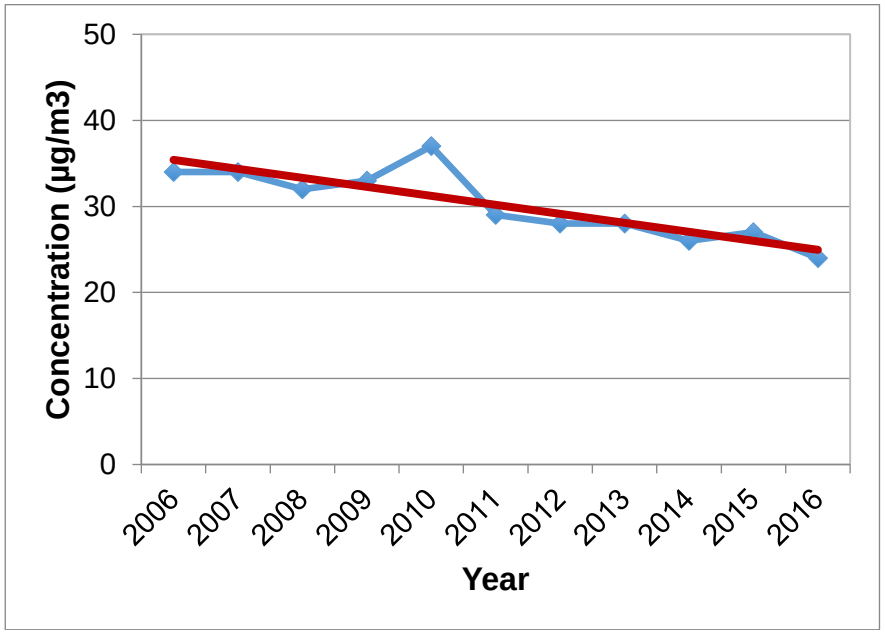


Figure A.3d Trend in Automatically Measured Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) at Salamander Street

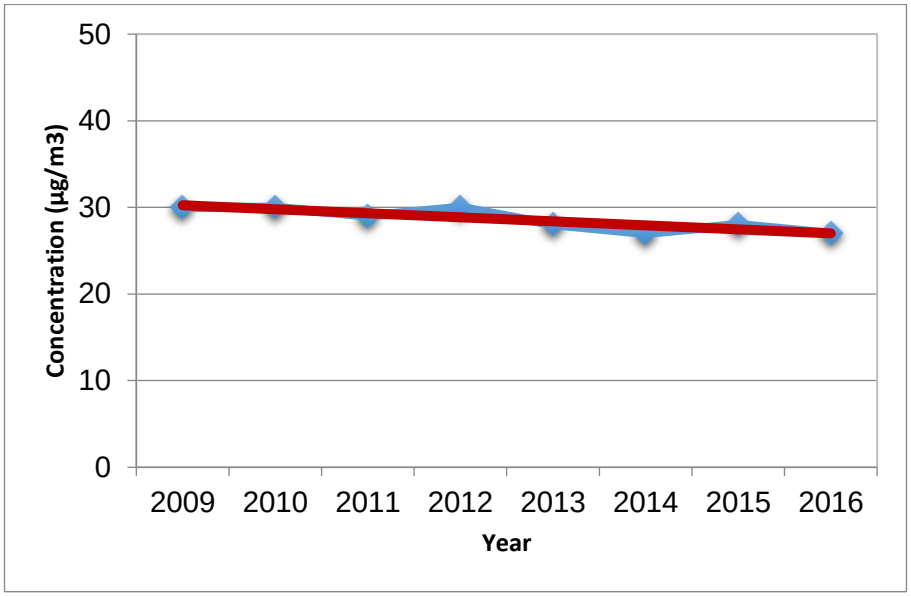


Figure A.3e Trend in Automatically Measured Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) at Currie

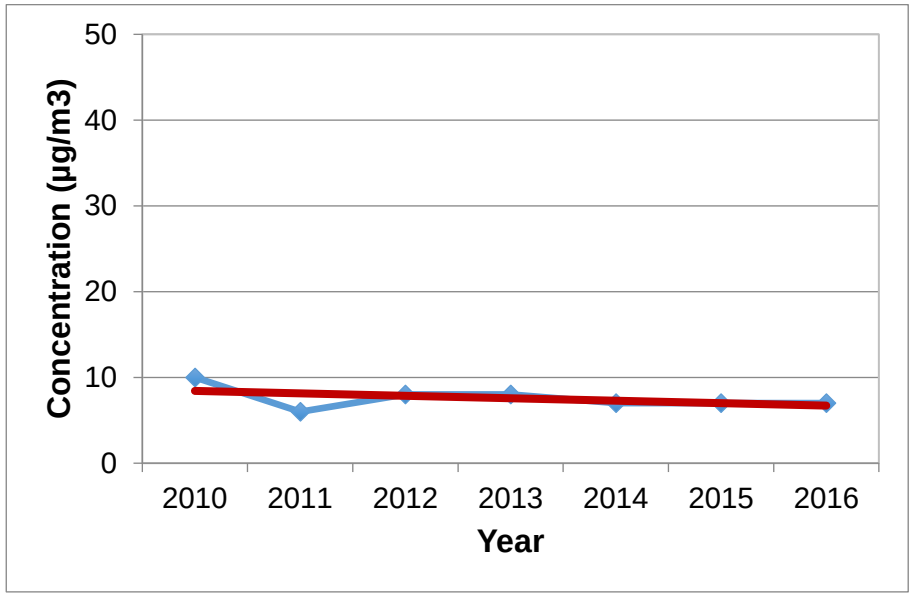


Figure A.3f Trend in Automatically Measured Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) at Queensferry Road

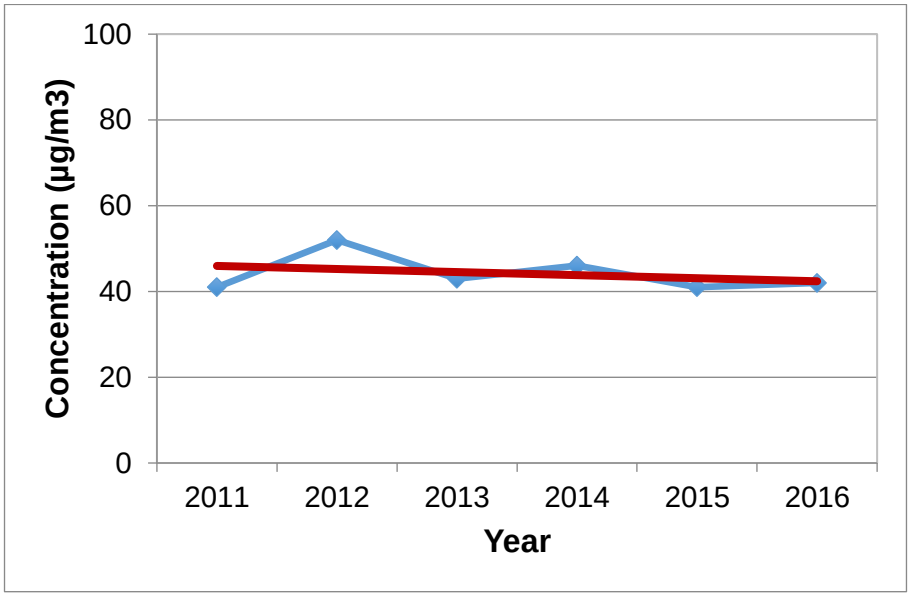


Figure A.3g Trend in Automatically Measured Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) at St John's Road

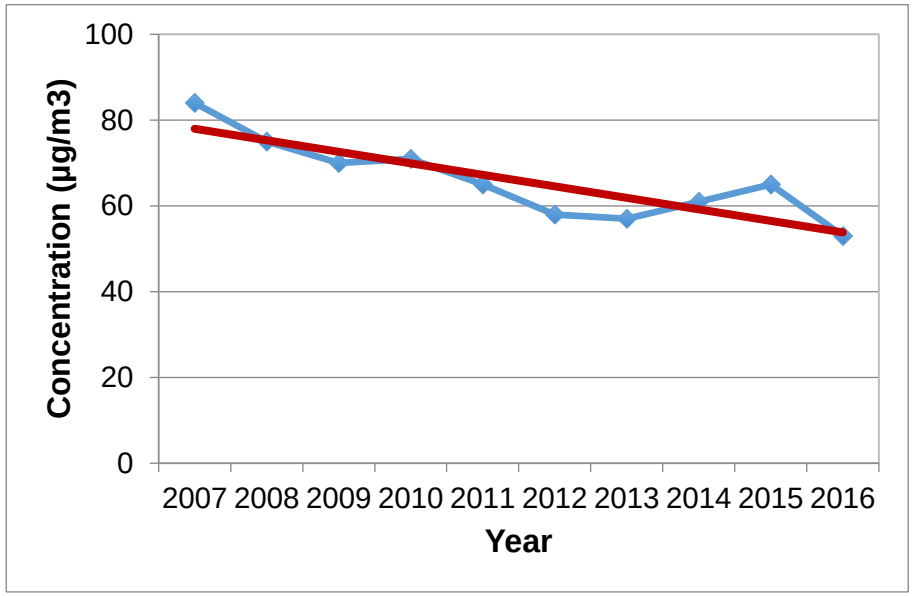


Figure A.3h Trend in the Number of Exceedances of the Hourly Mean Objective for Nitrogen Dioxide at St John's Road

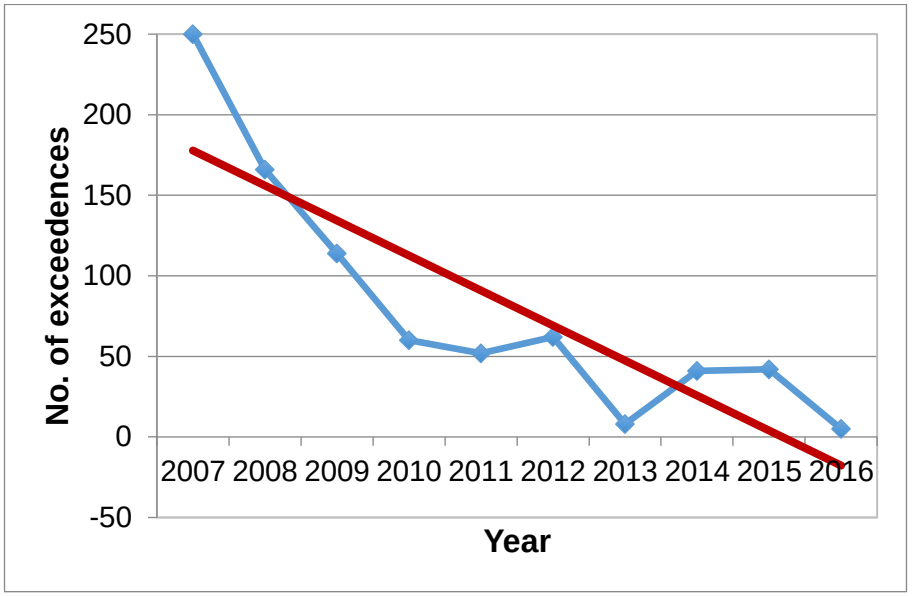


Figure A.3i Trend in Automatically Measured Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) at Glasgow Road

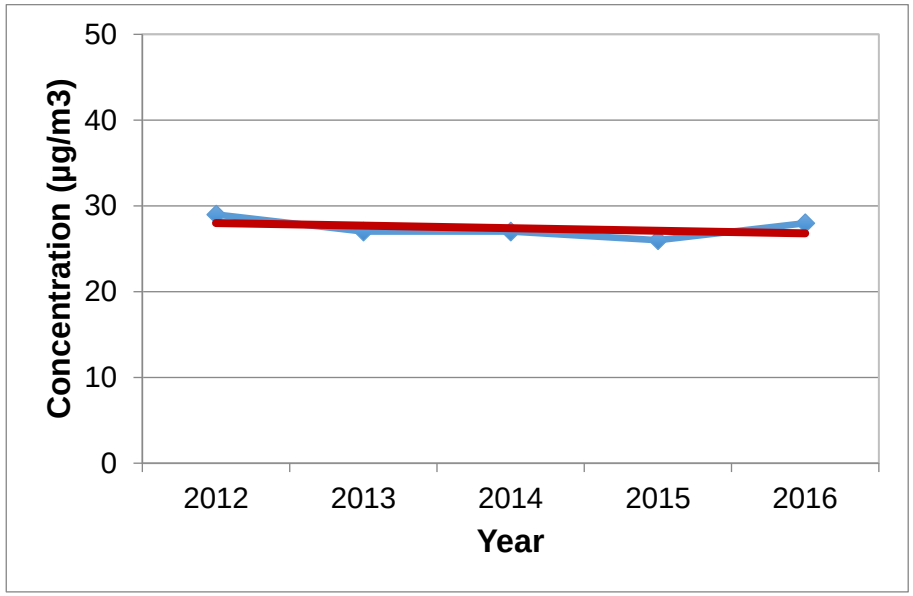


Table A.6

Data used to establish the trend of annual mean concentrations of nitrogen dioxide at passive diffusion tube sites within the Central AQMA.

	2008	2009	2010	2011	2012	2013	2014	2015	2016
PDT 2	N/A	56.8	73.4	73.2	50.5	N/A	58.8	51	54.3
PDT 3	58.2	26.3	55.6	55.1	48	43	43	45	49.6
PDT 5	N/A	58.2	60.1	54.3	51.9	48.5	43.3	42	44
PDT 18	51.5	45	54.5	48.2	49	45	42	37	38.3
PDT 20	53.1	36.8	38.1	N/A	35	34	32	33	39.7
PDT 21	N/A	40	40.7	35.8	38.8	36.2	35.1	35	40.3
PDT 23	N/A	47.5	58.2	41.4	45.1	41.2	45.7	37	39.7
PDT 24	N/A	46.2	73	N/A	49.7	59.9	N/A	54	56.7
PDT 25	58.2	50.8	49.7	43.6	45	41	39	40	45.7
PDT 27	52.3	48.4	49.4	48.7	52	47	48	N/A	53
PDT 36	N/A	39.2	41.1	36.9	43.1	29.1	34.1	36	33.6
PDT 46	52.3	43.4	46.2	40.4	46	38	38	37	39.3
PDT 47	N/A	31.6	47.5	39	N/A	41	41.1	38	40.8
PDT 48	46.6	39.8	46.2	40.2	40	38	33	33	37.7
PDT 49	N/A	48.2	54.5	53.5	50.8	46.8	39.3	36	41.7
PDT 66	N/A	43	40.5	N/A	36	34	31	33	31.5
PDT 67	N/A	47.9	51.3	45.5	46	46	39	42	40.5
PDT 68	N/A	30.4	36.6	31.5	33	29	28	31	30.9
PDT 69	N/A	56.2	50.6	50.4	42	40	42	43	39.3
PDT 70	N/A	47.3	46.1	42.4	41	44	38	44	40
PDT 76	N/A	N/A	52.9	44.4	48	41	41	38	43.4
PDT 77	N/A	N/A	47.6	38.1	43	40	37	38	33.9
PDT 80	N/A	N/A	47.4	42.2	42	44	37	33	38
PDT 81	N/A	N/A	N/A	51.2	46	44	43	50	56.7
PDT 17a	N/A	38.8	43.4	37.4	39	36	35	36	34.4
PDT 25b	44.9	38.8	39.1	35.8	35	34	31	31	34.7
PDT 25c	43.8	38	37.7	41	41	37	29	31	33.1
PDT 25d	40.8	37.3	37.1	32.7	34	30	30	30	32.3
PDT 25e	37.3	34.1	34.2	32	33	27	31	25	27.4
PDT 28b	72.5	66.7	62.4	57	61	52	56	58	58.9
PDT 28c	51.5	43.5	41.5	39	N/A	39	N/A	46	43.5
PDT 28d	66.6	60.2	54.9	55.2	60	58	51	52	50.8
PDT 37a	42.3	40.5	60	42	43	44	40	42	54.1
PDT 37b	N/A	N/A	N/A	37.1	39	37	35	36	36.7
PDT 48a	N/A	N/A	37.7	31.4	40	35	36	34	37.4
PDT 74f	N/A	N/A	43.4	44.7	47	34	30	26	30.8
Mean	**51.5**	**44.2**	**48.6**	**43.7**	**43.9**	**40.4**	**38.6**	**38.6**	**41.2**

Table A.7 Data used to establish the trend of annual mean concentrations of NO_2 at passive diffusion tube sites within the Glasgow Road AQMA.

	2009	2010	2011	2012	2013	2014	2015	2016
PDT 16	57.3	54.7	50.9	54.8	44.9	45.6	46	44.8
PDT 58	61.8	65	59.3	54.8	52	51.9	51.3	49
PDT 15	51.4	45.7	45.9	42.5	41.4	38.6	42.8	44
Mean	**56.8**	**55.1**	**52**	**50.7**	**46.1**	**45.4**	**46.7**	**45.9**

Table A.8 Data used to establish the trend of annual mean concentrations of NO_2 at passive diffusion tube sites within the Inverleith Row AQMA.

	2011	2012	2013	2014	2015	2016
PDT 55	43.8	46	43	40	41	40.5
PDT 55c	28.6	32.7	31.3	29.3	24.9	29.2
PDT 53	36.9	36.8	35.5	34.5	36.4	34.2
Mean	**36.4**	**38.5**	**36.6**	**34.6**	**34.1**	**34.6**

Table A.9 Data used to establish the trend of annual mean concentrations of NO_2 at passive diffusion tube sites within the Great Junction Street AQMA.

	2008	2009	2010	2011	2012	2013	2014	2015	2016
PDT 29	45.3	45.1	43.7	38.9	37	36	31	32	33.2
PDT 29a	48	42	44.6	41.9	40	38	34	34	37.2
PDT 29c	53.4	48.2	49.4	44.6	44	42	39	40	41.6
PDT 9	40.4	31.6	36.7	31.2	35	32	30	29	32
PDT 9a	N/A	N/A	45.5	46.2	44	41	41	42	39.8
PDT 45d	42.4	40.9	38.3	39.6	37	34	34	37	33.2
PDT 30b	38.4	38.5	39.9	40	38	36	33	38	32.8
PDT 30c	50.2	42.6	44.1	38.4	38	39	37	34	40.3
PDT 30d	39	37.1	39.9	33.8	38	34	34	30	33
PDT 30e	43.1	41.9	38.7	41.2	37	36	33	32	34
PDT 30	44.6	44.1	41.8	39.1	38	41	N/A	33	42.1
Mean	**44.5**	**41.2**	**42.1**	**39.5**	**37.7**	**37.2**	**34.6**	**34.6**	**36.3**

Table A.10 Data used to establish the trend of annual mean concentrations of NO_2 at passive diffusion tube sites within the St John's Road AQMA.

	2008	2009	2010	2011	2012	2013	2014	2015	2016
PDT 1	50	43	47	39	43	42	39	35	37.3
PDT 1b	48.8	44.2	43.5	38.4	44	41	37	33	36.1
PDT 1d	84.9	57.8	58.8	56.3	52	52	48	46	45.1
Mean	**61.2**	**48.3**	**49.8**	**44.6**	**46.3**	**45**	**41.3**	**38**	**39.5**

Figure A.4a Trend in Average Passive Diffusion Tube Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) in the Central AQMA

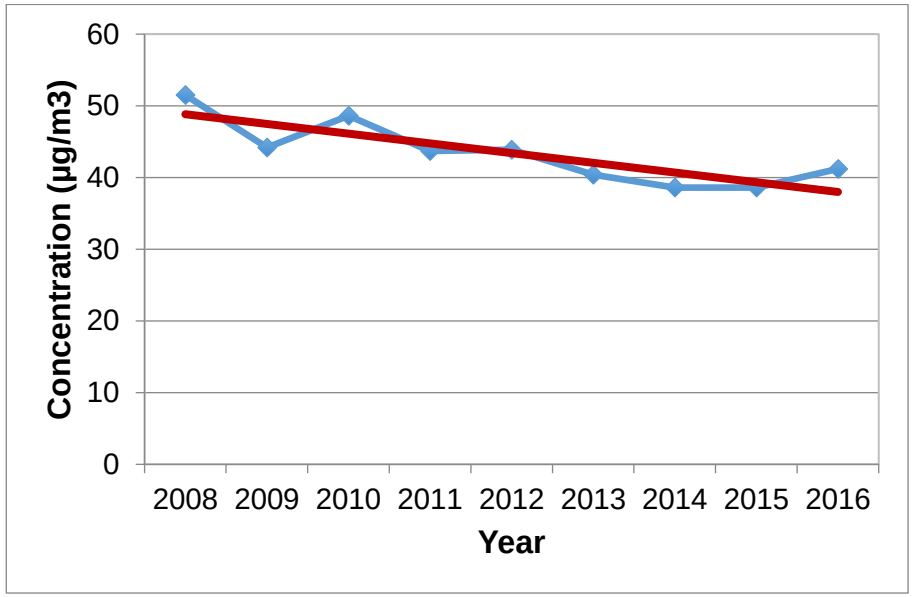


Figure A.4b Trend in Average Passive Diffusion Tube Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) in the Glasgow Road AQMA

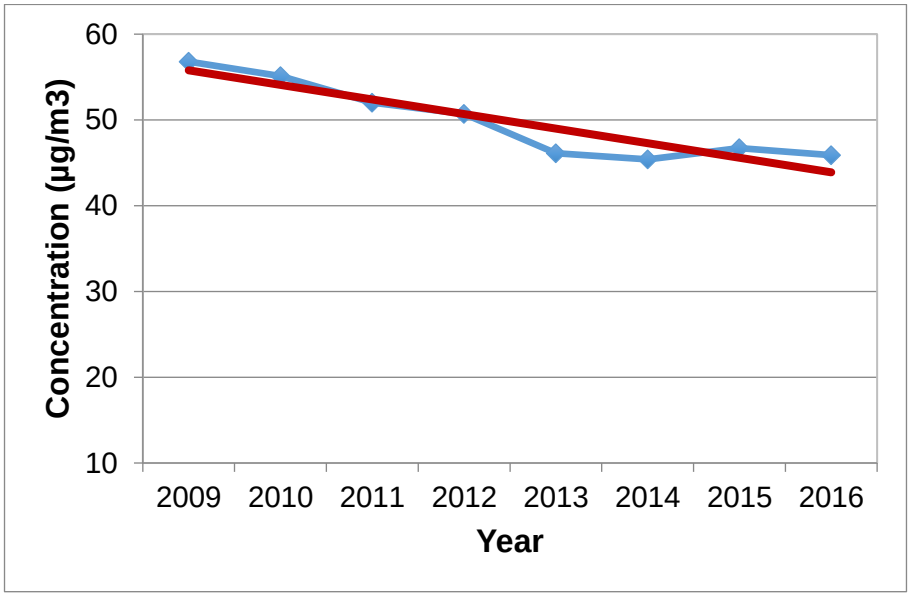


Figure A.4c Trend in Average Passive Diffusion Tube Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) in the Inverleith Row AQMA

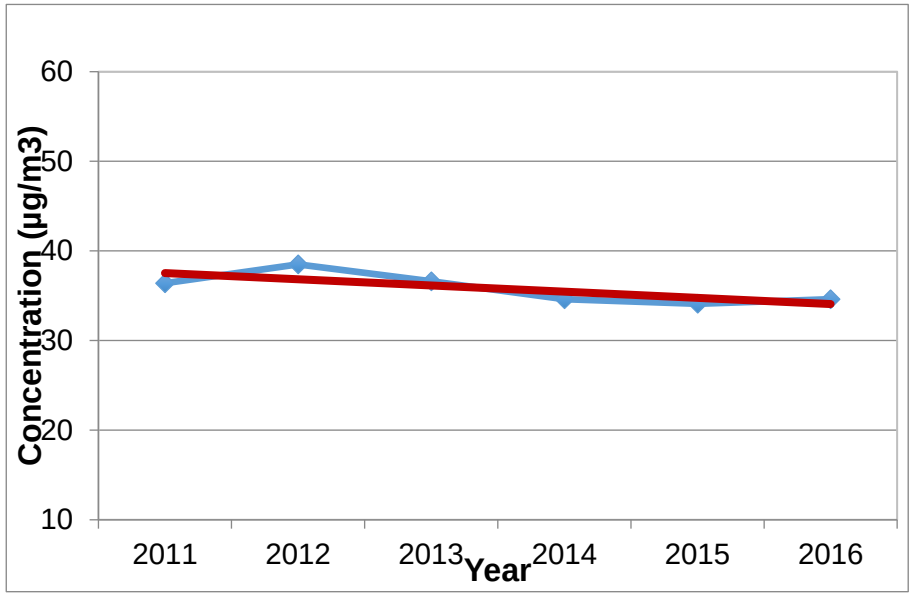


Figure A.4d Trend in Average Passive Diffusion Tube Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) in the Great Junction Street AQMA

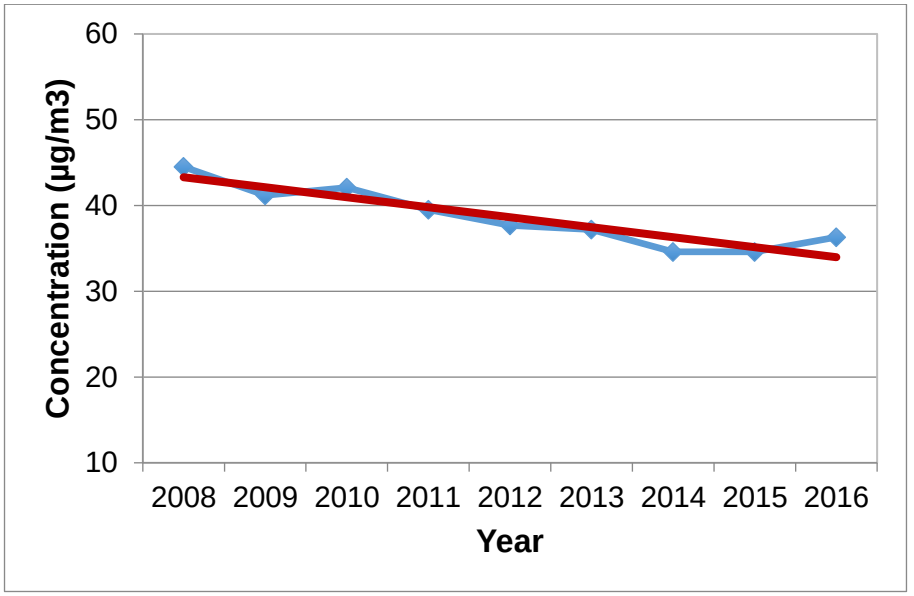


Figure A.4e Trend in Average Passive Diffusion Tube Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) in the St John's Road AQMA

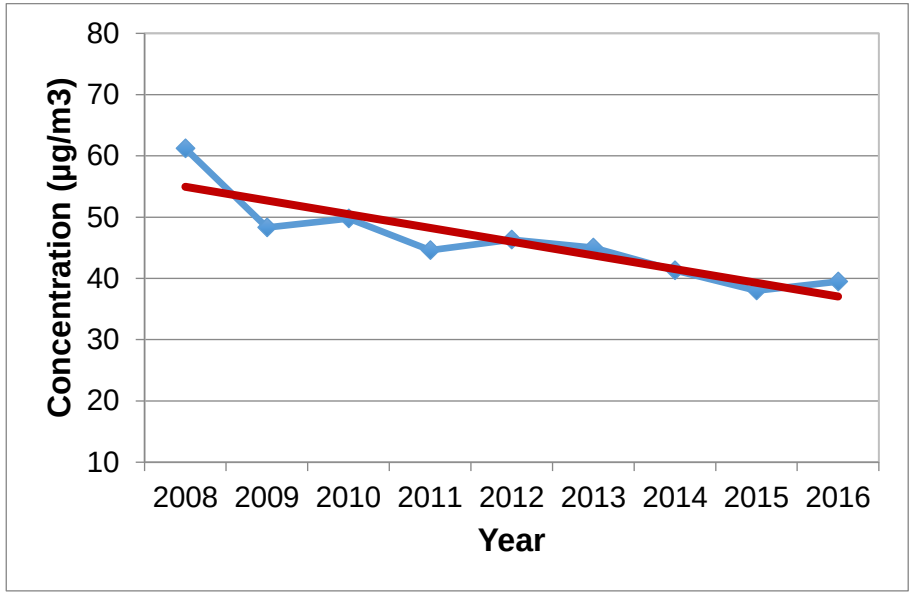


Table A.11 – Annual Mean PM_{10} Monitoring Results

Site ID	Site Name (Equipment Type) Site Type	Within AQMA ?	Annual Mean Concentration (µg/m³)							
			2009	2010	2011	2012	2013	2014	2015	2016
ID1	**Queen Street** (TEOM) Roadside **Data capture (%)**	Y (NO_2)	**18** (VCM) **18** (1.14) **96%**	**18** (VCM) **19** (1.14) **96%**	16 (VCM) 16 (1.14) **94%**	16 (VCM) 16 (1.14) **96%**	17 (VCM) 17 (1.14) **96%**	17 (VCM) 16 (1.14) **97%**	15 (VCM) 16 (1.14) **98%**	 N/A **49 %**
ID6	**Currie** (TEOM) Suburban **Data capture (%)**	N	N/A	11 (VCM) 11 (1.14) **98%**	13 (VCM) 11 (1.14) **99%**	11 (VCM) 11 (1.14) **98%**	12 (VCM) 11 (1.14) **64%**	11 (VCM) 10 (1.14) **98%**	9 (VCM) 10 (1.14) **77%**	9 (VCM) 10 (1.14) **98%**
ID7	**St Leonard's** (FDMS) Urban BG **Data capture (%)**	N	17 **63%**	14 **95%**	15 **98%**	16 **68%**	14 **94%**	13 **71%**	10 **93%**	11 **79%**
ID8	**Salamander St** (TEOM) Roadside **Data capture (%)**	Y (PM_{10})	**22** (VCM) **23** (1.14) **97%[1]**	**26** (VCM) **27** (1.14) **97%**	**26** (VCM) **27** (1.14) **97%**	**23** (VCM) **24** (1.14) **96%**	**22** (VCM) **22** (1.14) **94%**	**21** (VCM) **21** (1.14) **98%**	**20** (VCM) **22** (1.14) **90%**	17 (VCM) **18** (1.14) **98%**
ID9	**Queensferry Rd** (FDMS) Roadside **Data capture (%)**	N	N/A	N/A	**21** **63%**	**18** **86%**	**19** **77%**	**19** **68%**	16 **87%**	**19** **78%**
ID10	**Glasgow Road** (TEOM) Roadside **Data capture (%)**	Y (NO_2)	N/A	N/A	N/A	15 (VCM) 15 (1.14) **32%**	16 (VCM) 16 (1.14) **97%**	16 (VCM) 16 (1.14) **98%**	15 (VCM) 16 (1.14) **97%**	15 (VCM) 17 (1.14) **85%**

Notes for table A.11 Data capture generally represents full calendar year except [1] Data capture for period between September and December (when monitoring commenced at Salamander Street). Data is generally not annualised due to its sporadic nature.

Exceedances of the PM_{10} annual mean objective of 18µg/m³ are shown in bold red. Results of 18µg/m³ are shown in bold black.

[#] Data from St Leonard's had a new correction method applied in 2015 N/A Not applicable – Either no data or insufficient data.

Table A.12 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Name (Equipment Type) Site Type	Within AQMA?	Data Capture 2016 %	Number of Daily Means > 50µg/m³ [a]							
				2009	2010	2011	2012	2013	2014	2015	2016
ID1	**Queen Street** (TEOM) **Roadside**	Y (NO_2)	49	1	1	0	2	2	1	2	
ID6	**Currie** (TEOM) **Suburban**	N	98	N/A	0	0	0	0(29) [a]	0	0(23) [a]	0
ID7	**St Leonard's** (FDMS) **Urban Background**	N	79	2	1	0	2(40) [a]	3	0(32) [a]	0(31) [a]	0 (29)
ID8	**Salamander St** (TEOM) **Roadside**	Y (PM_{10})	98	2(44) [a]	**19**	**22**	**13**	5	5	**8**	0
ID9	**Queensferry Rd** (FDMS) **Roadside**	N	78	N/A	N/A	2	3	2(41) [a]	1(38) [a]	1(39) [a]	0(40)
ID10	**Glasgow Road** (TEOM) **Roadside**	Y (NO_2)	85	N/A	N/A	N/A	0(35) [a]	1	0	1	0

Notes for table;

Exceedance of the PM_{10} daily mean objective 50µg/m³ – not to be exceeded more than 7 times per year – are shown in bold red.

[a] if data capture for full calendar year is less than 90%, the 98.08th percentile of 24-hour means is in brackets (expressed in µg/m³).

Figure A.5a Trend in Automatically Measured Annual Mean PM_{10} Concentrations (Non-Volatile µg/m^3) at St Leonard's

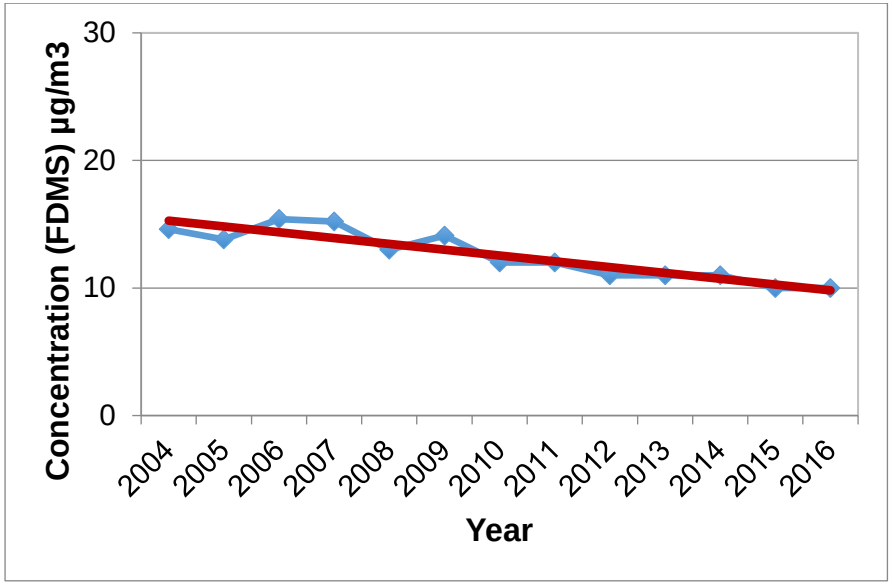


Figure A.5b Trend in Automatically Measured Annual Mean PM_{10} Concentrations (µg/m^3) at Currie

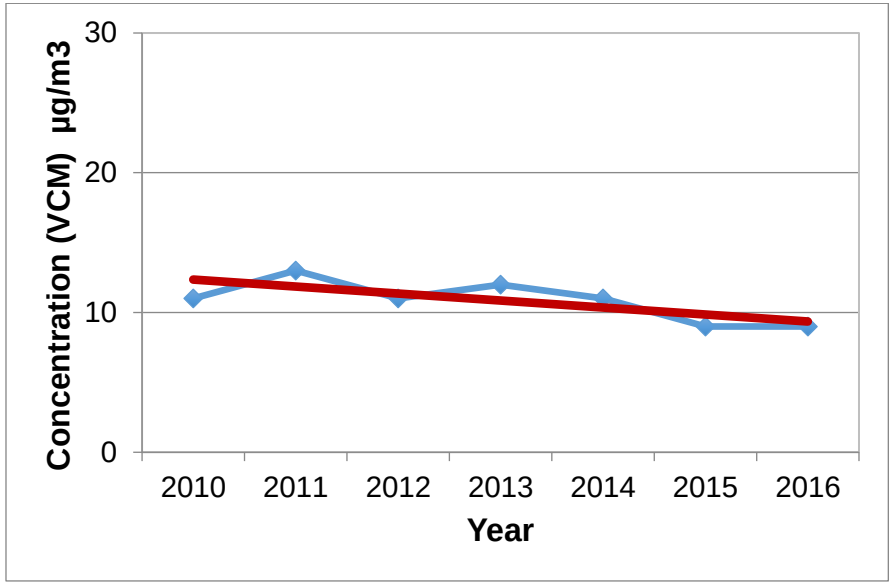


Figure A.5c Trend in Automatically Measured Annual Mean PM_{10} Concentrations ($\mu g/m^3$) at Salamander Street

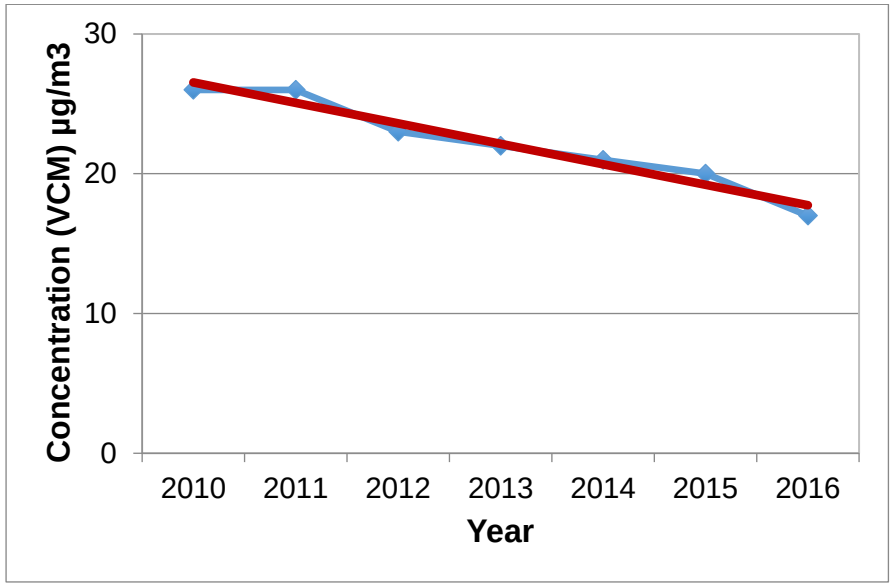


Figure A.5d Trend in Automatically Measured Annual Mean PM_{10} Concentrations ($\mu g/m^3$) at Queensferry Road

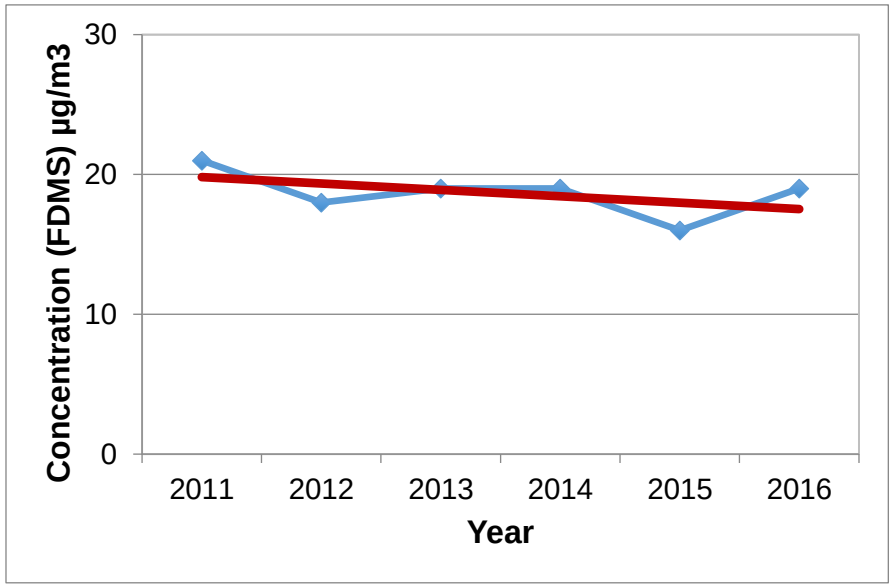


Table A.13a – Annual Mean $PM_{2.5}$ - Measured Concentrations at St Leonard's

Site ID	Site Name (Equipment Type) Site Type	Annual Mean Concentration (µg/m^3)							
		2009	2010	2011	2012	2013	2014	2015	2016
ID7	**St Leonard's** (TEOM FDMS) Urban Background	8 (95%)	9 (94%)	**12** (98%)	***11*** *(72%)*	8 (98%)	*9* *(65%)*	6 (86%)	6 (92%)

Notes for Table Exceedances of the $PM_{2.5}$ annual mean objective of 10µg/m^3 are shown in **bold red.**

Data capture in brackets (%) for measured data. Italic text indicates poor PM_{10} data capture.

Table A.13b Estimation of $PM_{2.5}$ concentrations from PM_{10} Measured data using the UK National & Scottish Factors

Site ID & Name (Equipment Type) Site Type	Annual Mean Concentration (µg/m³)				
	2012	2013	2014	2015	2016
ID1 - Queen Street (TEOM) Roadside	**11** (VCM) **11** (1.14)	**12** (VCM) **12** (1.14)	**12** (VCM) **11** (1.14)	**11** (VCM) **11** (1.14)	N/A
	10 (VCM) **10** (1.14)	**11** (VCM) **11** (1.14)	**11** (VCM) **10** (1.14)	**9** (VCM) **10** (1.14)	N/A
ID6 - Currie (TEOM) Suburban	8 (VCM) 8 (1.14)	*8 (VCM)* *8 (1.14)*	8 (VCM) 7 (1.14)	*6 (VCM)* *7 (1.14)*	*6 (VCM)* *7 (1.14)*
	7 (VCM) 7 (1.14)	*8* (VCM) 7 (1.14)	7 (VCM) 6 (1.14)	*6* (VCM) 6 (1.14)	*6* (VCM) 6 (1.14)
ID8 - Salamander St (TEOM) Roadside	**16** (VCM) **17** (1.14)	**15** (VCM) **15** (1.14)	**15** (VCM) **15** (1.14)	**14** (VCM) **15** (1.14)	**12** (VCM) **13** (1.14)
	14 (VCM) **15** (1.14)	**14** (VCM) **14** (1.14)	**13** (VCM) **13** (1.14)	**13** (VCM) **14** (1.14)	**11** (VCM) **11** (1.14)
ID9 - Queensferry Rd (TEOM FDMS) Roadside	**13**	***13***	***13***	**11**	**13**
	11	***12***	***12***	**10**	**12**
ID10 - Glasgow Road (TEOM) Roadside	***11 (VCM)*** ***11 (1.14)***	**11** (VCM) **11** (1.14)	**11** (VCM) **11** (1.14)	**11** (VCM) **11** (1.14)	**11** (VCM) **12** (1.14)
	9 (VCM) 9 (1.14)	**10** (VCM) **10** (1.14)	**10** (VCM) **10** (1.14)	9 (VCM) **10** (1.14)	9 (VCM) **11** (1.14)

Notes for Table: Estimation of $PM_{2.5}$ concentrations from PM_{10} Measurements using national factor (0.7) – Yellow

Estimation of $PM_{2.5}$ concentrations from PM_{10} Measurements using Scottish Factor 0.63 – Blue

Potential exceedances of the $PM_{2.5}$ annual mean objective of 10µg/m³ are shown in **bold red.**

Figure A.6 Trend in Automatically Measured Annual Mean $PM_{2.5}$ Concentrations (µg/m^3) at St Leonard's

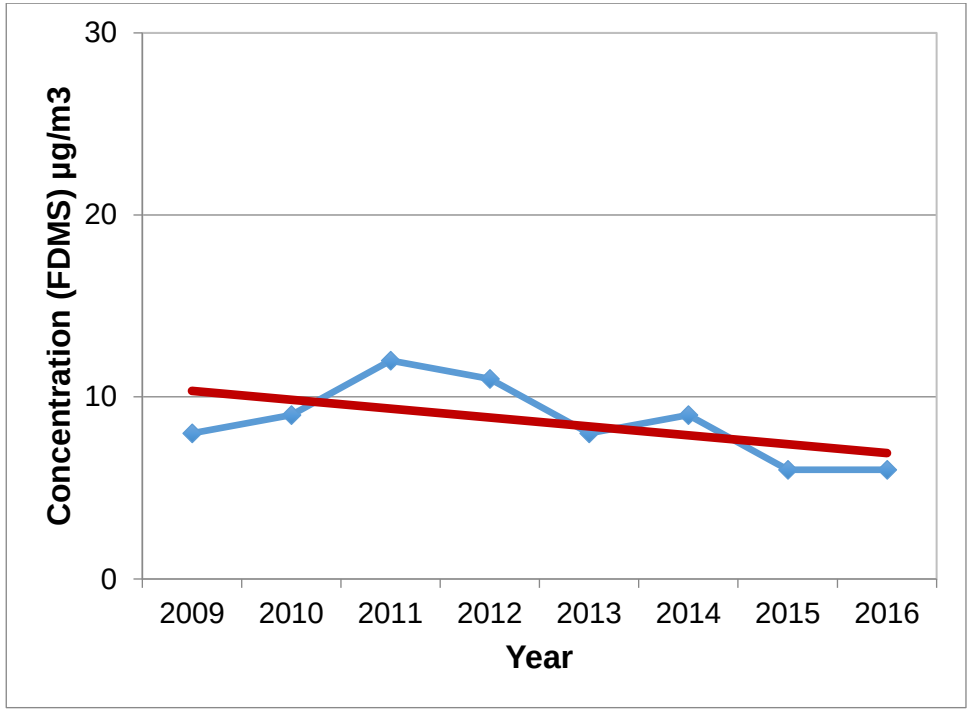


Table A.14 – SO_2 Monitoring Results

Site ID	Site Type	Year	Valid Data Capture [a] (%)	Number of Exceedances (percentile in bracket) [3]		
				15-minute Objective	1-hour Objective	24-hour Objective
ID7	**St Leonard's** Urban Background	2010	92	0	0	0
		2011	98	0	0	0
		2012	98	0	0	0
		2013	97	0	0	0
		2014	73	0	0	0
		2015	97	0	0	0
		2016	95	0	0	0

Notes for Table: (a) Data capture for the full calendar years.

Table A.15 – Number of Ozone exceedances at St Leonard's

St Leonard's Urban Background site	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Data Capture[a] %	98	96	95	96	99	92	98	*72*	98	97
No. of exceedances	**44**	**109**	**12**	0	0	**43**	9	***42***	**14**	**43**

Notes for Table: (a) data capture for the full calendar year
Italic; poor data capture

Table A.16 – PAH (B(a)P) Monitoring at St Leonard's

St Leonard's Urban Background site	2009	2010	2011	2012	2013	2014	2015	2016
Annual Concentration (ngm^{-3})	0.131	0.129	0.099	0.109	0.084	*0.058*	0.073	0.077

Notes for Table: Concentrations shown are not time-weighted
Italic; poor data capture

Appendix B: Full Monthly Diffusion Tube Results for 2016

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

														Annual Mean	
	Site	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Raw	Bias
	code													Data [1]	Adjust.[2]
NORTH WEST															
Glasgow Road 158	**57**	53.7	67.6	61.9	51.1	52.8	42.7	41.5	45.0	60.4	51.9	64.5	46.3	53.3	41.0
Glasgow Road 68/ Facade	**16a**	51.9	47.7	41.7	57.7	49.7	47.2	30.8	45.4	38.1	62.8	51.6	42.1	47.2	36.4
Glasgow Road 68/adj	**16**	66.2	50.1	65.3	64.5	54.5	63.0	41.4	47.4	60.8	69.1	72.0	44.6	58.2	44.8
Glasgow Road Facade/9	**15a**	46.1	M	M	M	M	M	110.2	44.3	48.6	46.7	68.9	23.9	42.3 [a]	32.6
Glasgow Road Newbridge R'about	**58**	73.1	71.5	69.5	58.8	52.8	51.1	66.2	63.4	41.2	65.2	71.9	55.9	61.7	47.5
Glasgow Road Newbridge R'about	**58**	73.3	66.1	77.6	63.6	53.9	55.8	75.6	71.0	22.6	73.5	76.8	77.8	65.6	50.5
Glasgow Road Newbridge R'about/3	**15**	65.8	58.7	54.8	50.5	48.3	43.3	M	53.4	M	69.1	66.5	60.9	57.1	44.0
Glasgow Road/Drumbrae R'about	**56**	40.3	48.5	39.9	37.4	39.1	43.6	31.7	41.2	42.5	47.2	44.8	46.5	41.9	32.3
Glasgow Road/Ratho Station 94	**16b**	52.1	M	M	55.0	36.6	41.4	37.9	36.6	**34.9**	M	M	M	49.5 [a]	38.1
Hamilton Place/Stockbridge Library	**143a**	38.7	40.5	38.1	45.8	39.7	M	33.7	35.8	44.7	48.8	66.9	37.5	42.7	32.9
Hillview Terrace	**41**	28.3	28.2	31.2	27.4	22.3	21.2	14.4	20.2	23.8	28.0	35.1	29.6	25.8	19.9
Inverleith Row/Café Montague	**55c**	35.0	34.8	39.2	47.2	48.4	36.3	21.3	34.8	32.4	52.0	41.6	32.3	37.9	29.2
Inverleith Row/Ferry Road	**55**	59.2	58.8	54.1	53.4	52.3	41.6	55.4	57.3	48.6	54.0	62.8	35.7	52.8	40.6
Inverleith Row/Ferry Road	**55**	46.5	49.6	60.4	56.0	43.4	**<1**	**111.5**	52.8	52.3	58.0	62.8	42.0	52.4	40.3
Queensferry Road 544	**63**	42.4	37.8	40.4	34.9	24.8	18.3	29.9	26.5	28.2	30.8	M	M	31.4	24.2
Queensferry Road 550	**64**	93.9	94.7	113.7	93.9	59.3	74.6	45.4	92.8	84.2	94.4	126.2	83.4	88.0	67.8
Queensferry Road 550F	**64b**	43.6	48.8	53.1	38.5	32.9	22.2	39.0	36.0	38.9	41.4	64.7	26.3	40.5	31.1
Queensferry Road 552	**64a**	39.3	41.8	46.0	44.1	26.7	29.6	33.8	30.6	19.4	34.2	60.0	44.5	37.5	28.9
Queensferry Road 561	**62**	31.9	29.7	27.2	33.4	26.0	30.2	16.2	21.4	19.8	32.0	32.1	18.2	26.5	20.4
Queensferry Road/Hillhouse Road	**40**	43.1	M	48.7	52.0	38.5	44.6	35.5	M	32.7	52.2	51.0	21.7	42.0	32.3
Raeburn Place	**13a**	35.5	40.8	M	M	M	34.6	23.0	**28.3**	M	M	46.4	33.7	33.4 [a]	25.7
Roseburn Terrace	**23**	55.7	46.6	46.3	64.8	52.2	**28.3**	**28.9**	46.9	55.2	M	48.3	48.5	51.6	39.7
St John's Road 131	**1d**	47.9	71.9	66.0	64.0	55.8	39.1	57.9	58.2	59.3	53.6	66.4	63.1	58.6	45.1
St John's Road 131	**SJ3**	48.0	50.7	47.6	55.8	39.4	46.3	34.3	49.4	47.6	50.5	M	45.9	46.9	36.1

	Site code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Mean Raw Data [1]	Annual Mean Bias Adjust.[2]
St John's Road 63	**SJ2**	41.4	M	46.4	47.1	30.8	33.8	21.8	31.2	33.6	50.1	43.4	45.6	38.7	29.8
St John's Road IR	**1b**	42.8	43.8	54.0	59.1	37.0	61.5	30.3	44.5	37.3	55.9	51.7	44.0	46.8	36.1
St John's Road SB	**1**	43.9	45.9	61.9	M	M	60.7	34.9	44.4	45.0	56.2	53.5	38.1	48.5	37.3
St John's Road/Kaimes Road	**SJ1**	52.9	M	38.5	50.2	42.1	37.0	30.3	39.9	43.1	48.6	47.1	50.5	43.7	33.6
St John's Road/Victor Park Terr.	**39**	46.2	**61.9**	58.8	M	45.3	32.1	36.3	43.1	46.1	43.2	61.7	59.8	47.3	36.4
Trinity Crescent	**14**	35.4	33.4	41.2	28.1	26.9	19.1	19.9	26.1	30.0	29.1	41.5	35.9	30.6	23.5
SOUTH WEST															
Angle Park Terrace 25	**76c**	48.2	45.3	M	44.2	34.4	27.9	35.4	30.0	32.4	38.2	49.9	39.7	38.7	29.8
Angle Park Terrace 74 2M East	**76b**	64.9	65.2	82.6	59.9	58.0	56.9	48.3	50.5	45.5	56.3	71.7	27.2	57.3	44.1
Angle Park Terrace/Harrison Road	**76**	58.2	52.4	57.1	49.7	57.5	54.0	37.1	49.6	47.0	78.0	79.5	**7.9**	56.4	43.4
Ardmillan Terrace 22	**76a**	38.4	42.1	36.1	46.7	37.9	41.2	26.5	31.6	33.4	47.9	48.9	44.3	39.6	30.5
Balgreen Rd/Library	**80e**	54.5	58.0	37.3	46.3	33.9	26.1	M	38.2	**<1.0**	48.3	56.8	29.5	42.9	33.0
Calder Road	**4a**	47.3	39.7	57.2	48.3	30.4	31.3	28.7	29.2	M	33.6	39.5	**24.6**	38.5	29.7
Dundee Street/Yeaman Place	**79d**	51.3	56.1	67.5	54.6	54.9	50.7	43.3	55.7	48.3	49.4	44.1	35.8	51.0	39.3
Fountainbridge 103	**79a**	45.9	56.5	48.0	53.2	51.4	46.4	36.8	42.7	42.6	53.6	52.1	37.7	47.2	36.4
Fountainbridge/Tollcross	**79**	50.7	46.3	M	53.9	46.1	44.8	35.7	M	41.8	46.1	56.1	**7.8**	46.8	36.1
Gorgie Road - Delhaigh	**80**	53.1	56.5	41.8	54.4	43.4	55.7	34.6	46.4	47.6	49.1	60.3	M	49.4	38.0
Gorgie Road 549	**80b**	36.4	49.6	35.7	50.3	35.2	41.8	34.8	43.5	35.3	56.5	44.2	M	42.1	32.4
Gorgie Road 8	**18**	53.7	57.8	46.7	54.9	44.5	47.0	37.2	45.8	37.6	53.6	67.9	**3.6**	49.7	38.3
Gorgie Road 87	**80c**	54.7	49.4	M	49.4	43.9	40.8	M	18.6	42.7	49.7	46.6	48.1	44.4	34.2
Gorgie Road/Glen Lea	**80a**	44.8	40.8	43.4	M	29.0	42.3	**<1.0**	34.0	36.8	47.0	47.4	33.5	39.9	30.7
Gorgie Road/Murieston Road	**5**	64.8	71.2	47.6	57.9	M	49.9	44.4	54.7	52.8	56.8	63.2	65.3	57.1	44.0
Henderson Terrace	**76d**	50.4	44.9	51.1	45.1	32.9	32.6	36.6	35.9	40.9	49.3	53.0	M	43.0	33.1
Lanark Road 610	**11**	37.3	33.1	29.6	38.6	26.1	26.9	19.1	22.5	25.9	37.6	35.6	29.4	30.1	23.2
Slateford Road 51	**77a**	61.4	47.3	54.4	44.3	39.0	33.5	33.6	41.7	43.8	52.9	58.8	49.1	46.7	35.9
Slateford Road 93/95	**77b**	56.4	51.0	54.8	40.4	49.9	52.4	37.5	41.4	40.4	59.1	52.6	25.8	46.8	36.0
Slateford Road 97	**77**	57.2	M	58.4	M	44.7	23.5	33.6	40.1	42.6	M	46.1	50.2	44.0	33.9

	Site													Annual Mean	
	code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Raw Data [1]	Bias Adjust.[2]
NORTH EAST															
Bernard Street/opp King Chambers	**29a**	42.2	42.5	48.5	51.0	46.6	M	45.6	50.3	50.6	52.3	65.3	37.2	48.4	37.2
Bernard Street/PS	**29c**	59.8	51.6	60.0	56.2	51.2	31.2	47.3	50.7	52.2	55.2	74.7	57.9	54.0	41.6
Bernard Street/PS	**29c**	67.5	M	57.0	45.8	42.3	25.8	40.6	36.6	40.4	57.8	M	51.4	46.5	35.8
Bernard Street/Sainsburys	**29**	42.4	45.1	49.8	48.2	40.4	37.6	36.1	45.6	40.4	36.2	54.9	40.4	43.1	33.2
Broughton Road	**43**	44.0	49.1	43.5	39.0	38.6	35.0	32.9	32.3	47.5	47.9	62.3	53.6	43.8	33.7
Commercial Street 0pp Job centre	**9d**	41.5	50.4	62.9	70.1	50.6	53.0	43.3	51.9	49.7	68.5	62.9	45.4	54.2	41.7
Commercial Street 88	**9**	32.9	44.3	48.3	52.0	45.6	43.8	28.1	M	36.7	40.8	50.8	34.4	41.6	32.0
Commercial Street/Portland Place	**9a**	52.8	59.0	51.0	58.2	M	39.6	51.5	50.0	54.5	48.1	43.2	60.9	51.7	39.8
Duke Street	**30f**	46.1	65.3	55.3	49.7	35.8	32.9	38.2	44.4	M	53.3	58.7	56.8	48.8	37.6
Easter Road 105/109	**25c**	47.8	54.2	52.1	45.7	28.9	25.1	36.9	35.9	40.1	34.2	65.1	50.1	43.0	33.1
Easter Road 198	**25e**	42.4	**44.3**	41.8	44.1	35.6	29.2	22.0	29.1	35.4	**42.4**	40.7	**43.4**	35.6	27.4
Easter Road/Bothwick	**25d**	47.5	46.2	37.1	49.7	41.8	39.7	29.8	37.2	36.4	48.8	44.5	44.2	41.9	32.3
Easter Road/CH shop	**25**	M	M	60.1	**1.4**	58.0	50.2	41.7	M	M	M	55.0	M	59.4 [a]	45.7
Easter Road/Rossie Place	**25b**	M	48.0	55.6	43.8	45.3	41.9	M	36.6	34.1	M	53.8	45.9	45.0	34.7
Ferry Road/ 6 Bowhill Terrace	**53**	59.4	51.7	40.5	43.6	40.0	30.7	38.3	42.8	46.3	39.7	50.7	48.7	44.4	34.2
Ferry Road/North Junction Street	**45d**	43.2	M	41.9	48.0	37.0	30.7	42.8	38.6	39.3	43.2	61.4	47.5	43.1	33.2
Great Junction Street 137	**30b**	43.7	52.0	40.2	46.8	31.9	26.8	42.4	40.4	50.4	43.1	54.9	38.8	42.6	32.8
Great Junction Street 14	**30c**	51.5	47.4	M	62.3	47.8	56.8	34.9	53.5	M	63.7	53.1	**5.4**	52.3	40.3
Great Junction Street/CG Pirrie St	**30e**	45.2	M	M	40.1	37.2	44.8	M	43.5	M	54.4	M	47.5	44.2 [a]	34.0
Great Junction Street/FV	**30**	54.5	52.6	55.9	57.3	56.2	70.9	M	42.1	46.9	66.9	56.4	42.4	54.7	42.1
Great Junction Street/WC opp 137	**30d**	43	45.1	45.2	54.4	40.5	44.9	29.8	35.7	40.7	50.0	40.2	44.4	42.8	33.0
Leith Walk/Brunswick Road	**21**	45.7	58.8	50.6	M	61.1	M	43.1	47.0	M	52.5	62.7	49.2	52.3	40.3
Leith Walk/McDonald Road	**20**	45.4	61.3	61.0	55.1	51.5	M	43.7	58.1	47.5	42.0	56.4	45.3	51.6	39.7
London Road/Cadzow Place	**66**	37.9	**49.8**	42.2	**49.2**	**42.0**	**38.6**	30.9	39.7	34.9	50.1	57.4	M	40.9 [a]	31.5
London Road/Earlston Place	**67**	55.4	43.8	58.9	62.0	50.8	52.6	48.3	59.8	42.6	54.8	55.4	47.2	52.6	40.5
London Road/East Norton Place	**81**	84.8	62.4	66.6	63.9	41.2	49.3	59.1	M	100.1	81.8	127.6	M	73.7	56.7
London Road/junct Easter Road	**46**	M	59.0	59.5	55.4	48.3	43.7	43.4	49.6	34.9	46.5	67.0	54.3	51.1	39.3
London Road/Parson's Green Ter	**68**	36.8	45.9	44.4	M	31.3	32.7	38.2	43.5	38.3	46.8	M	42.8	40.1	30.9

	Site code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Mean Raw Data [1]	Annual Mean Bias Adjust.[2]
London Road/Wolseley Place	**69**	57.9	48.2	53.0	49.7	M	34.5	46.6	44.7	52.1	56.3	61.7	42.3	49.7	38.3
London Road/Wolseley Terrace	**70**	66.5	48.2	52.6	45.5	42.2	32.8	51.5	48.6	51.8	53.3	53.9	76.0	51.9	40.0
Niddrie Mains Road 28	**32**	46.9	46.1	45.4	37.1	31.9	28.0	35.6	28.1	36.8	42.0	M	35.5	37.6	28.9
North Junction St nr 4	**9c**	46.6	43.6	49.1	48.3	33.3	M	32.6	M	37.8	38.0	58.1	47.2	43.5	33.5
Portobello High Street W 185	**71**	49.8	60.6	**40.5**	34.7	M	M	**31.9**	36.9	43.9	36.0	M	49.2	40.8 [a]	31.4
Portobello Rd facade Ramsay Inst	**73d**	53.8	44.1	55.5	44.8	37.9	36.4	40.2	45.4	53.0	42.1	62.2	52.3	47.3	36.4
Salamander Street/Baltic Street	**51c**	50.2	45.4	36.2	38.2	30.2	22.9	33.7	35.0	42.5	40.7	63.3	45.3	40.3	31.0
Seafield Road East 10	**72**	46.6	44.3	50.3	56.1	51.3	45.1	28.8	40.4	23.5	57.6	49.2	25.2	43.2	33.3
SOUTH EAST															
Broughton Street	**44**	50.1	38.4	44.6	M	42.3	**41.2**	29.7	38.3	48.2	44.3	M	49.6	42.8	33.0
Bruntsfield Place 210	**6a**	39.9	37.1	47.0	42.7	M	31.6	32.4	38.1	36.3	55.0	55.9	**<1.0**	41.6	32.0
Clerk Street 15	**138**	49.2	51.6	48.9	54.8	36.1	37.8	50.0	50.3	48.9	46.3	72.5	61.9	50.7	39.0
Cowgate/ 50 St Mary's Street	**48f**	57.8	41.6	57.7	53.8	41.2	50.0	**<1.0**	52.1	28.8	50.1	66.4	41.3	49.2	37.9
Cowgate/Blackfriars	**48c**	48.3	65.8	54.6	46.1	42.5	39.5	49.4	56.0	M	50.2	69.1	46.2	51.6	39.7
Cowgate/Blair Street	**48a**	45.8	39.7	56.2	63.5	50.8	53.6	31.2	M	M	M	56.8	39.3	48.5	37.4
Cowgate/Guthrie Street	**48**	50.2	45.4	53.7	53.9	32.5	41.8	39.9	M	68.4	50.5	56.5	46.3	49.0	37.7
Cowgatehead 2	**48e**	56.7	49.8	M	62.4	46.2	**46.3**	39.9	53.5	M	M	M	49.8	52.6 [a]	40.5
Drum Street	**150**	49.2	39.2	42.6	43.1	**37.8**	34.8	29.3	32.5	26.5	42.0	37.2	36.5	37.5	28.9
George Street 112	**74f**	40.1	48.7	44.7	34.7	36.6	31.6	29.9	27.4	M	45.4	49.9	51.2	40.0	30.8
Grassmarket 41	**37a**	108.5	M	M	61.9	M	41.9	49.4	53.9	64.7	57.0	101.0	M	70.2 [a]	54.1
Grassmarket 41	**37a**	57.7	M	53.6	54.5	M	52.5	44.0	67.8	82.9	90.9	110.6	M	68.3	52.6
Grassmarket 75	**37b**	46.8	48.6	49.6	51.6	49.8	44.4	37.1	51.6	44.2	55.7	44.4	48.4	47.7	36.7
Grassmarket/nrThomsons Court	**37c**	35.7	36.2	41.0	43.7	33.4	35.7	28.0	34.9	29.2	37.1	43.9	41.9	36.7	28.3
Gt Stuart Street 9	**75e**	36.1	38.3	24.6	29.1	26.4	20.5	23.7	27.2	31.0	33.0	40.1	39.7	30.8	23.7
Haymarket Terrace North side	**HT1**	44.4	49.5	M	65.9	**51.5**	58.9	39.3	55.7	M	65.0	64.1	52.5	55.0	42.4
Haymarket Terrace South side	**HT2**	63.6	55.1	47.4	66.3	61.6	64.2	50.0	53.9	66.8	70.7	75.6	48.5	60.3	46.4
Home Street/Tollcross	**10**	46.4	53.2	55.7	56.8	48.0	44.3	41.6	48.5	45.7	46.7	52.4	42.9	48.5	37.4
Hope Park Terrace/Clerk Street	**140**	73.1	M	46.5	50.1	47.6	41.3	36.9	45.9	44.4	43.4	**<1.0**	**91.1**	47.7	36.7
Hope Park Terrace/VS	**17a**	47.3	47.7	45.2	56.5	44.3	42.4	30.7	45.2	40.1	44.4	50.3	41.9	44.7	34.4

	Site													Annual Mean	
	code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Raw Data [1]	Bias Adjust.[2]
Howden Hall Road 79	**149a**	42.0	48.5	55.7	40.9	39.9	40.9	33.6	40.3	M	45.8	47.9	38.6	43.1	33.2
India Street	**34**	30.2	30.9	20.4	28.5	24.4	19.8	15.9	23.3	19.2	35.9	39.8	32.5	26.7	20.6
Leith Street News Room Pub	**74g**	62.9	60.7	85.0	79.6	72.3	83.6	55.4	79.2	78.1	102.6	82.6	69.1	75.9	58.5
Melville Drive	**38**	44.3	37.2	42.5	36.0	23.7	18.1	35.2	36.7	M	31.6	47.0	**<1.0**	35.2	27.1
Midmar Drive	**42**	30.1	23.0	27.0	20.0	15.0	16.4	**8.2**	18.4	15.5	22.0	32.9	20.1	21.9	16.8
Morningside Road	**8**	41.0	M	38.7	39.7	28.0	30.0	23.3	24.8	33.3	38.1	39.1	38.7	34.1	26.2
Morrison Street	**49**	45.7	54.3	52.6	63.3	50.8	50.1	44.7	54.0	44.9	65.1	70.2	54.3	54.2	41.7
Nicholson Street 69	**135**	55.6	64.8	63.2	63.4	43.8	48.2	M	66.8	52.9	54.7	78.1	70.1	60.1	46.3
Nicholson Street 92	**136**	61.6	46.5	56.2	58.2	48.4	**20.1**	36.4	51.7	38.7	M	51.2	39.1	48.8	37.6
North Bridge South	**27**	54.6	59.1	78.2	89.0	89.0	84.7	50.1	65.1	M	69.9	72.8	44.1	68.8	53.0
Princes Street (Eastbound)	**47**	49.1	55.5	51.1	64.3	57.4	59.4	43.9	52.3	35.3	56.4	57.6	53.8	53.0	40.8
Princes Street/Mound	**24**	73.5	95.5	M	64.6	66.8	53.8	M	74.9	M	81.7	82.3	69.1	73.6	56.7
Queen Street/Hanover Street	**33**	57.1	53.8	59.3	51.0	50.2	42.9	42.0	45.3	56.1	49.3	55.2	50.2	51.0	39.3
Shandwick Place Hostel	**SH1**	46.7	M	M	M	63.3	74.2	18.9	44.7	53.4	16.1	65.6	39.0	46.9	36.1
South Bridge 59	**144**	57.5	54.7	103.4	71.4	61.4	53.9	**47.4**	M	52.7	62.7	68.6	61.6	64.8	49.9
South Clerk Street 41a	**142**	45.1	50.1	46.8	55.3	49.2	M	38.3	44.4	47.9	56.3	48.0	44.4	47.8	36.8
South Clerk Street 84	**141**	73.2	45.8	49.0	55.9	M	32.7	38.0	41.8	M	47.2	61.1	25.9	47.1	36.2
St Colme Street/4	**75d**	M	39.4	47.6	44.4	37.4	43.1	22.3	36.0	28.6	39.3	38.8	32.5	37.2	28.7
Torphichen Place 1	**3b**	57.3	64.7	47.7	62.5	50.7	55.3	50.1	50.4	56.9	71.3	69.1	44.4	56.7	43.7
Torphichen Place	**3**	64.5	66.5	M	103.1	55.5	44.1	59.1	65.8	59.6	64.3	85.4	40.7	64.4	49.6
West Maitland St/Palmerston Pl	**2**	63.9	84.9	61.8	81.9	69.4	58.1	61.3	62.1	65.2	73.8	85.5	78.3	70.5	54.3
West Port 42	**28d**	74.2	69.9	M	73.7	M	57.0	M	68.7	60.1	57.4	77.2	56.0	66.0	50.8
West Port 62	**28b**	M	53.7	M	M	M	65.6	58.8	92.5	M	82.4	M	55.0	76.5 [a]	58.9
West Port Opp 50	**28c**	74.6	76.8	54.1	57.5	M	**<1.0**	42.8	55.0	46.5	**55.1**	54.3	46.6	56.5	43.5
York Place	**36**	M	49.5	49.4	54.2	45.9	38.7	36.7	43.0	34.4	**<1.0**	46.1	38.7	43.7	33.6

Notes for Table; **M** – Tube missing on collection.
Data in **red and bold** – problematic data removed from the data set e.g. tube upside down or squint on collection.
[1] Raw data annualised ([a]) where data capture below 75%. See details in Appendix C.
[2] See Appendix C for details on bias adjustment factor.

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

C1 Nitrogen Dioxide (NO_2) Diffusion Tube Bias Adjustment Factors

Edinburgh Scientific Services supply and analyse the passive diffusion tubes. The tubes are made of acrylic and the laboratory uses 50% v/v Triethanolamine (TEA) in acetone for the adsorbent; the grids are dipped into this solution and allowed to dry before insertion into the tube. The tubes are exposed for 4 or 5 week periods, in accordance with the recommended calendar supplied by DEFRA. The method has remained unchanged during the monitoring periods.

The annual mean data from the historical local co-location studies always show that passive diffusion samplers over read the real-time analysers by average factors from 0.74 to 0.91. See Tables C1a and C1b.

Between 2011 and 2015 the bias was calculated using a combination of local factors and the factors contained in the National Bias Database, with sites which are also analysed by Edinburgh Scientific Services. This followed a step change in the bias factor in 2011. A manual approximate orthogonal regression calculation was undertaken to combine the bias factors. The procedure for this calculation was updated with the revised technical guidance in 2016.

Table C1a Historical bias data used in previous reports 2001 - 2007

Site	Type	2001	2002	2003	2004	2005	2006	2007	2008
Currie	Suburban	N/A	N/A	N/A	0.91	N/A	N/A	N/A	N/A
Gorgie	Roadside	N/A	N/A	N/A	N/A	0.86	N/A	0.91	0.94
Haymarket	Roadside	0.93	N/A	N/A	0.88	0.93	0.91	0.92	0.87
Leith Walk	Roadside	0.89	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Queen St	Roadside	0.91	0.91	0.91	0.90	0.84	0.83	0.85	0.81
Roseburn	Roadside	N/A	N/A	N/A	N/A	0.92	N/A	N/A	0.91
St John's Rd.	Kerbside	N/A	N/A	N/A	N/A	N/A	N/A	0.93	0.86
Mean		**0.91**	**0.91**	**0.91**	**0.89**	**0.89**	**0.87**	**0.90**	**0.88**

(Table continued overleaf)

Table C1b Historical bias data used in previous reports 2007 - 2015

Site	Type	2009	2010	2011	2012	2013	2014	2015
Glasgow Road	Roadside	N/A	N/A	N/A	N/A	0.64	0.67	0.6
Gorgie	Roadside	N/A	N/A	0.87	0.86	0.87	0.85	0.86
Haymarket	Roadside	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Queensferry Rd	Roadside	N/A	N/A	0.66	0.71	0.71	0.69	0.66
Queen Street	Roadside	0.83	0.84	0.69	0.65	0.7	0.64	0.7
Salamander St	Roadside	N/A	0.79	0.77	0.80	0.78	0.77	0.8
Roseburn	Roadside	0.82	0.85	N/A	N/A	N/A	N/A	N/A
St. John's Rd.	Kerbside	0.92	0.92	0.79	0.74	0.77	0.82	0.94
Mean		**0.86**	**0.85**	0.76	0.75	0.75	0.73	0.74
Combined Mean[1]				**0.81**	**0.76**	**0.75**	**0.74**	**0.76**

Edinburgh co-locates triplicate tubes on the sampler head cages of each roadside and kerbside monitoring station. Data from five sites were considered for the co-location study 2016. The details and factors are shown in Table C2. Generally, the passive diffusion tubes give higher concentrations than the real-time analysers over an annual period.

Table C2 Bias Factors 2016 Data

Site	Type	Analyser Mean [2]	DC [3] (%) Analyser	PDT [4] Mean	PDT* Precision	Periods	Bias Factor A	Bias B (%)
Glasgow Road	Roadside	28	99	41	9	12	0.69	46
Gorgie Road	Roadside	33	100	40	7	12	0.83	20
Queensferry Rd	Roadside	43	97	65	9	9	0.67	50
Salamander St	Roadside	26	96	35	7	11	0.76	31
St John's Road	Kerbside	54	97	64	9	12	0.83	20

In 2016 the overall precision of triplicate tubes was good. So too was the overall data capture, except at Queensferry Road. Usual checks were carried out with respect to the automated and passive diffusion tube data to assess the reliability of the bias factor. Edinburgh Scientific Services laboratory scored satisfactory in the AIR/WASP NO_2 proficiency testing scheme throughout the year.

[1] An approximate orthogonal regression calculation was undertaken with the National Bias database data.
[2] Concentrations match sampling period not calendar year.
[3] Data Capture (for periods used).
[4] PDT – Passive Diffusion Tube.

An annual mean bias factor of 0.75 from the local co-location studies was calculated as per Table C3 – Mean Local Bias.

Table C3 Calculation of Local and Combined Bias Factors

Local Bias	**Bias A**	**Bias B**	**Calculation**	**Bias**
Glasgow Road	0.69	46		
Gorgie Road	0.83	20		
Queensferry Road	0.67	50		
Salamander Street	0.76	31		
St John's Road	0.83	20		
Mean Local Bias		**33.4**	0.334+1 = 1.334	
			1/1.334 =	**0.75**
National Bias				
Marylebone Road	0.87	15.5		
Mean Combined Bias		**30.4**	0.304+1 = 1.304	
			1/1.304 =	**0.77**

At the time of writing there was one other study (Marylebone Intercomparison) available on the National Diffusion Tube Bias Adjustment Factor Spreadsheet, for Edinburgh Scientific Services (0.87). This study, from a kerbside site (like the Edinburgh studies), also uses the same tube preparation method as the local studies. The overall precision was good.

In keeping with the methodology of combining the local studies with those available on the national database since 2011, a manual approximate orthogonal regression calculation was undertaken which resulted in a bias adjustment factor of **0.77**. Details of the calculation are also shown in Table C3. This combined factor was chosen as the most appropriate factor to use with 2016 data as it represents the worse-case situation.

C2 QA/QC of Automatic Monitoring

All monitoring stations are subject to an independent audit and stringent QA/QC procedures which are undertaken by Ricardo on behalf of DEFRA and the Scottish Government. This agreement commenced in 2007 (2013 for Currie). Nevertheless, all data, including calibration data, is scrutinised daily by City of Edinburgh Council officers (Monday to Friday) by visual examination, to see if they contained unusual measurements. Any data which was suspicious (e.g. large spikes) is flagged to undergo further checks.

Staff competence

Officers are trained as local site operators in relation to the management of the stations and undertake the necessary calibrations and basic maintenance. Shadow training is carried out during 6-monthly audits.

Calibration procedures

The three ML 9841 B NO_x analysers (located at Queen Street, Glasgow Road and Salamander Street) perform an auto-calibration each day with zero air and NO gas. Warning limits are set at +/- 5 % on the software program.

All other sites including those listed above are visited fortnightly, apart from the National Network site AURN which is visited monthly, and manual calibration checks are carried out using certified NO gas at approximately 500ppb plus a zero check. All cylinders are replaced at 12 - 18 month intervals. Nitric Oxide cylinders were supplied by Air Liquide UK prior to September 2012 and thereafter, by BOC.

Details of manual calibration checks and precision and accuracy of instruments can be made available on request.

Servicing

All instruments are serviced and recalibrated every six months by the appropriate supplier. The service contracts include a support package for software and replacement parts, plus any necessary call outs to the sites.

The TEOM heads on the automatic PM_{10} units are cleaned monthly and filters are changed regularly - approximately every 2 weeks.

During all visits to the monitoring stations, actions taken and activities noted adjacent to the site are recorded in the site log book.

C3 QA/QC of NO_2 Diffusion Tube Monitoring

Sampling staff at Scientific Services Laboratory, City of Edinburgh Council are trained to fulfil the requirements associated with passive diffusion tube samplers. The tubes are also supplied and analysed by the laboratory. It is UKAS accredited for this task and participates in the independent AIR-PT scheme, operated by LGC Standards and supported by the Health and Safety Laboratory, with yearly assessment against agreed performance criteria. AIR-PT combines two long running

PT schemes: LGC Standards STACKS PT scheme and HSL Workplace Analysis Scheme for Proficiency (WASP). The lab's performance was rated as being satisfactory over the rolling five rounds prior to the end of 2016.

NO_2 diffusion tube monitoring is conducted in accordance with the quality requirements contained in the UK NO_2 Survey Instruction Manual for local/unitary authorities and Technical Guidance LAQM.TG (16). The kerbside diffusion tubes are located within 1 metre of the kerb edge, roadside locations are greater than 1 metre from the road edge or at the façade of residential property. The tubes are attached to sign posts / lampposts using plastic spacer holders at a height of approximately 2m above ground level.

Three diffusion tubes from each monthly batch are used as blanks. These tubes are not exposed and are stored in a refrigerator during the exposure period. They are analysed along with the appropriate batch of exposed tubes. The purpose of blanks is to determine whether NO_2 contamination occurred during tube preparation.

All passive diffusion tube monitoring data shown in this report has been corrected for diffusion tube bias in accordance with LAQM TG (16). The monthly exposed passive diffusion tubes in Edinburgh generally over-read real-time analysers. Pre-2011 this was by a factor range of 0.85 to 0.91, which were derived from local co-location studies. There was then a step change in the studies and results have since ranged from 0.74 to 0.81. In 2016 the bias adjustment factor is 0.77.

C4 Short-term to Long-term Data adjustment for NO_2

Data from Currie and Bush Estate (Midlothian) monitoring sites was used to estimate annual nitrogen dioxide concentrations from short term measurements. The data capture for all these sites was within acceptable limits for the purpose. The Bush Estate is part of national Automatic Urban and Rural Network (AURN) and located within the required distance to Edinburgh.

Automatic Monitoring

There was six months of data collected at Queen Street and eight months at St Leonard's in 2016. Therefore, a calculation is undertaken to estimate the annual concentrations as detailed in the subsequent tables.

ID1 – Queen Street				
Measured Mean Value (M) = 26.3				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	6.41	7.14	0.898
Currie	Suburban	6.98	7.88	0.886
			Average Ratio (R)	0.892
Adjusted Mean (M x R) = 23.5				

ID7 – St Leonard's				
Measured Mean Value (M) = 20.1				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	6.41	5.50	1.165
Currie	Suburban	6.98	6.01	1.161
			Average Ratio (R)	1.163
Adjusted Mean (M x R) = 23.4				

Non-Automatic Monitoring (Passive Diffusion Tubes)

Where passive diffusion tubes have less than 75% data capture for the annual period, the same annualisation calculation is undertaken. See tables overleaf for details.

Note; annual mean concentrations from the automatic sites varies as timings/dates are coordinated to the relevant passive diffusion tube exposure dates.

PDT 13a				
Measured Mean Value (M) = 35.7				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	6.41	6.877	0.933
Currie	Suburban	6.98	7.45	0.937
			Average Ratio (R)	0.935
Adjusted Mean (M x R) = 33.4				

PDT 15a				
Measured Mean Value (M) = 46.4				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	6.41	7.07	0.907
Currie	Suburban	6.98	7.62	0.916
			Average Ratio (R)	0.912
Adjusted Mean (M x R) = 42.3				

PDT 16b				
Measured Mean Value (M) = 43.3				
Site	**Site Type**	**Annual Mean (AM) µg/m³**	**Period Mean (PM) µg/m³**	**Ratio AM/PM**
Bush	Rural background	6.41	5.49	1.168
Currie	Suburban	6.98	6.24	1.119
			Average Ratio (R)	1.143
Adjusted Mean (M x R) = 49.5				

PDT 25				
Measured Mean Value (M) = 53.0				
Site	**Site Type**	**Annual Mean (AM) µg/m³**	**Period Mean (PM) µg/m³**	**Ratio AM/PM**
Bush	Rural background	6.41	5.73	1.119
Currie	Suburban	6.98	6.22	1.122
			Average Ratio (R)	1.121
Adjusted Mean (M x R) = 59.4				

PDT 28b				
Measured Mean Value (M) = 68.0				
Site	**Site Type**	**Annual Mean (AM) µg/m³**	**Period Mean (PM) µg/m³**	**Ratio AM/PM**
Bush	Rural background	6.41	5.67	1.131
Currie	Suburban	6.98	6.24	1.119
			Average Ratio (R)	1.125
Adjusted Mean (M x R) = 76.5				

PDT 30e				
Measured Mean Value (M) = 44.7				
Site	**Site Type**	**Annual Mean (AM) µg/m³**	**Period Mean (PM) µg/m³**	**Ratio AM/PM**
Bush	Rural background	6.41	6.30	1.017
Currie	Suburban	6.98	7.28	0.959
			Average Ratio (R)	0.988
Adjusted Mean (M x R) = 44.2				

PDT 37a				
Measured Mean Value (M) = 67.3				
Site	**Site Type**	**Annual Mean (AM) µg/m³**	**Period Mean (PM) µg/m³**	**Ratio AM/PM**
Bush	Rural background	6.41	6.12	1.047
Currie	Suburban	6.98	6.72	1.039
			Average Ratio (R)	1.043
Adjusted Mean (M x R) = 70.2				

PDT 48e				
Measured Mean Value (M) = 51.2				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	6.41	6.13	1.046
Currie	Suburban	6.98	6.91	1.010
			Average Ratio (R)	1.028
Adjusted Mean (M x R) = 52.6				

PDT 66				
Measured Mean Value (M) = 41.9				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	6.41	6.56	0.977
Currie	Suburban	6.98	7.15	0.976
			Average Ratio (R)	0.977
Adjusted Mean (M x R) = 40.9				

PDT 71				
Measured Mean Value (M) = 44.4				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	6.41	7.02	0.913
Currie	Suburban	6.98	7.53	0.927
			Average Ratio (R)	0.920
Adjusted Mean (M x R) = 40.8				

Appendix D: Nitrogen Dioxide Fall Off with Distance Calculations

Non-automatic (Passive Diffusion Tube) Data

SITE NO.	1	2	4a	5	9a	9c	11	14	15	16	23
Step 1 How far from kerb was measurement made (m)	0.5	0.5	12.0	0.3	1.5	2.7	1.5	2.0	4.0	1.8	0.2
Step 2 How far from kerb is receptor in metres (m)	2.3	5.7	17.0	5.2	5.4	4.7	5.2	6.0	7.8	6.2	2.5
Step 3 Local background concentration of NO_2	15.1	26.4	20.0	20.2	16.6	16.6	11.9	14.3	20.4	18.0	18.7
Step 4 Annual mean bias corrected value	37.3	54.3	29.7	44.0	39.8	33.5	23.2	23.5	44.0	44.8	39.7
Result; Predicted annual mean at receptor	**31.5**	**42.3**	**28.3**	**33.0**	**33.2**	**31.1**	**20.1**	**21.1**	**39.6**	**37.2**	**31.9**

SITE NO.	24	32	36	38	39	47	49	53	55c	56	57
Step 1 How far from kerb was measurement made (m)	1.0	2.6	5.5	2.8	1.6	9.0	2.2	4.6	4.3	2.6	3.6
Step 2 How far from kerb is receptor in metres (m)	11.2	7.3	8.2	12.8	5.8	2.5	4.6	6.2	5.3	7.2	12.1
Step 3 Local background concentration of NO_2	25.1	11.8	21.3	17.3	15.4	25.1	26.4	14.3	14.8	15.4	14.4
Step 4 Annual mean bias corrected value	56.7	28.9	33.6	27.1	36.4	40.8	41.7	34.2	29.2	32.3	41.0
Result; Predicted annual mean at receptor	**41.3**	**24.5**	**32.1**	**23.3**	**30.4**	**48.1**	**39.0**	**32.5**	**28.3**	**28.0**	**32.2**

SITE NO.	58	58	64	140	SJ1	SJ2	SJ3	HT2	Automatic Data ID9
Step 1 How far from kerb was measurement made (m)	2.8	2.8	1.5	1.3	0.3	0.4	1.2	0.5	1.7
Step 2 How far from kerb is receptor in metres (m)	8.0	8.0	10.7	4.8	2.5	9.5	15.6	2.3	8.2
Step 3 Local background concentration of NO_2	20.4	20.4	12.4	17.7	15.1	15.1	15.1	18.7	12.4
Step 4 Annual mean bias corrected value	47.5	50.5	67.8	36.7	33.6	29.8	36.1	46.4	42.0
Result; Predicted annual mean at receptor	**40.3**	**42.5**	**43.9**	**31.4**	**27.1**	**21.8**	**24.7**	**39.0**	**31.5**

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

1 Action Plan for Area Designated 31st December 2000 (July 2003).

2 Newbridge Air Quality Improvement Study CH2m-Hill (March 2014).

3 Newbridge roundabout – vehicle delay report following installation of MOVA CH2MHill (July 2016).

4 The City of Edinburgh Council – Trial Findings (Masternaut Ltd) (2011).

5 Air Quality Action Plan Progress with Actions 2015 (August 2015).

6 Detailed Assessment of Particles for City of Edinburgh Council (June 2016).

7 Air Quality Monitoring: Determination of Ambient Suspended Particulate Fraction (PM_{10}) at Gogarburn Poultry Farm, Edinburgh SEPA 2016.

8 Investigations of concentrations and ratios of $PM_{2.5}$ and PM_{10} across Scotland to help inform potential changes to Air Quality Strategy Objectives and local Air Quality Management Ricardo Energy and Environment Report for the Scottish Government (2016).

9 Annual Progress Report, City of Edinburgh Council (2016).