THE CITY OF EDINBURGH COUNCIL

2015 Updating and Screening Assessment for City of Edinburgh Council

In fulfillment of Part IV of the
Environment Act 1995
Local Air Quality Management

August 2015

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Executive Summary

This report fulfils the requirements of the Local Air Quality Management (LAQM) process as set out in Part IV of the Environment Act 1995 and the National Air Quality Strategy 2007. The report has been completed in accordance with Technical Guidance (LAQM, TG09) document, produced by DEFRA and the Devolved Administrations.

Nitrogen Dioxide: Data for calendar year 2014 shows that there are no new breaches of the relevant standards beyond the boundaries of the existing and planned amended Air Quality Management Areas (AQMAs). This is the first year of recorded monitoring where there is no identified need to take forward additional Detailed Assessments for the pollutant and consequently no requirement for extending or declaring additional AQMAs.

A number of monitoring locations within each of the Air Quality Management Areas (AQMAs) continue to exceed the annual mean air quality objective except at Inverleith Row. The AQMAs remain valid. Consistent with previous years, a number of monitoring locations within the AQMA boundaries also meet the objectives. The city's AQMAs are designed to support the Council and its partners implement a combination of local and strategic management measures appropriate for dynamic, high-volume urban traffic environments; consequently their boundaries, including any approved amendments or extensions, will be maintained until sufficient and consistent evidence is available to support any potential contraction.

Exceedences of the annual mean objective also continue to be evidenced within the location of previously-proposed extensions to the Central AQMA. Although the 2014 monitoring in these areas (South Bridge / Nicolson Street corridor and Ardmillan / Slateford Road) suggests an improving picture, the continuing exceedences mean it remains valid for the relevant AQMA amendment Orders (as described in the 2014 Progress Report and approved by City of Edinburgh Council) - to be taken forward.

A single monitoring location outwith the AQMAs exceeds the annual mean objective, at Queensferry Road (ID64). This passive diffusion tube site has previously been identified as anomalous when compared with adjacent monitoring data (including automatic data). Supplementary monitoring commenced January 2015, to provide

further insight into localised circumstances, and to check whether concentrations at the residential facade do comply with the standards. See map on page 142.

The automatic monitoring station (AQMS) on St John's Road at Clermiston Road junction, recorded one breach of the short term one hour NO_2 objective. This is the second consecutive year the site has been in compliance. If the trend is sustainable then the NO_2 hourly mean AQMA could be revoked, but the NO_2 annual mean AQMA would remain in force. This assessment is based on an updated report received from Ricardo-AEA at the end of July 2015 due to errors in their data verification process.

Analysis of passive diffusion tube data suggests that no other sites exceeded the hourly mean objective for NO_2 in 2014. A potential breach is observed however at West Port (ID 28b) where an annual mean of 56ug/m^3 was recorded. This, along with the other PDT sites, is being kept under close review.

Particulate Matter (PM_{10}): Data from all monitoring locations in 2014 meet the UK National Objectives. Data from the St Leonard's urban background site and Currie suburban site readily meet the Scottish Government annual mean objective of 18µg/m^3, while roadside sites at Queen Street and Glasgow Road marginally meet it.

The draft Low Emission Strategy for Scotland, published for consultation by Scottish Government in January 2015, proposes to amend the annual mean objective for PM_{10} to 20µg/m^3 to correspond with World Health Organisation standards.

Monitoring data from Queensferry Road AQMS shows continuing exceedence of the existing Scottish objective, but it is anticipated that the proposed new objective will be met. Data from the Salamander Street AQMS shows continuing exceedence of the existing Scottish PM^{10} objective and of the proposed new objective. The data trend suggests the site will meet the proposed revised objective, in line with similar trends in Edinburgh and other locations Scotland. This will influence how matters at Salamander Street are best addressed. The Council intends to describe its proposals for relevant action here and elsewhere in Edinburgh in the outcomes of its city-wide Detailed Assessment for PM_{10}, to be completed following formal release of the amended standards by Scottish Government.

Trend Analysis: The 2014 data shows a general downward pattern of both NO_2 and PM_{10} pollutants at the majority of monitoring locations in the City.

Traffic flows are normalising after completion of the Edinburgh Trams construction project. Changes and enhancements to the entire transport system across Edinburgh are continuing and it is anticipated that these will continue to deliver an effective and efficient network, address congestion and encourage multi-mode integration. Many of the planned changes are substantial and will take time to evolve and fully settle in. It will therefore necessitate some time to pass before a sufficient degree of confidence can be attributed to air quality trend analysis.

Sources: A number of significant changes that may impact on local air quality are noted since the last round of Review and Assessment, namely:

- introduction of a new 20mph speed limit across large parts of the city's road network;
- proposed major residential development in Midlothian, adjacent to Edinburgh's southern boundary, with potential for significant additional transport demand into the city;
- installation of a number of large-scale Combined Heat and Power (CHP) plants within in the city centre.

Table of contents

Appendices

Abbreviations

AQMA – Air Quality Management Area

CHP – Combined Heat and Power

DEFRA – Department for Environment, Food and Rural Affairs

LAQM – Local Air Quality Management

NO_2 – Nitrogen Dioxide

PM_{10} – Particulate Matter (10microgrammes in diameter)

SEPA – Scottish Environmental Protection Agency

SEStran – South East Scotland Transport Partnership

PPC – Pollution and Prevention Control

List of Tables

List of Figures

1 Introduction

1.1 Description of Local Authority Area

Edinburgh is the capital city of Scotland and the seat of the Scottish Parliament. It is the second largest city in Scotland and the seventh most populous in the United Kingdom. Located in the south east of Scotland's central belt it is bounded by the Firth of Forth to the North and the Pentlands Hills to the South. The latter ranges 20 miles in length and includes farming and recreational land. The peripheral areas of the city to the West and South West are predominately semi-rural. The city is a financial, commercial and tourist centre and attracts over one million visitors annually.

Edinburgh's population grew by nearly 28,000 between the 2001 Census and the 2011 Census – an increase of 6.2%, to 476,600. In terms of absolute numbers this was the largest increase of any local authority area in Scotland. Although there has been a substantial growth in population, the Census has shown that this has not been as fast as previously thought. This means that future population estimates and projections will need to be recalibrated to reflect the detailed and comprehensive information now available. The revised population figure for the city could have a number of implications for future land use allocations.

Edinburgh has a large proportion of households living in flats (64%), compared to the Scottish average (37%). This means that the city is relatively compact and high density, where residents are mostly within easy reach of jobs, shops and services - which in turn encourages sustainable travel modes including walking, cycling and public transport.

Many of Edinburgh's main streets and the major radial routes into the city are narrow, with tenement buildings four to five storeys high on either side of the roadway, forming many street canyons. In many instances, the distances from the edge of the road to the façade of residential properties can be as little as two metres.

The majority of tenement properties are located in the central and northern areas of the city. There has also been substantial growth of additional residential flats in these locations mostly as a result of the re-development of former industrial land. The

southern and western peripheral areas of the city consist predominantly of detached and semi-detached housing.

As a major employment centre, Edinburgh attracts a substantial amount of road and rail commuter traffic. The City has one of the highest levels of sustainable travel to work in the country and the highest proportion travelling by bus of any major UK City (26%) (Census, 2011) The proportion of people in Edinburgh utilising 'active' travel modes to get to work is the highest in Scotland (23%, including 5% by cycling) The converse of high public transport and active transport usage is lower levels of car use However, with significant new housing development in surrounding local authority areas, increased car use and journeys into Edinburgh have been generated as a result.

The main UK East Coast rail line is routed through the city centre and there are further rail links to Glasgow, Fife and the major population centres to the north.

Smoke Control Orders cover the entire City of Edinburgh Council area and significant improvements in air quality have been achieved since their introduction, especially due to use of natural gas in the domestic and commercial sectors.

The major cause of poor air quality in parts of Edinburgh, as with many urban environments, is associated with road traffic.

1.2 Purpose of Report

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedences are considered likely, the local authority must then 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.

The objective of this Updating and Screening Assessment is to identify any matters that have changed which may lead to risk of an air quality objective being exceeded. A checklist approach and screening tools are used to identify significant new sources or changes and whether there is a need for a Detailed Assessment. The U&SA

report should provide an update of any outstanding information requested previously in Review and Assessment reports.

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM **in Scotland** are set out in the Air Quality (Scotland) Regulations 2000 (Scottish SI 2000 No 97), the Air Quality (Scotland) Amendment Regulations 2002 (Scottish SI 2002 No 297), and are shown in Table 1.1. This table shows the objectives in units of micrograms per cubic metre µg/m^3 (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

Table 1.1 Air Quality Objectives included in Regulations for the purpose of LAQM in Scotland

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 µg/m^3	Running annual mean	31.12.2003
	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	0.5 µg/m^3	Annual mean	31.12.2004
	0.25 µg/m^3	Annual mean	31.12.2008
Nitrogen dioxide	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
Particles (PM_{10}) (gravimetric)	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
Sulphur dioxide	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

1.4 Summary of Previous Review and Assessments

The UK Review and Assessment process of Local Air Quality Management (LAQM) commenced in 1997.

A summary of the City of Edinburgh's findings and description of the five AQMAs are detailed in Tables 1.2 and 1.3. Maps of the boundaries of the AQMAs are presented in Figures 1.1 to 1.5.

Table 1.2 Summary of previous Review and Assessments

Round / Report		Date	Outcome
1	**Review & Assessment of Air Quality Stage 1&2**	1998	Potential exceedences of NO_2 and PM_{10}
1	**City of Edinburgh Council Review Stage 3**	2000	Exceedences of NO_2 annual mean objective. Attributed to traffic emissions AQMA declared for City Centre
1	**Review & Assessment of Air Quality Stage 4**	2002	Source apportionment identified that buses were the major contributors of NO_2
2	**Air Quality Action Plan**	2003	Key actions; cleaner vehicles HGVs and buses, congestion charging, tram network.
2	**Updating & Screening Assessment Phase 2**	2003	Detailed Assessment required city-wide for PM_{10} due to high background concentrations and tightening of air quality objectives for Scotland. Detailed Assessment for NO_2 at St John's Road.
2	**Detailed Assessment Report**	2004	Partisol co-location study with TEOM gave local gravimetric conversion factor of 1.14 AQMA not required for PM_{10} using 1.14. AQMA required for NO_2 at St John's Road.
2	**Progress Report**	2005	Potential exceedences of NO_2 at West Port and Great Junction Street Four locations in Central AQMA likely to fail EU limit value – West Maitland St, Torphichen Pl, Princes St and Roseburn Terrace. Concerns were raised with respect to density of development in city centre and North Edinburgh Waterfront.
3	**Updating & Screening**	2006	Exceedences of NO_2 within Central AQMA & St John's Road

Round / Report		Date	Outcome
	Assessment Report		AQMA declared for St John's Rd 31.12.2006
3	**Detailed Assessment for Nitrogen Dioxide at Great Junction St and West Port**	2007	AQMA required for NO_2 at Gt. Junction Street and West Port. West Port also likely to not meet hourly NO_2 objective. Council to explore various options to extend existing Central AQMA to cover both areas or West Port. Declare two separate AQMAs. Preferred option to extend Central AQMA.
3	**Air Quality Progress Report.**	2008	NO_2 exceedences within AQMAs. Number of locations also did not meet hourly mean objective. Based on 2007 data predictions EU limit values are likely to be exceeded within AQMAs. Exceedences of NO_2 at Bernard St, Commercial St, Ferry Rd, Easter Rd, London Rd, Hope Park Terrace, Glasgow Rd. Detailed Assessment required. City-wide Detailed Assessment required for PM_{10} due to exceedences of Scottish Air Quality Objectives using 1.14 local gravimetric factor. AQMA declared for Gt. Junction. Central AQMA amended to include West Port and exceedences of hourly mean NO_2 objective. St John's Rd AQMA amended to include exceedence of hourly mean NO_2
3	**Air Quality Action Plan**	2008	Revised, Congestion charge removed as an action. Include St John's Road AQMA
4	**Updating and Screening Assessment**	2009	NO_2 exceedences within AQMAs. Existing AQMAs remain valid. NO_2 annual exceedences noted at Glasgow Rd, Easter Rd, London Rd, Bernard St, Grassmarket, Cowgate, Queensferry Rd/ Barnton and Hillhouse Rd. Potential exceedences of NO_2 at Hope Park Terrace, Broughton Rd and Commercial Street. City-wide Detailed Assessment for PM_{10} required, which will address the four biomass installations and poultry farm complex at Gogarburn. Most congested main roads in city centre are likely to exceed Scottish annual objective for PM_{10} based on monitoring

Round / Report		Date	Outcome
			at Queen Street, Haymarket and DMRB modelling.
4	**Progress Report**	2010	NO_2 exceedences within all 3 AQMAs. AQMAs remain valid. Exceedences of NO_2 at, Portobello High St, Inverleith Row, Bernard Street, Glasgow Road, Easter Road, London Road, Queensferry Road, Grassmarket. Potential exceedences at, Broughton Rd, Commercial St, Hope Park Terrace, Cowgate, Hillhouse Road.
4	**Further Assessment:** **St John's Road** **West Port (extension of Central AQMA)** **Great Junction Street**	2011	NO_2 exceedence within 3 AQMAs, which remain valid. Source apportionment –Within local vehicle fleet, buses contribute the greatest percentage of the measured NO_2 at St John's Rd and Gt. Junction St, whilst at West Port the greatest contribution is attributed to cars. % Range of roadside NO_X reduction required to meet NO_2 Annual Mean Objective using both UK and Scottish (SG) background maps. Gt. Junction St UK 40.7% SG 49.9% St John's Rd UK 70.6% SG 76.8% West Port UK 74.9% SG 86.4%
4	**Progress Report**	2011	NO_2 exceedences in all 3 AQMAs. Existing AQMAs remain valid.NO_2 exceedences outwith existing AQMAs – London Road, Easter Road, Grassmarket, Cowgate, Bernard Street, Hope Park Terrace, Queensferry Road, Glasgow Road, Inverleith Row, Hillhouse Road Angle Park Terrace, Slateford Road, Fountainbridge / Tollcross and Gorgie Road / Delhaig.NO_2 potential exceedences identified at Broughton Road, Ferry Road, Commercial Street, Salamander Street/Bath St and Portobello High St. NO_2 Detailed Assessment work being progressed at Queensferry Road, Portobello, Inverleith Row and required for Hope Park Terrace / Clerk Street junction, Hillhouse

Round / Report		Date	Outcome
			Road, Slateford Road, Fountainbridge / Tollcross and Angle Park Terrace Extend Central AQMA and & Great Junction St AQMA for exceedences of NO_2 Declare Glasgow Road/Newbridge for exceedences of NO_2
5	**Updating and Screening Assessment**	2012	NO_2 exceedences in all 4 AQMAs. Existing AQMAs remain valid. Exceedences in proposed new Glasgow Road AQMA and extensions to existing Central and Great Junction Street AQMAs. Other exceedences at Inverleith Row, Queensferry Road, Portobello Road and Angle Park Terrace. Potential exceedences of NO_2 identified at Slateford Road, Fountainbridge/Tollcross, Hope Park Terrace, Hillhouse Road, Salamander Street/Baltic, Salamander Street/Bath Road and Ferry Road. Ongoing Detailed Assessment work at Hope Park Terrace/Clerk Street, Hillhouse Road, Slateford Road, Fountainbridge/Tollcross and Angle Park Terrace. Progress with declaration of Glasgow Road AQMA and extensions of Central and Great Junction Street AQMAs. Declare AQMA at Inverleith Row for exceedences of annual mean objective for NO_2
5	**Progress Report**	2013	**NO_2** exceedences in all 5 AQMAs. Existing AQMAs remain valid. Exceedences outwith AQMAs at Queensferry Road, Angle Park Terrace, Slateford Road, Nicolson Street and South Clerk Street. Potential exceedences of NO_2 identified at Broughton Road, Queensferry Road, Hope Park Terrace, Ferry Road, Salamander Street and Fountainbridge. Detailed Assessment work in relation to Clerk Street & Angle Park Terrace not concluded due to complications originating from temporary traffic management arrangements. Ongoing Detailed Assessment at Portobello Road & Fountainbridge. Further Assessment work being progressed with regards to the declared AQMAs at

Round / Report		Date	Outcome
			Inverleith Row/Ferry Road junction and Glasgow Road; and the extension to the Central and Great Junction Street AQMAs. Exceedences of the PM_{10} annual and 24hr mean objectives.
	Further Assessment	2013	Further Assessment work completed with regards to the declared AQMAs at Inverleith Row/Ferry Road junction and Glasgow Road; and the extension to the Central and Great Junction Street AQMAs. Source apportionment studies identified buses having a marginal role in Cowgate and Grassmarket to having the largest impacts at London Road, Gorgie/Chesser and Inverleith Row. Cars were shown to have a significant impact in all areas and LGVs showed the least. The required reduction in NO_x emissions from local roads to attain the annual mean nitrogen dioxide Air Quality Objective were defined as follows; Central AQMA: ►Cowgate 17% ►Easter Road 26.5% ►Gorgie Road/Chesser 12.3% ►Grassmarket 24.7% ►London Road 30.4% Great Junction Street AQMA: ►Bernard Street 21.3% Glasgow Road/Ratho Station AQMA: ►Newbridge junction 43.3% ►Ratho Station 35% Inverleith Row/Ferry Road junction AQMA: ►Inverleith Row 28.1%
5	**Progress Report**	2014	Exceedences of NO_2 objective in all 5 AQMAs. Existing AQMAs remain valid. Exceedences outwith AQMAs at Angle Park Terrace, Dundee Street, Nicolson Street, Queensferry Road, South Bridge, South Clerk Street, and Slateford Road. Potential exceedences of NO_2 identified at Balgreen Road, Broughton Road, Clerk Street,

Round / Report	Date	Outcome
		Fountainbridge, Hope Park Terrace, Portobello Road and Queensferry Road/Hillhouse Road. Detailed Assessment work in relation to Clerk Street & Angle Park Terrace areas concluded. Central AQMA to be extended to include these areas. Other Detailed Assessment work at Portobello Road & Fountainbridge found that AQMAs are not required as there are no exceedences of the objective. Exceedences of the PM_{10} annual and 24hr mean objectives. Detailed Assessment on-going.

Table 1.3 Descriptions of AQMAs

Description AQMA / Declaration (Date)	Pollutant / Source	Amendments
Central AQMA **31/12/2000** Includes area of City Centre and main arterial routes leading into the city centre. Exceedences 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	**NO_2** **Traffic**	**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*** *To be extended* to include Angle Park Terrace and Clerk Street/Nicolson

Description AQMA / Declaration (Date)	Pollutant / Source	Amendments
Port.		Street areas
St John's Road **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.	**NO_2** **Traffic**	**09/03/2009** Amended to cover hourly breach as well as annual breach of NO_2.
Great Junction Street **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.	**NO_2** **Traffic**	**26/04/2013** Extended to include Bernard Street, Commercial Street and North Junction Street.
Glasgow Road **26/04/2013** Part length of A8, between Newbridge Roundabout and Ratho Station, to the depth of the building facades.	**NO_2** **Traffic**	
Inverleith Row **26/04/2013** The road comprising the junction of Inverleith Row and Ferry Road, to the depth of building facades.	**NO_2** **Traffic**	

Figure 1.1 Map of Central AQMA Boundaries including draft extension (2015)

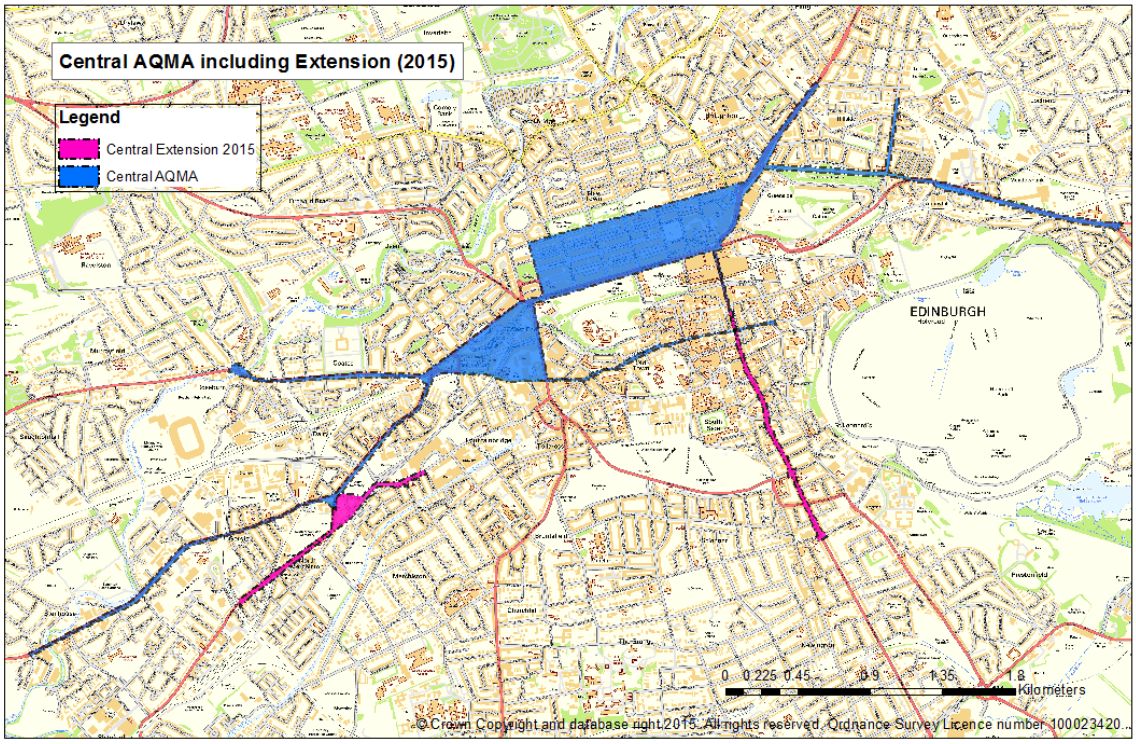


Figure 1.2 Map of St John's Road AQMA Boundaries

Figure 1.3 Map of Great Junction Street AQMA Boundaries

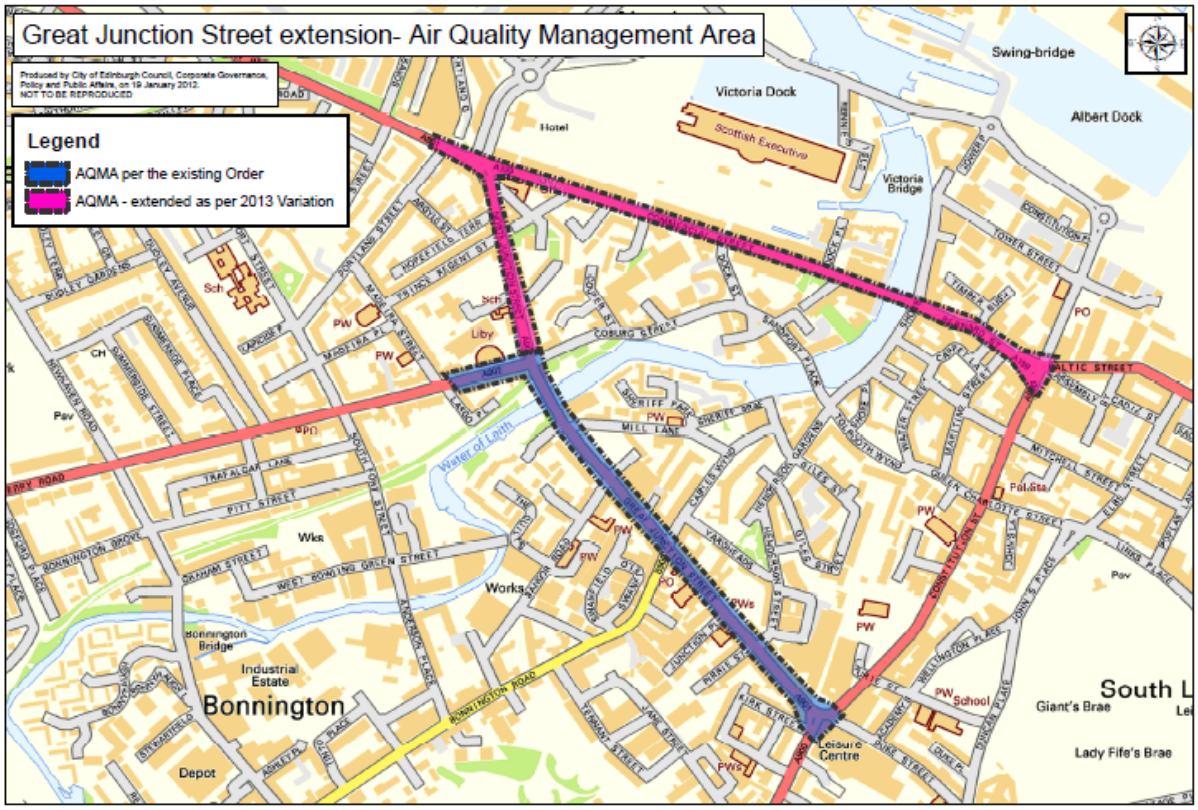


Figure 1.4 Map of Glasgow Road AQMA Boundaries

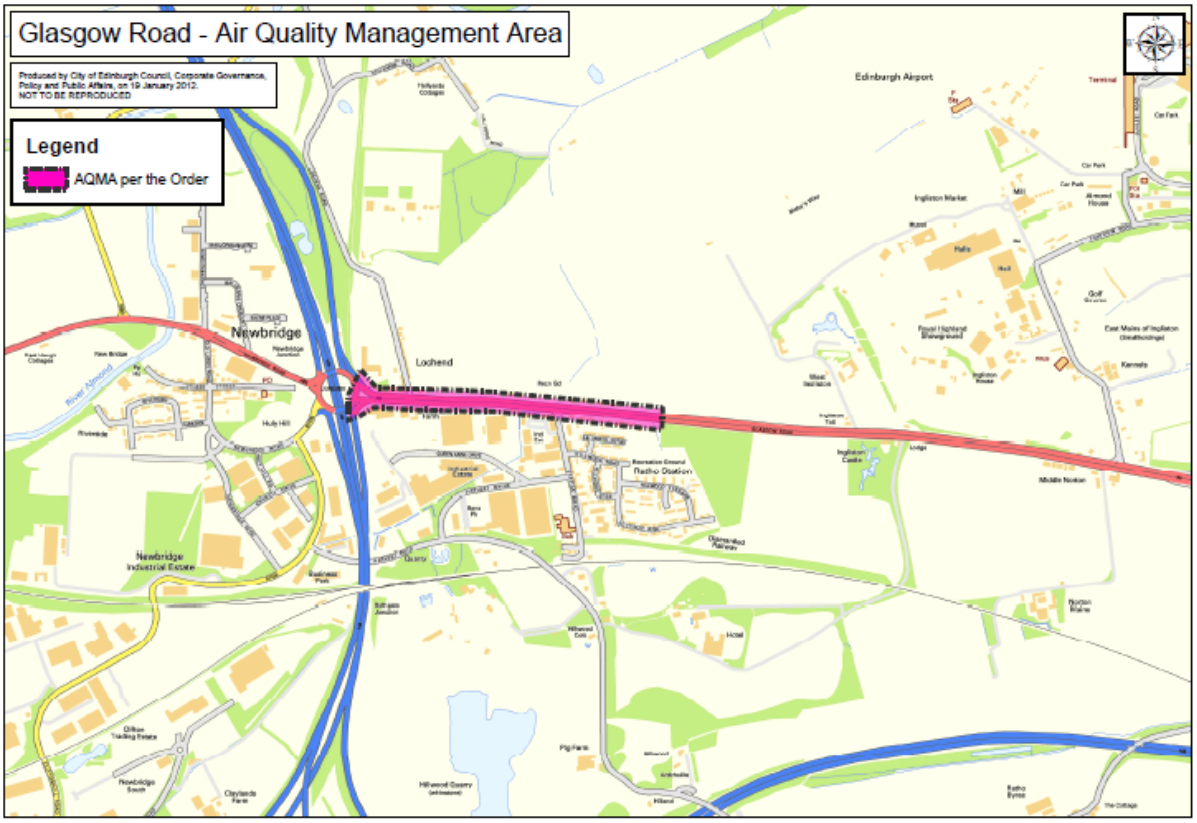
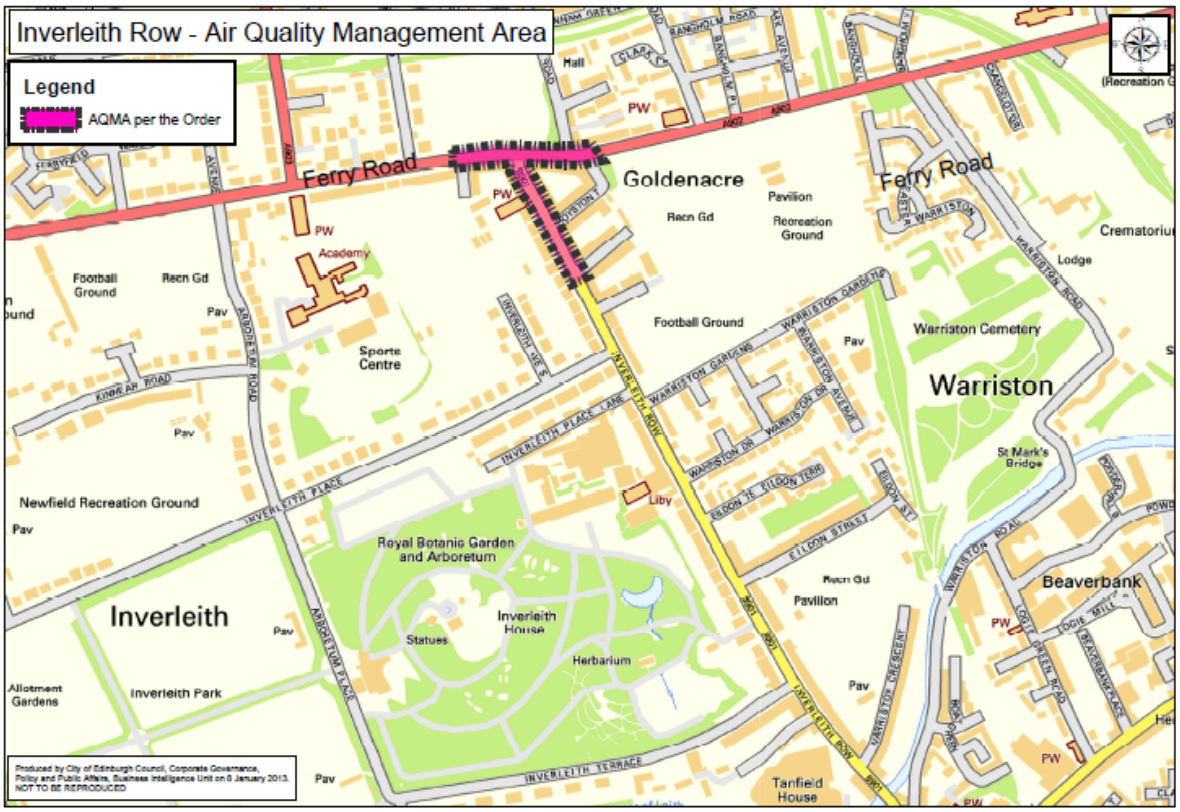


Figure 1.5 Map of Inverleith Row AQMA Boundaries



Developments since Progress Report 2014

Nitrogen Dioxide

Our Progress Report 2014 concluded that it was necessary to extend the Central AQMA to include exceedences at Angle Park Terrace, Dundee Street, Nicolson Street, South Bridge, South Clerk Street, and Slateford Road. The Council is currently progressing a Legal Order to this effect, with an expectation of it coming into effect in autumn 2015. Figure 1.1 (above) shows the proposed extension in relationship to the exiting Central AQMA.

Additional monitoring was established in 2015 at a number of sites in the periphery of the city, including Gilmerton (Drum Street) and Howden Hall Road junction on the A701 arterial road, both in the south of the city, as well as at Duke Street in Leith. Further monitoring commenced at Queensferry Road at the facade of a residential property, concurrent with the existing roadside passive diffusion tube site, where exceedences have been recorded.

Particulate Matter PM_{10}

A draft Low Emission Strategy for Scotland, published by Scottish Government for consultation in January 2015 proposes to amend the annual mean objective for PM_{10} from 18 to 20µg/m^3, which is in line with World Health Organisation standards.

The Local Authority is continuing to progress a city-wide Detailed Assessment for this pollutant and will necessarily take account of these planned changes. Salamander Street however continues to require ongoing review, with monitored concentrations there being above both the existing and proposed standard. A modelling study commissioned by the Council and supported by grant funding from the Scottish Government has provided recommendations regarding the extent of an AQMA boundary to account for fugitive and road sources.

The Detailed Assessment for Particulate Matter PM_{10} will be concluded and published separately in 2015 or early in 2016 when Scottish Government publish the PM standards.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Edinburgh has eight operating automatic monitoring stations currently collecting data. One of the stations at St Leonards is part of the UK Automated Urban and Rural National Network (AURN). This station underwent refurbishment between September and December 2014. Data could not be collected during this period. All other automatic stations were operational throughout 2014.

Details and descriptions of the automatic monitoring stations, including historical locations which are provided for completeness of information, are shown in Figure 2.1 and Tables 2.1 and 2.1a.

QA/QC procedures on the automated monitoring sites are shown in Appendix A.

Figure 2.1 Map of Automatic Monitoring Sites

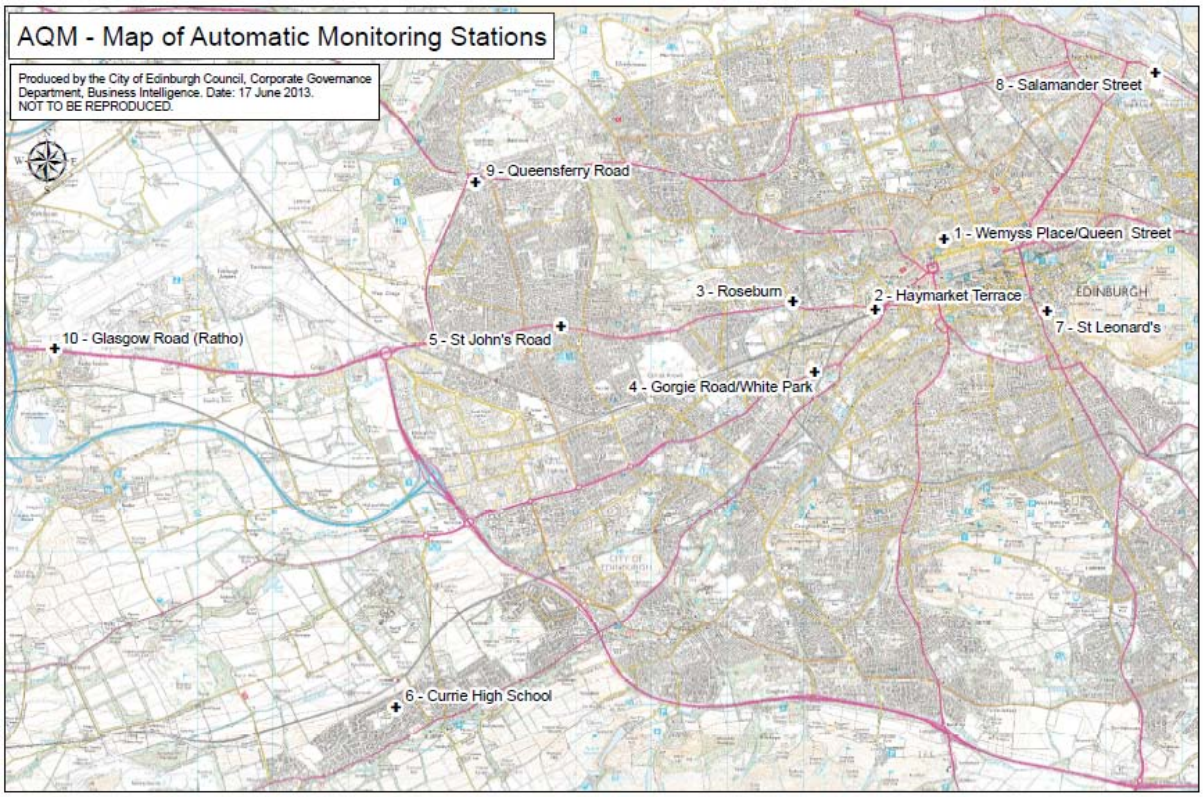


Table 2.1 Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref.	Y OS Grid Ref.	Inlet Height (m)	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
ID1	**Queen Street**	Roadside	324826	674078	2.87	NO_2 PM_{10}	Yes	Chemilum TEOM	Y (façade)	5.2m	Y
ID2	**Haymarket**[1]	Roadside	323896	673197	N/A	NO_2 PM_{10}	Yes	Chemilum TEOM	Y (7m)	9.2m	N
ID3	**Roseburn**[1]	Roadside	322939	673233	n/a	NO_2 PM_{10}	Yes	Chemilum TEOM	Y (4.9m)	7.6m	N
ID4	**Gorgie Road**	Roadside	323121	672314	2.63	NO_2	Yes	Chemilum	Y (façade)	2.5m	Y
ID5	**St. John's Road**	Kerbside	320101	672907	1.98	NO_2	Yes	Chemilum	Y (1.35m)	0.5m	Y
ID6	**Currie High School**	Suburban	317595	667909	3.59 3.24	NO_2 PM_{10}	No	Chemilum TEOM	Y (rear of school)	N/A	N/A

Continued overleaf/...

Site ID	Site Name	Site Type	X OS Grid Ref.	Y OS Grid Ref.	Inlet Height (m)	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
ID7	**St. Leonards**	Urban Back-ground (AURN)	326265	673129	3.4m – 3.2m – 3.1m – 3.4m – 3.4m – 3.4m – 3.4m –	NO_2 PM_{10} $PM_{2.5}$ O_3 CO SO_2 PAH	No	Chemilum FDMS FDMS UV absorp IR absorp UV absorp Digitalsamp	Y (29.0m)	35m	N/A
ID8	**Salamander Street**	Roadside	327615	676333	2.86	NO_2 PM_{10}	No	Chemilum TEOM	Y (façade)[2]	2.13m	Y
ID9	**Queensferry Road**	Roadside	318736	674930	2.96	NO_2 PM_{10}	No	Chemilum TEOM/FDMS	Y (6.5m)	1.7m	Y
ID10	**Glasgow Road**	Roadside	313103	672663	2.84	NO_2 PM_{10}	Yes	Chemilum TEOM	Y (facade) [2]	6m	Y

[1] Historic monitoring location

[2] Adjacent residential properties comparable distance from roadside as the monitoring station

Table 2.1a 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.

2.1.2 Non-Automatic Monitoring Sites

There is an extensive network of more than 150 passive diffusion tube (PDT) samplers located across the city to monitor nitrogen dioxide. These are within and outwith the AQMAs. Many locations are in street canyons where tenement-style residential properties are within 2 to 3 metres of the road edge. The PDTs are sited at the building facades of residential properties, where possible. Details are tabulated into six different geographical areas of the city (Table 2.2). Maps illustrating the network across the city are shown in Appendix B.

To ensure no additional areas of concerns are appearing in the city additional monitoring sites were identified at a number of city centre locations namely; St Leonard's Street (ID28e), St Mary's Street (ID48f), Torphichen Place (ID3b), Leith Street (ID74g) and Bruntsfield Place (ID6a). Locations outside the city centre were also identified including two sites in Kirkliston (ID146 & ID146a), Corstorphine High Street (ID145), Commercial Street (ID9d) and further monitoring within the Glasgow Road AQMA (ID16b & ID15a). Monitoring commenced at these sites at the beginning of 2014. Three new sites were also identified along St John's Road. A number of sampling sites were relocated due to poor data collection and/or identification of more suitable sites. These included Grassmarket (ID37), Torphichen Street (ID3), North Junction Street (ID9c) and Angle Park Terrace (ID76b).

In 2014, PDT monitoring was reduced at four sites where concentrations are not of concern i.e Telford Road (ID40a), Marischall Place (ID40e), Piersfield Terrace (ID82) and Portobello High Street (ID73b), and at other sites where data capture rates have been repeatedly poor: George Street (ID74e), Nicolson Street (ID137) and Cowgate (ID48b) Duplicate sampling at West Maitland Street (ID2) was reduced to one PDT.

Quality Control and Quality Assurance (QA/QC) work associated with the PDT method of monitoring is contained in the following Appendices:

- A1 Nitrogen Dioxide (NO_2) PDT bias adjustment factors
- A2 NO_2 Bias Adjustment Factor from Local Co-location studies
- A3 Discussion of Choice of Factor to use
- A5 Short-term to Long-Term data adjustment for NO_2
- A7 QA/QC of PDT monitoring.

All PDTs are fixed at a height of approximately two metres.

Table 2.2 Details of Non-Automatic Monitoring Sites

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In AQMA ?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (m) (N/A if not applicable)	Worst-case Locat-ion?
	NORTH							
29	**Bernard Street/CA**	Roadside	327148	676507	Yes	Y façade	2.2	Y
29a	**Bernard Street/Kings Chambers**	Roadside	327137	676529	Yes	Y façade	2.1	Y
29b	**Bernard Street 32**	Roadside	327192	676513	Yes	Y façade	2.2	Y
29c	**Bernard Street/PS**	Roadside	327135	676515	Yes	Y façade	2.1	Y
9d	**Commercial Street** [i]	Roadside	326477	676759	Yes	Y façade	2.6	Y
9	**Commercial Street 88**	Roadside	326879	676626	Yes	Y façade	2.6	Y
9a	**Commercial St/Portland Place**	Roadside	326430	676754	Yes	Y (3.90)	1.47	Y
52	**Ferry Road 268**	Roadside	324946	676070	No	Y (4.6)	1.65	Y
53	**Ferry Road/Bowhill Terrace 6**	Roadside	324726	676004	Yes	Y (1.57)	1.75 +2.85 [ii]	Y
45b	**Ferry Road/Maderia Street**	Roadside	326359	676420	No	Y façade	7.5	Y
45	**Ferry Road/North Fort Street**	Roadside	326136	676361	No	Y façade	3.7	Y
45d	**Ferry Road/North Junction Street**	Roadside	326503	674436	Yes	Y façade	3.1	Y
30b	**Great Junction Street 137**	Roadside	326740	676138	Yes	Y façade	2.9	Y
30c	**Great Junction Street 14**	Roadside	326925	675949	Yes	Y façade	2.8	Y
30d	**Great Junction Street/WC**	Roadside	326757	676144	Yes	Y façade	2.8	Y
30e	**Great Junction Street/CG**	Roadside	326845	676015	Yes	Y façade	2.7	Y
30	**Great Junction Street/FV**	Roadside	326884	675997	Yes	Y façade	2.8	Y
55	**Inverleith Row/Ferry Road**	Roadside	324638	675993	Yes	Y façade	4.65	Y
55c	**Inverleith Row/Montague**	Roadside	324686	675941	Yes	Y (1.06)	2.28 + 2.0[ii]	Y
9c	**North Junction Street** [iii]	Roadside	326448	676710	Yes	Y (2.05)	2.65	Y
9b	**Ocean Drive/Leith**	Roadside	326455	676805	No	Y façade	4.2	Y

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In AQMA ?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (m) (N/A if not applicable)	Worst-case Locat-ion?
51c	**Salamander Street/Baltic Street**	Roadside	327476	676418	No	Y façade	2.25	Y
51b	**Salamander Street/Bath Road**	Roadside	327665	676331	No	Y façade	1.8	Y
14	**Trinity Crescent**	Roadside	324896	676991	No	Y (4.0)	2.0	Y
	EAST							
19	**Baileyfield Road**	Background	329997	674274	No	N	18	Y
31	**Dalkeith Road 187**	Roadside	327231	671782	No	Y (4.9)	1.8	Y
25	**Easter Road/CH Shop**	Roadside	326934	674503	Yes	Y façade	2.3	Y
25b	**Easter Road/Rossie Place**	Roadside	326950	674624	Yes	Y façade	3.3	Y
25c	**Easter Road 105/109**	Roadside	326958	674770	Yes	Y façade	3.25	Y
25d	**Easter Road/Bothwick**	Roadside	326974	674780	Yes	Y façade	2.8	Y
25e	**Easter Road 198**	Roadside	326999	674940	Yes	Y façade	3.95	Y
25f	**Easter Road 271**	Roadside	327010	675149	No	Y façade	2.8	Y
25g	**Easter Road 327**	Roadside	327071	675467	No	Y façade	3.0	Y
46b	**London Road/Brunton Place**	Roadside	326779	674487	Yes	Y facade	6.9 + 2[ii]	Y
81	**London Rd/East Norton Place**	Roadside	326980	674446	Yes	Y façade	2.5	Y
67	**London Road/Earlston Place**	Roadside	327190	674433	Yes	Y façade	2.7	Y
68	**Parsons Green Terrace**	Roadside	328049	674174	Yes	Y façade	2.7	Y
69	**London Road/Wolseley Place**	Roadside	328272	674143	Yes	Y façade	2.62	Y
70	**London Road/Wolseley Terrace**	Roadside	328337	674129	Yes	Y façade	4.6	Y
66	**London Road/Cadzow Place**	Roadside	327468	674362	Yes	Y façade	2.04 + 2.0[ii]	Y
46	**London Road/Easter Road**	Roadside	326944	674472	Yes	Y façade	5.6	Y
32	**Niddrie Mains Road 28**	Kerbside	328889	671649	No	Y (4.7)	0.2 + 2.4[ii]	Y
71	**Portobello High Street 185**	Roadside	330533	673850	No	Y façade	3.0	Y
73a	**Portobello Road/Ramsay 1**	Roadside	329923	674389	No	Y (1.98)	2.8	Y
73d	**Portobello Road/Ramsay F**	Roadside	329917	674388	No	Y façade	3.7	Y

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In AQMA ?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (m) (N/A if not applicable)	Worst-case Locat-ion?
73e	**Portobello Road/Ramsay 2**	Roadside	329885	674384	No	Y (2)	2.5	Y
73f	**Portobello Road /College Court**	Roadside	329848	674371	No	Y façade	10.3	Y
73g	**Portobello Road/Inchview Terr**	Roadside	329839	674697	No	Y (8.4)	4.5	Y
72	**Seafield Road East 10**	Roadside	329993	674457	No	Y façade	4.5	Y
72a	**Seafield Road East 7**	Roadside	330001	674444	No	Y façade	8.5	Y
	CITY CENTRE NORTH							
43	**Broughton Road**	Roadside	325513	675134	No	Y façade	2.0	Y
44	**Broughton Street**	Roadside	325855	674527	No	Y façade	4.5	Y
13	**Deanhaugh Street**	Kerbside	324603	674555	No	Y (5.1)	0.6 + 2.1[ii]	Y
35	**Dundas Street**	Kerbside	325243	674400	No	Y (7.3)	0.3 + 2.1[ii]	Y
74f	**George Street 112**	Roadside	324880	673891	Yes	Y façade	6.8	Y
75b	**Great Stuart Street 7** [iv]	Roadside	324488	673978	No	Y (6.1)	2.5	Y
75f	**Great Stuart Street 14**	Roadside	324487	673936	No	Y facade	7.2 + 2.4[ii]	Y
75e	**Great Stuart Street 9**	Roadside	324476	673967	No	Y facade	7.25 +2.1[ii]	Y
143	**Hamilton Place 72**	Roadside	324734	674683	No	Y facade	4.6m	Y
143a	**Hamilton Place Library**	Roadside	324699	674651	No	Y play area	2.1m	Y
34	**India Street**	Background	324790	674341	No	N	0.4 + 2.1[ii]	N
55b	**Inverleith Row/Summer Place**	Roadside	325052	675217	No	Y façade	6.1	Y
74g	**Leith Street 35** [i]	Roadside	325945	674095	Yes	Y façade	3.65	Y
21	**Leith Walk/Brunswick Road**	Roadside	326386	674872	Yes	Y (3.4)	1.16	Y
20	**Leith Walk/McDonald Road**	Kerbside	326361	674882	Yes	Y façade	5.6	Y
47	**Princes Street (Eastbound)**	Roadside	325049	673791	Yes	Y (6.5)	9.0	Y
24	**Princes Street/Mound**	Kerbside	325397	673869	Yes	Y (10.2)	1.0	Y
33	**Queen Street/Hanover Street**	Roadside	325362	674205	Yes	Y (4.25)	2.2 + 2.0 [ii]	Y
75a	**St Colme Street**	Kerbside	324624	674012	No	Y (5.1)	0.6	Y

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In AQMA ?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (m) (N/A if not applicable)	Worst-case Locat-ion?
75d	**St Colme Street 4**	Roadside	324646	674025	No	Y facade	6.2	Y
36	**York Place**	Roadside	325828	674362	Yes	Y (2.7)	5.5	Y
	CITY CENTRE SOUTH							
6a	**Bruntsfield Place 210** [i]	Roadside	324495	672035	No	Y façade	2.8	Y
138	**Clerk Street 15**	Roadside	326229	672287	No	Y façade	2.35 +2 [ii]	Y
48	**Cowgate/Guthrie Street**	Roadside	325881	673471	Yes	Y façade	4.5	Y
48a	**Cowgate/Blair Street**	Roadside	325929	673490	Yes	Y façade	3.2	Y
48f	**Cowgate/50 St Mary's Street** [i]	Roadside	326198	673587	No	Y façade	2.6	Y
48c	**Cowgate Blackfriars**	Roadside	326047	673519	Yes	Y façade	2.4	Y
48e	**Cowgatehead 2**	Roadside	325537	673405	Yes	Y façade	1.9	Y
79d	**Dundee Street/Yeaman Place**	Roadside	323926	672550	No	Y façade	2.3	Y
79a	**Fountainbridge 103**	Roadside	324731	672984	No	Y façade	2.2	Y
79b	**Fountainbridge/Grove Street**	Roadside	324438	672859	No	Y façade	2.2	Y
79	**Fountainbridge/Tollcross**	Roadside	324682	672939	No	Y façade	3.3	Y
37	**Grassmarket** [iii]	Roadside	325398	673358	Yes	Y (5.0)	1.95 + 2.1 [ii]	Y
37a	**Grassmarket 41**	Roadside	325401	673340	Yes	Y façade	3.4	Y
37b	**Grassmarket 75**	Roadside	325471	673369	Yes	Y façade	5.0	Y
37c	**Grassmarket/Thompsons Court**	Background	325397	673377	Yes	Y façade	21 + 2.1 [ii]	N
10	**Home Street**	Roadside	324905	672893	No	Y façade	2.8	Y
17a	**Hope Park Terrace/VS**	Roadside	326312	672614	No	Y façade	5	Y
139	**Hope Park Terrace 5**	Roadside	326244	672581	No	Y facade	4.9	Y
140	**Hope Park Terrace/Clerk Street**	Roadside	326323	672596	No	Y (3.5)	1.3	Y
38	**Melville Drive**	Roadside	325141	672733	No	Y (10.0)	2.8	Y
42	**Midmar Drive**	Background	325105	670511	No	N	1.4	N
8	**Morningside Road**	Kerbside	324538	671166	No	Y (2.8)	0.7	Y

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In AQMA ?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (m) (N/A if not applicable)	Worst-case Locat-ion?
49	**Morrison Street**	Roadside	324167	673249	Yes	Y (2.4)	2.2	Y
135	**Nicolson Street 69**	Roadside	326112	673115	No	Y façade	3 + 2	Y
136	**Nicolson Street 92**	Roadside	326164	673054	No	Y façade	3.74 + 2 [ii]	Y
27	**North Bridge – South**	Roadside	325944	673670	Yes	Y façade	3.5	Y
144	**South Bridge 59**	Roadside	326020	673370	No	Y façade	2.3	Y
142	**South Clerk Street 41a**	Roadside	326367	672554	No	Y façade	1.96 + 2 [ii]	Y
141	**South Clerk Street 84**	Roadside	326383	672472	No	Y façade	2.57 + 2 [ii]	Y
28e	**St Leonards Street 145a** [i]	Roadside	326559	672610	No	Y façade	3.4	Y
3	**Torphichen Place CH** [iii]	Roadside	324258	673295	Yes	Y façade	2.25	Y
3b	**Torphichen Place 1** [i]	Roadside	324277	673309	Yes	Y façade	4.8	Y
3a	**Torphichen Street**	Roadside	326020	673370	Yes	Y façade	5.8	Y
2	**West Maitland Street**	Kerbside	324193	673346	Yes	Y (5.2)	0.5	Y
28b	**West Port 62**	Roadside	325166	673242	Yes	Y façade	1.4	Y
28c	**West Port Opp. 50**	Roadside	325184	673261	Yes	Y façade	3.0	Y
28d	**West Port 42**	Roadside	325203	673250	Yes	Y façade	2.7	Y
	WEST							
145	**Corstorphine High Street** [i]	Roadside	319957	672697	No	Y façade	2.75	Y
56	**Glasgow Road /Drumbrae**	Roadside	319212	672921	No	Y (4.6)	0.57 + 2 [ii]	Y
57	**Glasgow Road 158**	Roadside	318185	672756	No	Y (8.5)	3.6	Y
16	**Glasgow Road 68**	Roadside	313028	672633	Yes	Y (4.4)	1.8	Y
16a	**Glasgow Road 68 facade**	Roadside	313028	672629	Yes	Y façade	6.2	Y
16b	**Glasgow Road/Ratho Station 94** [i]	Roadside	313211	672612	Yes	Y façade	2.9	Y
58	**Glasgow Road Newbridge**	Roadside	312693	672670	Yes	Y (5.2)	2.8	Y
15	**Glasgow Road Newbridge**	Roadside	312664	672672	Yes	Y (3.8)	1.6 + 2.4 [ii]	Y
15a	**Glasgow Road 9** [i]	Roadside	312702	672675	Yes	Y façade	7.5	Y

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In AQMA ?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (m) (N/A if not applicable)	Worst-case Locat-ion?
40f	**Hillhouse Road 118**	Roadside	322478	674406	No	Y (2.57)	2.6	Y
40c	**Hillhouse Road 240**	Roadside	322082	674543	No	Y façade	3.2	Y
40b	**Hillhouse/Craigcrook Terrace**	Roadside	321990	674586	No	Y (4.9)	2.1	Y
40d	**Hillhouse/Marischall Place No4**	Roadside	322123	674492	No	Y façade	3.1	Y
41	**Hillview Terrace**	Background	320081	673232	No	N	1.0	N
61	**Maybury Road/Barnton**	Roadside	318612	674924	No	Y (12.5)	2.8	Y
40	**Queensferry Rd/Hillhouse Rd**	Roadside	322144	674497	No	Y façade	2.0 + 2 [ii]	Y
63	**Queensferry Road 544**	Roadside	318723	674963	No	Y façade	13.6	Y
64	**Queensferry Road 550**	Roadside	318698	674955	No	Y (9.2)	1.49	Y
64a	**Queensferry Road 552**	Roadside	318698	674964	No	Y façade	10.5	Y
62	**Queensferry Road 561**	Roadside	318810	674903	No	Y façade	16.9	Y
23	**Roseburn Terrace**	Kerbside	323007	673198	Yes	Y (2.3)	0.23	Y
1	**St John's Road SB**	Kerbside	320122	672917	Yes	Y (1.8)	0.54	Y
1b	**St John's Road IR**	Roadside	320154	672911	Yes	Y façade	2.0	Y
SJ1	**St John's Road Kaimes Rd**	Kerbside	320571	672809	Yes	Y (2.255)	0.278	Y
SJ2	**St John's Road 63**	Kerbside	320436	672830	Yes	Y (9.148)	0.371	Y
SJ3	**St John's Road 81**	Roadside	320316	672857	Yes	Y (14.475)	1.148	Y
1d	**St John's Road 131**	Roadside	320096	672907	Yes	Y façade	2.1	Y
39	**St John's Road/Victor Pk**	Roadside	319677	672991	Yes	Y (4.15)	1.6	Y
146a	**Station Road 2 Kirkliston** [i]	Roadside	312586	674505	No	Y façade	0.85	Y
146	**Station Road 41 Kirkliston** [i]	Roadside	312629	674393	No	Y façade	1.9	Y
50a	**Whitehouse Rd/Barnton Grove**	Roadside	318571	675028	No	Y (1.57)	3.5	Y
	SOUTH WEST							
76	**Angle Park/Harrison Road**	Roadside	323498	672263	No	Y façade	2.20	Y
76c	**Angle Park Terrace 25**	Roadside	323587	672360	No	Y façade	4.75	Y

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In AQMA ?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (m) (N/A if not applicable)	Worst-case Locat-ion?
76b	**Angle Park Terrace 74** [iii]	Roadside	323526	672285	No	Y façade	2.1	Y
76a	**Ardmillan Terrace 22**	Roadside	323487	672287	No	Y façade	2.2	Y
80d	**Balgreen Road / School**	Roadside	322069	672317	No	Y play area	2.9	Y
80e	**Balgreen Road / Library**	Roadside	322110	672268	No	Y play area	2	Y
4	**Calder Road**	Roadside	319062	670543	No	Y (25)	1.6	Y
18	**Gorgie Road 8**	Roadside	323477	672476	Yes	Y façade	2.4	Y
80c	**Gorgie Road 87**	Roadside	323265	672394	Yes	Y façade	2.5	Y
80b	**Gorgie Road 549**	Roadside	321724	671557	Yes	Y façade	2.5	Y
80	**Gorgie Road / Delhaig**	Roadside	321967	671666	Yes	Y façade	2.6	Y
80a	**Gorgie Road Glen Lea**	Roadside	322381	671950	Yes	Y façade	2.6	Y
5	**Gorgie Road/Murieston Road**	Kerbside	323484	672478	Yes	Y (4.9)	0.3	Y
76d	**Henderson Terrace**	Roadside	323632	672449	No	Y façade	1.8	Y
11	**Lanark Road 610**	Roadside	319527	668420	No	Y (3.7)	1.5	Y
77a	**Slateford Road 51**	Roadside	323167	672009	No	Y façade	2.3	Y
77b	**Slateford Road 93/95**	Roadside	322999	671876	No	Y façade	2.6	Y
77	**Slateford Road 97**	Roadside	322960	671846	No	Y façade	2.67	Y
78	**Slateford Road/The Maltings**	Roadside	322772	671606	No	Y façade	2.2	Y

Notes for table:

i. New monitoring location in 2014
ii. Distance to nominal kerb, due to parking bay in front of monitoring location
iii. Site relocated in 2014 in close proximity to previous site
iv. Amendments made to details following review

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

All automatic monitoring locations, other than Queensferry Road, represent relevant exposure as they are either at or aligned with a residential facade. The Queensferry Road station is set 6.5m to the front of residential facades; hence measured concentrations are likely to overestimate relevant exposure. Data has therefore been corrected using DEFRA's Distance Correction Calculator Tool[1].

Automatic monitoring data for 2014, corrected where necessary, complied with the annual and hourly mean nitrogen dioxide objectives except at the automatic monitoring station (AQMS) on St John's Road at Clermiston Road junction. This site recorded one breach of the short term one hour NO_2 objective which is the second consecutive year of compliance. If the trend is sustainable then the NO_2 hourly mean AQMA could be revoked, but the NO_2 annual mean AQMA would remain in force. The annual mean concentration of 59 µg/m^3 NO_2 was a slight increase on the 2013 data. The site has had some technical difficulties with failures of the air conditioning unit and service engineers found a leak in the sampling system suspected of causing internal sampling and readings of greater than 350 µg/m^3 NO_2 . As a result Ricardo-AEA issued an amended report for the site in July 2015 to take account of the suspect data.

Data capture was poor at St Leonard's AURN station due to an extended period of refurbishment works by DEFRA. Consequently, data has been annualised in line with LAQM Technical Guidance TG09[2] to give an estimated annual concentration. The calculation is shown in Appendix A5. Automatic data is shown in Tables 2.3a & 2.3b.

Table 2.3a Results of Automatic Monitoring for NO_2: Comparison with Annual Mean Objective

Site ID	Site Name	Within AQMA?	Valid Data Capture 2014 % [a]	Annual Mean Concentration (µg/m^3)						
				2008	2009	2010	2011	2012	2013	2014
1	Queen Street	Y	94	32	33	37	29	28	28	26
2	Haymarket	Y	N/A	**41 (49)**	N/A	N/A	N/A	N/A	N/A	N/A
3	Roseburn	Y	N/A	28 (31)	26 (28)	30 (33)	24 [b]	N/A	N/A	N/A
4	Gorgie Road	Y	98	**42**	38	**41**	37	39	38	34
5	St John's Road	Y	95	**75**	**70**	**71**	**65**	**58**	**57**	**59**
6	Currie	N	98	N/A	N/A	10	6	8	8	7
7	St Leonard's	N	72	31	24	31	25	24	22	22 [b]
8	Salamander St	N	98	N/A	30 [b]	30	29	30	28	27
9	Queensferry Rd	N	94	N/A	N/A	N/A	41 (29)	52 **(40)**	43 (34)[b]	46 (36)
10	Glasgow Road	Y	99	N/A	N/A	N/A	N/A	29 [b]	27	27

Notes for table;

In bold and red, exceedence 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
b annualised mean per TGO9 (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 2.3b Results of Automatic Monitoring for NO_2: Comparison with 1-hour Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture 2014 % [a]	Number of Hourly Means > 200µg/m^3						
				2008	2009	2010	2011	2012	2013	2014
1	Queen Street	Y	94	0	0	0	0	0	0	0
2	Haymarket	Y	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
3	Roseburn	Y	N/A	0	0	1	0 (101) [b]	N/A	N/A	N/A
4	Gorgie Road	Y	98	0	0 (130) [b]	0 (122) [b]	0	0	0 (115)	0
5	St John's Road	Y	95	**166**	**114**	**60**	**52**	**62**	8	1
6	Currie	N	98	N/A	N/A	0	0	0	0	0
7	St Leonard's	N	72	0	0	0	0	0	0	0 (69)
8	Salamander St	N	98	0	0 (144) [b]	0	0	0	0	0
9	Queensferry Rd	N	94	N/A	N/A	N/A	0	3	0 (145)	0
10	Glasgow Road	Y	99	N/A	N/A	N/A	0	0	0	0

Notes for table;

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

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.

Trends in Annual Mean NO_2 Concentrations Measured at Automatic Monitoring Sites

Trend analysis has been undertaken at all monitoring locations that have five or more years of valid data. Annual mean nitrogen dioxide concentrations have been plotted for successive years at St Leonard's, Queen Street, Gorgie Road, St John's Road, Salamander Street and, for the first time, Currie which joined the network later than the other stations. Trend lines have been drawn using an Excel simple regression statistical program. Analysis has also been carried out with the hourly mean data from St John's Road. Data trends are shown in Figures 2.3 to 2.8 and summarised in Table 2.4.

Table 2.4 Summary of Annual Mean Nitrogen Dioxide trends measured at Automatic Monitoring Sites

Monitoring Location	Site Type	Trend in annual mean NO_2 (years included)	Concentrations of NO_2
Currie	Suburban	(2010 to 2014) ↘	Slight Decrease
Gorgie Road	Roadside	(1999 to 2014) ↘	Slight Decrease
Queen Street	Roadside	(2006 to 2014) ↓	Decreasing
Salamander St	Roadside	(2009 to 2014) ↘	Slight Decrease
St John's Road	Kerbside	(2007 to 2014) ↓	Decreasing
St Leonard's	Urban background	(2004 to 2014) ↘	Slight decrease

Trend analysis of the annual mean nitrogen-dioxide concentrations at a number of sites shows a slight decrease, namely; St Leonard's, Gorgie Road, Salamander Street and Currie. These sites are a combination of urban background, roadside and suburban sites. The new trend analysis for Currie should be considered with some caution as data from the site was not subject to quality assurance and quality control by Ricardo-AEA (on behalf of the Scottish Government) until 2013.

There are defined downward trends at Queen Street and St John's Road in respect to annual mean concentrations, albeit there is a slight increase in the annual mean at St John's Road in 2014. There was a reduction in the number of hourly exceedences at St John's Road compared with the 2013 data, the overall trend remains downward.

Traffic flows in Edinburgh are normalising after completion of Tram construction works. Changes and enhancements to the wider transport system are however continuing in order to ensure an effective network, tackle congestion and encourage multi-mode integration. Consequently, it will be some time before a sufficiently high degree of confidence can be attributed to the ongoing trend analyses**.**

Figure 2.3 Trend in Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) measured at St Leonard's AURN

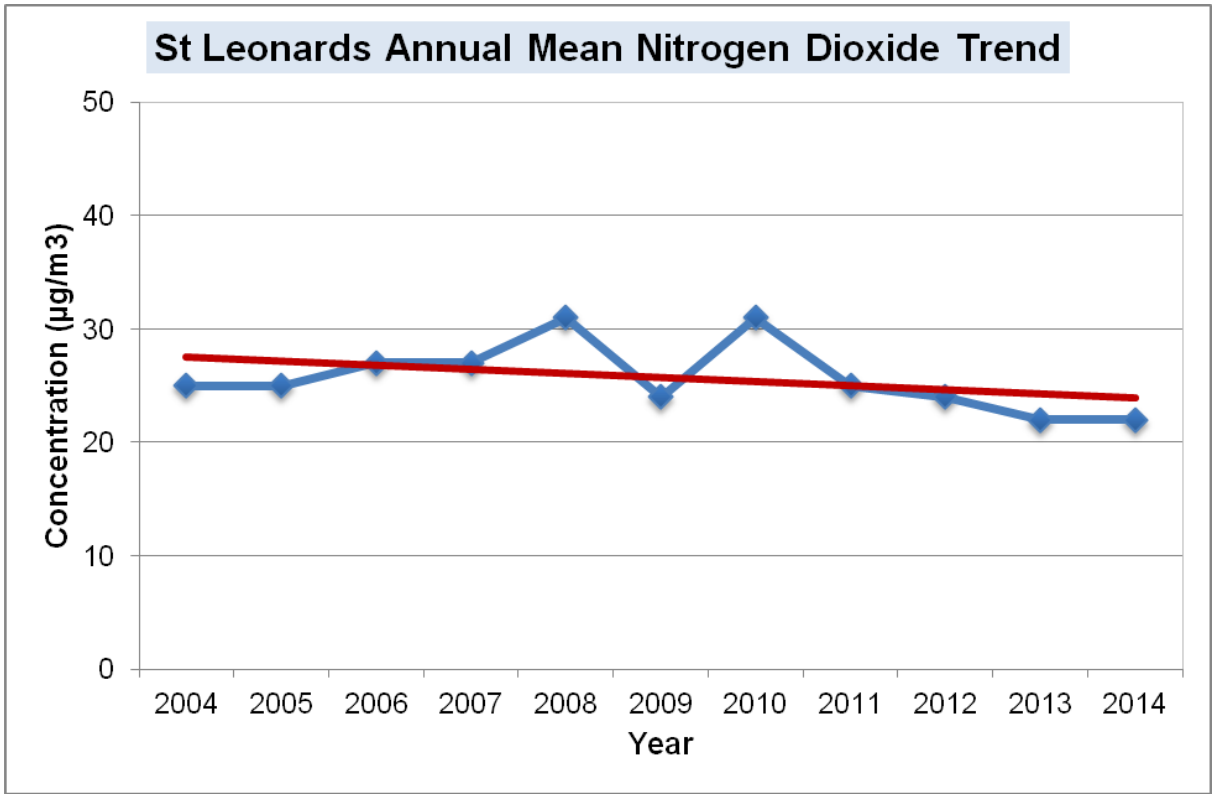


Figure 2.4 Trend in Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) measured at Queen Street

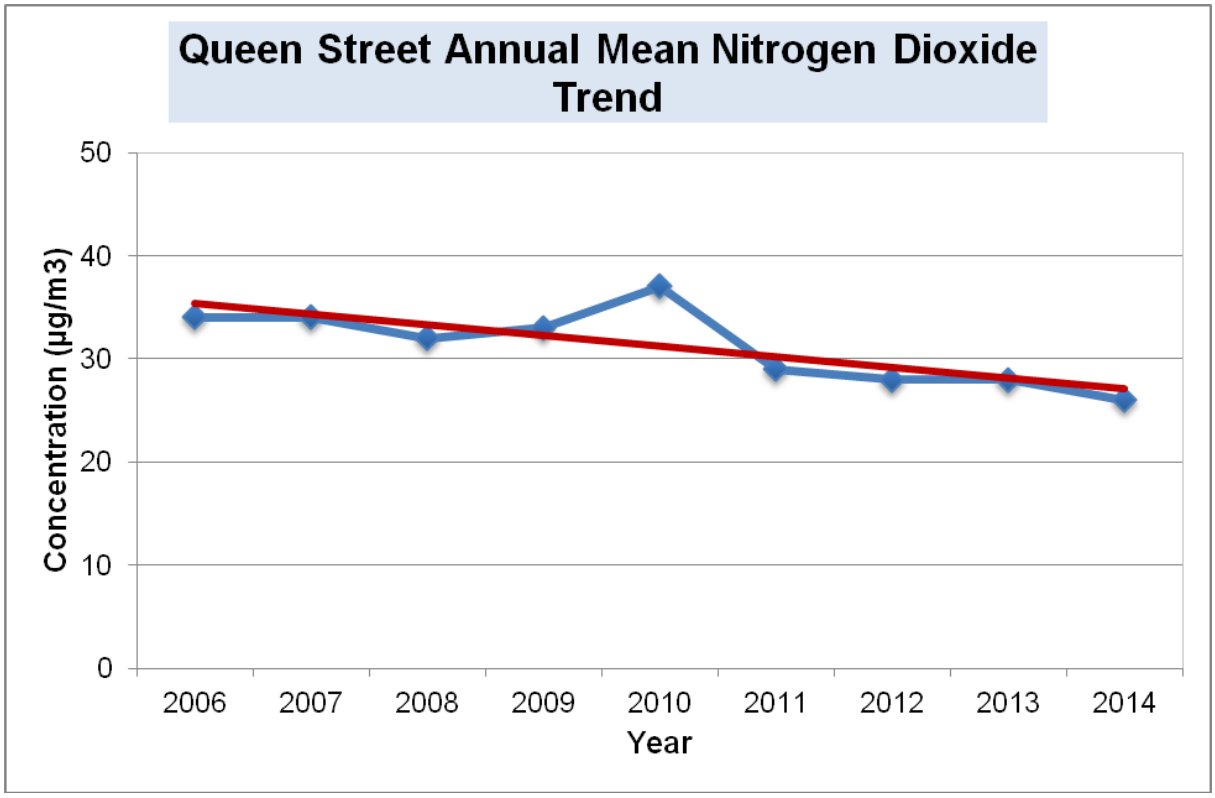


Figure 2.5 Trend in Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) measured at Gorgie Road

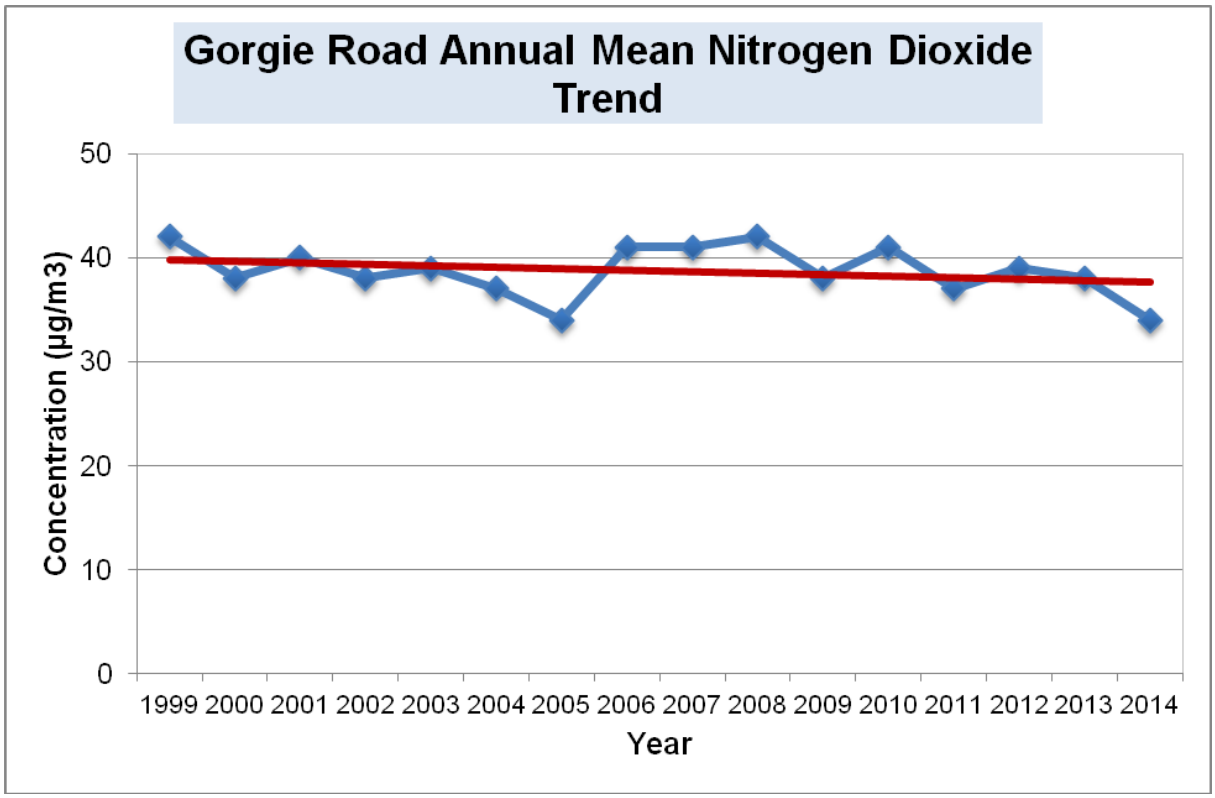


Figure 2.6 Trend in Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) measured at Salamander Street

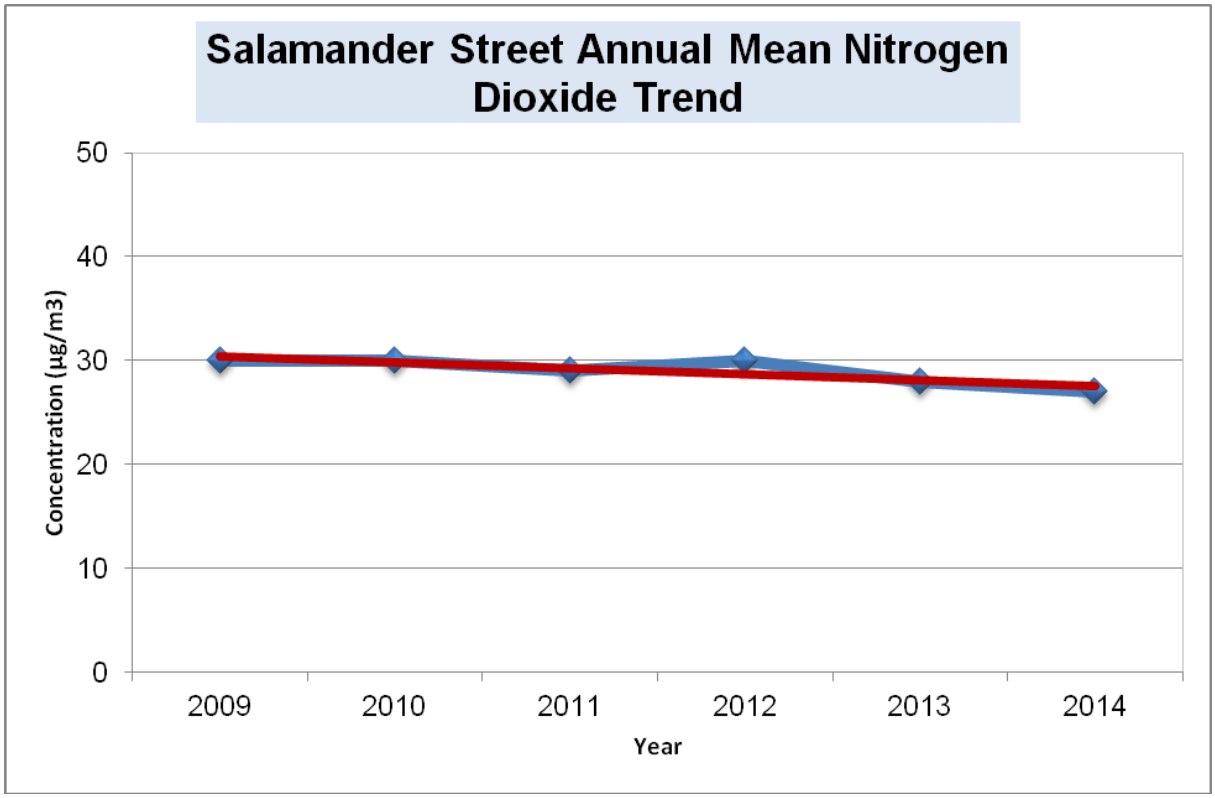


Figure 2.7 Trend in Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) measured at Currie

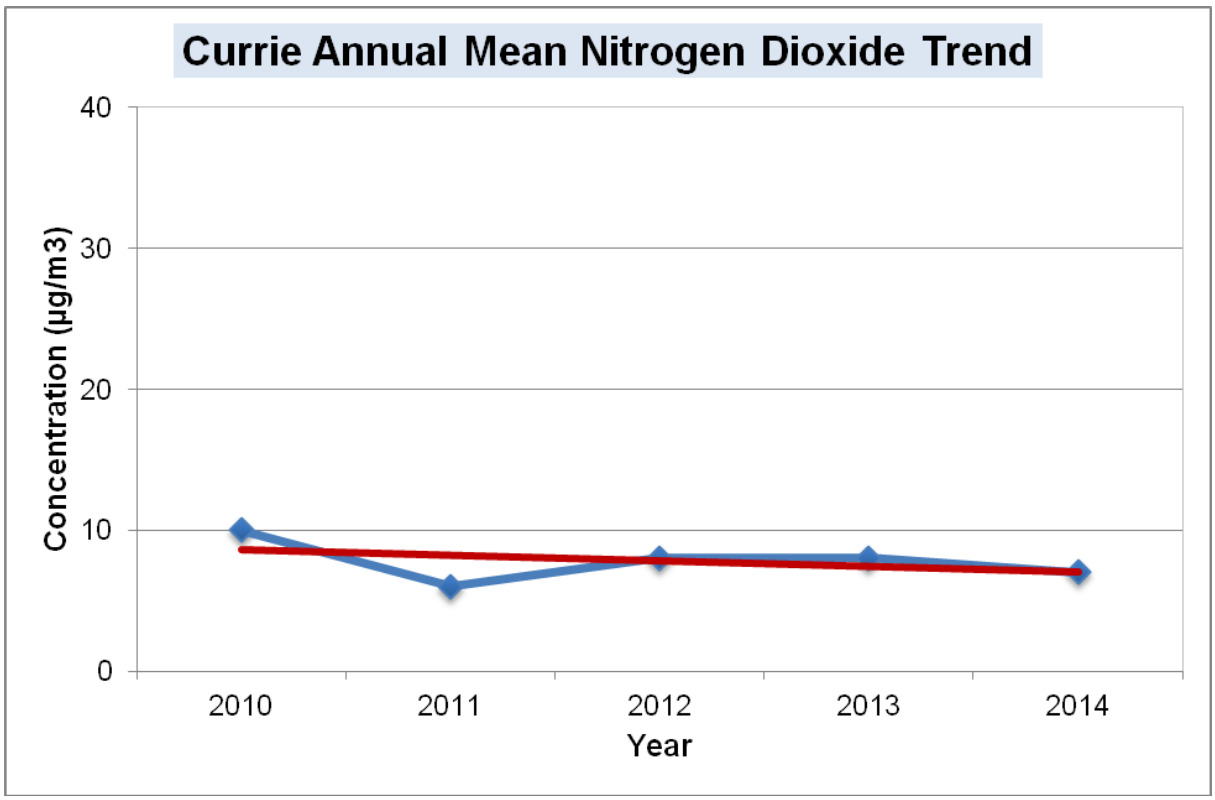


Figure 2.8a Trend in Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) measured at St John's Road

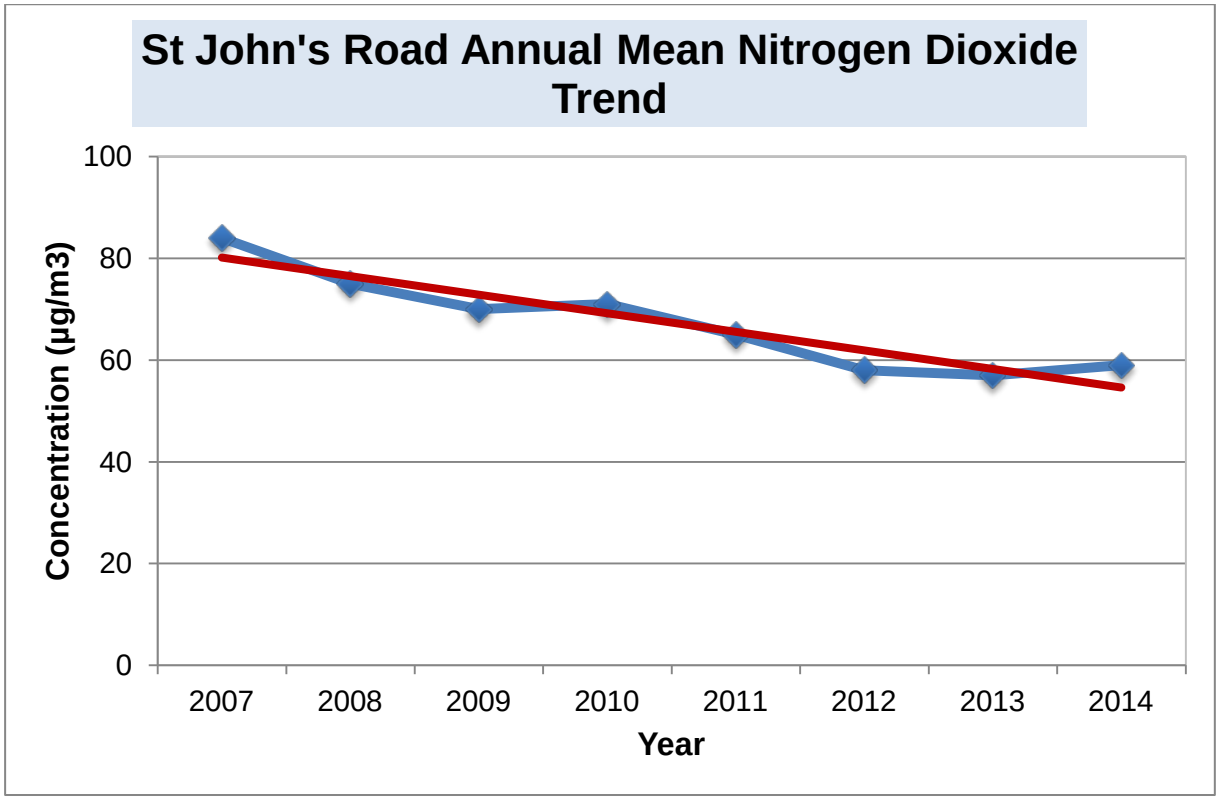
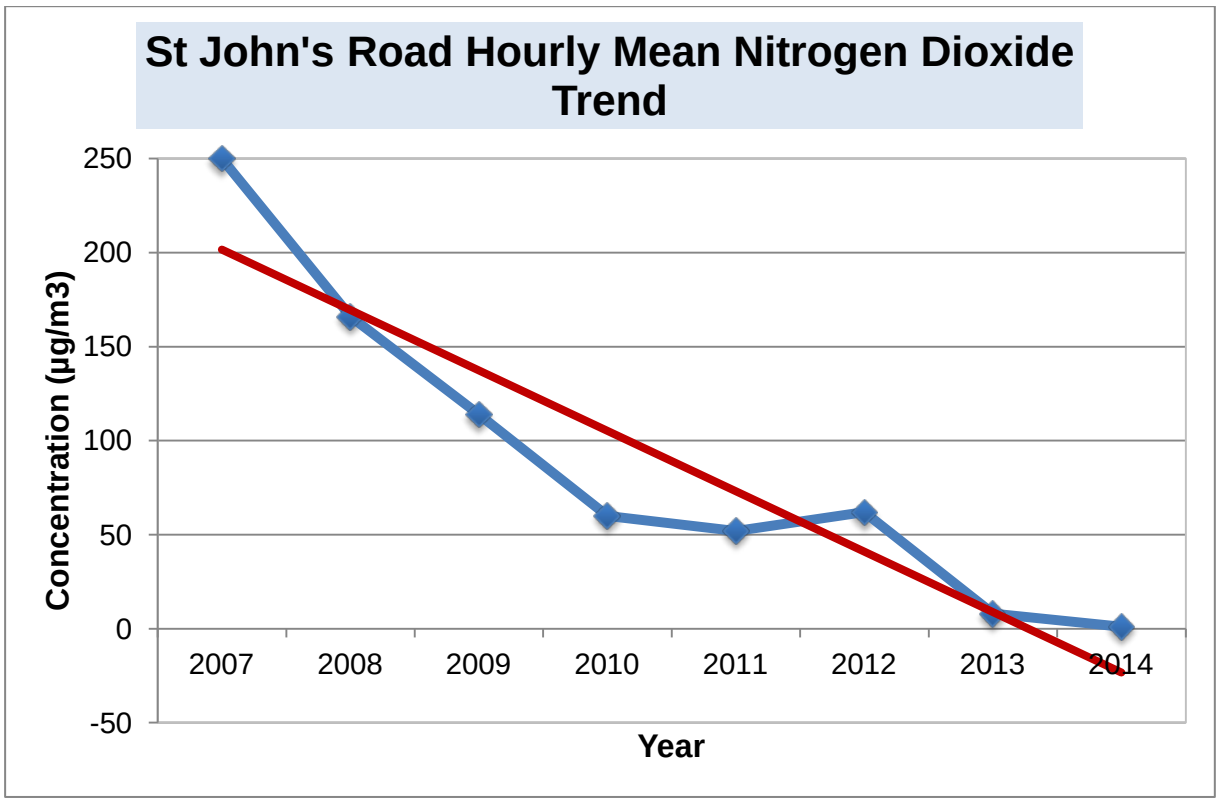


Figure 2.8b Trend in the Number of Exceedences of the Hourly Mean Objective for Nitrogen Dioxide at St John's Road



Passive Diffusion Tube (PDT) Monitoring Data

All results from Passive Diffusion Tube monitoring is shown in Table 2.5.

Exceedences

Analysis of the PDT monitoring results shows the annual mean objective continues to be exceeded in locations within all of the current AQMAs except Inverleith Row which just met the objective. The AQMAs remain valid.

As in previous years, there are also locations within the individual AQMAs where the objectives are met. This reflects the fact that AQMA boundaries are designed around local features, incorporating road junctions and extended portions of the local road network, creating a wider geographical management area beyond the immediate location of individual exceedences. This is the most effective means of enabling a strategic approach to air quality action planning and for informing planning and development management processes in dense urban environments like Edinburgh. It also assists in determining action plan resource allocation[3], such as where on the network to place the lowest emission vehicles e.g the targeted placement of many of Lothian Buses newer vehicles. Scottish Government also offers grant support funding to local authorities to assist implementation of improvement actions within these geographically wider areas – such as the purchase and installation of smart traffic management systems to help reduce road congestion in the designated management areas.

None of the passive diffusion tube data collected during 2014 suggests breaches of the hourly mean objective for NO_2, although annualised data from Westport (ID28b) shows that there is potential (56µg/m^3).

Exceedences of the annual mean objective at monitoring locations outwith the AQMAs are identified at the following locations; Angle Park Terrace, Dundee Street/Yeaman Place, Nicolson Street, South Clerk Street and Queensferry Road. Details are shown in Table 2.6.

All of these sites, except one, are to be included in the extension to the Central AQMA 2015 which is being progressed by the Council. The exception is at Queensferry Road (ID64) which, as previously identified, continues to give anomalous results compared with adjacent data (including automatic data).

Supplementary PDT monitoring commenced in January 2015, on the facade of a residential property concurrent with the existing roadside location. It is anticipated that this will provide further insight into the localised circumstances that might be causing the higher corrected back to façade result from the roadside PDT when compared to the much lower and compliant direct façade PDT measurements. See data mapped on page 143.

Table 2.7 on page 57 onwards shows data of PDT monitoring from 2008 to 2014.

Potential exceedences

Locations which are considered borderline with respect to exceeding the annual mean objective are detailed in Table 2.8 on page 64.

A number of these sites are also included in planned extension of the Central AQMA, namely; Clerk Street, South Clerk Street, Nicolson Street and Slateford Road.

2014 data shows a potential exceedence at PDT site (ID73a) at Ramsay Institute, Portobello Road, with concentration of 36µg/m^3 NO_2. The conclusions of a Detailed Assessment (2014) found that an AQMA was not required at Portobello Road/Sir Harry Lauder Road. Monitoring is continuing at these sites.

There were also potential exceedences at Broughton Road (ID43) and at a new monitoring site at Cowgate/St Mary's Street (ID48f). Data from the former appears to be stabilising with similar concentrations over the past three years (37µg/m^3, 37µg/m^3 and 35µg/m^3 respectively). The new monitoring site (Cowgate/St Mary's Street) is located on the downhill carriageway of an inclined road, approximately 0.25km from the Central AQMA. Monitoring is continuing at these sites.

General notes

Other new monitoring in Kirkliston (ID146a) shows that concentrations, in a worst case location, are low (23µg/m^3). It is a similar situation at Corstorphine High Street (ID145), where the mean annual concentration result is 27µg/m^3.

In the Glasgow Road AQMA, new monitoring shows the potential for exceedence of the annual mean (34µg/m^3 at ID15a and 36µg/m^3 at ID16a). Both locations are on the facade of sensitive properties.

New data from monitoring in the Great Junction Street AQMA shows mixed results with breaches of the annual mean objective on the Commercial Street arm of the junction with Ocean Drive (42µg/m^3 at ID9d) and below objective levels (30µg/m^3) on the North Junction Street arm (ID9c). Site ID9d is attached to the south facing wall of a 4 storey building adjacent to a busy bus stop.

At other new monitoring locations; St Leonards (ID28e), Bruntsfield Place (ID6a) and those sites along St John's Road (SJ1, SJ2 and SJ3), concentrations are well below the annual mean objective. Within the Central AQMA at Torphichen Place (ID3b), monitoring confirms exceedences of the annual mean (45 µg/m^3).

In general, concentrations of NO_2 are lower compared with 2013. However there are slight increases at Ferry Road (ID52), Hamilton Place (ID143a), Cowgate (ID48a), Nicolson Street (ID136), North Bridge (ID27), South Bridge (ID144), Queensferry Road (ID64a) and Roseburn Terrace (ID23).

More defined increases in concentrations are recorded at Easter Road (ID25e), London Road (ID69), Westport (ID28b) and York Place (ID36). At York Place this is likely to be related to the reopening of the road network following completion of Tram construction.

All PDT data reported in the tables below are representative of relevant exposure, except four background sites at India Street (ID34), Hillview Terrace (ID41), Midmar Drive (ID42) and Baileyfield Road (ID19).

All raw (uncorrected) PDT diffusion tube monitoring data is described in Appendix C.

Appendix D shows the calculations used to estimate annual concentrations at relevant receptors using the NO_2 Fall-Off with Distance calculator (DEFRA LAQM, Tools, 2014).

Appendix A5 (Short-term to Long-term data adjustment for NO_2) shows the calculations undertaken to estimate the annual mean concentrations where data capture was poor, as per instruction in the Technical Guidance 09 and with further advice from the LAQM Helpdesk. Data from the following sites was not annualised due to poor data capture; Great Junction Street (ID30), new site Leith Street (ID74g), Princes Street (ID24), Queen Street (ID33), Grassmarket (ID37), Westport (ID28c), Station Road, Kirkliston (146a) and Gorgie Road (ID80c).

Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes in 2014

Site ID	Site Name/ Address	Site Type	In AQMA?	Result is Mean of Duplicate	Data Capture for calendar year 2014 %	2014 Annual Mean Concentration [i, ii] (µg/m^3) Bias Adjustment factor = 0.74
	NORTH					
29	**Bernard Street/CA**	Roadside	Yes	No	100	31
29a	**Bernard Street/King Chamber**	Roadside	Yes	Yes	92	34
29b	**Bernard Street 32**	Roadside	Yes	No	100	26
29c	**Bernard Street/PS**	Roadside	Yes	Yes	100	39
9d	**Commercial Street** [iii]	Roadside	Yes	No	67	**42**
9	**Commercial Street 88**	Roadside	Yes	No	92	30
9a	**Commercial St/Portland Place**	Roadside	Yes	No	83	35
52	**Ferry Road 268**	Roadside	No	No	92	29
53	**Ferry Road/Bowhill Terrace 6**	Roadside	Yes	No	100	33
45b	**Ferry Road/Maderia Street**	Roadside	No	No	100	24
45	**Ferry Road/North Fort Street**	Roadside	No	No	83	31
45d	**Ferry Rd/North Junction Street**	Roadside	Yes	No	100	34
30b	**Great Junction Street 137**	Roadside	Yes	No	92	33
30c	**Great Junction Street 14**	Roadside	Yes	No	100	37
30d	**Great Junction Street/WC**	Roadside	Yes	No	100	34
30e	**Great Junction Street/CG**	Roadside	Yes	No	67	33
30	**Great Junction Street/FV**	Roadside	Yes	Yes	54	N/A
55	**Inverleith Row/Ferry Road**	Roadside	Yes	Yes	96	**40**
55c	**Inverleith Row/Montague**	Roadside	Yes	No	92	29
9c	**North Junction Street** [iii]	Roadside	Yes	No	92	30
9b	**Ocean Drive/Leith**	Roadside	No	No	100	28
51c	**Salamander Street/Baltic Street**	Roadside	No	No	92	30

Site ID	Site Name/ Address	Site Type	In AQMA?	Result is Mean of Duplicate	Data Capture for calendar year 2014 %	2014 Annual Mean Concentration [i, ii] ($\mu g/m^3$) Bias Adjustment factor = 0.74
51b	**Salamander Street/Bath Street**	Roadside	No	No	100	32
14	**Trinity Crescent**	Roadside	No	No	92	25
	EAST					
19	**Baileyfield Road**	Background	No	No	75	19
31	**Dalkeith Road 187**	Roadside	No	No	92	25
25	**Easter Road/CH Shop**	Roadside	Yes	No	67	39
25b	**Easter Road/Rossie Place**	Roadside	Yes	No	67	31
25c	**Easter Road 105/109**	Roadside	Yes	No	100	29
25d	**Easter Road/Bothwick**	Roadside	Yes	No	100	30
25e	**Easter Road 198**	Roadside	Yes	No	75	31
25f	**Easter Road 271**	Roadside	No	No	83	24
25g	**Easter Road 327**	Roadside	No	No	100	24
46b	**London Road/Brunton Place**	Roadside	Yes	No	100	28
81	**London Rd/East Norton Place**	Roadside	Yes	No	100	**43**
67	**London Road/Earlston Place**	Roadside	Yes	No	67	39
68	**Parsons Green Terrace**	Roadside	Yes	No	92	28
69	**London Road/Wolseley Place**	Roadside	Yes	No	100	**42**
70	**London Road/Wolseley Terrace**	Roadside	Yes	No	92	38
66	**London Road/Cadzow Place**	Roadside	Yes	No	83	31
46	**London Road/Easter Road**	Roadside	Yes	No	67	38
32	**Niddrie Mains Road 28**	Kerbside	No	No	100	28
71	**Portobello High Street 185**	Roadside	No	No	67	32
73a	**Portobello Road/Ramsay I**	Roadside	No	No	75	36
73d	**Portobello Road/Ramsay F**	Roadside	No	No	100	35
73e	**Portobello Road/Ramsay 2**	Roadside	No	No	83	34

Site ID	Site Name/ Address	Site Type	In AQMA?	Result is Mean of Duplicate	Data Capture for calendar year 2014 %	2014 Annual Mean Concentration [i, ii] ($\mu g/m^3$) Bias Adjustment factor = 0.74
73f	**Portobello Road /College Ct.**	Roadside	No	No	83	18
73g	**Portobello Rd/Inchview Terrace**	Roadside	No	No	92	27
72	**Seafield Road East 10**	Roadside	No	No	92	33
72a	**Seafield Road East 7**	Roadside	No	No	100	33
	CITY CENTRE - NORTH					
43	**Broughton Road**	Roadside	No	No	100	35
44	**Broughton Street**	Roadside	No	No	92	31
13	**Deanhaugh Street**	Kerbside	No	No	100	28
35	**Dundas Street**	Kerbside	No	No	75	27
74f	**George Street 112**	Roadside	Yes	No	100	30
75b	**Great Stuart Street 7**	Roadside	Yes	No	92	27
75f	**Great Stuart Street 14**	Roadside	No	No	100	23
75e	**Great Stuart Street 9**	Roadside	No	No	100	23
143	**Hamilton Place 72**	Roadside	No	No	100	28
143a	**Hamilton Place Library**	Roadside	No	No	100	35
34	**India Street**	Background	Yes	No	83	20
55b	**Inverleith Row/Summer Place**	Roadside	Yes	No	100	27
74g	**Leith Street 35** [iii]	Roadside	Yes	No	42	N/A
21	**Leith Walk/Brunswick Road**	Roadside	Yes	No	92	33
20	**Leith Walk/McDonald Road**	Kerbside	Yes	No	92	32
47	**Princes Street (Eastbound)**	Roadside	Yes	No	100	**50**
24	**Princes Street/Mound**	Kerbside	Yes	No	33	N/A
33	**Queen Street/Hanover Street**	Roadside	Yes	No	50	N/A
75a	**St Colme Street**	Kerbside	No	No	83	29
75d	**St Colme Street 4**	Roadside	No	No	92	27

Site ID	Site Name/ Address	Site Type	In AQMA?	Result is Mean of Duplicate	Data Capture for calendar year 2014 %	2014 Annual Mean Concentration [i, ii] ($\mu g/m^3$) Bias Adjustment factor = 0.74
36	**York Place**	Roadside	Yes	No	100	33
	CITY CENTRE - SOUTH					
6a	**Bruntsfield Place 210** [iii]	Roadside	No	No	75	32
138	**Clerk Street 15**	Roadside	No	No	83	38
48	**Cowgate/Gurthrie Street**	Roadside	Yes	No	100	33
48a	**Cowgate/Blair Street**	Roadside	Yes	No	92	36
48f	**Cowgate/50 St Mary's Street** [iii]	Roadside	No	No	75	37
48c	**Cowgate Blackfriars**	Roadside	Yes	No	67	34
48e	**Cowgatehead 2**	Roadside	Yes	No	75	35
79d	**Dundee Street/Yeaman Place**	Roadside	No	No	67	**41**
79a	**Fountainbridge 103**	Roadside	No	No	83	34
79b	**Fountainbridge/Grove Street**	Roadside	No	No	92	24
79	**Fountainbridge/Tollcross**	Roadside	No	No	100	34
37	**Grassmarket/PS**	Roadside	Yes	No	33	N/A
37a	**Grassmarket 41**	Roadside	Yes	No	75	**40**
37b	**Grassmarket 75**	Roadside	Yes	No	100	35
37c	**Grassmarket/Thompsons Court**	Background	No	No	100	25
10	**Home Street**	Roadside	No	No	58	27
17a	**Hope Park Terrace/VS**	Roadside	No	Yes	100	35
139	**Hope Park Terrace 5**	Roadside	No	No	100	29
140	**Hope Park Terrace/Clerk Street**	Roadside	No	No	92	32
38	**Melville Drive**	Roadside	No	No	100	23
42	**Midmar Drive**	Background	No	No	100	13
8	**Morningside Road**	Kerbside	No	No	58	23
49	**Morrison Street**	Roadside	Yes	No	83	36

Site ID	Site Name/ Address	Site Type	In AQMA?	Result is Mean of Duplicate	Data Capture for calendar year 2014 %	2014 Annual Mean Concentration [i, ii] ($\mu g/m^3$) Bias Adjustment factor = 0.74
135	**Nicolson Street 69**	Roadside	No	No	100	**43**
136	**Nicolson Street 92**	Roadside	No	No	83	39
27	**North Bridge – South**	Roadside	Yes	No	83	**48**
144	**South Bridge 59**	Roadside	No	No	92	**47**
142	**South Clerk Street 41a**	Roadside	No	No	92	36
141	**South Clerk Street 84**	Roadside	No	No	100	38
28e	**St Leonards Street 145a** [iii]	Roadside	No	No	100	28
3	**Torphichen Place**	Roadside	Yes	No	100	**43**
3b	**Torphichen Place 1** [iii]	Roadside	Yes	No	100	**45**
3a	**Torphichen Street**	Roadside	Yes	No	100	31
2	**West Maitland Street**	Kerbside	Yes	No	75	**43**
28b	**West Port 62**	Roadside	Yes	No	50	**56**
28c	**West Port Opp. 50**	Roadside	Yes	No	58	N/A
28d	**West Port 42**	Roadside	Yes	No	92	**51**
	WEST					
145	**Corstorphine High Street** [iii]	Roadside	No	No	100	27
56	**Glasgow Road / Drumbrae**	Roadside	No	No	92	29
57	**Glasgow Road 158**	Roadside	No	No	92	33
16	**Glasgow Road 68**	Roadside	Yes	No	100	**40**
16a	**Glasgow Road 68 Facade**	Roadside	Yes	No	83	36
16b	**Glasgow Rd/Ratho Station 94** [iii]	Roadside	Yes	No	100	32
58	**Glasgow Road Newbridge**	Roadside	Yes	Yes	100	**45**
15	**Glasgow Road Newbridge**	Roadside	Yes	No	92	37
15a	**Glasgow Road 9** [iii]	Roadside	Yes	No	100	34
40f	**Hillhouse Road 118**	Roadside	No	No	83	30

Site ID	Site Name/ Address	Site Type	In AQMA?	Result is Mean of Duplicate	Data Capture for calendar year 2014 %	2014 Annual Mean Concentration [i, ii] ($\mu g/m^3$) Bias Adjustment factor = 0.74
40c	**Hillhouse Road 240**	Roadside	No	No	100	26
40b	**Hillhouse/Craigcrook Terrace**	Roadside	No	No	100	27
40d	**Hillhouse/Marischall Place 4**	Roadside	No	No	100	30
41	**Hillview Terrace**	Background	No	No	100	18
61	**Maybury Road/Barnton**	Roadside	No	No	67	23
40	**Queensferry Rd/Hillhouse Rd**	Roadside	No	No	100	32
63	**Queensferry Road 544**	Roadside	No	No	100	23
64	**Queensferry Road 550**	Roadside	No	No	100	**47**
64a	**Queensferry Road 552**	Roadside	No	No	100	30
62	**Queensferry Road 561**	Roadside	No	No	100	19
23	**Roseburn Terrace**	Kerbside	Yes	No	92	37
1	**St John's Road SB**	Kerbside	Yes	No	100	34
1b	**St John's Road IR**	Roadside	Yes	No	100	37
SJ1	**St John's Road Kaimes Rd**	Kerbside	Yes	No	75	31
SJ2	**St John's Road 63**	Kerbside	Yes	No	83	25
SJ3	**St John's Road 81**	Roadside	Yes	No	83	27
1d	**St John's Road 131**	Roadside	Yes	No	100	**48**
39	**St John's Road/Victor Park**	Roadside	Yes	No	100	32
146a	**Station Road 2 Kirkliston** [iii]	Roadside	No	No	75	N/A
146	**Station Road 41 Kirkliston** [iii]	Roadside	No	No	25	23
50a	**Whitehouse Rd/Barnton Grove**	Roadside	No	No	92	28
	SOUTH WEST					
76	**Angle Park/Harrison Road**	Roadside	No	No	83	**41**
76c	**Angle Park Terrace 25**	Roadside	No	No	92	30
76b	**Angle Park Terrace 74**	Roadside	No	No	92	**41**

Site ID	Site Name/ Address	Site Type	In AQMA?	Result is Mean of Duplicate	Data Capture for calendar year 2014 %	2014 Annual Mean Concentration [i, ii] ($\mu g/m^3$) Bias Adjustment factor = 0.74
76a	**Ardmillan Terrace 22**	Roadside	No	No	100	27
80d	**Balgreen Road / School**	Roadside	No	No	100	31
80e	**Balgreen Road / Library**	Roadside	No	No	100	32
4	**Calder Road**	Roadside	No	No	100	26
18	**Gorgie Road 8**	Roadside	Yes	Yes	96	**42**
80c	**Gorgie Road 87**	Roadside	Yes	No	50	N/A
80b	**Gorgie Road 549**	Roadside	Yes	No	75	31
80	**Gorgie Road / Delhaig**	Roadside	Yes	No	92	37
80a	**Gorgie Road Glen Lea**	Roadside	Yes	No	75	31
5	**Gorgie Road/Murieston Road**	Kerbside	Yes	No	100	35
76d	**Henderson Terrace**	Roadside	No	No	92	32
11	**Lanark Road 610**	Roadside	No	No	100	19
77a	**Slateford Road 51**	Roadside	No	No	100	35
77b	**Slateford Road 93/95**	Roadside	No	No	92	38
77	**Slateford Road 97**	Roadside	No	No	75	37
78	**Slateford Road/The Maltings**	Roadside	No	No	67	25

Notes for table;

In bold and red, exceedence of the NO_2 annual mean objective of 40µg/m^3 and in bold black, results of 40µg/m^3shown.

i. All data is representative of relevant exposure, distance corrected where necessary, except at background sites [India Street (ID34), Hillview Terrace (ID41), Midmar Drive (ID42) and Baileyfield Road (ID19)] which are not distance corrected.

ii. Means “annualised” as in Box 3.2 of TG(09), where full calendar year data capture is less than 75%

iii. New monitoring location 2014

Table 2.6 Locations outwith AQMAs where 2014 monitoring results shows exceedences of the Annual Mean Nitrogen Dioxide Objective

Site ID	Location	Data Capture %	Annual Mean Concentration (µg/m^3)
76	**Angle Park/Harrison Road ***	83	**41**
76B	**Angle Park Terrace No 74 ***	92	**41**
79D	**Dundee Street/Yeaman Place ***	67	**41**
135	**Nicolson Street No 69 ***	100	**43**
64	**Queensferry Road No 550**	100	**47**
144	**South Clerk St No 41a ***	100	**47**

Notes for Table;

* Site to be included in the Central AQMA extension (2015)

Bold red - exceedence of the NO_2 annual mean objective of 40µg/m^3

Table 2.7 Results of Nitrogen Dioxide Diffusion Tubes (2008 to 2014)

Site ID	Site Name	Within AQMA ?	Annual mean concentration (adjusted for bias) µg/m^3						
			2008 Bias Adj. Factor = 0.88	2009 Bias Adj. Factor = 0.86	2010 Bias Adj. Factor = 0.85	2011 Bias Adj. Factor = 0.81	2012 Bias Adj. Factor = 0.76	2013 Bias Adj. Factor = 0.75	2014 Bias Adj. Factor = 0.74
	NORTH								
29	**Bernard Street/CA**	Yes	**45.3**	**45.1**	**43.7**	38.9	37	36	31
29a	**Bernard Street/King Chambers**	Yes	**48.0**	**42.0**	**44.6**	**41.9**	**40**	38	34
29b	**Bernard Street 32**	Yes	**41.3**	32.9	36.9	32.7	33	31	26
29c	**Bernard Street/PS**	Yes	**53.4**	**48.2**	**49.4**	**44.6**	**44**	**42**	39
9d	**Commercial Street 3/4**	Yes	-	-	-	-	-	-	**42**
9	**Commercial Street 88**	Yes	**40.4**	31.6	36.7	31.2	35	32	30
9a	**Commercial St/Portland Place**	Yes	-	-	38.1	**41.0**	39	36	35
52	**Ferry Road 268**	No	-	32.1	32.4	32.5	34	28	29
53	**Ferry Road/Bowhill Terrace 6**	Yes	-	36.4	34.8	32.5	35	34	33
45b	**Ferry Road/Maderia Street**	No	35.3	30.9	33.5	32.7	31	27	24
45	**Ferry Road/North Fort Street**	No	39.6	35.4	**41.5**	32.6	36	32	31
45d	**Ferry Road/North Junction St**	Yes	**42.4**	**40.9**	38.3	39.6	37	34	34
30b	**Great Junction Street 137**	Yes	38.4	38.5	39.9	**40.0**	38	36	33
30c	**Great Junction Street 14**	Yes	**50.2**	**42.6**	**44.1**	38.4	38	39	37
30d	**Great Junction Street/WC**	Yes	39.0	37.1	39.9	33.8	38	34	34
30e	**Great Junction Street/CG**	Yes	**43.1**	**41.9**	38.7	**41.2**	37	36	33
30	**Great Junction Street/FV**	Yes	**44.6**	**44.1**	**41.8**	39.1	38	**41**	N/A
55	**Inverleith Row/Ferry Road**	Yes	-	**42.6**	**44.0**	**43.8**	**46**	**43**	**40**
55c	**Inverleith Row/Montague**	Yes	-	-	-	28.2	32	31	29
9c	**North Junction Street**	Yes	-	-	-	-	-	-	30
9b	**Ocean Drive/Leith**	No	-	-	33.0	26.2	31	29	28
51c	**Salamander St/Baltic St**	No	-	37.1	36.2	38.5	35	33	30

Site ID	Site Name	Within AQMA ?	Annual mean concentration (adjusted for bias) µg/m^3						
			2008 Bias Adj. Factor = 0.88	2009 Bias Adj. Factor = 0.86	2010 Bias Adj. Factor = 0.85	2011 Bias Adj. Factor = 0.81	2012 Bias Adj. Factor = 0.76	2013 Bias Adj. Factor = 0.75	2014 Bias Adj. Factor = 0.74
51b	**Salamander St/Bath Rd**	No	-	37.4	**40.3**	37.0	38	35	32
14	**Trinity Crescent**	No	28.3	28.6	27.5	28.9	28	27	25
	EAST								
19	**Baileyfield Road**	No	24.6	22.5	27.5	24.3	22	20	19
31	**Dalkeith Road 187**	No	31.8	28.1	27.8	28.0	29	28	25
25	**Easter Road/CH shop**	Yes	**58.2**	**50.8**	**49.7**	**43.6**	**45**	**41**	39
25b	**Easter Road/Rossie Place**	Yes	**44.9**	38.8	39.1	35.8	35	34	31
25c	**Easter Road 105/109**	Yes	**43.8**	38.0	37.7	**41.0**	**41**	37	29
25d	**Easter Road/Bothwick**	Yes	**40.8**	37.3	37.1	32.7	34	30	30
25e	**Easter Road 198**	Yes	37.3	34.1	34.2	32.0	33	27	31
25f	**Easter Road 217**	No	35.0	30.1	32.5	27.9	-	24	24
25g	**Easter Road 327**	No	33.4	27.9	30.3	26.8	28	26	24
46b	**Brunton Place**	Yes	-	-	-	-	-	30	28
81	**London Road/East Norton Pl**	Yes	-	-	-	**51.2**	**46**	**44**	**43**
67	**London Rd/Earlston Place**	Yes	-	**47.9**	**51.3**	**45.5**	**46**	**46**	39
68	**London Road /Parsons Grn Ter**	Yes	-	30.4	36.6	31.5	33	29	28
69	**London Road/Wolseley Place**	Yes	-	**56.2**	**50.6**	**50.4**	**42**	**40**	**42**
70	**London Road/Wolseley Terr**	Yes	-	**47.3**	**46.1**	**42.4**	**41**	**44**	38
66	**London Rd/Cadzow Place**	Yes	-	**43.0**	**40.5**	-	36	34	31
46	**London Road/Easter Road**	Yes	**52.3**	**43.4**	**46.2**	**40.4**	**46**	38	38
32	**Niddrie Mains Road 28**	No	26.9	30.7	32.5	30.9	33	31	28
71	**Portobello High St West 185**	No	-	**43.0**	39.2	36.0	32	33	32
73a	**Portobello Road/Ramsay Inst**	No	-	-	-	**41.6**	37	37	36
73d	**Portobello Road/Ramsay F**	No	-	-	-	-	-	38	35
73e	**Portobello Road/Ramsay 2**	No	-	-	-	-	-	35	34

Site ID	Site Name	Within AQMA ?	Annual mean concentration (adjusted for bias) µg/m^3						
			2008 Bias Adj. Factor = 0.88	2009 Bias Adj. Factor = 0.86	2010 Bias Adj. Factor = 0.85	2011 Bias Adj. Factor = 0.81	2012 Bias Adj. Factor = 0.76	2013 Bias Adj. Factor = 0.75	2014 Bias Adj. Factor = 0.74
73f	**Portobello Road /College Court**	No	-	-	-	-	-	19	18
73g	**Portobello Road/Inchview Terr**	No	-	-	-	-	-	28	27
72	**Seafield Road East No10**	No	-	35.0	38.4	33.1	37	36	33
72a	**Seafield Road East No. 7**	No	-	-	-	-	-	35	33
	CITY CENTRE - NORTH								
43	**Broughton Road**	No	**40.4**	38.1	39.8	34.6	37	37	35
44	**Broughton Street**	No	37.7	35.1	35.3	32.8	34	31	31
13	**Deanhaugh Street**	No	32.3	30.1	33.0	33.5	32	31	28
35	**Dundas Street**	No	28.9	27.2	31.6	30.6	31	30	27
74f	**George Street No 112**	Yes	-	-	**43.4**	**44.7**	**47**	34	30
75b	**Great Stuart Street 7**	No	-	-	36.2	33.4	31	30	27
75f	**Great Stuart Street 14**	No	-	-	-	-	-	26	23
75e	**Great Stuart Street 9**	No	-	-	-	-	-	24	23
143	**Hamilton Place No 72**	No	-	-	-	-	-	31	28
143a	**Hamilton Place Library**	No	-	-	-	-	-	34	35
34	**India Street**	No	22.7	22.6	22.7	23.6	23	21	20
55b	**Inverleith Row/Summer Place**	No	-	-	-	33.7	32	30	27
21	**Leith Walk/Brunswick Rd**	Yes	37.3	35.3	35.4	34.2	36	34	33
20	**Leith Walk/McDonald Rd**	Yes	**53.1**	36.8	38.1	-	35	34	32
47	**Princes Street East Bound**	Yes	**64**	34	**58**	**45.3**	**45**	**50**	**50**
24	**Princes Street/Mound**	Yes	**51.5**	36.2	**49.3**	N/A	34	**41**	N/A
33	**Queen Street/Hanover Street**	Yes	**43.7**	**50.8**	**56.3**	**50.0**	**49**	33	N/A
75a	**St Colme Street**	No	-	-	38.5	36.5	38	34	29
75d	**St Colme Street No 4**	No	-	-	-	-	-	31	27
36	**York Place**	Yes	**40.5**	37.5	39.0	35.4	**41**	28	33

Site ID	Site Name	Within AQMA ?	Annual mean concentration (adjusted for bias) µg/m^3						
			2008 Bias Adj. Factor = 0.88	2009 Bias Adj. Factor = 0.86	2010 Bias Adj. Factor = 0.85	2011 Bias Adj. Factor = 0.81	2012 Bias Adj. Factor = 0.76	2013 Bias Adj. Factor = 0.75	2014 Bias Adj. Factor = 0.74
	CITY CENTRE - SOUTH								
6a	**Bruntsfield Place 210**	No	-	-	-	-	-	-	32
138	**Clerk Street 15**	No	-	-	-	-	**40**	38	38
48	**Cowgate/Guthrie Street**	Yes	**46.6**	39.8	**46.2**	**40.2**	**40**	38	33
48a	**Cowgate/Blair Street**	Yes	-	-	37.7	31.4	**40**	35	36
48f	**Cowgate/50 St Mary's St**	No	-	-	-	-	-	-	37
48c	**Cowgate Blackfriars**	Yes	-	-	-	-	**43**	**42**	34
48e	**Cowgatehead No 2**	Yes	-	-	-	-	-	39	35
79d	**Dundee Street/Yeaman Place**	No	-	-	-	-	-	**46**	**41**
79a	**FountainbridgeNo103**	No	-	-	-	-	39	37	34
79b	**Fountainbridge/Grove Street**	No	-	-	-	-	32	28	24
79	**Fountainbridge/Tollcross**	No	-	-	**42.0**	36.3	37	36	34
37	**Grassmarket /PS**	Yes	35.1	35.4	38.4	32.5	35	-	N/A
37a	**Grassmarket 41**	Yes	**42.3**	**40.5**	**60.0**	**42.0**	**43**	**44**	**40**
37b	**Grassmarket 75**	Yes	-	-	-	37.1	39	37	35
37c	**Grassmarket/Thompsons Ct**	No	-	-	-	-	-	27	25
10	**Home Street/Tollcross**	No	37.4	32.3	36.5	25.7	33	31	27
17a	**Hope Park Terrace/VS**	No	-	38.8	**43.4**	37.4	39	36	35
139	**Hope Park Terrace 5**	No	-	-	-	-	34	30	29
140	**Hope Park Terrace/Clerk St**	No	-	-	-	-	35	35	32
38	**Melville Drive**	No	26.2	25.3	27.6	27.3	29	26	23
42	**Midmar Drive**	No	17.4	15.2	18.4	16.1	18	15	13
8	**Morningside Road**	No	30.0	27.1	28.8	28.6	26	25	23
49	**Morrison Street**	Yes	**61.4**	**44.6**	**49.3**	**48.5**	**46**	**42**	36
135	**Nicolson Street 69**	No	-	-	-	-	**50**	**45**	**43**

Site ID	Site Name	Within AQMA ?	Annual mean concentration (adjusted for bias) µg/m^3						
			2008 Bias Adj. Factor = 0.88	2009 Bias Adj. Factor = 0.86	2010 Bias Adj. Factor = 0.85	2011 Bias Adj. Factor = 0.81	2012 Bias Adj. Factor = 0.76	2013 Bias Adj. Factor = 0.75	2014 Bias Adj. Factor = 0.74
136	**Nicolson Street 92**	No	-	-	-	-	**42**	39	39
27	**North Bridge - South**	Yes	**52.3**	**48.4**	**49.4**	**48.7**	**52**	**47**	**48**
144	**South Bridge 69**	No	-	-	-	-	-	**46**	**47**
142	**South Clerk Street 41a**	No	-	-	-	-	**42**	**40**	36
141	**South Clerk Street 84**	No	-	-	-	-	**44**	**41**	38
28e	**St Leonards Street 145**	No	-	-	-	-	-	-	28
3	**Torphichen Place**	Yes	**58.2**	26.3	**55.6**	**55.1**	**48**	**43**	**43**
3b	**Torphichen Place 1**	Yes	-	-	-	-	-	-	**45**
3a	**Torphichen Street**	Yes	-	-	-	-	-	32	31
2	**West Maitland St/Palmerston Pl**	Yes	**70.1**	**45.6**	**52.4**	**55.3**	**40**	-	**43**
28b	**West Port 62**	Yes	**72.5**	**66.7**	**62.4**	**57.0**	**61**	**52**	**56**
28c	**West Port Opp 50**	Yes	**51.5**	**43.5**	**41.5**	39.0	-	39	N/A
28d	**West Port 42**	Yes	**66.6**	**60.2**	**54.9**	**55.2**	**60**	**58**	**51**
	WEST								
145	**Corstorphine High Street**	No	-	-	-	-	-	-	27
56	**Glasgow Road/Drumbrae**	No	-	28.6	30.7	29.5	31	30	29
57	**Glasgow Road No 158**	No	-	34.9	36.3	36.5	36	33	33
16	**Glasgow Road 68**	Yes	**42.4**	**46.8**	**44.5**	**43.8**	**47**	**40**	**40**
16a	**Glasgow Road 68 facade**	Yes	-	-	-	-	-	38	36
16b	**Glasgow Road/Ratho Station 94**	Yes	-	-	-	-	-	-	32
58	**Glasgow Rd Newbridge R'about**	Yes	-	**51.1**	**51.3**	**51.5**	**48**	**46**	**45**
15	**Glasgow Rd Newbridge R'about**	Yes	35.7	**42.0**	37.6	**40.9**	**40**	39	37
15a	**Glasgow Road 9**	Yes	-	-	-	-	-	-	34
40f	**Hillhouse Road 118**	No	-	-	-	-	35	31	30
40c	**Hillhouse Road 240**	No	-	-	-	-	30	28	26

Site ID	Site Name	Within AQMA ?	Annual mean concentration (adjusted for bias) µg/m^3						
			2008 Bias Adj. Factor = 0.88	2009 Bias Adj. Factor = 0.86	2010 Bias Adj. Factor = 0.85	2011 Bias Adj. Factor = 0.81	2012 Bias Adj. Factor = 0.76	2013 Bias Adj. Factor = 0.75	2014 Bias Adj. Factor = 0.74
40b	**Hillhouse/Craigcrook Terr**	No	-	-	-	-	26	27	27
40d	**Hillhouse/ Marischall Pl 4**	No	-	-	-	-	32	33	30
41	**Hillview Terrace**	No	19.6	21.2	22.4	18.4	21	18	18
61	**Maybury Rd/Barnton**	No	-	24.2	27.0	25.8	16	25	23
40	**Queensferry Rd/Hillhouse Rd**	No	**44.4**	37.4	**42.4**	34.2	**40**	37	32
63	**Queensferry Road 544**	No	-	27.6	29.4	25.2	26	26	23
64	**Queensferry Road 550**	No	-	**46.8**	**47.5**	**43.9**	**50**	**47**	**47**
64a	**Queensferry Road 552**	No	-	-	-	-	30	28	30
62	**Queensferry Road 561**	No	-	22.0	25.6	19.2	25	21	19
23	**Roseburn Terrace**	Yes	**49.5**	37.2	**43.2**	34.5	38	35	37
1	**St John's Road SB**	Yes	**41.2**	36.7	38.6	35.1	38	36	34
1b	**St John's Road IR**	Yes	**48.8**	**44.2**	**43.5**	38.4	**44**	**41**	37
SJ1	**St John's Road Kaimes Rd**	Yes	-	-	-	-	-	-	31
SJ2	**St John's Road 63**	Yes	-	-	-	-	-	-	25
SJ3	**St John's Road 81**	Yes	-	-	-	-	-	-	27
1d	**St John's Road 131**	Yes	**84.9**	**57.8**	**58.8**	**56.3**	**52**	**52**	**48**
39	**St John's Road**	Yes	31.7	28.2	31.1	30.0	32	35	32
146	**Station Road 41 Kirkliston**	No	-	-	-	-	-	-	23
50a	**Whitehouse Rd/Barnton Grove**	No	31.4	29.8	32.1	27.8	32	28	28
	SOUTH WEST								
76	**Angle Park/Harrison Rd**	No	-	-	**52.9**	**44.4**	**48**	**41**	**41**
76c	**Angle Park Terrace 25**	No	-	-	-	-	36	32	30
76b	**Angle Park Terrace 74**	No	-	-	-	-	**51**	**46**	**41**
76a	**Ardmillan Terrace 22**	No	-	-	-	-	32	30	27
80d	**Balgreen Road / School**	No	-	-	-	-	-	36	31

Site ID	Site Name	Within AQMA ?	Annual mean concentration (adjusted for bias) µg/m^3						
			2008 Bias Adj. Factor = 0.88	2009 Bias Adj. Factor = 0.86	2010 Bias Adj. Factor = 0.85	2011 Bias Adj. Factor = 0.81	2012 Bias Adj. Factor = 0.76	2013 Bias Adj. Factor = 0.75	2014 Bias Adj. Factor = 0.74
80e	**Balgreen Road / Library**	No	-	-	-	-	-	37	32
4	**Calder Road**	No	29.5	26.3	25.9	31.7	32	30	26
18	**Gorgie Road 8**	Yes	**51.5**	**45.0**	**54.5**	**48.2**	**49**	**45**	**42**
80c	**Gorgie Road 87**	Yes	-	-	-	-	39	**40**	N/A
80b	**Gorgie Road 549**	Yes	-	-	-	-	33	34	31
80	**Gorgie Road /Delhaig**	Yes	-	-	**47.4**	**42.2**	**42**	**44**	37
80a	**Gorgie Road Glen Lea**	Yes	-	-	-	-	-	33	31
5	**Gorgie Road/Murieston Road**	Yes	**44.3**	**42.6**	**42.9**	**44.4**	**43**	**41**	35
76d	**Henderson Terrace**	No	-	-	-	-	38	35	32
11	**Lanark Road 610**	No	**24.8**	**22.3**	**23.5**	**22.5**	24	22	19
77a	**Slateford Road 51**	No	-	-	-	-	**41**	37	35
77b	**Slateford Road 93/95**	No	-	-	-	-	**46**	**42**	38
77	**Slateford Road 97**	No	-	-	**47.6**	**38.1**	**43**	**40**	37
78	**Slateford Rd/The Maltings**	No	-	-	**35.9**	**30.2**	31	30	25

Notes for Table;

Bold and red, exceedence of the NO_2 annual mean objective of 40µg/m^3

Bold black shows results of 40µg/m^3 .

Bold, red and underlined text show potential exceedence of the hourly mean objective with results over 60µg/m^3.

Pale yellow cells indicate PDT sites that are distance corrected. Local experience has found that the DEFRA distance correction tool typically over estimates the actual façade result by around 2 to 3ug/m^3 when compared to a kerbside or roadside tube corrected back to the façade.

Table 2.8 Locations outwith AQMAs where monitoring results indicate potential exceedences of the Annual Mean Nitrogen Dioxide Objective

Site ID	Site Name	Within AQMA ?	Annual mean concentration (adjusted for bias) µg/m^3						
			2008 Bias Adj. Factor = 0.88	2009 Bias Adj. Factor = 0.86	2010 Bias Adj. Factor = 0.85	2011 Bias Adj. Factor = 0.81	2012 Bias Adj. Factor = 0.76	2013 Bias Adj. Factor = 0.75	2014 Bias Adj. Factor = 0.74
43	**Broughton Road**	No	**40.4**	38.1	39.8	34.6	37	37	35
138	**Clerk Street 15**	No	-	-	-	-	**40**	38	38
48f	**Cowgate/50 St Mary's St**	No	-	-	-	-	-	-	37
136	**Nicolson Street 92**	No	-	-	-	-	**42**	39	39
73a	**Portobello Road/Ramsay Inst**	No	-	-	-	**41.6**	37	37	36
73d	**Portobello Road/Ramsay F**	No	-	-	-	-	-	38	35
77b	**Slateford Road 93/95**	No	-	-	-	-	**46**	**42**	38
77	**Slateford Road 97**	No	-	-	**47.6**	38.1	**43**	**40**	37
142	**South Clerk Street 41a**	No	-	-	-	-	**42**	**40**	36
141	**South Clerk Street 84**	No	-	-	-	-	**44**	**41**	38

Note for Table;

Bold and red, exceedence of the NO_2 annual mean objective of 40µg/m^3

Bold black, shows results of 40µg/m^3 .

Trend Data from Nitrogen Dioxide Passive Diffusion Tubes within AQMAs

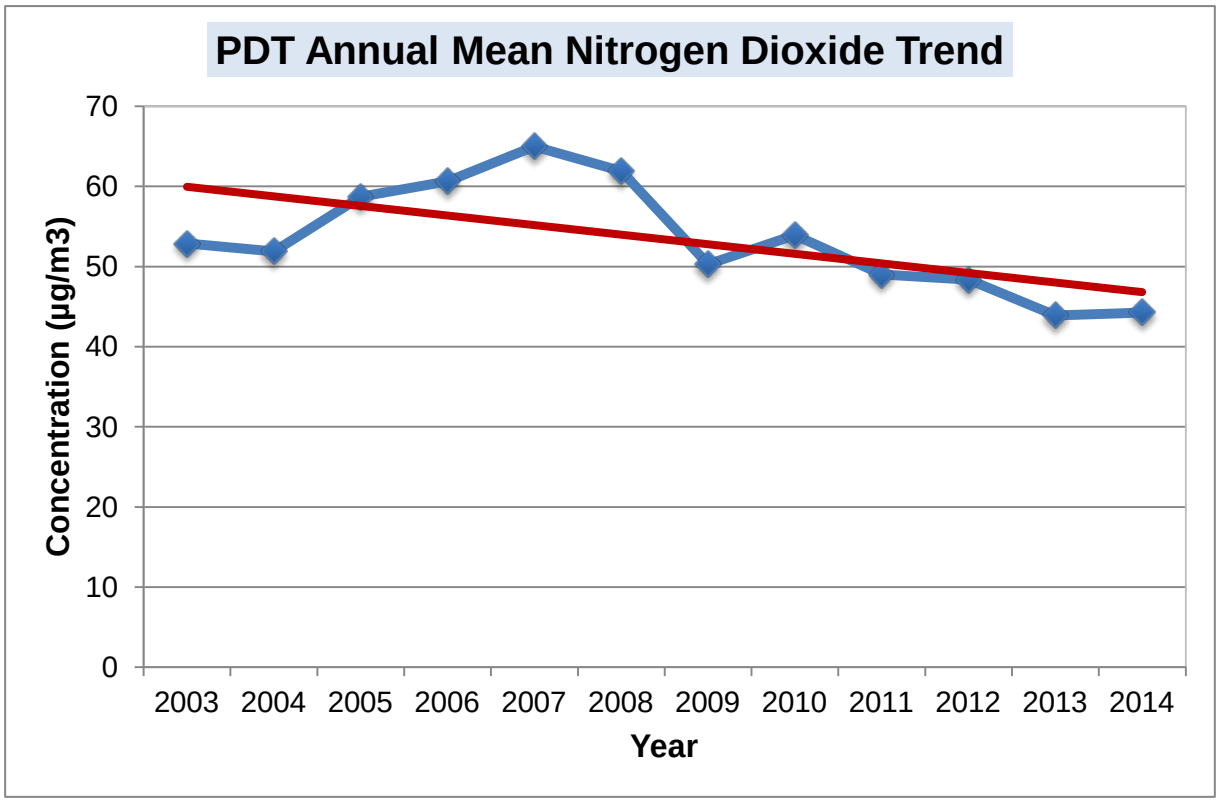
Passive diffusion tube data used in the trend assessment has been corrected for bias and taken from the point of measurement. This is to ensure consistency due to the change in methodology in 2008 for calculating nitrogen dioxide fall off with increasing distance from source. Many of Edinburgh's historic monitoring sites within the Central AQMA were positioned at the kerbside/roadside and these locations have been retained for continuity. Trend lines have been drawn using an Excel simple regression statistical program.

Figure 2.9 shows the trend analysis. The data used is shown in Appendix E.

The trend data is based on the average mean concentrations obtained from passive diffusion tube monitoring at the following locations each year:

- St John's Road (ID1)
- St John's Road (ID1b)
- St John's Road (ID1d)
- West Maitland Street (ID2)
- Torphichen Place (ID3)
- Gorgie Road (ID18)
- Leith Walk (ID21)
- Roseburn Terrace (ID23)
- North Bridge (ID27)
- Westport (ID28a)
- York Place (ID36)

Figure 2.9 Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites within the AQMAs



There is a downward trend of nitrogen dioxide concentrations at passive diffusion tube sites located within Air Quality Management Areas. There has also been a downtrend of the bias adjustment factor for passive diffusion tube analysis over the same period. This is also represented across much of the UK.

Traffic flows are normalizing after completion of the Edinburgh Trams construction project. However changes and enhancements to the entire transport system are continuing in order to ensure an effective network, deal with congestion and encourage multi-mode integration. It will be sometime before confidence can be attributed to trend analysis**.**

The Local Authority's Further Assessment (2013) work, which followed designation of the Glasgow Road and Inverleith Row AQMAs and extension of the Central and Great Junction Street AQMAs, used DEFRA approved projection factors to estimate the earliest date when air quality objectives are likely to be achieved. The projection of roadside concentrations to future years is not an absolute and can only give indicative values.

Estimation of concentrations in the Great Junction Street AQMA suggested the annual mean objective would be achieved in 2014. This has not been the case at all sites with new location (Site ID 9d) showing an exceedance.

It also predicted near compliance in the Central AQMA, with full compliance in 2015 and full compliance for Glasgow Road and Inverleith Row in 2016.

The Central and Glasgow Road AQMA projections are unlikely to be achieved, although planned actions to the traffic management system at Glasgow Road Newbridge roundabout could change that.

In terms of compliance of the annual mean objective in the Inverleith Row AQMA, data shows this is on-target; however it is accepted that a number of years of data well below the objective will be necessary before proceeding with a revocation of the AQMA. This will also give cognises of varying meteorological conditions and the actual improvements of vehicles in the national fleet, which is dependent on new engine technology delivering expected improvements in the 'real driving-world'.

Future Review and Assessment work will include analysis of trends within each individual AQMA.

2.2.2 PM_{10}

St Leonard's (AURN) and Queensferry Road operate a Filter Dynamics Measurement System (FDMS) unit to monitor PM_{10}. All other monitoring stations use Tapered Element Oscillating Microbalance (TEOM) instruments.

The TEOM data from Queen Street, Salamander Street, Currie and Glasgow Road has been corrected to provide a gravimetric equivalent, using the Kings College Volatile Correction Model (VCM). The data has also been gravimetrically corrected using a local derived gravimetric factor of 1.14 for comparison and continuity with historical data. The data shows that the two correction methodologies are comparable. Further details are discussed in Appendix A4.

Data are shown in Tables 2.9 and 2.10 compared with the annual and 24-hour mean objectives.

All monitoring locations are representative of relevant public exposure.

Table 2.9 Results of Automatic Monitoring for PM_{10}: Comparison with Annual Mean Objective

Site ID	Site Name Equipment Type	Within AQMA?	Valid Data Capture [a] 2014 (%)	Annual Mean Concentration (µg/m^3)						
				2008	2009	2010	2011	2012	2013	2014
1	**Queen Street** TEOM	Y (NO_2)	97	**19** (vcm) **19** (1.14)	**18** (vcm) **18** (1.14)	**18** (vcm) **19** (1.14)	16 (vcm) 16 (1.14)	16 (vcm) 16 (1.14)	17 (vcm) 17 (1.14)	17 (vcm) 16 (1.14)
6	**Currie** TEOM	N	98	N/A	N/A	11 (vcm) 11 (1.14)	13 (vcm) 11 (1.14)	11 (vcm) 11 (1.14)	*12 (vcm)* *11 (1.14)*	11 (vcm) 10 (1.14)
7	**St Leonard's** FDMS	N	71	15	*17*	14	15	*16*	14	*13*
8	**Salamander St** TEOM	N	98	N/A	***22** (vcm)* ***23** (1.14)*	**26** (vcm) **27** (1.14)	**26** (vcm) **27** (1.14)	**23** (vcm) **24** (1.14)	**22** (vcm) **22** (1.14)	**21** (vcm) **21** (1.14)
9	**Queensferry Rd** FDMS	N	68	N/A	N/A	N/A	***21***	**18**	**19**	***19***
10	**Glasgow Road** TEOM	Y (NO_2)	98	N/A	N/A	N/A	N/A	*15 (vcm)* *15 (1.14)*	16 (vcm) 16 (1.14)	16 (vcm) 16 (1.14)

Notes for table:

In bold and red, exceedence of the PM_{10} annual mean objective of 18µg/m^3 and in bold black, result of 18µg/m^{3}shown.

In *italic*, poor data capture. Data not annualised due to its sporadic nature.

[a] Data capture for the full calendar year.

Table 2.10 Results of Automatic Monitoring for PM_{10}: Comparison with 24-hour Mean Objective

Site ID	Site Type	Within AQMA?	Data Capture 2014 %	Confirm Gravimetric Equivalent (Y or N/A)	Number of Daily Means > 50µg/m^3						
					2008	2009	2010	2011	2012	2013	2014
1	**Queen Street** TEOM	Y (NO_2)	97	Y	0	1	1	0	2	2	1
6	**Currie** TEOM	N	98	Y	N/A	N/A	0	0	0	0(29)[a]	0
7	**St Leonards** FDMS	N	71	Y	0	2	1	0	2(40) [a]	3	0(32)[a]
8	**Salamander St** TEOM	N	98	Y	N/A	2(44) [a]	**19**	**22**	**13**	5	5
9	**Queensferry Rd** FDMS	N	68	Y	N/A	N/A	N/A	2	3	2(41)[a]	1(38)[a]
10	**Glasgow Road** TEOM	Y (NO_2)	98	Y	N/A	N/A	N/A	N/A	0(35) [a]	1	0

Notes for table;

In bold and red, exceedence of the PM_{10} daily mean objective 50µg/m^3 – not to be exceeded more than 7 times per year

[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)

PM_{10} data from all monitoring locations in 2014 meet the UK National Objectives.

Data from the St Leonard's urban background site and Currie suburban site readily meet the Scottish air quality annual mean objective of 18µg/m^3.

It should be noted that the Low Emission Strategy for Scotland, published for consultation in January 2015 by Scottish Government, proposes to change the annual mean objective for PM_{10} to 20µg/m^3 to correspond with the World Health Organisation's recommended standard.

Having regard to this, roadside monitoring at Queen Street and Glasgow Road, which marginally meet the existing Scottish objective (18µg/m^3), are below the proposed objective of 20µg/m^3.

At Queensferry Road and Salamander Street the existing PM_{10} objective is exceeded in 2014, with annual means of 19µg/m^3 and 21µg/m^3 respectively. Queensferry Road AQMS, which is sited at a busy bus stop, meets the proposed objective, however this should be considered with caution as data capture from the station was poor. (The replacement of the drier on the FDMS unit caused the majority of issues.) The data could not be annualised due to its very sporadic nature. The marginal result does however replicate 2013 data which had reasonable data capture.

In respect to the breaches of the annual mean PM_{10} objective at Salamander Street, air quality specialists have investigated the extent of a boundary for an AQMA, predominately considering fugitive sources. Based on the study, a recommendation was made for an appropriate zone to be designated as an Air Quality Management Area. This could potentially be carried out as a further extension to the existing Great Junction Street AQMA. Details will be reported separately in the Detailed Assessment for PM_{10}.

In general 2014 results show that the decision to proceed to Detail Assessment for PM_{10} remain valid, the findings of which will be reported separately in 2015.

Trend in Annual Mean PM_{10} concentrations

In 2014 there were four monitoring sites with over five years data required in order to undertake trend analysis.

Uncorrected TEOM data (non-volatile fraction) has been used to assess PM_{10} trends at Queen Street, due to changes in gravimetric correction methodology.

The non-volatile fraction of the FDMS data for years 2008 to 2014 at St Leonard's has also been used to ensure a consistent approach. Nevertheless this should be viewed with caution as the TEOM instrument was replaced with a FDMS unit in 2008.

At Salamander Street and Currie volatile corrected TEOM data was used for the analysis, from 2010 to 2014.

Trend lines have been drawn using an Excel simple regression statistical program.

Data trends are shown in Figures 2.10 and 2.13 and summarised below.

Table 2.11 Summary of PM_{10} Annual Mean Trend Data

Monitoring Location / Type	Trend in annual mean PM_{10} (years)	Concentrations of PM_{10}
Currie (Suburban)	(2010 to 2014) ↔	No change
Queen Street (Roadside)	(1999 to 2014) ↓	Decreasing
Salamander Street (Roadside/Fugitive)	(2010 to 2014) ↓	Decreasing
St Leonard's (Urban background)	(2004 to 2014) ↓	Decreasing

A downward trend is noted at St Leonard's, the urban background site. Similar conclusions can be determined at both roadside location Queens Street and Salamander Street, although the latter is also affected by fugitive sources.

At Currie, the suburban site, there is a stabilising trend with no significant changes in annual mean concentrations since monitoring began in 2010.

The city-wide detailed assessment will undertake a full assessment of trend analysis.

Figure 2.10 Trend in Uncorrected Annual Mean Non Volatile Fraction PM_{10} Concentrations (µg/m^3) measured at St Leonard's

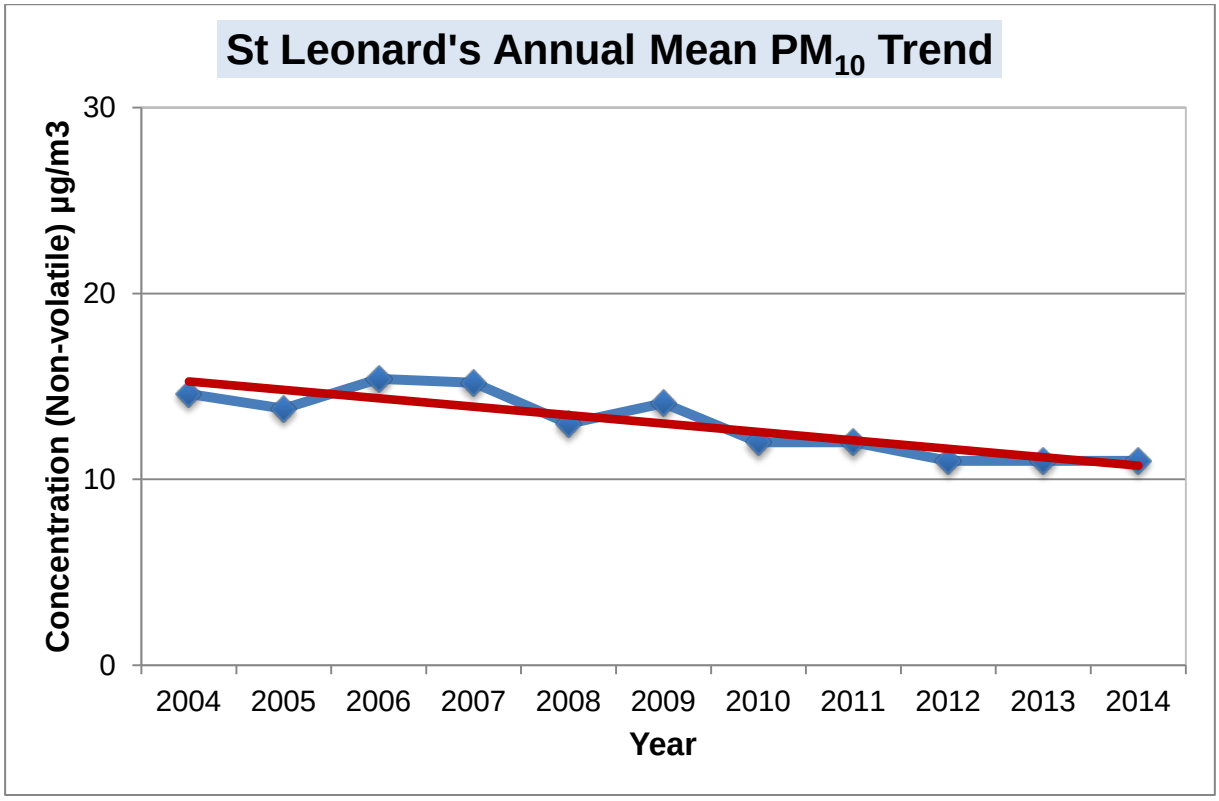


Figure 2.11 Trend in Uncorrected Annual Mean Non Volatile Fraction PM_{10} Concentrations (µg/m^3) measured at Queen Street

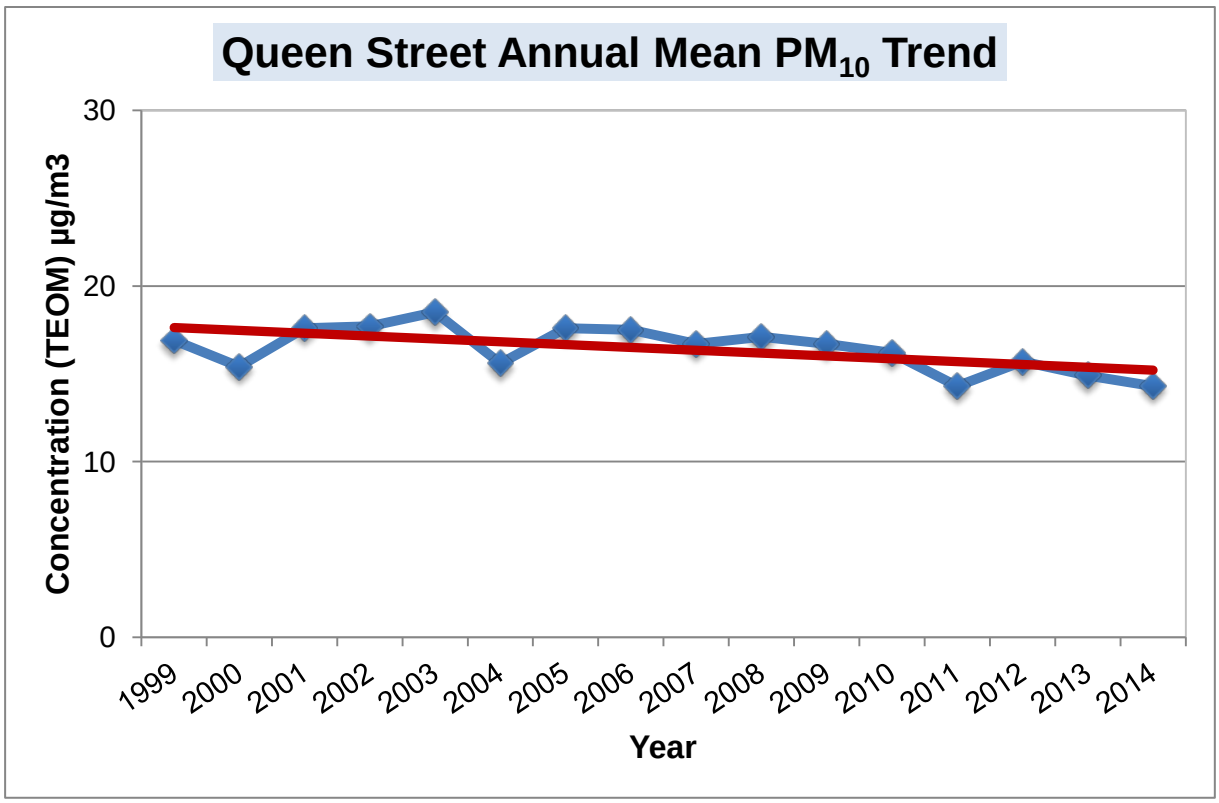


Figure 2.12 Trend in Annual Mean PM_{10} Concentrations (µg/m^3) measured at Currie

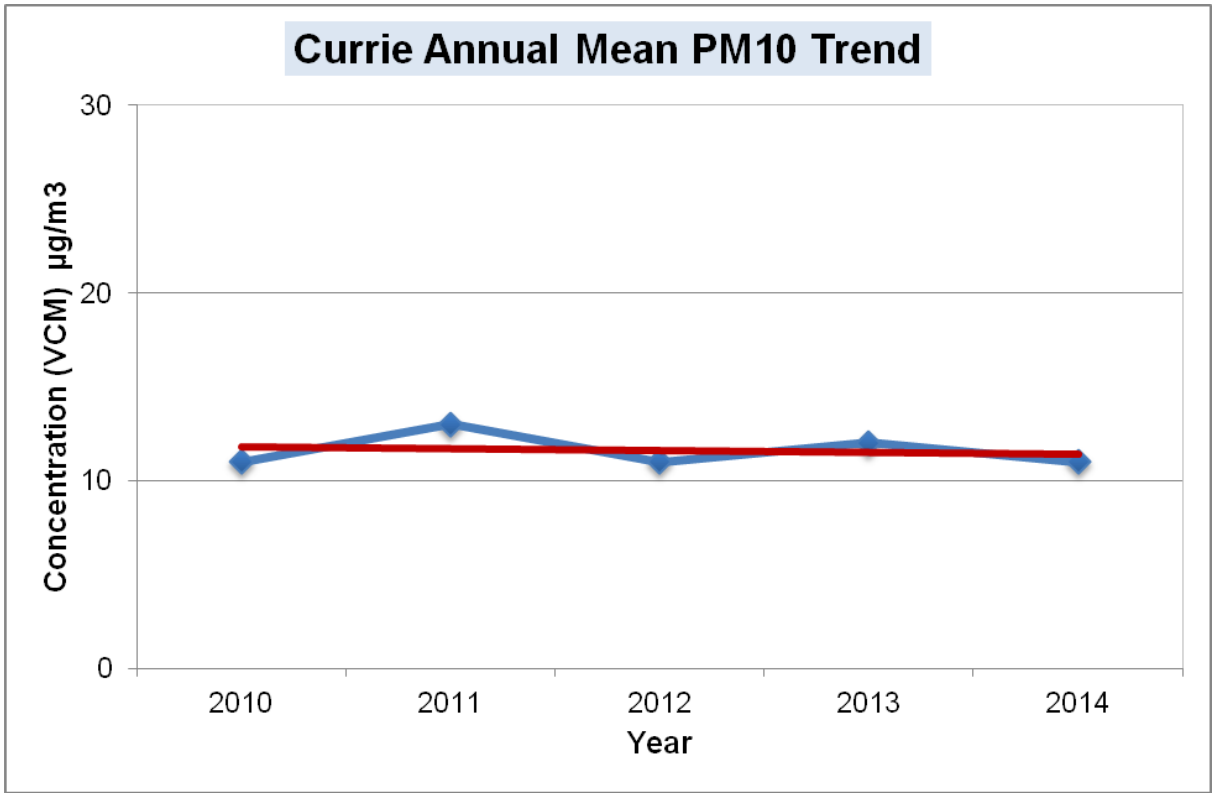
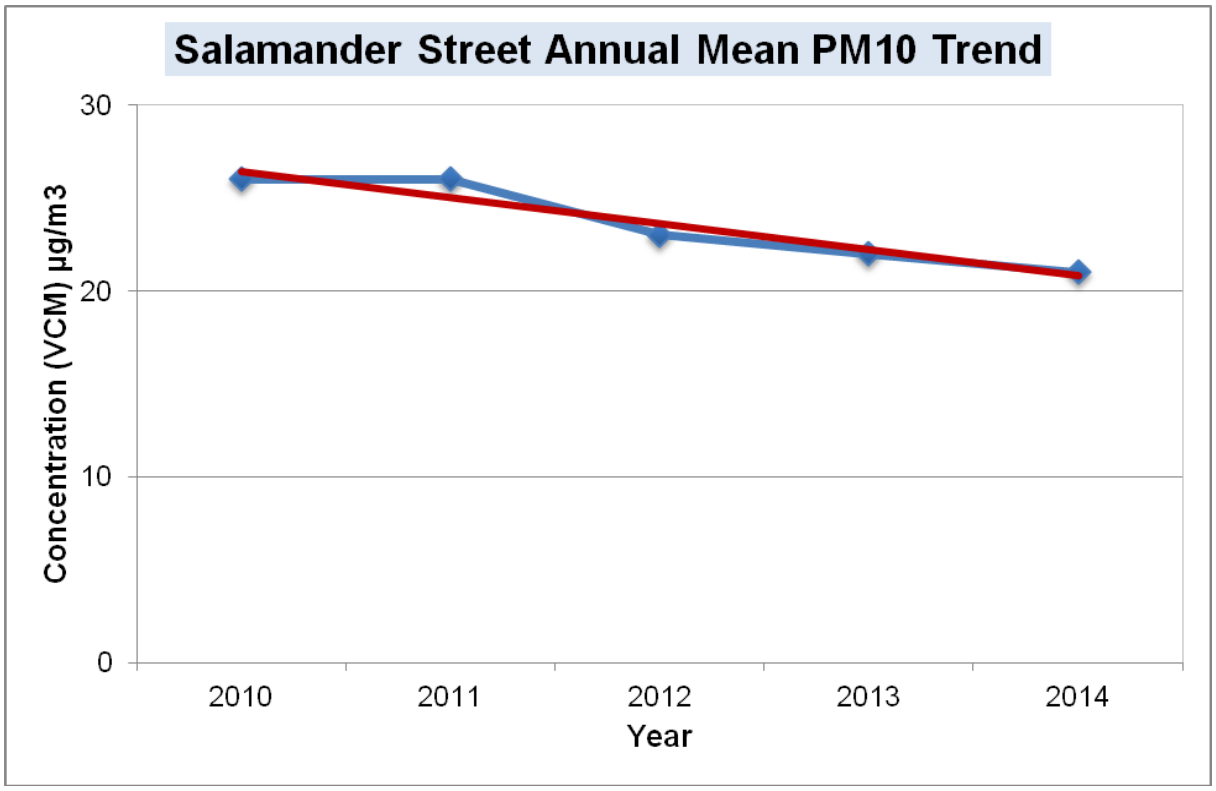


Figure 2.13 Trend in Annual Mean PM_{10} Concentrations (µg/m^3) measured at Salamander Street



2.2.3 Sulphur Dioxide

In 2014 the 15-minute, 1-hour and 24-hour Objectives for Sulphur Dioxide were met with no exceedences recorded. This has been the case since 2009. Results are shown below in Table 2.12.

Table 2.12 Results of Automatic Monitoring of SO_2: Comparison with Annual Mean Objectives

Site ID & Type	Within AQMA ?	Monitoring Year (% Data Capture)	Number of Exceedences (percentile in bracket µg/m^3)		
			15-minute Objective (266 µg/m^3)	1-hour Objective (350 µg/m^3)	24-hour Objective (125 µg/m^3)
St Leonard's Urban Background	No	**2009** (95%)	0	0	0
		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

2.2.4 Other pollutants monitored

The following pollutants were monitored at the urban background AURN site at St Leonards and data is presented below; Ozone, Polycyclic Aromatic Hydrocarbons (PAHs) and $PM_{2.5}$. Data collection during 2014 was poor due to the refurbishment of the station. The UK Government and Devolved Administrations are responsible for the review and assessment of these pollutants.

2.2.4.1 Ozone

In 2014 there were 6 exceedences of the 8-hr running mean >100µgm^{-3} of ozone concentrations which meets the objective. Results are shown below in conjunction with historic data, which highlights exceedences between 2007 and 2009 and also again in 2012 – see Table 2.13 below. The objective is met for the past two years.

Table 2.13 Number of Ozone exceedences at St Leonard's

St Leonard's Urban Background site	2007	2008	2009	2010	2011	2012	2013	2014
No. of exceedences	**11**	**14**	**12**	0	0	**43**	9	*6*

Ozone Objective 100µgm^{-3} not to be exceeded more than 10 times per year as an 8-hour running mean by 31st December 2005.

Italic; poor data capture

2.2.4.2 $PM_{2.5}$

The Low Emission Strategy for Scotland which was published (for consultation) in January 2015 proposes a number of changes to the $PM_{2.5}$ regime in Scotland. Local Authorities are likely to become responsible for the review and assessment of the pollutant. Additionally it is proposed that the annual mean objective is changed from 12µg/m^3 to 10µg/m^3 in conjunction with WHO recommendations.

2014 data from St Leonards shows that both the existing and proposed objectives are met, however this must be considered with caution due to poor data capture (72%) during this period. Table 2.14 details monitoring since 2009.

Table 2.14 $PM_{2.5}$ Average annual concentrations at St Leonards

St Leonard's Urban Background site						
Year (Data Capture %)	**2009** (95%)	**2010** (94%)	**2011** (98%)	**2012** (72%)	**2013** (98%)	**2014** (65%)
Annual Concentration (µg/m^3)	8	9	**12**	11	8	9
$PM_{2.5}$ Scottish Objective 12µg/m^3 annual average (limit) 2010.						

2.2.4.3 Polycyclic Aromatic Hydrocarbons (PAHs)

There are many different PAHs; however, the component, used as a marker, is benzo (a) pyrene (B(a)P). The concentration monitored at St Leonards complies with the UK objective however due to poor data capture in 2014 the result should be treated with caution. Monitoring is undertaken using a digital sampler. Concentrations since 2009 are shown in Table 2.15.

Table 2.15 PAH (B(a)P) Monitoring: Comparison with Objective

St Leonard's Urban Background site	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Annual Concentration (ngm^{-3})	0.131	0.129	0.099	0.109	0.084	*0.058*
BaP Objective 0.25ngm^{-3} as an annual average by 31 December 2010. Concentrations shown are not time-weighted. *Italic;* poor data capture						

2.2.5 Summary of Compliance with AQS Objectives

The City of Edinburgh Council has examined the results from monitoring within the Local Authority area.

There are monitoring locations within each of the existing AQMAs, except Inverleith Row, which exceed the annual mean objective for **Nitrogen Dioxide** at relevant receptors and therefore they remain valid. There are also breaches of the objective within the proposed extension to the Central AQMA, so it remains valid that this extension is progressed. At one measurement location out with these areas the concentration of nitrogen dioxide when distance corrected back to facade is above the annual mean objective (Queensferry Road ID64). The result of a PDT located on an adjacent property façade is satisfactory Further monitoring at the facade of the nearest residential property, concurrent to the site commenced at the start of 2015. The case will be further reviewed in 2016.

St John's Road automatic monitoring data met the hourly mean objective for Nitrogen Dioxide. None of the passive diffusion tube data collected during 2014 suggests breaches of the hourly mean objective for NO_2.

2014 measured concentrations of **PM_{10}** are above the existing and proposed Scottish annual mean objective at Salamander Steet. Data for 2014 shows that an AQMA may be required to address exceedences at Salamander Street. A Detailed assessment is currently being undertaken. As part of the assessment Queensferry Road will be kept under review in conjunction with the Scottish Government's PM10 standard review.

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Local knowledge has identified that Drum Street in Gilmerton is heavily trafficked, particularly during rush hour. There are residential properties in close proximity to the road edge, including newly proposed flats at first floor level. Non-automatic monitoring commenced at the start of 2015 in a worst case location to determine if concerns of elevated pollution levels are valid.

Additional monitoring also commenced at the Howdenhall Road / Burdiehouse Road junction where an air quality impact assessment for the major residential development, Broomhills (Planning reference numbers 14/04860/FUL and 14/04880/FUL) identified a potential breach of the annual average objective. A smaller multi-storey residential development at the junction is also under construction (14/00336/FUL).

City of Edinburgh Council confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

3.2 Busy Streets Where People May Spend 1-hour or More Close to Traffic

There are no new locations identified outwith the existing AQMAs where there is public exposure of 1-hour or more close to traffic.

Following works undertaken for the Leith Walk Improvement Project, monitoring will continue within the Great Junction Street AQMA. However, it is unlikely that concentrations at this location will exceed the 1-hour Objective.

City of Edinburgh Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

3.3 Roads with a High Flow of Buses and/or HGVs.

A new speed limit network throughout Edinburgh has been approved by the Local Authority. Many residential roads, shopping streets as well as the city centre will be 20mph roads, although a network of 30mph and 40mph is also retained. An interactive map of the new road network can be found on the Council's website here; http://www.edinburgh.gov.uk/20mph . Enforcement of the city-wide 20mph network will be through road traffic signage. Experience from the Edinburgh South pilot study that followed a similar approach showed a reduction in speeds on the majority of streets. However, in certain streets speeds remained at an inappropriate level. Police Scotland recognises speed management is an important element of road safety and will continue to enforce 20, 30 and 40mph speed limits across the city road network. There is some uncertainty in research the Council has seen as to the benefit these changes will have in terms of air quality. There may be a trade off between lower nitrogen dioxide and higher CO_2 set against greater pedestrian safety. The project ethos is about changing behaviour and attitudes to make lower speeds more acceptable and ultimately encourage modal shift. The Council is currently working on developing a framework for assessment purposes which is likely to include analysis of roadside emissions. Under duties prescribed in the Local Air Quality Management regime air quality monitoring will continue throughout the City network which may assist in this process.

The Edinburgh tram project was completed in May 2014 and passenger service commenced on 31st May 2014. The service running from Edinburgh Airport to York Place connects with railway stations at Edinburgh Park, Haymarket and Waverley as well as Edinburgh bus station and integrates with existing bus services. The Local Authority has received a number of proposals for enhancements to the transport system in the light of the introduction of the new tram. A working group has therefore been set-up to consider these, the effectiveness of the bus and tram operations and how the different modes connect and interface with walking, cycling and other road users. The remit of the group is:

- To consider operational arrangements relating to the integration of tram and bus, together with interfaces with Air/Rail/Active travel, and to consider opportunities to enhance integration along the route of the tram.

- To consider air quality issues, both along the route of the tram and elsewhere in the city centre, where general traffic has been displaced.
- To consider future investment in public transport both in relation to vehicles and infrastructure, given the integration opportunities presented by Transport for Edinburgh, and consider options for improvements to the road and active travel network in the city centre adjacent to the route of the tram.

Possible future investment in trams and the options to extend the route will also be considered in 2015, taking account of integration with other major projects including the St James Quarter redevelopment and the Leith Programme.

The Local Authority is currently seeking to establish design principles and options for the future of George Street following the end of the current Experimental Traffic Regulation Order (ETRO) which included widening of footways and a one way traffic system. The focus will be based on assessing key themes including heritage, place, function and movement and will take account of the wider City Centre Vision.

Air quality monitoring will continue within the city centre and revised source apportionment work will be undertaken for the Central AQMA, in respect to the various changes to the road network once traffic has stabilised.

City of Edinburgh Council confirms that there are no new/newly identified roads with high flows of buses/HDVs.

3.4 Junctions

The Local Authority is considering exploratory design options in respect to the Picardy Place junction, as part of the St James' Quarter redevelopment, which is located within the Central AQMA. A Masterplan for the site allows the development of a hotel on the existing roundabout area.

City of Edinburgh Council has assessed new/newly identified junctions meeting the criteria in Section A.4 of Box 5.3 in TG(09), and concluded that it will not be necessary to proceed to a Detailed Assessment at this time.

3.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment

The new road across the Forth estuary – the Queensferry Crossing – is due to open in 2016. The bridge is a centre-piece in a major upgrade to the Cross Forth Transport corridor which includes major motorway upgrades to the north and south of the bridges and the first ever use in Scotland of variable mandatory speed limits to smooth traffic congestion via an Intelligent Transport System. This system also controls dedicated bus lanes within the motorway hard shoulder. When the new crossing opens, the existing Froth Road Bridge will become dedicated for public transport use, cycling and walking. A refreshed Public Transport Strategy[4] details further interventions and measures to support this aspiration. The construction of the Halbeath Park and Choose (Ride) is an important component because of the potential to provide a concentration of passengers to develop new bus services. Additional interventions in the Strategy include the development of an Orbital Bus Rapid Transit system, real time information improvements work, feasibility work to consider additional park and ride sites (e.g. Newbridge) and work to assess the feasibility of improving bus movements between Gogar Roundabout through to the Maybury Junction and Hillhouse Road in Edinburgh.

City of Edinburgh Council confirms that there are no new/proposed roads.

3.6 Roads with Significantly Changed Traffic Flows

Midlothian Council are currently considering a planning application for the erection of up to 650 houses, a primary school and ancillary mixed uses (shops and offices etc) and infrastructure at a site adjacent to City of Edinburgh Council boundary, where it is estimated that most vehicle trips will made. The planning reference number for the application is 14/00910/PPP. The City of Edinburgh Council did not raise objection to the application but asked Midlothian Council to ensure that the applicant makes provision for the introduction of robust air quality mitigation measures to address emissions from space heating within the proposed development (in order to keep background concentrations to a minimum), and to ensure that journeys by private car are reduced by providing good access to public transport.

Reducing the need to travel and promoting use of sustainable modes of transport are key principles underpinning the (Second) Proposed Local Development Plan Strategy 2014[5]. It states,

> 'Future growth of the city based on excessive car use and dependency would have serious consequences in terms of congestion and deteriorating air quality. This will have a knock on effect on the economy and environment and would also disadvantage people who do not have access to a car. An improved transport system based on sustainable alternatives to the car is therefore a high priority for Edinburgh. This is the central objective of the Council's Local Transport Strategy, which proposed continued investment in public transport (including trams), walking and cycling.'

The strategy also directs major travel generating developments to occur in locations well served by public transport, walking and cycling networks, and says there will be resistance to development in non-central locations with limited sustainable travel options. The LDP helps reduce car dependency by encouraging higher densities in accessible locations and mixed use developments which bring homes, shops and work places closer together, and by paying careful attention to the design of development and to the supply and quality of car and cycle parking provision.

The South East Scotland Strategic Development Planning Authority, SESplan, is a partnership of six member authorities comprising of Edinburgh, East Lothian, Midlothian, Fife, Scottish Borders and West Lothian, working together on strategic development planning matters. Currently the organisation is preparing the next Strategic Development Plan which will replace the current plan in 2018 - a consultation on the Main Issues Report will begin in July 2015. This will assess main issues in the region with options on how the next plan could address these. The consultation will run until 15 September 2015.

SEStran (South East Scotland Transport Partnership) released a draft Regional Transport Strategy on 5 August 2014 and sought comments from the partner authorities. The draft refreshed Regional Transport Strategy contains policies, at a regional level, that are similar to those in the Council's own Local Transport Strategy. They include regional policies to improve public transport, achieve local air quality

targets, reduce road traffic accidents and support “soft” measures, such as travel plans and marketing.

City of Edinburgh Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

3.7 Bus and Coach Stations

Edinburgh Bus Station at St Andrew Square is within the Central AQMA. The majority of buses which use the station pass through the St John’s Road and Central AQMAs. Table 3.1 shows the number of bus movements reported previously and in 2014.

Table 3.1 Comparison of daily mean bus movements since 2006

	Daily Mean Bus Movements			
Day	**2006**	**2008**	**2011**	**2014**
Monday to Friday	560	702	776	796
Saturday	470	642	666	702
Sunday	242	346	410	440

There has been a slight increase in the number of movements of buses since the last Updating and Screening Assessment. However, this is still below the review and assessment criteria that would require further assessment.

City of Edinburgh Council confirms that there are no relevant bus stations in the Local Authority area.

4 Other Transport Sources

4.1 Airports

Previous rounds of Review and Assessment work did not identify likely exceedences from aircraft emissions at Edinburgh Airport.

The number of airline passengers has increased since the previous round in 2009 from 9.385 to 10.160 million passengers per annum (mppa). Freight handling data has not been finalised for 2014.

Table 4.1 Comparison of annual airline passengers and freight between 2002 and 2014 at Edinburgh Airport

Edinburgh Airport	2002	2005	2009	2011	2014
Passenger throughput (mppa*)	5.6	8.48	9.047	9.385	10.160
Freight (tonnes)	18,280	31,868	53,161	45,627	#
Total mppa (including equivalent freight)	5.78	8.79	9.58	9.84	N/A

*mppa million passengers per annum

data not available

Edinburgh Airport Limited commissioned Ricardo-AEA by to undertake a 6-month air quality survey investigating whether the Air Quality Strategy (AQS) objectives of NO_2 concentrations at Edinburgh Airport are being met during 2013[6]. The survey followed on from similar studies carried out during 1999, 2003/2004, 2006/2007 and 2010/2011. Data was annualised and corrected using the national bias adjustment factor (0.80) to assess against air quality objectives. Annual mean NO_2 concentrations close to or above the objective level of 40µg/m^3 were measured at four sites (see Table 4.2 below).

Table 4.2. Nitrogen dioxide concentrations greater than 40µg/m^3 monitored at Edinburgh Airport 2010 and 2013.

Location	2010	2013
Head of Stand 9	61	54
Coach park entrance	52	53
Taxi area	50	44
Eastfield Road East	50	40

As with 2010 data, 2013 data shows highest concentrations of NO_2 at Head of Stand 9, followed by coach park entrance, taxi area and Eastfield Road. Fortunately the sites are not considered relevant exposure when comparing to the annual mean objective and therefore, this objective was not likely to have been breached at any location during 2013. Similarly the hourly NO_2 objective of no more than 18 exceedences in a year of 200 µg/m^3 is not likely to have been exceeded at any location in terms of public exposure.

Overall, set against an increase in passenger numbers and flights, a decrease in annual average NO_2 concentrations was seen when compared to the 2010 survey.

City of Edinburgh Council confirms that there are no relevant airports in the Local Authority area.

4.2 Railways (Diesel and Steam Trains)

The new domestic, Scottish Government-funded, Borders Railway will re-establish passenger services for the first time in over 40 years from Edinburgh through Midlothian to Tweedbank. With construction due to be completed in the summer and the line to enter service in September 2015, the new railway will offer a fast and efficient alternative to the local road network allowing passengers to travel from Tweedbank to South and East Edinburgh.

4.2.1 Stationary Trains

Virgin Trains East Coast, Craigentinny Service Delivery/Maintenance Depot is situated adjacent to residential properties. Although previous Review and Assessment work did not identify operations on this site which would adversely impact meeting the sulphur dioxide 15-minute objective, the company has been advised on appropriate methodology for carrying out a short-term study with automatic monitoring (for various averaging periods) for this pollutant.

The company is currently monitoring dust on-site, which is linked to a management system to identify alerts for workplace and contractors incidents. Proposals have been made to undertake monitoring of PM_{10} with the Osiris monitoring device. The Local Authority has provided advice in terms of equivalent techniques.

On the site, technical issues continue to prevent plans to fully operate shore supply which would allow stationary vehicles to be linked to electricity during servicing and maintenance to avoid use of generators or idling of train engines.

City of Edinburgh Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

4.2.2 Moving Trains

A summary of the Detailed Assessment work carried out in respect of to potential exceedences of nitrogen dioxide objectives associated with the movement of diesel trains at Haymarket Station can be found in the following report – 2010 Air Quality Progress Report for City of Edinburgh Council[7]. The assessment concluded that moving trains will not result in exceedences of nitrogen dioxide objectives.

City of Edinburgh Council confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

4.3 Ports (Shipping)

Previous rounds of Review and Assessment did not identify shipping in Leith Docks to be a significant source of sulphur dioxide. In 2014 there were 481 vessel calls to the port, which equates to 962 vessel movements. This is well below the assessment criteria.

City of Edinburgh Council confirms that there are no ports or shipping that meet the specified criteria within the Local Authority area.

5 Industrial Sources

5.1 Industrial Installations

5.1.1 New or Proposed Installations for which an Air Quality Assessment has been Carried Out

A detailed planning application for the Millerhill Recycling and Energy Recovery Centre (RERC) development is currently being considered by neighbouring Midlothian Local Authority. The site is located in close proximity to the City of Edinburgh boundary, approximately 6km southeast of the City Centre.

The centre will burn up to 195,000 tonnes per annum of residual non-hazardous waste, generated by households and businesses from within the City of Edinburgh and Midlothian Councils, as part of a commitment to reduce the amount of waste being sent to landfill. Recycling will also be carried out at the centre and there will also be an anaerobic digestion facility with a mechanical biological treatment plant. The heat treated waste will generate up to 11MW of electricity and up to 20MW of thermal heat. A 75m high chimney is proposed in line with the Waste Incineration Directive. It is estimated that there will be approximately 68 daily HGV movements.

This is an additional facility which does not replace any other waste transfer station.

An air quality impact assessment has been submitted in support of the application.

City of Edinburgh Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been Introduced

There is potential for coal handling operations at Leith Docks to cease, particularly following the closure of Cockenzie coal-fired power station. However the PPC permit issued by SEPA continues to be valid for operation. Port operations are being considered in full as part of the PM_{10} Detailed Assessment.

City of Edinburgh Council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

Aggregate Industries LTD has obtained a permit from the SEPA to operate a concrete industrial process at Port of Leith, Leith Docks. The ready mixed concrete plant which is currently located adjacent to the Leith Dock on Bath Road would relocate. The Local Authority is currently considering whether there are any implications under the terms of the Planning regime.

City of Edinburgh Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.2 Major Fuel (Petrol) Storage Depots

There are no major fuel (petrol) storage depots in the Local Authority area. Previous reports have assessed the crude oil storage tanks at Dalmeny and the fuel transfer facility at Hound Point in the Firth of Forth, for potential exceedences of benzene. However, no exceedences were identified. The Local Authority no longer monitors Benzene.

There are no major fuel (petrol) storage depots within the Local Authority area.

5.3 Petrol Stations

There was one application for a petrol filling station in 2013-14 (Planning Reference number 13/01259/PPP) which was refused by the Planning Authority. The development, located 30m to residential property, included an electric vehicle charging station.

City of Edinburgh Council confirms that there are no petrol stations meeting the specified criteria**.**

5.4 Poultry Farms

Further work is necessary in conjunction with the Scottish Government and the Scottish Environmental Protection Agency (SEPA) to consider a number of poultry

farms in the west of the city. Based on an updated screening calculation which takes into account background levels of PM_{10}, there is potential for a number of poultry farms to breach the daily mean PM_{10} objective. In conjunction with SEPA, monitoring at a sensitive receptor adjacent to one of the poultry farms is expected to commence in 2015, in order to establish actual PM_{10} levels. Details will be included in the city-wide PM_{10} Detailed Assessment.

City of Edinburgh Council has identified poultry farms meeting the specified criteria, and **will need to proceed to a Detailed Assessment for PM_{10}.**

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

The City of Edinburgh Council continues to actively discouraged new biomass installations (less than 20Mwe) through planning policy. However each case is considered on its own merits.

At Dundas Castle, South Queensferry an 800kW biomass boiler installation was deemed acceptable. It is currently under construction and due to be operational in May/June 2015. The boiler is located away from the main building (residential exposure) and will include a ceramic filter. The system will also provide hot water. The PM_{10} and NO_2 background levels in the area are low (1km grid; PM_{10} and NO_2 in 2014 was 12.5$\mu g/m^3$) and with the site being located off the gas-grid appropriate justification could be made for the installation.

The findings and conclusions of the city-wide Detailed Assessment for PM_{10} will provide a steer on future policy in respect to biomass installations.

City of Edinburgh Council has assessed biomass combustion plant, and concluded that **it will be necessary to consider details within the city-wide Detailed Assessment for PM_{10}.**

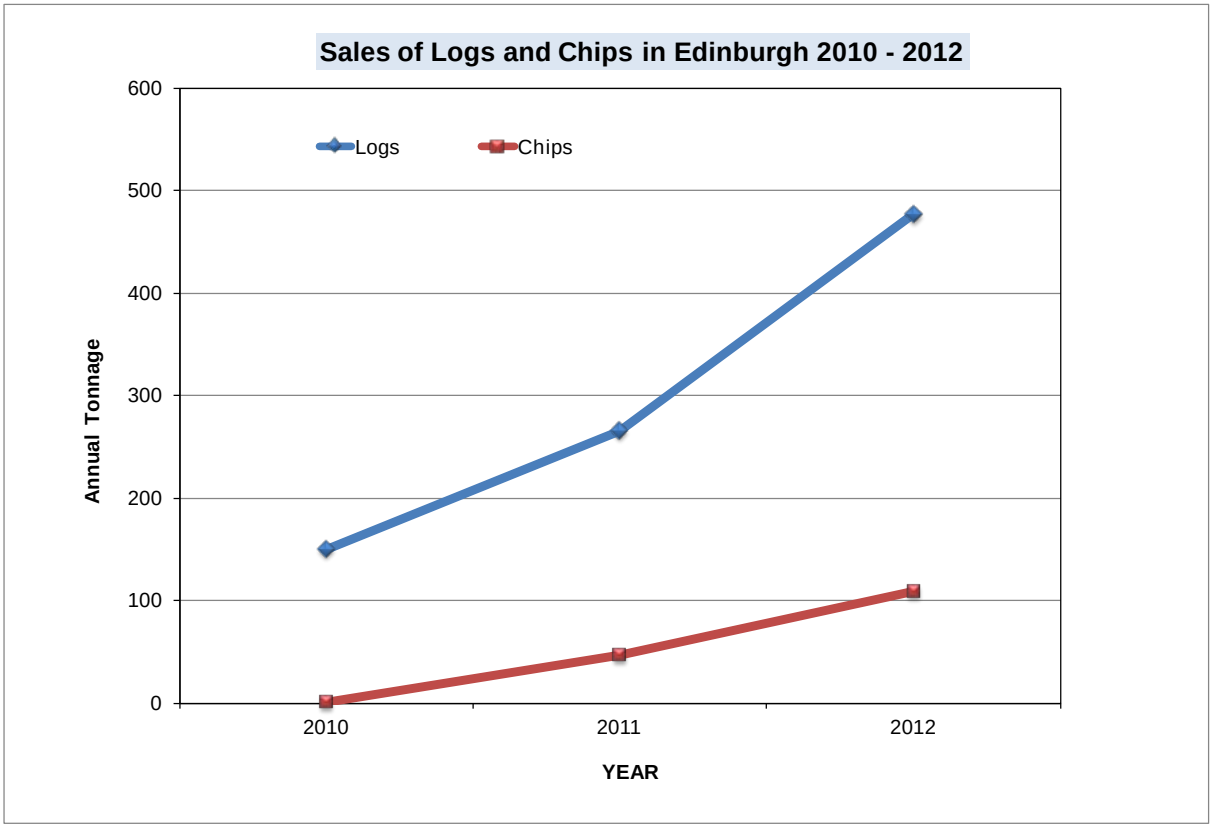
6.2 Biomass Combustion – Combined Impacts

The Local Authority has noted an increased number of complaints about smoke and smell from wood or solid fuel burning stoves or boilers. In 2014 a total of 137 enquiries and complaints about potential/existing installations were received, which was a 20% increase on the previous year. A database is being compiled of all domestic solid-fuel appliances that have been identified through local knowledge, enforcement activity, local area inspection and Planning and Building Control processes. Currently there are 138 solid fuel appliances registered within the City boundary.

A survey was carried out by the Council of various suppliers of logs and wood chip which found that sales have increased between 2010 and 2012 in the Edinburgh

area (see Figure 6.1). Details of these findings will be considered in more detail within the PM_{10} City-wide Detailed Assessment.

Figure 6.1 Sales of Logs and Chips (in annual tonnage) in the Edinburgh area from various suppliers between 2010 and 2012.



The Council's Interim Planning Policy (2010) to discourage the installation of commercial biomass combustion in the City will be reviewed in conclusion to the city-wide Detailed Assessment for PM_{10}.

City of Edinburgh Council has assessed biomass combustion plant, and concluded that **it will be necessary** to consider the details within the city-wide Detailed Assessment for PM_{10}.

6.3 Domestic Solid-Fuel Burning

Smoke Control Orders are operational across the entire Local Authority area. There are no areas where significant levels of coal burning take place. However, the increasing trend in small scale domestic solid-fuel burning as mentioned above, will need to be kept under review.

It is recognised that the use of open fires is occasional and not likely to lead to exceedences of the sulphur dioxide objectives.

City of Edinburgh Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

6.4 Combined Heat and Power Plants

A number of significantly sized Combined Heat and Power (CHP) systems have been proposed within the city centre.

Edinburgh University has commenced development of a 15.6MW natural gas Combined Heat and Power (CHP) system to supply energy to several university buildings including the Pleasance Sports Facilities, Holyrood North/South residential complexes and the Climate Change Centre at High School Yards.

In the Central AQMA a 6.6MW (heat input) natural gas CHP system is proposed for the St James redevelopment following outline planning permission in 2009. Although the energy centre will replace a number of existing energy generating units the potential for an increase of emissions from a point source in a sensitive location is of some concern. A current planning application for the plant and chimney has yet to be determined.

Outwith the city centre the Royal Edinburgh Hospital development includes a dedicated energy centre for electrical and heating supply with three dual fuel boilers (3.2MW), three diesel generators (2MW) and a gas fired CHP (0.6MW). Overall the development is predicted to result in air quality improvements at some receptor locations and slight increases in pollutant concentrations at other locations. Although there will be no exceedences of any air quality objectives or limit values. The site is located 5km south east of the city centre where background levels are low.

In relation to the requirements of the Clean Air Act, the Local Authority requests that any plant with an output capacity above 366kW undertakes an appropriate chimney height calculation.

7 Fugitive or Uncontrolled Sources

Levels of airborne particulate matter (PM_{10}) at Salamander Street have been measured to be above the Scottish annual mean air quality objective. Possible contributors to the airborne PM_{10} levels include local traffic on Salamander Street and Baltic Street, and dust-generating activity at the nearby Leith Docks.

City of Edinburgh Council commissioned Ricardo-AEA to carry out a study to investigate the potential extent of the area affected by elevated PM_{10} levels above the air quality objectives. The study used published methods and data to estimate emissions of dust from local road traffic and industrial activities at Leith Docks. A computer dispersion model was then used to forecast airborne levels of PM_{10}.

The modelling study found that levels of PM_{10} may be above the air quality standard in the immediate vicinity of Salamander Street and Baltic Street and some adjacent local streets. Levels of PM_{10} could also be above the standard due to emissions from dust-generating activities at Leith Docks over a wider area.

If the Council decided that an PM_{10} AQMA was required the report contained options for the boundary of an appropriate zone to be designated. One option may be to extend the existing Great Junction Street AQMA to include Salamander Street.

The city-wide Detailed Assessment for PM_{10} will be reported in 2015.

City of Edinburgh Council has identified potential sources of fugitive particulate matter that meet specified criteria, and **will need to consider the details as a part of the City-wide Detailed Assessment for PM_{10}.**

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

8.1.1 Nitrogen Dioxide

The City of Edinburgh Council has examined the results from monitoring within the Local Authority area.

There are monitoring locations within each of the existing AQMAs, except Inverleith Row, which exceed the annual mean objective for **nitrogen dioxide** at relevant receptors and therefore they remain valid. There are also breaches of the objective within the proposed extensions to the AQMAs, so it remains valid that these extensions are made.

St John's Road automatic monitoring data shows that the hourly mean objective for Nitrogen Dioxide again met the objective in 2014. Analysis of passive diffusion tube data suggests that no other sites are likely to have exceeded this objective in 2014.

In 2014 there were a number of monitoring locations outwith the AQMAs where the annual objective was exceeded, however all but one of these are to be included in the extension to the Central AQMA. The remaining site at Queensferry Road (ID64) has been previously identified as an anomaly compared with adjacent façade monitoring data and automatic site located across the road. Supplementary monitoring commenced January 2015, concurrent with the existing roadside location, on the facade of the residential property. It is anticipated that this will provide further insight into the localised circumstances.

A summary of all locations where monitoring results are at or above the annual mean nitrogen dioxide objective is shown in Table 9.1 (overleaf).

Table 9.1Summary of the locations where 2014 monitoring results are at or exceed the annual mean Nitrogen Dioxide Objective

Site ID	Area / Site Name	In AQMA?	Data Capture 2014 %	Annual Mean Concentration (µg/m^3) 2014 Bias Adjustment factor = 0.74
	NORTH			
9d	**Commercial Street** [i]	Y Gt Junction St	67	**42**
55	**Inverleith Row/Ferry Road**	Y Gt Junction St	96	**40**
	EAST			
81	**London Rd/East Norton Pl**	Y Central	100	**43**
69	**London Road/Wolseley Pl**	Y Central	100	**42**
	CITY CENTRE - NORTH			
47	**Princes Street Eastbound**	Y Central	100	**50**
	CITY CENTRE - SOUTH			
79d	**Dundee Street/Yeaman Pl**	No [ii]	67	**41**
37a	**Grassmarket No 41**	Y Central	75	**40**
135	**Nicolson Street No 69**	No [ii]	100	**43**
27	**North Bridge – South**	Y Central	83	**48**
144	**South Bridge No 59**	No [ii]	92	**47**
3	**Torphichen Place**	Y Central	83	**43**
3b	**Torphichen Place 1** [i]	Y Central	100	**45**
2	**West Maitland Street**	Y Central	75	**43**
28b	**West Port No 62**	Y Central	50	**56**
28d	**West Port No 42**	Y Central	92	**51**
	WEST			
16	**Glasgow Road No 68**	Y Glasgow Rd	100	**40**
58	**Glasgow Road Newbridge**	Y Glasgow Rd	100	**45**
64	**Queensferry Road No 550**	No	100	**47**
1d	**St John's Road No 131**	Y St John's Rd	100	**48**
-	**St John's Road** *(Automatic Data)*	Y St John's Rd	93	**59**
	SOUTH WEST			
76	**Angle Park/Harrison Road**	No [ii]	83	**41**
76b	**Angle Park Terrace No 74**	No [ii]	92	**41**
18	**Gorgie Road No 8**	Y Central	96	**42**

Notes for Table;

[i] New monitoring location

[ii] Site to be included in the extension to the Central AQMA 2015

8.1.2 Particulate Matter (PM_{10})

PM_{10} data from all monitoring locations in 2014 meet the UK National Objectives. Data from the St Leonard's urban background site and Currie suburban site readily meet the Scottish air quality annual mean objective of 18µg/m^3.

The Low Emission Strategy for Scotland, published for consultation in January 2015 by Scottish Government proposes to change the annual mean objective for PM_{10} to 20µg/m^3, to correspond with the World Health Organisation's standards.

Queen Street and Glasgow Road, which marginally meet the existing Scottish objective are well below the proposed objective of 20µg/m^3. Queensferry Road marginally fails the existing Scottish objective but meets the proposed one.

Monitoring data from Salamander Street shows exceedences of the existing and proposed objective.

Overall the results show that the decision to proceed to Detail Assessment for PM_{10} remain valid, the findings of which will be reported separately in 2015.

8.1.3 Trends

There is a downward trend of annual mean **nitrogen dioxide** concentrations at all automatic monitoring stations, although for the majority it is slight, namely; St Leonards, Gorgie Road, Salamander Street and Currie High School. These sites are a combination of urban background, roadside and suburban sites. The downward trend at Queen Street and St John's Road is more defined, even though there has been a slight increase in the annual mean at St John's Road in 2014.

There is a downward trend of nitrogen dioxide concentrations at passive diffusion tube sites located within Air Quality Management Areas although there was a slight increase in the average concentration between 2013 and 2014. There has also been a downtrend of the bias adjustment factor for passive diffusion tube analysis over the same period.

Traffic flows are normalizing after completion of the Edinburgh Trams construction project. However, changes and enhancements to the entire transport system are continuing. It is anticipated these will ensure an effective network, deal with

congestion and encourage multi-mode integration. It will be some time before confidence can be attributed to trend analysis.

The Local Authority's Further Assessment (2013) work, which followed designation of the Glasgow Road and Inverleith Row AQMAs and extension of the Central and Great Junction Street AQMAs, used DEFRA approved projection factors to estimate the earliest date when air quality objectives are likely to be achieved. The projection of roadside concentrations to future years is not an absolute and can only give indicative values.

Estimation of concentrations in the Great Junction Street AQMA suggested the annual mean objective would be achieved in 2014 which apart from a new site placed at a busy bus stop in Commercial Street (42ug/m^3), this has been the case.

It also predicted near compliance in the Central AQMA, with full compliance in 2015 and full compliance for Glasgow Road and Inverleith Row in 2016.

The Central AQMA projection is unlikely to be achieved and Glasgow Road AQMA projections may be achieved if the MOVA signal system at Newbridge Roundabout delivers the promised benefits.

In terms of compliance of the annual mean objective in the Inverleith Row AQMA, data shows this is on-target and was compliant in 2014; however it is accepted that a number of years of data well below the objective will be necessary before proceeding with a revocation of the AQMA. This will also give cognises of varying meteorological conditions and the actual improvements of vehicles in the national fleet, which is dependent on new engine technology delivering expected improvements in the 'real driving-world'.

A downward trend of **PM_{10}** is noted at St Leonard's, the urban background site and roadside sites Queens Street and Salamander Street; although the latter is also affected by fugitive sources.

PM_{10} trend analysis was carried out at the suburban site at Currie for the first time. It shows a stable trend, with no significant changes in annual mean concentrations since monitoring began in 2010.

The city-wide detailed assessment due in 2015 will undertake a full assessment of trend analysis.

8.2 Conclusions from Assessment of Sources

A new speed limit network throughout Edinburgh has been approved by the Local Authority. Many residential roads, shopping streets and the city centre will be 20mph roads the enforcement of which will be predominately by the use of signs. There is some uncertainty in research the Council has seen as to the benefit these changes will have in terms of air quality. There may be a trade off between lower nitrogen dioxide and higher CO_2 set against greater pedestrian safety. The project ethos is about changing behaviour and attitudes, to make lower speeds more acceptable and ultimately encourage modal shift. The Council is currently working on developing a framework for assessment purposes which is likely to include analysis of roadside emissions. Under the LAQM regime air quality monitoring will continue throughout the City network which may assist in this process.

The new road bridge, the Queensferry Crossing is due to open in 2016. Further feasibility work is recommended as a part of a revised Public Transport Strategy to ensure enhancement to this major Cross Forth Transport corridor. This work includes evaluating the need for additional park and ride sites (e.g. Newbridge) and assessing the feasibility of improving bus movements between Gogar Roundabout through to the Maybury Junction and Hillhouse Road in Edinburgh. Also the development of an Orbital Bus Rapid Transit system and real time information improvements are recommended in the strategy.

The additional waste incineration plant proposed at Millerhill in Midlothian Local Authority Area, near the boundary with Edinburgh will burn up to 195,000 tonnes per annum of residual non-hazardous waste, generated by households and businesses from within both Local Authorities. A current planning application is assessing the impact of the proposed development.

There is potential for coal handling operations to cease at Leith Docks, particularly following the closure of Cockenzie coal-fired power station; however the PPC permit issued by SEPA continues to be valid. Port operations are being considered as part of the PM_{10} Detailed Assessment.

SEPA have issued a permit for operation of a cement industrial process at, Port of Leith, Leith Docks.

In assessing PM_{10} exceedences at Salamander Street the Local Authority requested the services of an air quality specialist consultant to consider the extent of fugitive emissions from in and around the Docks, as well as road emissions. Based on the study, a recommendation was made for an appropriate zone to be designated as an Air Quality Management Area. This could potentially be carried out as a further extension to the existing Great Junction Street AQMA. Details will be reported separately in the Detailed Assessment for PM_{10}.

Further work is necessary in conjunction with the Scottish Government and the Scottish Environmental Protection Agency (SEPA) to consider a number of poultry farms in the west of the city. Based on an updated screening calculation which takes into account background levels of PM_{10}, there is potential for a number of poultry farms to breach the daily mean objective. In conjunction with SEPA, monitoring at a sensitive receptor adjacent to one of the poultry farms will commence in 2015, in order to establish actual levels. Again, details will be included in the city-wide PM_{10} Detailed Assessment.

The Local Authority has noted an increased number of complaints about smoke and smell from wood or solid fuel burning stoves or boilers. A survey of various suppliers of logs and wood chip found that sales have increased between 2010 and 2012 in the Edinburgh area. A database is being compiled of all domestic solid-fuel appliances that have been identified.

A number of significantly sized Combined Heat and Power (CHP) systems have been proposed within the City centre. Edinburgh University have commenced development of a 15.6MW facility in close proximity to the Central AQMA. Within the said AQMA a 6.6MW system is proposed for the James development. The Local Authority will continue to keep a log of all installations.

8.3 Proposed Actions

The Local Authority will carry out the following actions;

- Complete the legal process to extend the Central AQMA as required by findings of the Progress Report 2014.
- Progress city-wide Detailed Assessment for PM_{10} in association with proposed changes to the Scottish annual mean objective.

- Further source apportionment work will be undertake for areas previously considered in order to take account of the latest emission factors and traffic changes in the Central and St John's Road AQMAs.
- Continue monitoring at a number of sites on Queensferry Road to assess details of the single exceedences of the annual mean Nitrogen Dioxide objective.
- Undertake analysis of trends within each individual AQMA as part of the Review and Assessment process.
- Decommission Queen Street air quality monitoring station due to impending expiry of temporary planning consent, which has been renewed once already, and re-establish the station at a suitable location..
- Consider the impact of the Low Emission Strategy for Scotland's proposed changes to the $PM_{2.5}$ regime, particularly in respect to a monitoring network for the pollutant.
- A revised air quality actions plan is currently being drafted and will take account of the extension to the Central AQMA and associated source apportionment work.

9 References

1. NO_2 Fall Off with Distance calculator, LAQM, Tools, DEFRA website 2014
2. Technical Guidance LAQM TG09, Box 3.2, DEFRA, 2009
3. Local Air Quality Management Policy Guidance, Scottish Government, 2009
4. Forth Replacement Crossing, Refreshed Public Transport Strategy (2012), Partner organisations; Confederation of Passenger Transport – Scotland, The City of Edinburgh Council, Fife Council, First Bus Group - South East & Central Scotland, Lothian Buses, ScotRail, SEStran - South East of Scotland Transport Partnership, Stagecoach East Scotland, Transport Scotland and West Lothian Council.
5. Second Proposed Local Development Plan, City of Edinburgh Council. 2014
6. Air Quality Study, Edinburgh Airport, Nitrogen Dioxide 2013, Ricardo AEA, May 2015
7. Progress Report 2010, City of Edinburgh Council, 2010.

10 Appendices

Appendices

Appendix A: Quality Assurance / Quality Control (QA/QC) Data

A1 Nitrogen Dioxide (NO_2) Diffusion Tube Bias Adjustment Factors

A2 NO_2 Bias Adjustment Factor from Co-location Studies

A3 Discussion of Choice of Factor to Use

A4 PM Monitoring Adjustment

A5 Short-term to Long-term Data adjustment for NO_2

A6 QA/QC of automatic monitoring

A7 QA/QC of Diffusion Tube Monitoring

Appendix B: Maps of Non Automatic Air Quality Monitoring (AQM) Passive Diffusion Tube Locations

Appendix C: Raw Passive Diffusion Tube Data

Appendix D: Passive diffusion tube Distance Correction Calculations

Appendix E: Passive diffusion tube data used in Trend analysis

Appendix F: Maps of Air Quality Monitoring Passive Diffusion Tube Data

Appendix A: QA/QC Data

A1 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 0.85 to 0.91. See Tables A1a and A1b.

Between 2011 and 2013 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 and represent worse-case scenario.

Table A1a Historical bias data used in previous reports 2001 - 2007

Site	Type	2001	2002	2003	2004	2005	2006	2007
Currie	Suburban	N/A	N/A	N/A	0.91	N/A	N/A	N/A
Gorgie	Roadside	N/A	N/A	N/A	N/A	0.86	N/A	0.91
Haymarket	Roadside	0.93	N/A	N/A	0.88	0.93	0.91	0.92
Leith Walk	Roadside	0.89	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
Roseburn	Roadside	N/A	N/A	N/A	N/A	0.92	N/A	N/A
St John's Road	Kerbside	N/A	N/A	N/A	N/A	N/A	N/A	0.93
Mean		**0.91**	**0.91**	**0.91**	**0.89**	**0.89**	**0.87**	**0.90**

Table A1b Historical bias data used in previous reports 2007 - 2013

Site	Type	2008	2009	2010	2011	2012	2013
Glasgow Road	Roadside	N/A	N/A	N/A	N/A	N/A	0.64
Gorgie	Roadside	0.94	N/A	N/A	0.87	0.86	0.87
Haymarket	Roadside	0.87	N/A	N/A	N/A	N/A	N/A
Queensferry Road	Roadside	N/A	N/A	N/A	0.66	0.71	0.71
Queen Street	Roadside	0.81	0.83	0.84	0.69	0.65	0.7
Salamander St	Roadside	N/A	N/A	0.79	0.77	0.80	0.78
Roseburn	Roadside	0.91	0.82	0.85	N/A	N/A	N/A
St. John's Road	Kerbside	0.86	0.92	0.92	0.79	0.74	0.77
Mean		**0.88**	**0.86**	**0.85**	0.76	0.75	0.75
Combined Mean*					**0.81**	**0.76**	**0.75**

* An approximate orthogonal regression calculation undertaken with National Bias Database data

A2 NO_2 Bias Adjustment Factor from Local Co-location Studies

Six automatic monitoring stations were considered for the co-location study during 2014. The factors for studies are shown in Table A2.

Table A2 Bias factors used for 2014 data

Site	Type	Analyser Mean	DC# % Analyser	PDT* Mean	PDT* Precision	Period	Bias Factor A	Bias B (%)
Glasgow Road	Roadside	26	100	39	7	12	0.67	49
Gorgie Road	Roadside	34	97	40	8	11	0.85	18
Queensferry Rd	Roadside	46	94	66	7	11	0.69	44
Queen Street	Roadside	25	97	39	7	11	0.64	56
Salamander St	Roadside	27	99	35	6	12	0.77	30
St John's Road	Kerbside	58	95	71	5	11	0.82	22
						AVERAGE	**0.74**	**37**

Notes for table; * PDT - Passive Diffusion Tube # DC - Data Capture for periods used. Date range is linked to DEFRA PDT sampling period, so does not match an exact calendar year.

A3 Discussion of Choice of Factor to Use

Edinburgh co-locates triplicate tubes on the sampler head cages of each roadside/kerbside monitoring station. The analysis has been undertaken for a number of years using Edinburgh Scientific Services Laboratory and the preparation of tubes has remained the same. Generally the passive diffusion tubes give higher concentrations than the real time analysers over an annual period.

In 2014, an annual mean bias factor of 0.73 (Table A3) was calculated from the local co-location studies. All studies showed that overall precision of triplicate tubes was good, as was the overall data capture. 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.

A Marylebone Road study was available on the National Diffusion Tube Bias Adjustment Factor Spreadsheet [Version 03/15] http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html which allowed a combined factor to be calculated

In conclusion, the Local Authority chose the combined bias adjustment factor of 0.74 (Table A3) as it ensures a conservative approach to the assessment.

Table A3
Manual approximate orthogonal regression calculation for 2014 bias

	Bias A 2014	Bias B 2014	Calculation as AQC Guidance Para 2.4	Bias 2014
Local Bias				
Glasgow Road	0.67	49		
Gorgie Road	0.85	18		
Queensferry Road	0.69	44		
Queen Street	0.64	56		
Salamander Street	0.77	30		
St John's Road	0.82	22		
National Bias				
Marylebone Road	0.78	29		
Mean Local Bias	**0.74**	**37**	0.37+1 = 1.37	
			1/1.37 =	**0.73**
Mean Combined Bias		**35**	0.35+1 = 1.35	
			1/1.35 =	**0.74**

A4 PM Monitoring Adjustment

Ricardo-AEA on behalf of the Scottish Government, provided Volatile Correction Model (VCM) corrected Tapered Element Oscillating Microbalance (TEOM) data to the Local Authority under the Scottish Air Quality Database and Website project for the following automatic monitoring stations; Queen Street, Salamander Street, Glasgow Road and Currie.

TEOM data was also corrected to provide a gravimetric equivalent using Edinburgh's local gravimetric factor 1.14, which was derived from undertaking a co-location study with a partisol unit and TEOM instrument in Detailed Assessment Report 2004.

A5 Short-term to Long-term Data adjustment for NO_2

Data from Bush Estate (Midlothian) monitoring site was used to estimate annual nitrogen dioxide concentrations from short term measurements. No other monitoring sites met the required criteria in 2014.

The site is part of the national Automatic Urban and Rural Network (AURN) and located within the required distance to Edinburgh. Data capture (DC) was also considered to be within acceptable limits.

Automatic Monitoring

Data was not collected at St Leonards between September and December 2014 due to the station refurbishment, therefore an estimation of annual mean concentration is calculated below;

St Leonard's Automatic Monitoring Station				
Measured Mean Value (M) – 19.1				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio(R) AM/PM**
Bush	Rural background	8.46	7.45	1.14
Adjusted Mean (M x R) = 22µg/m^3				

Non-Automatic Monitoring (Passive Diffusion Tubes)

Where passive diffusion tubes have less than 75% data capture for the annual period, a calculation is undertaken to estimate the annual concentrations. Details are shown in the subsequent tables.

Site ID/Location 8 – Morningside Road			
Measured Mean Value (M) = 32.5 µg/m^3			
Background Site	**Annual Mean µg/m^3**	**Period Mean µg/m^3**	**Ratio AM/PM (R)**
Bush Estate	8.37	8.50	0.98
Adjusted Mean (M x R) = 31.9 µg/m^3			

Site ID/Location 9d - Commercial Street			
Measured Mean Value (M) = 61.6 **µg/m^3**			
Background Site	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM (R)**
Bush Estate	8.37	9.10	0.92
Adjusted Mean (M x R) = 56.7 µg/m^3			

Site ID/Location 10 – Home Street			
Measured Mean Value (M) = 37.2 µg/m^3			
Background Site	**Annual Mean µg/m^3**	**Period Mean µg/m^3**	**Ratio AM/PM (R)**
Bush Estate	8.37	8.50	0.98
Adjusted Mean (M x R) = 37 µg/m^3			

Site ID/Location 25 - Easter Road/CH Shop			
Measured Mean Value (M) = 53.7µg/m^3			
Background Site	**Annual Mean µg/m^3**	**Period Mean µg/m^3**	**Ratio AM/PM (R)**
Bush Estate	8.37	8.59	0.97
Adjusted Mean (M x R) = 52.1 µg/m^3			

Site ID/Location 25b - Easter Road/Rossie Place			
Measured Mean Value (M) = 42.5 µg/m^3			
Background Site	**Annual Mean µg/m^3**	**Period Mean µg/m^3**	**Ratio AM/PM (R)**
Bush Estate	8.37	8.46	0.99
Adjusted Mean (M x R) = 42.1 µg/m^3			

Site ID/Location 28b – Westport 62			
Measured Mean Value (M) = 77.7 µg/m^3			
Background Site	**Annual Mean µg/m^3**	**Period Mean µg/m^3**	**Ratio AM/PM (R)**
Bush Estate	8.37	8.66	0.97
Adjusted Mean (M x R) = 75.4 µg/m^3			

Site ID/Location 30e - Great Junction Street			
Measured Mean Value (M) = 47.4 µg/m^3			
Background Site	**Annual Mean µg/m^3**	**Period Mean µg/m^3**	**Ratio AM/PM (R)**
Bush Estate	8.37	9.03	0.93
Adjusted Mean (M x R) = 44.1 µg/m^3			

Site ID/Location 46 – London Road/Easter Road			
Measured Mean Value (M) = 46.3 µg/m^3			
Background Site	**Annual Mean µg/m^3**	**Period Mean µg/m^3**	**Ratio AM/PM (R)**
Bush Estate	8.37	7.55	1.11
Adjusted Mean (M x R) = 51.4 µg/m^3			

Site ID/Location 48c – Cowgate/Blackfriars			
Measured Mean Value (M) = 48.9 µg/m^3			
Background Site	**Annual Mean µg/m^3**	**Period Mean µg/m^3**	**Ratio AM/PM (R)**
Bush Estate	8.37	8.99	0.93
Adjusted Mean (M x R) = 45.5 µg/m^3			

Site ID/Location 61 – Maybury Road/Barnton			
Measured Mean Value (M) = 38.6 µg/m^3			
Background Site	**Annual Mean µg/m^3**	**Period Mean µg/m^3**	**Ratio AM/PM (R)**
Bush Estate	8.37	9.12	0.92
Adjusted Mean (M x R) = 35.5 µg/m^3			

Site ID/Location 67 - London Road /Earlston Place			
Measured Mean Value (M) = 54.2 µg/m^3			
Background Site	**Annual Mean µg/m^3**	**Period Mean µg/m^3**	**Ratio AM/PM (R)**
Bush Estate	8.37	8.50	0.98
Adjusted Mean (M x R) = 53.1 µg/m^3			

Site ID/Location 71 – Portobello High Street			
Measured Mean Value (M) = 42.4 µg/m^3			
Background Site	**Annual Mean µg/m^3**	**Period Mean µg/m^3**	**Ratio AM/PM (R)**
Bush Estate	8.37	8.17	1.03
Adjusted Mean (M x R) = 43.7 µg/m^3			

Site ID/Location 79d – Dundee Street/Yeaman Place			
Measured Mean Value (M) = 56.3 µg/m^3			
Background Site	**Annual Mean µg/m^3**	**Period Mean µg/m^3**	**Ratio AM/PM (R)**
Bush Estate	8.37	8.50	0.99
Adjusted Mean (M x R) = 55.7 µg/m^3			

Site ID/Location 78 – Slateford Road/The Maltings			
Measured Mean Value (M) = 38.6 µg/m^3			
Background Site	**Annual Mean µg/m^3**	**Period Mean µg/m^3**	**Ratio AM/PM (R)**
Bush Estate	8.37	9.49	0.88
Adjusted Mean (M x R) = 34 µg/m^3			

A6 QA/QC of Automatic Monitoring

All monitoring stations are subject to an independent audit and stringent QA/QC procedures which are undertaken by Ricardo-AEA on behalf of DEFRA and the Scottish Government. This agreement commenced in 2007 (2013 for Currie). Nevertheless, all data, including calibration data, is scrutinised on a daily basis by Local Authority officers (Monday to Friday) by visual examination, to see if they contained unusual measurements. Any data which was considered to be 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. Training was carried out by Ricardo-AEA in February 2013.

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.

A7 QA/QC of 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 Workshop Analysis Scheme for Proficiency (WASP) inter-laboratory QC/QA. The laboratories performance was rated as being satisfactory over the rolling five rounds prior to the end of 2014, with 100% of results ≤± 2.

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 Government Guidance Document LAQM.TG (09). 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 or not 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 (09). The monthly exposed passive diffusion tubes in Edinburgh 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 0.75 to 0.81. In 2014 the bias adjustment factor was 0.74.

Appendix B: Maps of Air Quality Monitoring (AQM) Passive Diffusion Tube Sites

Maps of passive diffusion tubes are presented in the following six geographical areas of the city. Further details are stipulated in Table 2.2 within main report.

- **North**
  - Leith
  - Inverleith / Trinity

- **East**
  - Craigmillar
  - Easter Road / London Road
  - Portobello

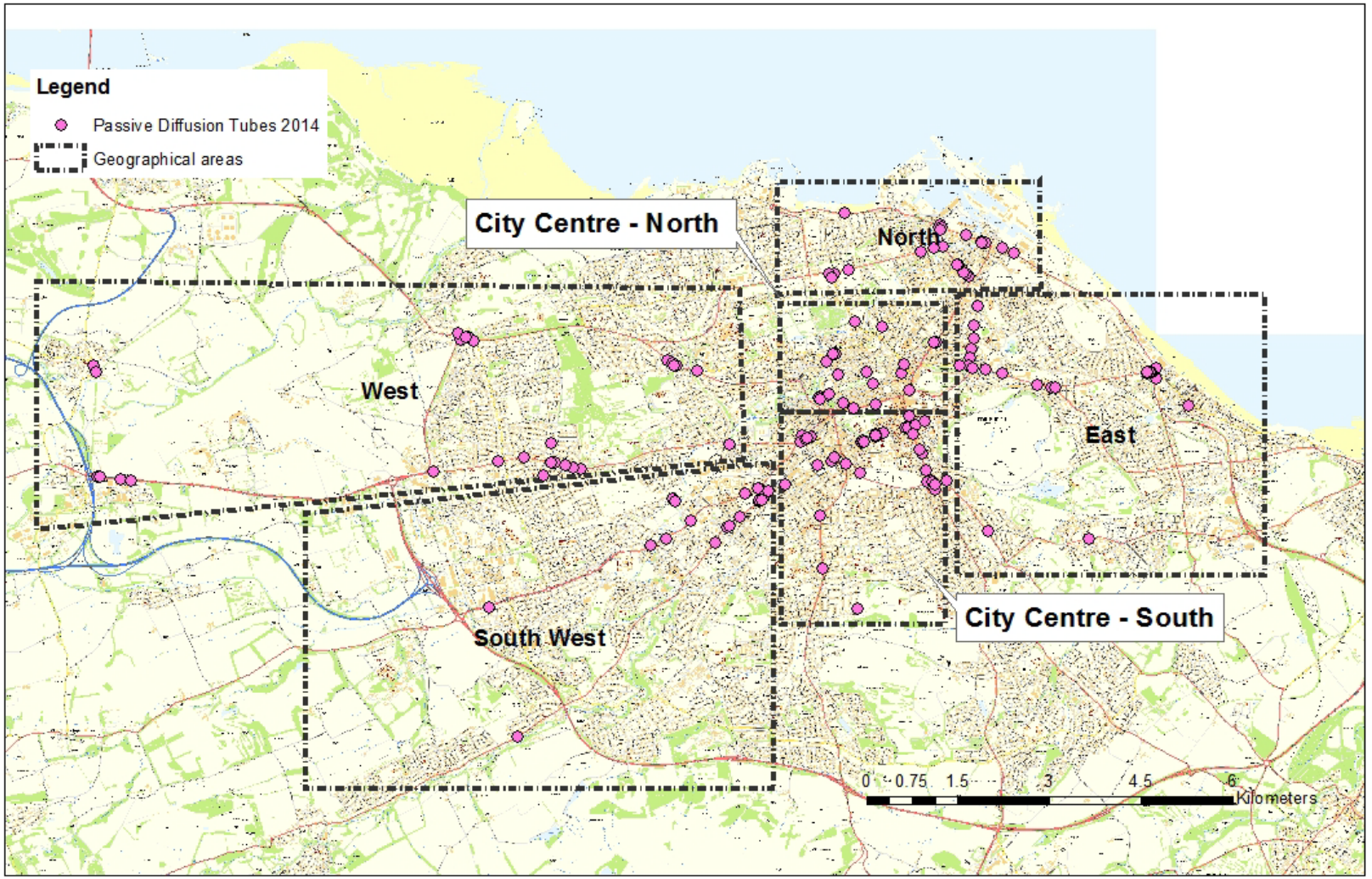
- **City Centre North**

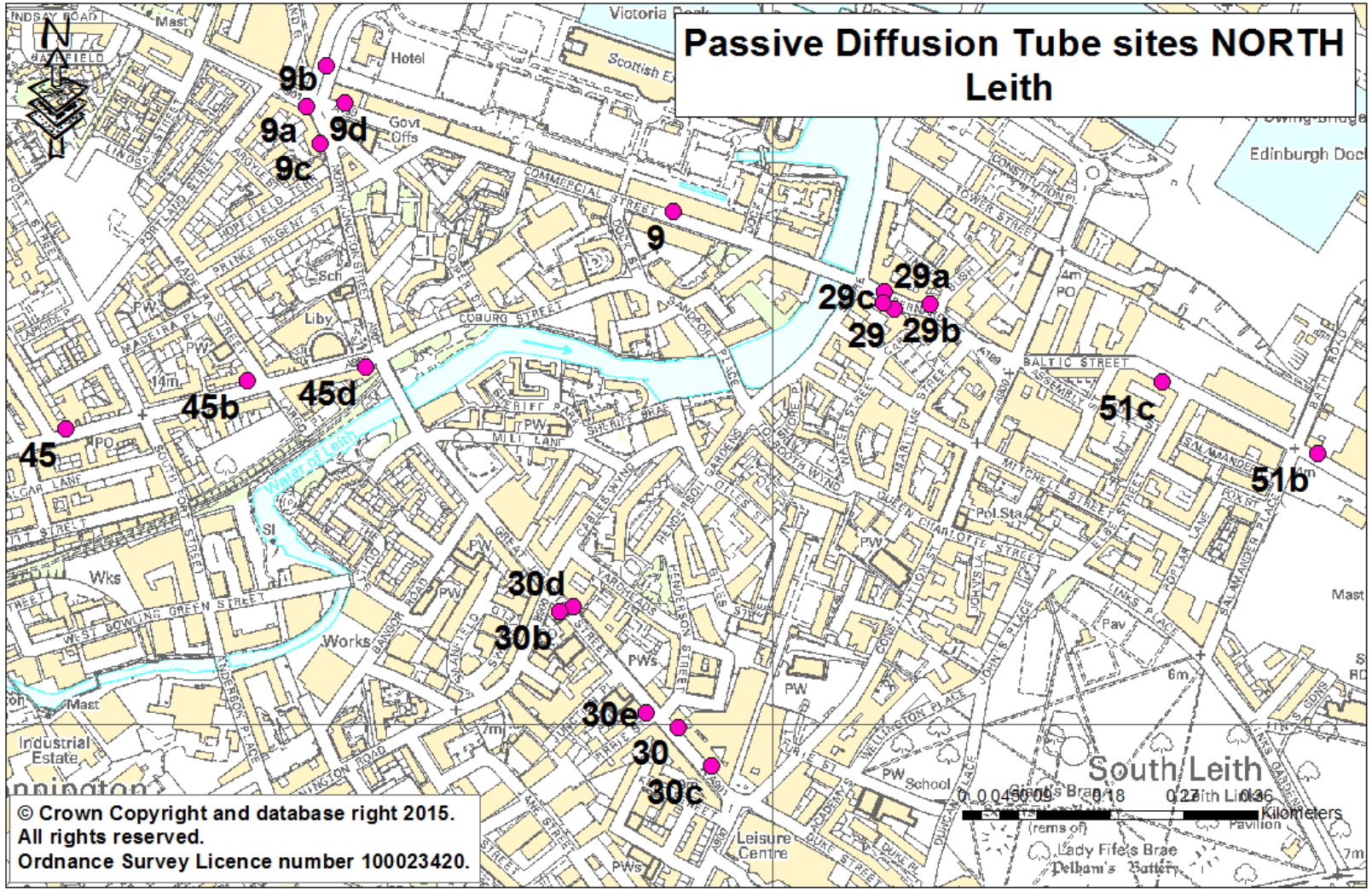
- **City Centre South**
  - Bridges
  - Haymarket etc.
  - Morningside

- **West**
  - Queensferry Road
  - Hillhouse Road & Roseburn
  - St John's Road
  - Newbridge & Kirkliston

- **South West**
  - Slateford / Gorgie
  - Lanark & Calder Road

Geographical Areas of Passive Diffusion Tube Monitoring Sites 2014




Passive Diffusion Tube sites NORTH Leith
9b
9a
9d
9c
9
29a
29c
29
29b
45b
45d
45
51c
51b
30d
30b
30e
30
30c
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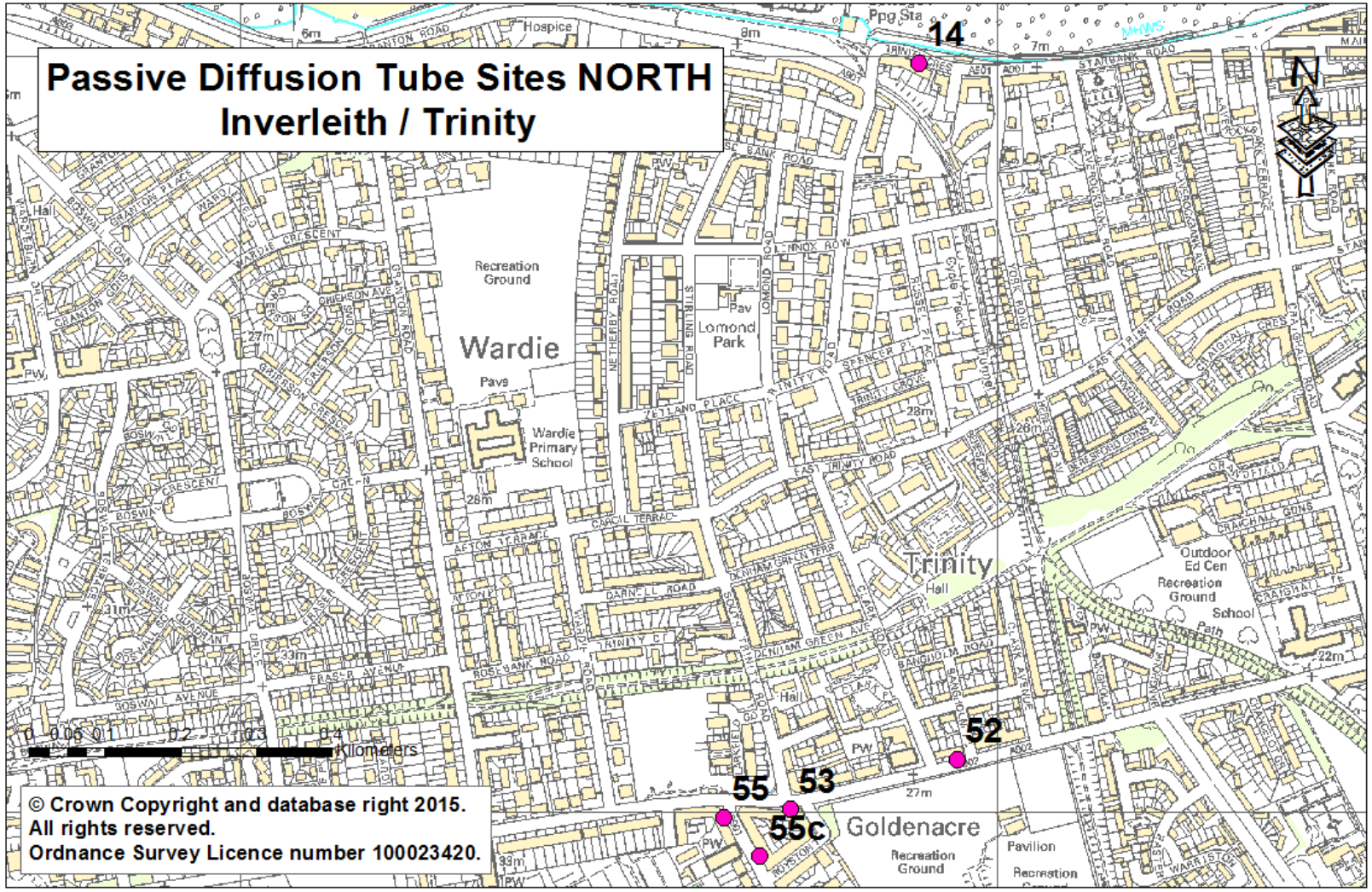
Kilometers


Passive Diffusion Tube Sites NORTH
Inverleith / Trinity
14
52
53
55
55c
Wardie
Recreation Ground
Wardie Primary School
Lomond Park
Trinity
Outdoor Ed Cen
Recreation Ground
Goldenacre
Recreation Ground
Pavilion
Hospice
Ppg Sta
0 0.05 0.1 0.2 0.3 0.4 Kilometers
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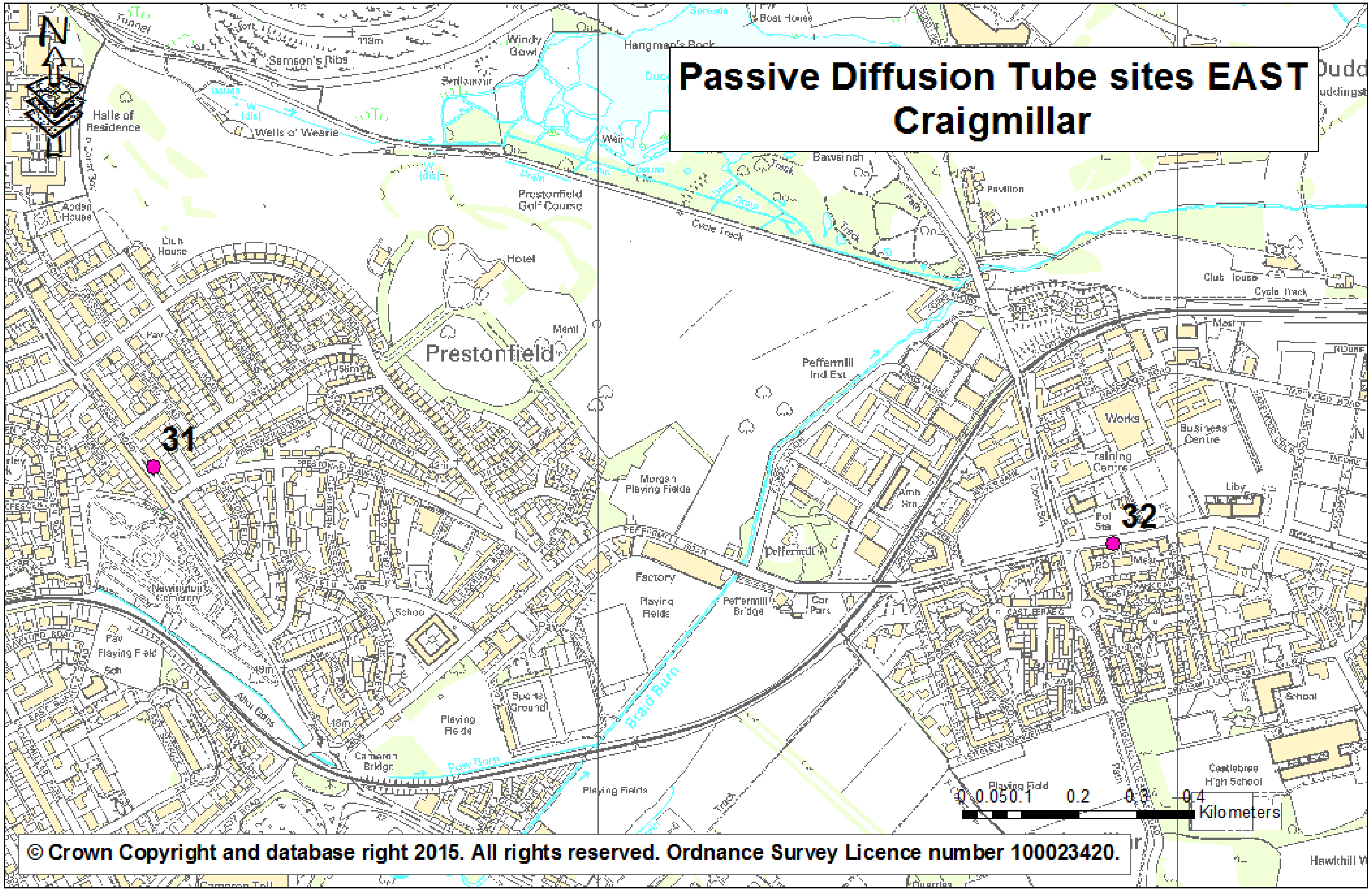
Passive Diffusion Tube sites EAST
Craigmillar
31
32
Prestonfield
Prestonfield Golf Course
Peffermill Ind Est
Morgan Playing Fields
Factory
Playing Fields
Peffermill Bridge
Braid Burn
Works
Business Centre
Castlebrae High School
School
0 0.050.1 0.2 0.3 0.4
Kilometers
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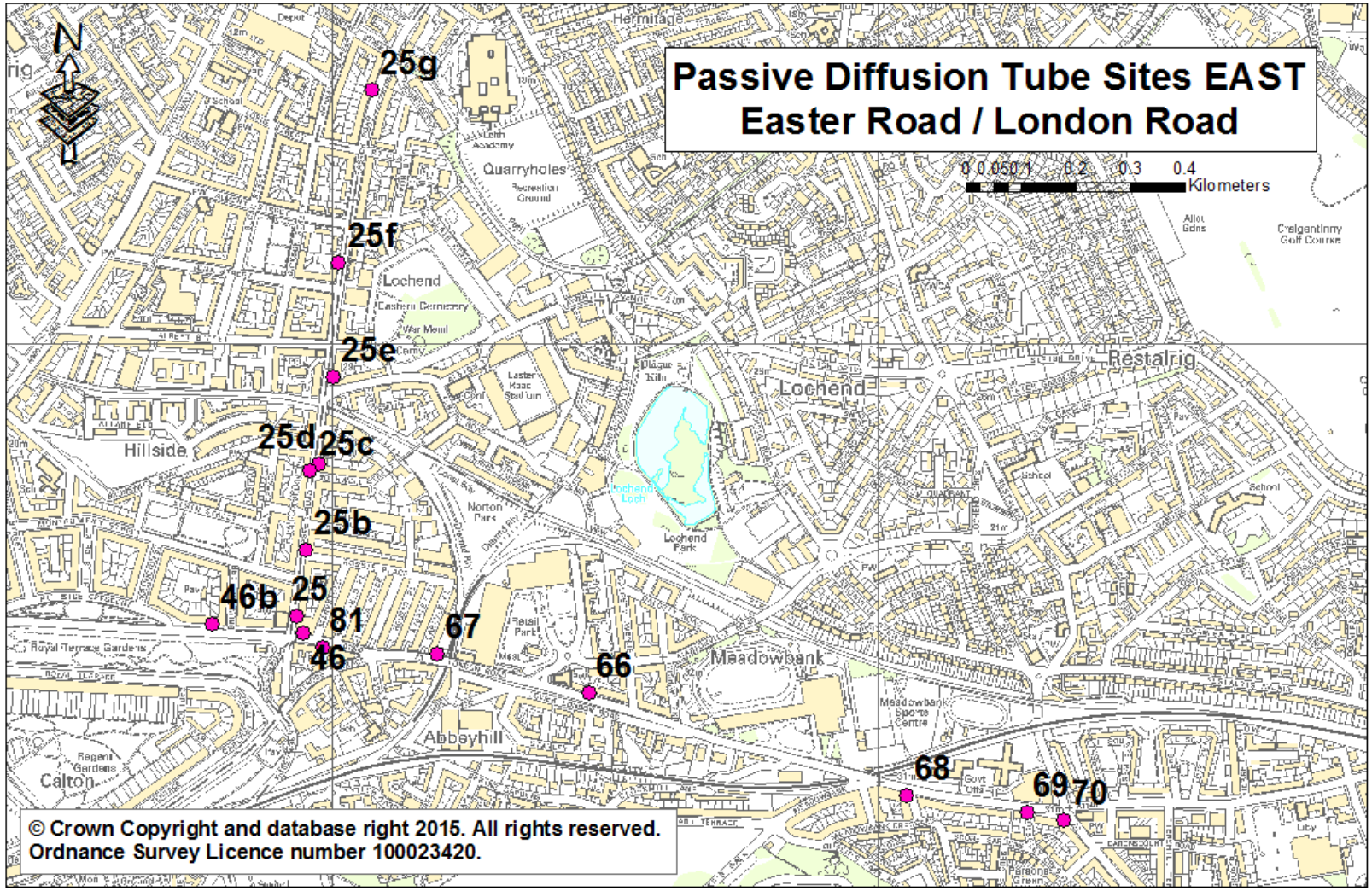
Passive Diffusion Tube Sites EAST
Easter Road / London Road
0 0.05 0.1 0.2 0.3 0.4
Kilometers
N
25g
25f
25e
25d
25c
25b
46b
25
81
46
67
66
68
69
70
Lochend
Quarryholes
Hillside
Restalrig
Meadowbank
Abbeyhill
Calton
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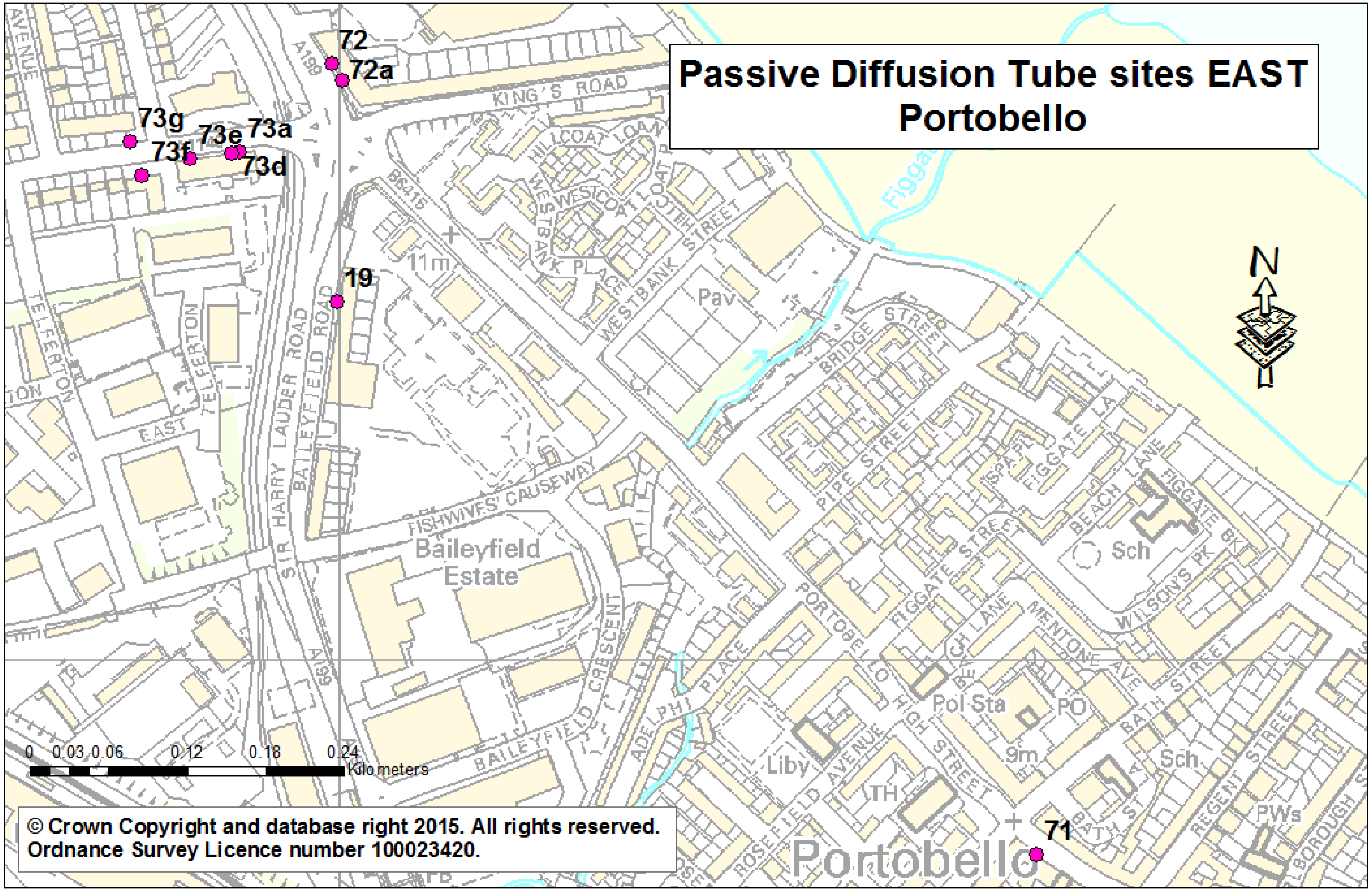
Passive Diffusion Tube sites EAST
Portobello
72
72a
73g
73e
73a
73f
73d
19
71
N
0 0.03 0.06 0.12 0.18 0.24
Kilometers
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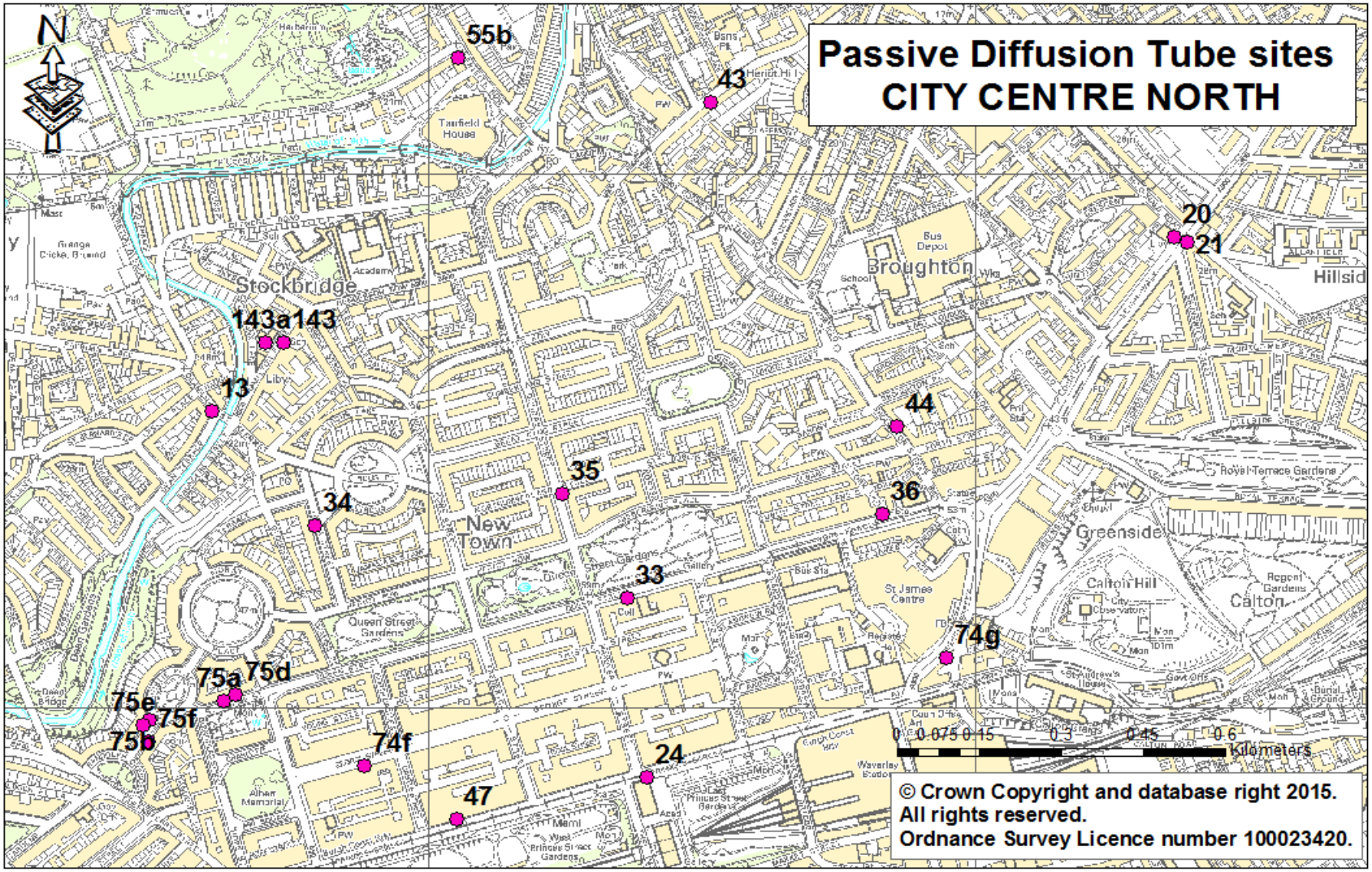
Passive Diffusion Tube sites
CITY CENTRE NORTH
N
55b
43
20
21
143a
143
13
44
35
36
34
33
74g
75a
75d
75e
75f
75b
74f
24
47
Stockbridge
New Town
Broughton
Greenside
Calton Hill
Calton
Hillsid
Royal Terrace Gardens
Queen Street Gardens
St James Centre
Regent Gardens
0 0.075 0.15 0.3 0.45 0.6
Kilometers
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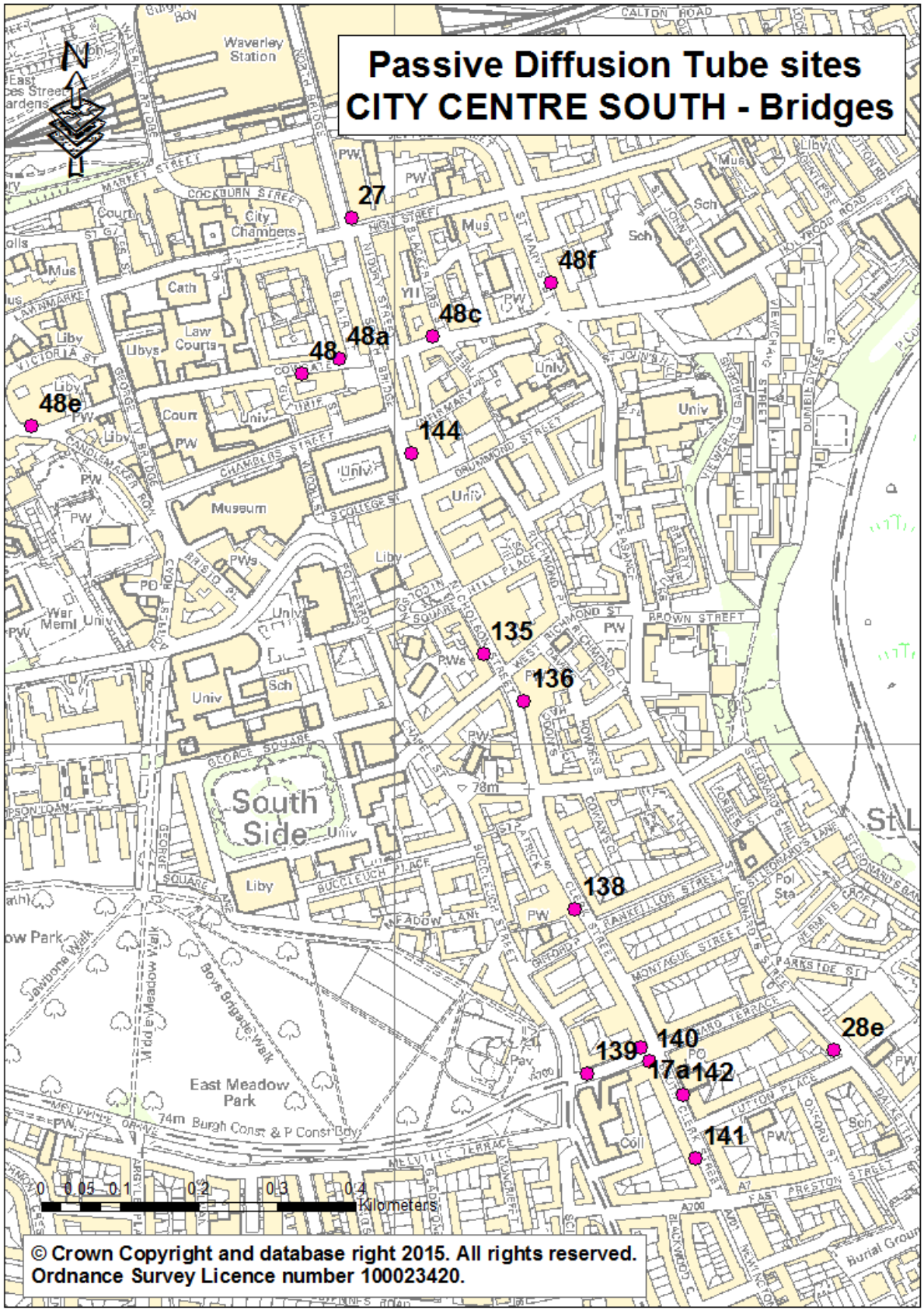
Passive Diffusion Tube sites
CITY CENTRE SOUTH - Bridges
27
48f
48c
48a
48
48e
144
135
136
138
139
140
17a
142
141
28e
Waverley Station
City Chambers
Law Courts
Museum
South Side
East Meadow Park
0 0.05 0.1 0.2 0.3 0.4 Kilometers
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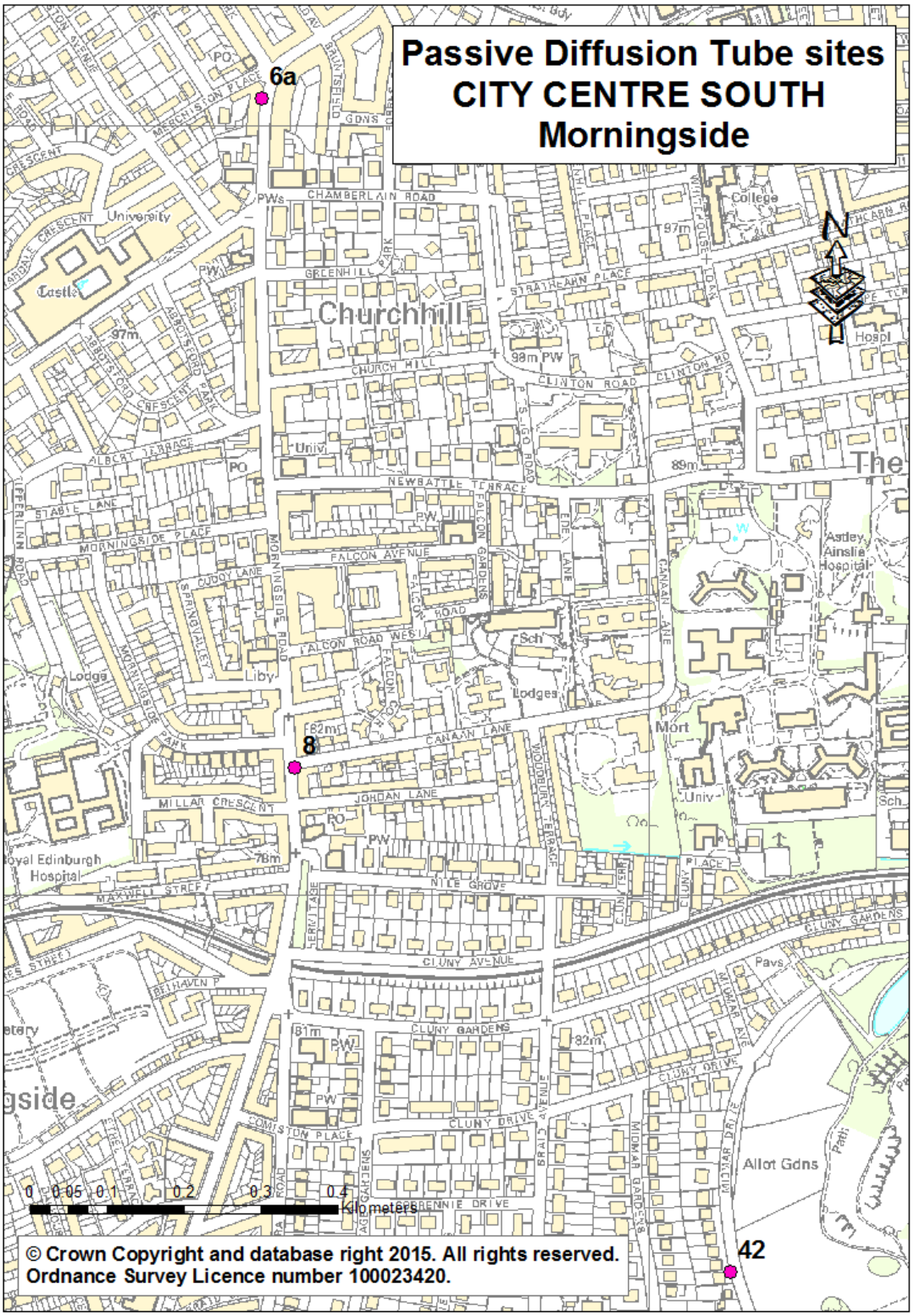
Passive Diffusion Tube sites
CITY CENTRE SOUTH
Morningside
6a
8
42
N
Churchhill
CHAMBERLAIN ROAD
CHURCH HILL
CLINTON ROAD
NEWBATTLE TERRACE
FALCON AVENUE
FALCON ROAD WEST
CANAAN LANE
JORDAN LANE
MILLAR CRESCENT
NILE GROVE
CLUNY AVENUE
CLUNY GARDENS
CLUNY DRIVE
MORNINGSIDE ROAD
MORNINGSIDE PLACE
GREENHILL PARK
STRATHEARN PLACE
ALBERT TERRACE
STABLE LANE
COMISTON PLACE
BRENNIE DRIVE
MIDMAR DRIVE
Royal Edinburgh Hospital
Astley Ainslie Hospital
Allot Gdns
0 0.05 0.1 0.2 0.3 0.4
Kilometers
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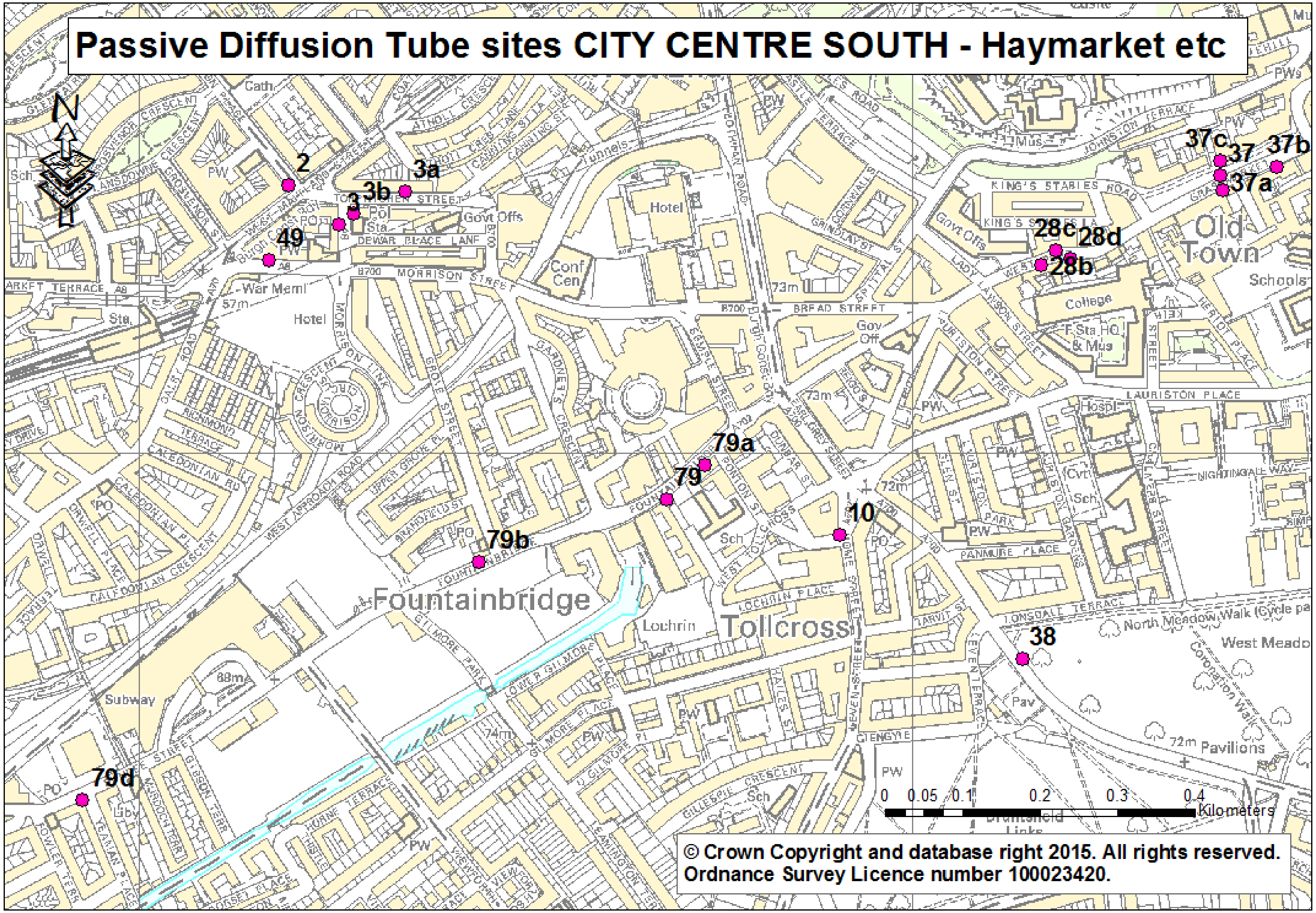
Passive Diffusion Tube sites CITY CENTRE SOUTH - Haymarket etc
2
3a
3b
3
49
37c
37
37b
37a
28c
28d
28b
79a
79
10
79b
38
79d
Fountainbridge
Tollcross
Old Town
Lochrin
West Meadows
North Meadow Walk (Cycle path)
Coronation Walk
Pavilions
0 0.05 0.1 0.2 0.3 0.4 Kilometers
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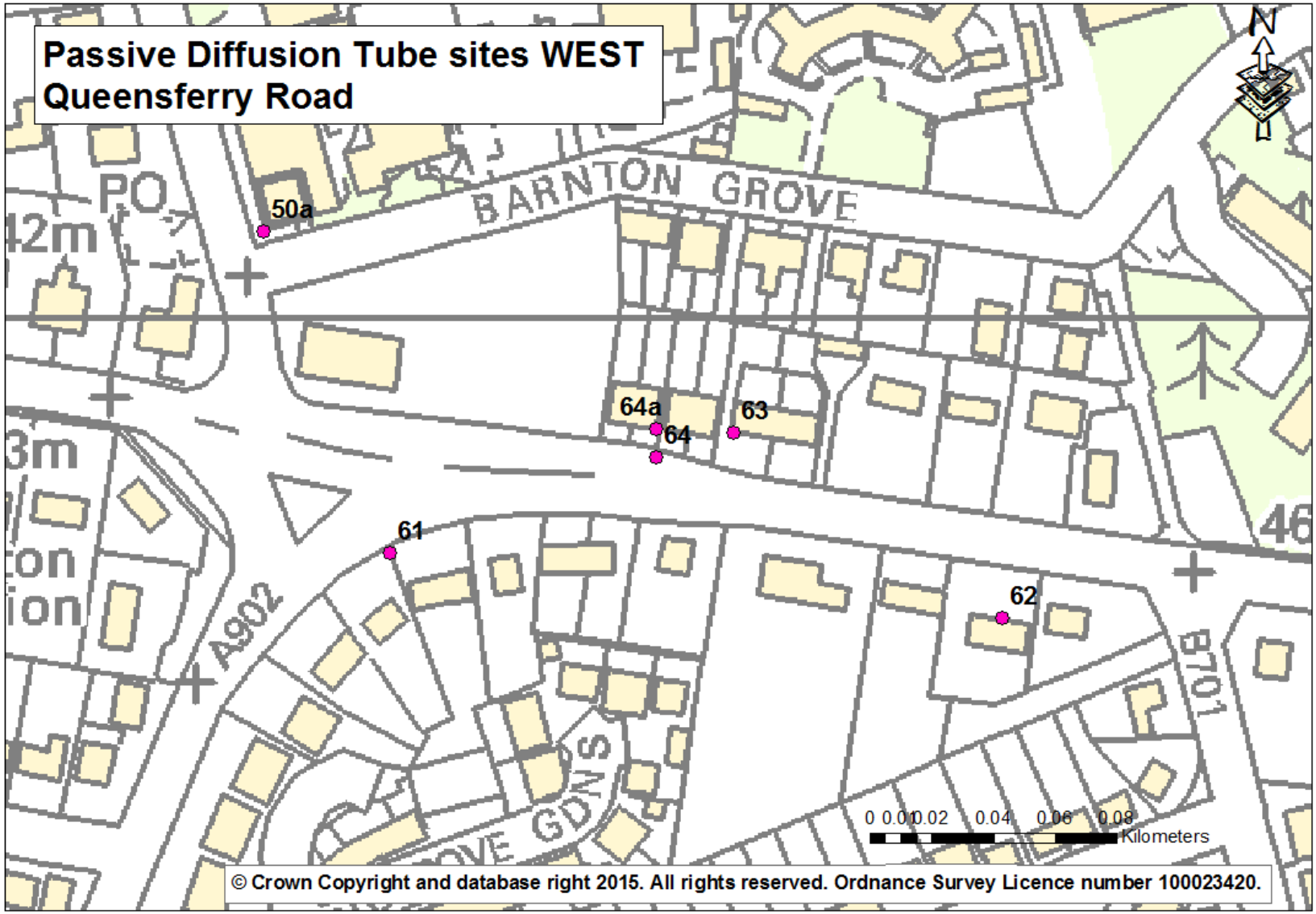
Passive Diffusion Tube sites WEST
Queensferry Road
BARNTON GROVE
50a
64a
64
63
61
62
A902
B701
N
0 0.01 0.02 0.04 0.06 0.08
Kilometers
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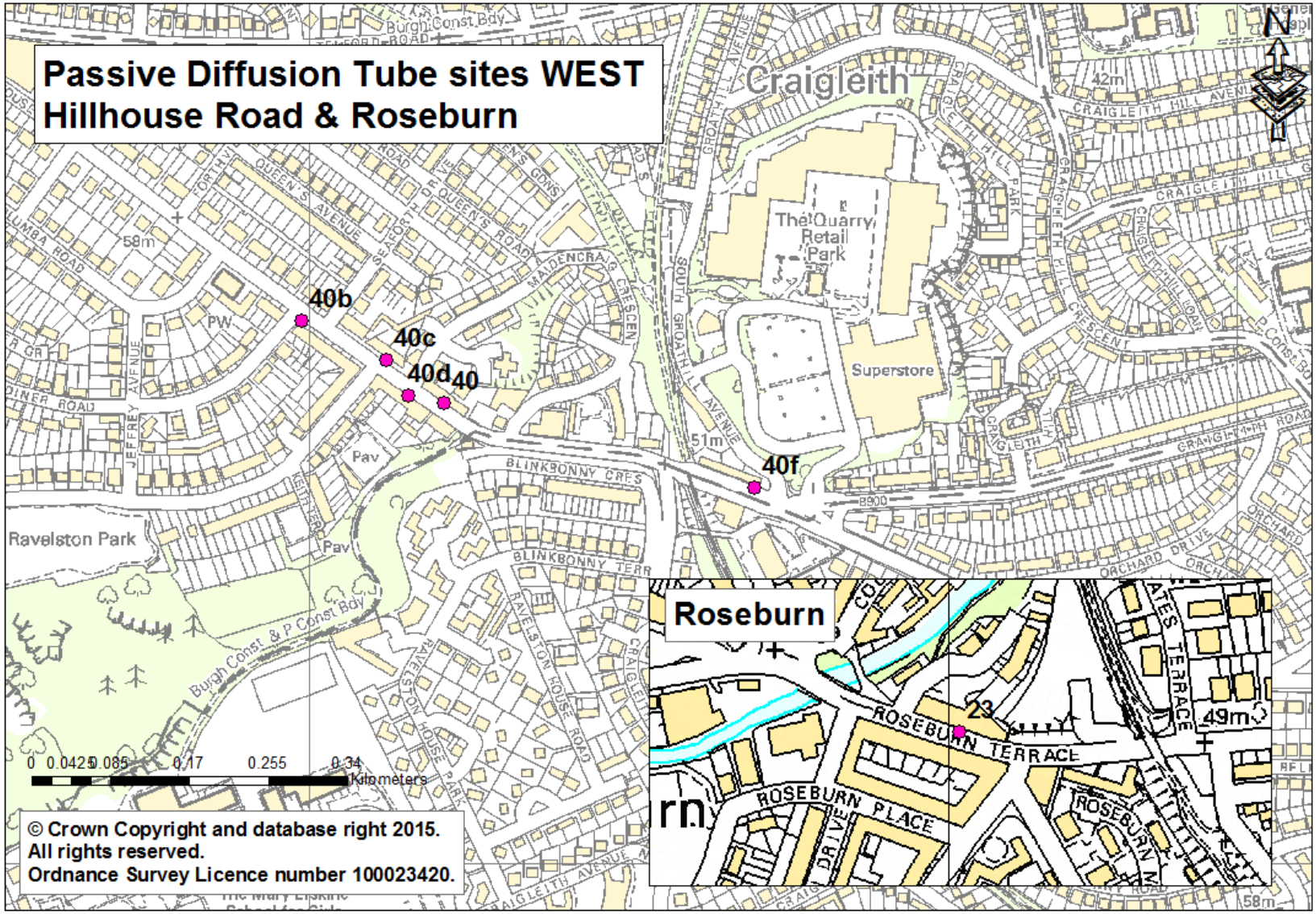
Passive Diffusion Tube sites WEST
Hillhouse Road & Roseburn
Craigleith
The Quarry Retail Park
Superstore
Ravelston Park
40b
40c
40d
40
40f
Roseburn
ROSEBURN TERRACE
ROSEBURN PLACE
23
49m
0 0.0425 0.085 0.17 0.255 0.34
Kilometers
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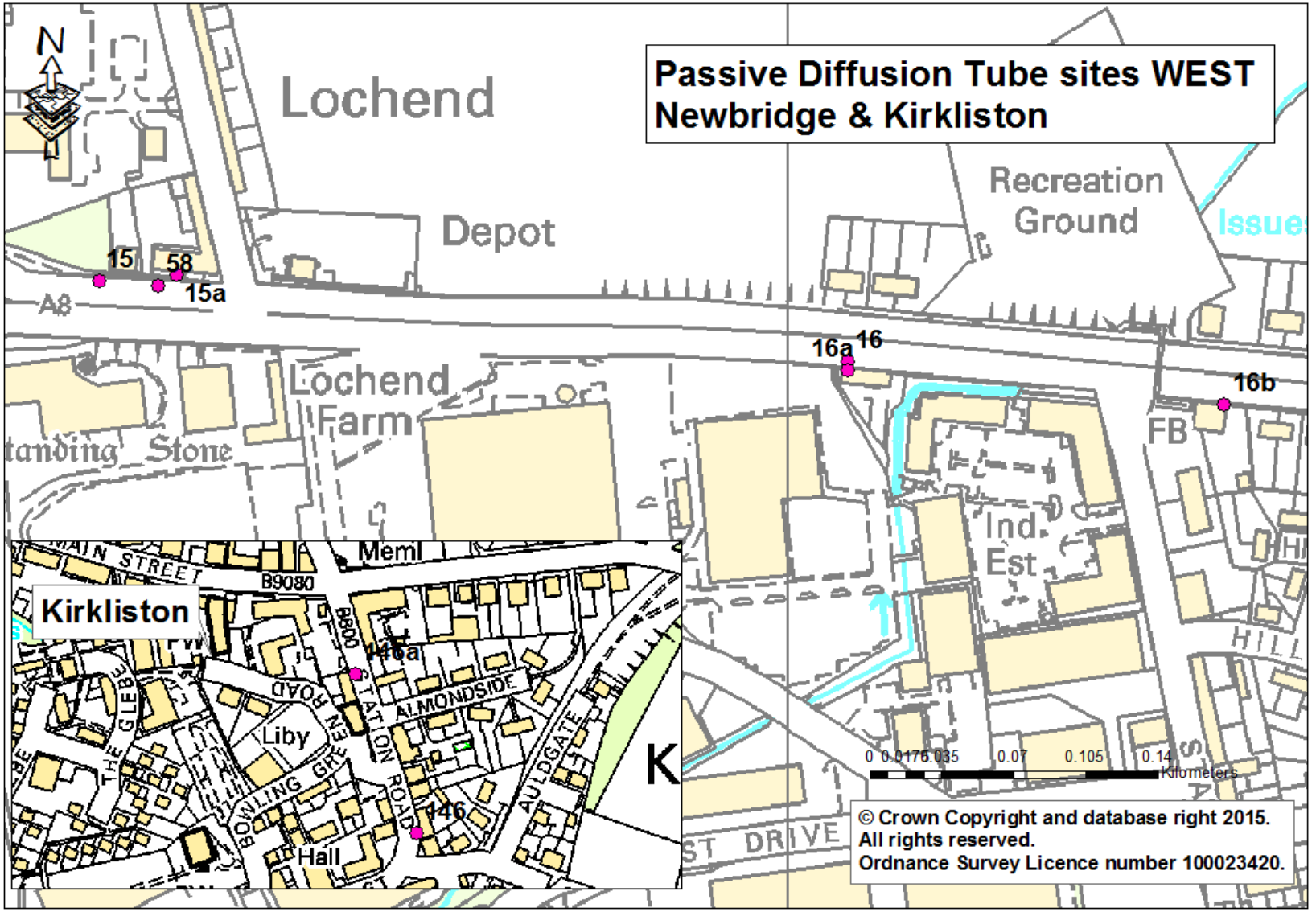
Passive Diffusion Tube sites WEST
Newbridge & Kirkliston
N
Lochend
Depot
Recreation
Ground
Issue
15
58
15a
A8
16a
16
16b
Lochend
Farm
tanding Stone
FB
Ind.
Est
Kirkliston
MAIN STREET
B9080
Meml
B800
146a
ALMONDSIDE
Liby
BOWLING GRE
ROAD
146
AULDGATE
Hall
K
ST DRIVE
0 0.0175 0.035 0.07 0.105 0.14
Kilometers
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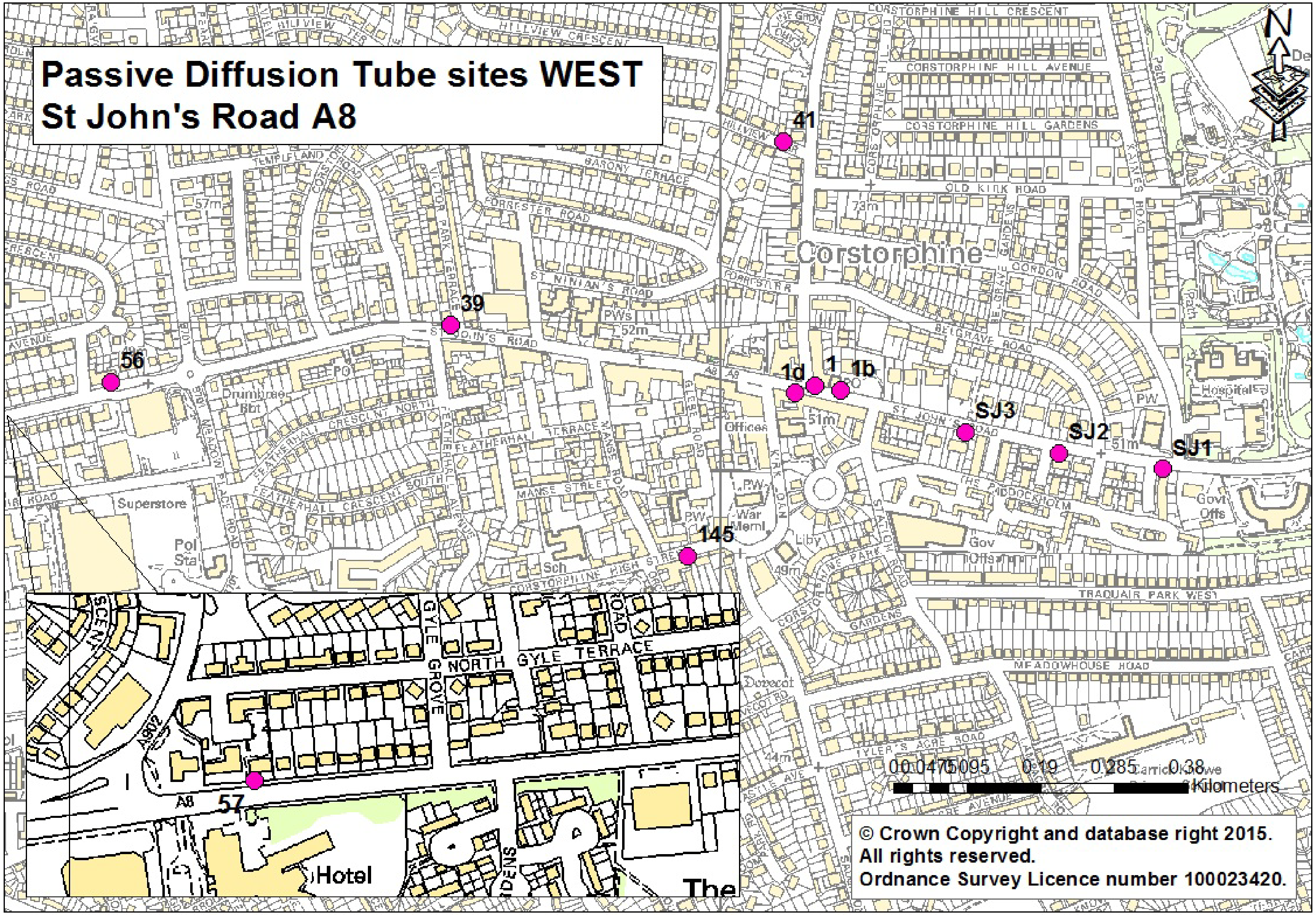
Passive Diffusion Tube sites WEST
St John's Road A8
41
39
56
1d
1
1b
SJ3
SJ2
SJ1
145
57
Corstorphine
0 0.0475 0.095 0.19 0.285 0.38
Kilometers
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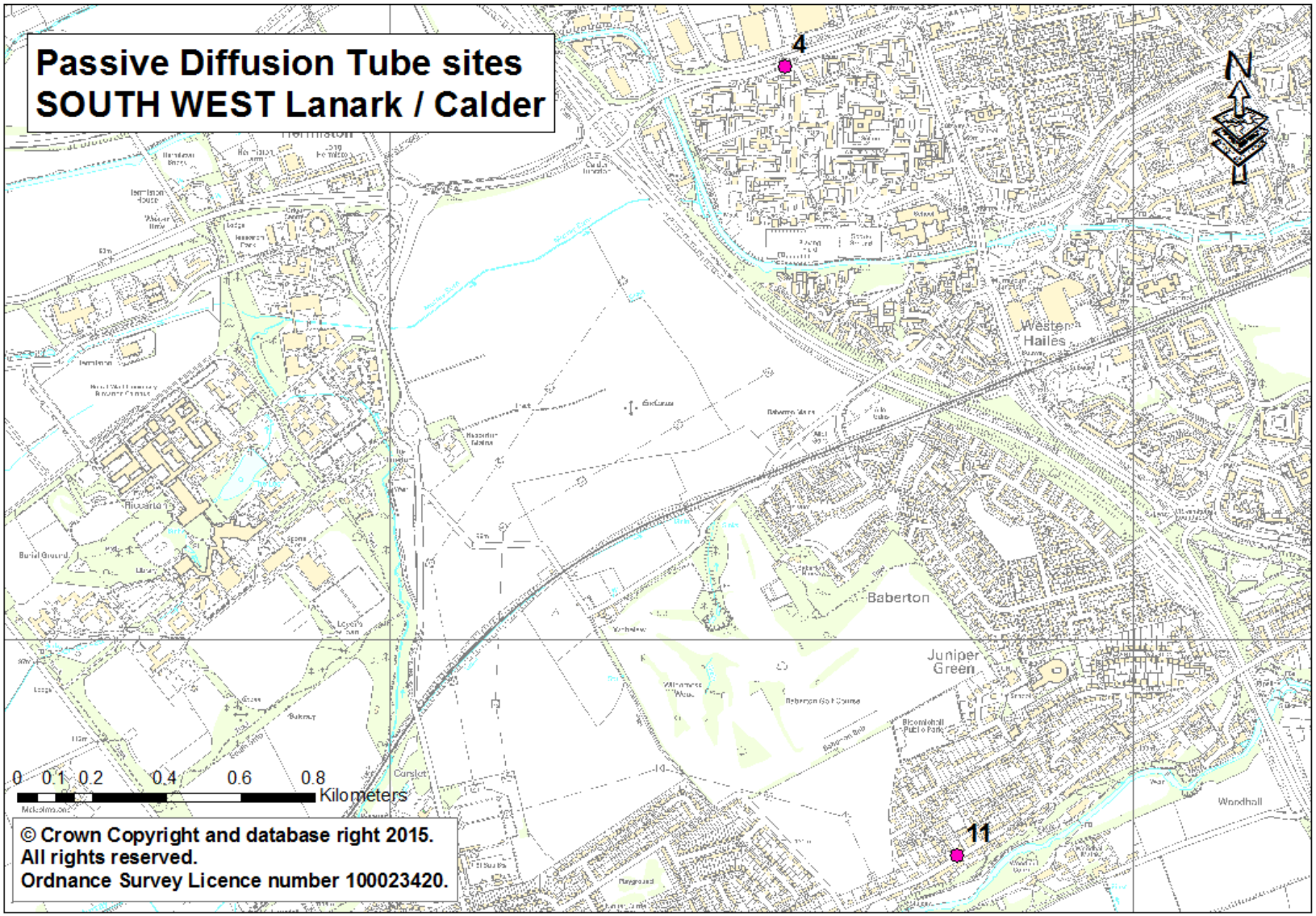
Passive Diffusion Tube sites
SOUTH WEST Lanark / Calder
4
11
N
Western Hailes
Baberton
Juniper Green
Wandhall
0 0.1 0.2 0.4 0.6 0.8
Kilometers
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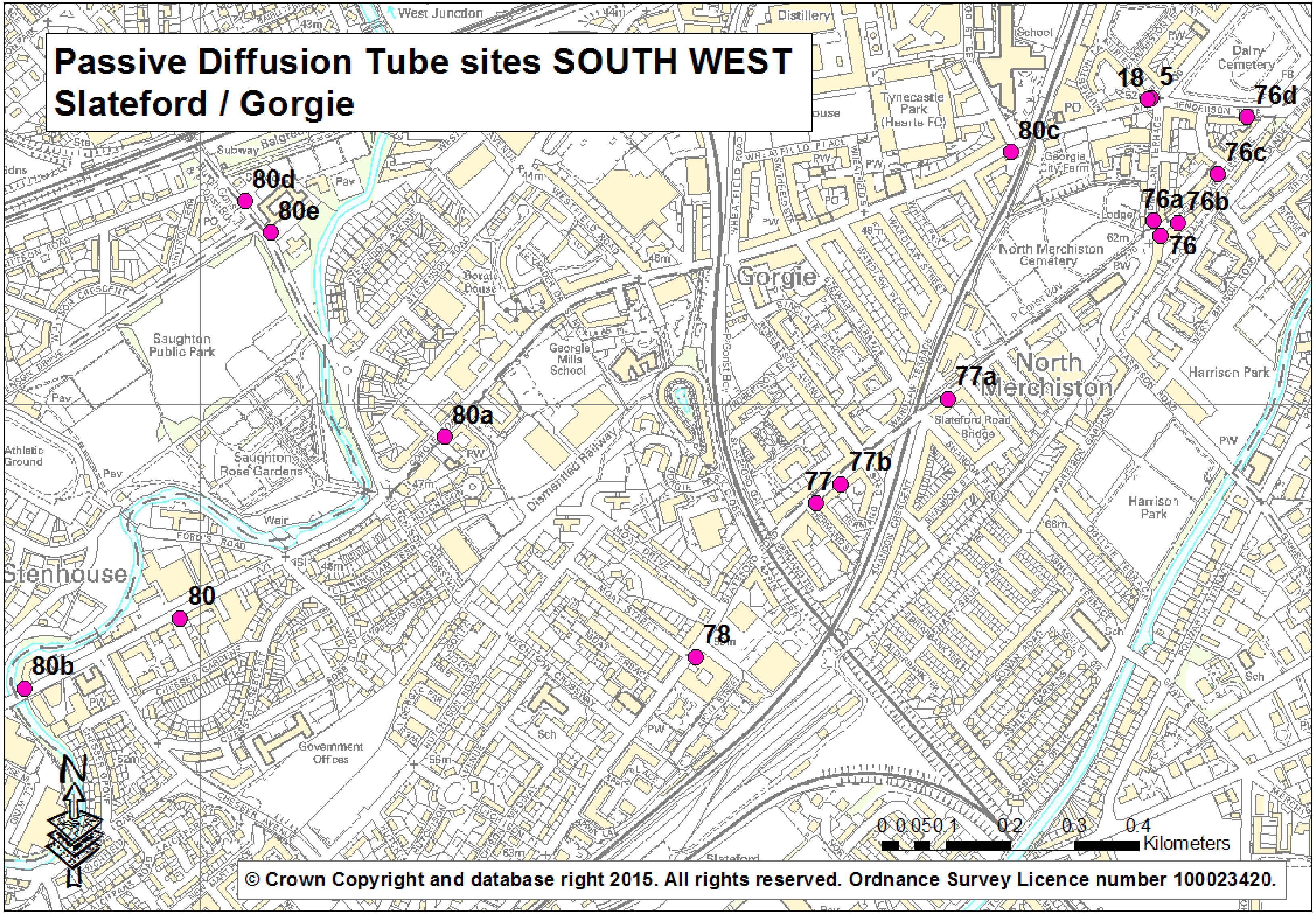
Passive Diffusion Tube sites SOUTH WEST
Slateford / Gorgie
18
5
76d
80c
76c
76a
76b
76
80d
80e
80a
77a
77b
77
80
78
80b
Gorgie
North Merchiston
Stenhouse
Saughton Public Park
Saughton Rose Gardens
Tynecastle Park (Hearts FC)
Dalry Cemetery
North Merchiston Cemetery
Harrison Park
Gorgie Mills School
Dismantled Railway
Slateford Road Bridge
Government Offices
Athletic Ground
West Junction
Distillery
0 0.050.1 0.2 0.3 0.4
Kilometers
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Appendix C: Raw Passive Diffusion Tube Data 2014

Data highlighted in bold and red was excluded from the annual set due to very low or extremely high values that were not in keeping with the monitoring location nor related to pollution episodes.

See notes at the end of this section for an explanation of the abbreviated letters.

	Site No.	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Mean	Corr-ected
NORTH															
Bernard Street/Sainsburys	**29**	44.5	48.0	46.2	31.7	39.0	32.7	35.0	41.7	40.3	42.9	47.9	59.9	**42.5**	
Bernard Street/King Chambers	**29a**	48.1	47.7	**32.8**	47.6	49.0	47.6	42.1	37.1	46.7	45.3	47.8	48.3	**N/A**	**46.1** *
Bernard Street/King Chambers	**29a**	48.3	48.3	**30.5**	44.4	38.4	40.4	40.0	35.6	43.2	46.1	54.4	59.3	**N/A**	**45.3** *
Bernard Street 32	**29b**	38.6	37.6	37.5	36.3	35.9	28.0	31.8	30.0	36.9	36.3	36.2	40.6	**35.5**	
Bernard Street/PS	**29c**	56.5	63.0	49.6	39.7	51.5	43.9	42.9	40.1	51.4	56.6	62.6	57.5	**51.3**	
Bernard Street/PS	**29c**	66.9	59.7	48.9	44.8	53.2	41.5	47.7	46.3	48.5	56.8	77.5	67.1	**54.9**	
Commercial Street/Job Centre	**9d**	49.6	55.7	M	62.9	75.5	67.9	M	M	59.8	M	66.5	54.7	**N/A**	**56.7** #
Commercial Street 88	**9**	43.9	33.8	37.5	42.4	47.9	47.6	35.4	31.1	49.1	40.5	M	44.3	**41.2**	
Commercial Street/Portland Place	**9a**	57.5	65.2	51.4	M	55.3	48.7	43.5	45.5	M	56.0	59.2	65.2	**54.8**	
Ferry Road 268	**52**	50.2	47.5	43.5	M	43.5	20.7	30.7	42.2	42.7	44.6	63.8	57.3	**44.2**	
Ferry Road/ 6 Bowhill Terrace	**53**	50.4	53.1	48.0	35.7	46.1	34.2	41.4	35.7	39.9	50.2	55.7	69.2	**46.6**	
Ferry Road/Maderia Street	**45b**	25.0	34.8	33.3	32.6	34.3	34.2	25.1	28.8	33.9	32.8	37.5	41.5	**32.8**	
Ferry Road 128/North Fort Street	**45**	32.8	32.4	46.7	48.4	47.3	49.2	41.3	M	37.3	34.5	46.0	M	**41.6**	
Ferry Road/North Junction Street	**45d**	55.7	54.0	42.7	40.5	42.3	39.2	34.4	34.2	43.4	44.6	51.0	61.2	**45.3**	
Great Junction Street 137	**30b**	52.3	46.9	43.4	40.1	46.5	37.7	41.1	44.9	43.6	41.5	M	55.6	**44.9**	
Great Junction Street 14	**30c**	54.5	47.6	46.8	58.2	53.0	49.7	56.5	36.4	54.5	46.8	63.2	37.6	**50.4**	
Great Junction Street/WC	**30d**	44.4	43.7	45.5	42.1	52.3	58.0	49.4	35.2	48.9	34.4	60.1	37.0	**45.9**	
Great Junction Street/Pirie St	**30e**	M	44	M	43.4	55.8	M	46.7	35.8	46.4	44.7	62.2	M	**N/A**	**44.1** #
Great Junction Street/FV	**30**	57.4	M	54.4	57.6	55.4	M	56.8	M	M	48.8	M	40.3	**N/A**	
Great Junction Street/FV	**30**	58.5	M	M	56.8	64.1	M	47.6	M	M	48.0	M	47.7	**N/A**	

	Site No.	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Mean	Corr-ected
Inverleith Row/Ferry Road	**55**	60.6	55.9	53.6	44.5	56.9	53.2	49.3	43.2	51.4	52.9	65.5	48.5	**53.0**	
Inverleith Row/Ferry Road	**55**	52.0	56.7	52.1	53.7	61.6	52.1	42.6	**21.3**	48.7	51.4	68.0	54.1	**N/A**	**53.9 ***
Inverleith Row/Café Montague	**55c**	35.4	35.9	37.4	47.0	45.5	48.0	39.6	M	34.7	34.3	54.5	23.6	**39.6**	
North Junction St nr 4	**9c**	37.9	46.1	41.8	M	44.5	42.0	36.1	38.0	36.4	38.5	45.5	56.5	**42.1**	
Ocean Drive/Leith	**9b**	40.1	36.6	40.1	40.5	38.8	38.6	31.1	31.0	30.5	32.4	43.6	43.1	**37.2**	
Salamander Street/Baltic Street	**51c**	48.7	48.3	37.0	34.4	M	26.1	26.4	31.5	33.7	46.4	48.6	59.6	**40.1**	
Salamander Street/Bath Road	**51b**	42.7	32.4	39.8	47.2	47.0	51.7	40.9	32.9	49.5	36.2	53.4	45.6	**43.3**	
Trinity Crescent	**14**	51.6	47.0	41.3	31.9	M	27.5	24.1	20.7	33.2	34.6	41.3	42.0	**35.9**	
EAST															
Baileyfield Road	**19**	29.7	25.7	21.3	22.8	21.5	M	24.4	19.8	M	23.7	M	39.1	**25.3**	
Dalkeith Road 187	**31**	37.0	29.8	32.5	42.9	47.2	44.5	34.6	26.4	40.6	33.4	47.2	M	**37.8**	
Easter Road/CH shop	**25**	M	47.5	55.4	57.7	**8.5**	56.0	56.7	M	M	42.6	66.2	47.3	**N/A**	**52.1*** #
Easter Road/Rossie Place	**25b**	M	45.0	M	M	44.4	39.5	M	30.5	43.3	41.3	52.0	43.8	**N/A**	**42.1** #
Easter Road 105/109	**25c**	43.0	42.3	36.6	38.2	35.2	34.0	32.1	37.3	42.5	40.9	47.4	44.4	**39.5**	
Easter Road/Bothwick	**25d**	50.0	35.3	37.6	44.8	43.6	38.0	37.8	29.2	39.5	37.0	49.2	47.4	**40.8**	
Easter Road 198	**25e**	40.8	35.4	M	44.0	38.9	38.7	**<1.0**	58.1	31.8	M	46.3	38.2	**N/A**	**41.4 ***
Easter Road 217	**25f**	39.3	31.6	32.1	31.9	M	26.9	26.0	26.0	31.2	M	41.3	41.9	**32.8**	
Easter Road 327	**25g**	38.0	35.7	32.8	32.3	28.6	25.6	26.0	27.6	28.2	34.8	44.9	41.9	**33.0**	
London Road/Brunton Pl	**46b**	37.9	32.2	37.3	38.0	39.8	32.6	38.8	37.3	41.7	33.1	45.7	41.9	**38.0**	
London Road/East Norton Place	**81**	70.6	69.6	54.4	54.7	46.5	43.4	51.8	49.5	55.9	64.1	59.2	75.0	**57.9**	
London Road/Earlston Place	**67**	43.5	47.4	56.4	M	M	M	63.6	48.7	M	54.7	63.0	56.2	**N/A**	**53.1** #
London Road/Parson's Green Ter	**68**	34.0	33.3	39.6	42.2	35.7	M	36.0	37.9	43.3	32.4	44.2	41.8	**38.2**	
London Road/Wolseley Place	**69**	63.4	58.9	43.7	51.1	51.4	45.0	47.7	48.5	51.3	70.5	64.7	86.4	**56.9**	
London Road/Wolseley Terrace	**70**	62.4	48.9	44.0	M	48.0	39.0	45.3	53.2	48.2	57.0	43.2	75.6	**51.3**	
London Road/Cadzow Place	**66**	31.5	36.0	45.0	50.4	46.1	M	45.5	39.7	44.5	34.8	51.7	**<1.0**	**N/A**	**42.5 ***
London Road/junct Easter Road	**46**	42.2	48.6	47.6	M	55.3	M	M	42.3	45.8	37.4	M	50.8	**N/A**	**51.4** #
Niddrie Mains Road 28	**32**	54.3	40.8	36.7	40.0	46.2	42.8	43.8	34.3	36.2	43.3	58.2	43.5	**43.3**	

	Site No.	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Mean	Corr-ected
Portobello High Street W 185	**71**	52.2	53.1	39.3	37.6	39.7	M	M	37.2	39.8	40.0	M	M	**N/A**	**43.7** #
Portobello Road/Ramsay Institute	**73a**	69.8	**25.6**	38.7	54.8	M	46.4	M	46.0	50.2	57.7	58.9	44.5	**N/A**	**51.9 ***
Portobello Rd facade Ramsay Inst	**73d**	59.8	55.2	41.5	49.0	44.3	23.0	43.4	36.7	49.7	53.5	58.0	53.1	**47.3**	
Portobello Rd Lp PJJ93	**73e**	59.9	47.8	M	52.8	46.6	49.7	M	34.8	46.6	42.7	61.3	47.7	**49.0**	
Portobello Rd/College Crt	**73f**	28.7	**62.5**	21.2	M	23.8	24.3	22.0	18.7	25.8	24.7	31.6	22.4	**N/A**	**24.3 ***
Portobello Rd/Inchview Terr	**73g**	37.9	34.5	36.2	47.5	40.2	41.5	38.6	30.8	M	38.7	45.5	48.8	**40.0**	
Seafield Road East 10	**72**	49.4	38.7	42.5	54.1	57.7	50.6	46.4	30.5	**19.0**	36.4	52.7	30.0	**44.5**	**44.5 ***
Seafield Road East 7	**72a**	46.7	39.4	40.0	54.8	52.3	55.3	46.2	36.2	38.9	39.1	55.7	36.8	**45.1**	
CITY CENTRE - NORTH															
Broughton Road	**43**	54.1	56.9	49.6	46.8	49.4	42.0	43.8	34.8	42.7	48.1	61.8	44.5	**47.9**	
Broughton Street	**44**	45.8	44.2	39.0	46.5	46.4	M	37.1	28.4	39.7	43.6	54.8	35.9	**41.9**	
Deanhaugh Street	**13**	50.6	41.1	46.3	44.5	40.7	36.7	29.1	32.8	36.2	39.2	50.9	43.5	**41.0**	
Dundas Street	**35**	52.6	**9.0**	39.4	M	38.4	30.5	26.7	M	35.6	37.4	62.8	36.8	**N/A**	**40.0 ***
George Street 112	**74f**	51.2	35.8	42.3	40.7	49.2	35.5	35.5	29.4	37.7	33.5	54.0	41.2	**40.5**	
Gt Stuart Street 7	**75b**	42.5	45.3	41.6	35.7	35.2	30.2	29.7	31.4	37.0	M	47.5	48.4	**38.6**	
Gt Stuart Street 14	**75f**	31.7	36.5	31.6	29.4	31.5	25.7	27.3	23.4	28.4	34.3	46.8	34.2	**31.7**	
Gt Stuart Street 9	**75e**	38.4	27.8	29.9	29.7	29.3	23.4	25.0	27.8	29.1	32.7	42.0	41.9	**31.4**	
Hamilton Place 72	**143**	47.1	46.0	38.2	36.0	36.0	26.3	25.1	23.7	34.2	39.6	58.8	35.6	**37.2**	
Hamilton Place/Stockbridge Libr.	**143a**	62.2	48.2	40.2	34.2	40.9	35.9	38.2	33.0	43.8	51.6	83.3	55.6	**47.3**	
India Street	**34**	**75.2**	32.9	26.6	25.0	24.0	16.7	19.4	18.1	INV	28.2	46.1	30.2	**N/A**	**26.7 ***
Inverleith Row/Summer Place	**55b**	47.3	36.1	37.4	34.6	30.7	26.2	31.2	32.0	35.0	40.7	57.4	37.1	**37.1**	
Leith Street 35	**74g**	69.4	M	66.1	64.3	M	M	M	57.5	M	M	62.6	M	**N/A**	
Leith Walk/Brunswick Road	**21**	54.7	57.8	48.6	44.1	47.3	38.6	M	38.1	43.3	49.8	52.8	46.7	**47.4**	
Leith Walk/McDonald Road	**20**	39.4	50.6	M	45.6	53.5	42.1	38.4	36.2	40.1	42.7	46.3	45.1	**43.6**	
Princes Street (Eastbound)	**47**	50.7	47.3	52.9	64.9	70.6	60.3	61.7	52.5	57.1	40.5	56.1	51.1	**55.5**	
Princes Street/Mound	**24**	M	M	M	M	M	M	84.0	M	81.2	66.4	90.6	M	**N/A**	
Queen Street/Hanover Street	**33**	67.5	63.0	M	M	63.4	M	M	M	59.2	54.5	M	68.3	**N/A**	

	Site No.	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Mean	Corr-ected
St Colme Street	**75a**	42.1	46.5	42.3	50.9	57.1	49.8	51.2	39.6	INV	38.6	**54.5**	47.8	**N/A**	**46.6 ***
St Colme Street/4	**75d**	35.4	33.7	35.6	36.3	41.8	36.6	39.5	30.7	42.1	28.7	**65.1**	37.2	**N/A**	**36.1** *
York Place	**36**	45.1	45.2	41.6	42.0	49.5	42.9	42.8	35.4	46.3	47.8	55.9	58.6	**46.1**	
CITY CENTRE - SOUTH															
Bruntsfield Place 210	**6a**	41.6	M	38.0	M	49.0	45.8	M	40.5	45.7	38.4	58.4	37.1	**43.8**	
Clerk Street 15	**138**	64.4	60.0	M	41.7	M	41.1	47.2	49.4	50.0	52.2	61.2	53.1	**52.0**	
Cowgate/Guthrie Street	**48**	50.8	41.2	44.7	41.6	53.9	45.8	41.8	41.0	43.9	36.2	49.5	50.3	**45.1**	
Cowgate/Blair Street	**48a**	52.1	38.4	55.4	47.6	51.8	M	46.3	45.3	47.4	34.5	64.8	46.6	**48.2**	
Cowgate/ 50 St Mary's Street	**48f**	M	M	54.5	44.5	56.4	57.4	43.7	53.9	M	41.0	52.7	44.1	**49.8**	
Cowgate/Blackfriars	**48c**	46.8	M	46.3	43.3	M	M	50.5	M	52.8	44.4	49.1	58.0	**N/A**	**45.5** #
Cowgatehead 2	**48e**	38.0	35.8	41.7	52.4	61.9	M	M	48.5	53.8	35.7	M	57.1	**47.2**	
Dundee Street/Yeaman Place	**79d**	M	56.6	57.8	M	M	58.5	M	47.7	58.4	54.9	59.9	56.4	**N/A**	**55.7** #
Fountainbridge 103	**79a**	48.2	42.1	M	47.4	58.9	M	40.9	39.7	48.6	43.3	52.9	39.2	**46.1**	
Fountainbridge Grove Street	**79b**	26.0	24.2	37.4	39.6	39.6	28.4	31.1	29.1	34.5	26.1	40.2	M	**32.4**	
Fountainbridge/Tollcross	**79**	50.2	46.4	48.0	52.3	49.7	41.3	39.9	38.4	45.8	41.3	46.5	46.4	**45.5**	
Grassmarket/PS adjacent lpost	**37**	M	M	M	M	57.7	M	56.7	48.3	M	M	M	68.2	**N/A**	
Grassmarket 41	**37a**	M	68.7	37.9	53.0	59.3	42.5	M	71.8	76.9	M	INV	65.9	**N/A**	
Grassmarket 41	**37a**	68.7	**83.9**	43.4	56.3	49.7	45.5	M	60.0	52.0	63.1	INV	48.5	**N/A**	**54.1 ***
Grassmarket 75	**37b**	53.4	39.6	45.7	45.3	48.0	46.2	47.7	45.8	47.2	38.6	55.9	51.6	**47.1**	
Grassmarket/nrThomsons Court	**37c**	35.3	29.5	31.1	35.0	37.4	31.6	35.0	34.7	35.3	28.9	33.3	35.9	**33.6**	
Home Street/Tollcross	**10**	M	30.8	M	M	M	M	36.2	36.9	41.0	35.3	44.9	35.3	**N/A**	**37** #
Hope Park Terrace/VS	**17a**	46.3	45.5	46.0	51.0	57.7	52.7	45.7	40.3	51.6	38.6	47.1	51.2	**47.8**	
Hope Park Terrace/VS	**17a**	47.1	42.0	44.8	52.2	53.5	50.6	43.3	44.2	48.3	33.6	54.5	43.3	**46.5**	
Hope Park Terrace 5	**139**	42.2	33.2	38.4	46.2	43.7	36.8	30.7	34.5	47.2	33.5	45.8	32.5	**38.7**	
Hope Park Terrace/Clerk Street	**140**	61.8	50.9	46.1	43.2	44.7	44.9	41.5	37.9	M	43.5	56.1	55.4	**47.8**	
Melville Drive	**38**	31.3	29.1	33.3	27.4	33.4	28.6	27.4	33.9	35.2	28.5	41.4	40.6	**32.5**	
Midmar Drive	**42**	19.0	15.4	18.2	14.0	17.2	17.2	14.6	14.8	19.1	19.0	25.7	19.9	**17.8**	

	Site No.	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Mean	Corr-ected
Morningside Road	**8**	M	27.6	M	M	M	M	30.5	26.2	38.0	32.4	42.0	31.1	**N/A**	**31.9** #
Morrison Street	**49**	50.0	49.7	59.4	M	71.0	56.3	61.9	44.0	54.0	M	33.9	51.1	**53.1**	
Nicholson Street 69	**135**	59.2	56.8	64.1	49.2	67.6	60.9	63.7	44.0	56.9	58.0	57.6	59.5	**58.1**	
Nicholson Street 92	**136**	56.3	48.0	43.7	47.8	63.2	57.3	52.3	72.6	51.0	M	M	35.8	**52.8**	
North Bridge South	**27**	63.2	48.1	72.2	66.3	85.5	72.6	69.6	M	59.1	51.9	63.3	M	**65.2**	
South Bridge 59	**144**	73.4	66.2	62.0	58.4	70.1	71.0	59.5	55.1	M	56.5	72.6	47.1	**62.9**	
South Clerk Street 41a	**142**	49.0	53.1	39.1	52.7	60.3	50.9	**40.0**	39.6	48.6	43.9	53.1	47.3	**N/A**	**48.9** *
South Clerk Street 84	**141**	54.4	51.2	50.5	45.4	56.1	51.4	48.4	47.4	50.4	49.3	63.0	50.5	**51.5**	
St Leonards 145A	**28e**	38.8	41.2	38.3	34.6	25.3	32.2	31.8	42.2	39.8	38.0	44.5	55.0	**38.5**	
Torphichen Place/Chiropractice	**3**	53.4	48.3	59.2	66.6	66.4	40.7	63.1	63.5	55.3	62.5	61.5	60.0	**58.4**	
Torphicen Place 1	**3b**	58.3	57.9	53.5	63.8	59.8	54.5	59.3	50.4	62.1	59.4	82.8	62.5	**60.4**	
Torphichen Street	**3a**	39.8	39.5	43.3	45.7	46.1	39.7	36.5	36.9	39.5	42.5	45.1	45.3	**41.7**	
West Maitland St/Palmerston Pl	**2**	71.7	103.0	83.6	M	81.5	M	74.5	63.4	75.4	75.8	INV	85.7	**79.4**	
West Port 62	**28b**	M	72.0	M	M	95.5	M	52.4	M	M	70.1	88.5	87.6	**N/A**	**75.4** #
West Port Opp 50	**28c**	49.4	49.0	M	52.5	68.0	M	M	M	56.3	51.5	46.7	M	**N/A**	
West Port 42	**28d**	73.3	78.1	65.7	**66.4**	73.9	53.2	63.5	72.2	71.5	61.5	73.8	71.6	**68.7**	**68.9** *
WEST															
Corstorphine High Street 9	**145**	35.7	40.9	34.8	33.3	32.4	30.2	28.2	27.5	36.3	36.5	58.9	41.6	**36.4**	
Glasgow Road/Drumbrae R'about	**56**	45.6	M	43.2	47.8	38.3	42.4	37.4	31.1	39.6	38.3	70.7	40.2	**43.1**	
Glasgow Road 158	**57**	60.4	49.1	52.1	49.7	54.0	51.1	**6.1**	43.2	52.7	49.0	70.3	55.0	**N/A**	**53.3** *
Glasgow Road 68/adj	**16**	64.8	59.3	55.4	54.3	47.9	70.4	56.0	63.2	78.7	54.3	89.7	45.5	**61.6**	
Glasgow Road 68/ Facade	**16a**	46.3	39.5	39.7	43.9	55.9	58.4	47.0	45.2	60.8	44.5	M	M	**48.1**	
Glasgow Road/Ratho Station 94	**16b**	37.4	29.2	37.9	42.1	48.5	50.5	39.8	42.9	53.8	42.9	54.5	41.3	**43.4**	
Glasgow Road Newbridge RA	**58**	67.6	70.1	72.0	55.0	77.7	68.6	69.7	66.5	87.3	77.1	71.7	77.0	**71.7**	
Glasgow Road Newbridge RA	**58**	70.6	76.6	61.6	48.3	81.1	68.3	68.5	60.0	69.3	68.1	72.0	79.2	**68.6**	
Glasgow Road Newbridge RA/3	**15**	67.8	61.6	54.9	40.6	52.4	43.4	34.1	**10.1**	50.6	53.2	53.6	62.3	**N/A**	**52.2** *
Glasgow Road Facade/9	**15a**	51.6	49.7	44.9	36.2	46.9	45.5	47.2	41.3	52.4	40.0	50.2	53.4	**46.6**	

	Site No.	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Mean	Corr-ected
Hillhouse Road 118	**40f**	42.5	27.8	**13.7**	M	53.8	52.6	44.0	40.1	49.1	38.4	53.0	28.4	**N/A**	**43.0** *
Hillhouse Road 240	**40c**	39.4	22.5	30.3	42.7	39.9	41.7	29.2	33.8	39.5	29.9	46.0	24.4	**34.9**	
Hillhouse Road/Craigcrook Terr	**40b**	41.3	33.3	38.9	40.4	47.1	41.9	32.7	38.1	41.4	38.5	60.6	27.5	**40.1**	
Hillhouse Road/Marischall Place4	**40d**	44.0	43.3	40.8	39.3	35.8	38.3	33.0	36.2	45.4	35.5	47.7	41.0	**40.0**	
Hillview Terrace	**41**	27.8	18.7	21.5	19.1	23.7	20.9	21.3	18.9	22.6	24.5	53.2	24.0	**24.7**	
Maybury Road/Barnton Junction	**61**	42.4	41.6	38.4	33.4	M	38.7	M	M	34.1	M	45.0	34.9	**N/A**	**35.5** #
Queensferry Road/Hillhouse Rd	**40**	47.9	37.7	41.6	46.9	40.3	49.0	39.8	39.7	52.2	35.0	53.5	34.4	**43.2**	
Queensferry Road 544	**63**	32.3	28.0	29.8	22.8	22.2	28.4	27.1	36.9	30.7	29.5	39.7	41.4	**30.7**	
Queensferry Road 550	**64**	83.5	80.1	81.1	94.2	89.4	88.6	98.9	103.6	109.5	87.4	97.3	96.4	**92.5**	
Queensferry Road 552	**64a**	39.3	34.6	38.5	40.0	39.3	41.6	38.6	41.3	45.5	36.4	47.5	39.7	**40.2**	
Queensferry Road 561	**62**	25.8	19.1	24.6	31.4	28.7	27.1	23.7	26.9	28.8	22.2	34.1	19.9	**26.0**	
Roseburn Terrace	**23**	63.0	52.6	54.5	66.0	77.1	70.9	61.4	M	61.0	51.6	85.8	35.6	**61.8**	
St John's Road SB	**1**	54.7	43.4	50.2	55.1	60.8	62.6	53.1	37.9	55.3	47.1	67.8	45.5	**52.8**	
St John's Road IR	**1b**	51.2	39.7	50.4	48.9	64.4	53.9	52.6	46.1	53.6	46.6	60.6	39.6	**50.6**	
St John's Road Kaimes Road	**SJ1**	59.1	50.5	38.1	50.5	49.9	M	M	33.8	46.5	M	73.5	40.5	**49.2**	
St John's Road 63	**SJ2**	43.4	40.7	36.3	M	47.6	35.2	33.0	29.8	41.6	36.6	63.1	M	**40.7**	
St John's Road 81	**SJ3**	54.6	44.1	47.7	51.6	51.1	M	48.1	40.3	M	47.0	**15.1**	46.5	**N/A**	**47.9 ***
St John's Road 131	**1d**	78.1	69.6	64.8	60.6	65.3	55.7	56.4	55.7	65.5	61.0	77.6	63.7	**64.5**	
St John's Road/Victor Park Terr	**39**	47.5	46.3	44.1	52.8	42.0	49.1	48.8	46.5	49.4	43.5	58.9	53.5	**48.5**	
Station Road 41 Kirkliston	**146**	30.3	28.3	25.6	M	M	M	22.4	27.0	38.3	25.8	47.8	32.8	**30.9**	
Station Road 2 Kirkliston	**146a**	M	M	M	M	M	30.4	M	M	M	M	35.6	41.9	**N/A**	
Whitehouse Road/Barnton Grove	**50a**	48.3	41.1	37.0	33.6	32.8	37.2	M	29.8	42.6	38.0	55.3	38.4	**39.5**	
SOUTH WEST															
Angle Park Terrace/Harrison Rd	**76**	59.2	46.4	M	60.2	59.0	M	50.0	52.6	57.7	48.5	66.6	54.6	**55.5**	
Angle Park Terrace 25	**76c**	34.4	M	42.1	43.2	38.9	37.4	34.0	37.6	43.1	39.6	36.3	57.5	**40.4**	
Angle Park Terrace 74 2M East	**76b**	61.3	67.3	41.1	M	55.2	52.1	49.5	52.1	57.6	58.1	67.4	54.3	**56.0**	
Ardmillan Terrace 22	**76a**	41.4	36.4	38.0	38.2	36.2	39.1	30.5	29.3	37.5	33.4	50.1	34.2	**37.0**	

	Site No.	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Mean	Corr-ected
Balgreen Rd/School	**80d**	42.8	50.4	45.7	39.3	42.4	34.4	37.6	30.1	36.7	41.3	51.1	45.1	**41.4**	
Balgreen Rd/Library	**80e**	40.1	42.3	45.7	33.8	45.5	40.3	43.4	38.0	49.5	42.8	57.7	47.2	**43.9**	
Calder Road	**4**	44.3	36.2	45.4	55.9	47.5	52.7	38.1	42.9	60.9	38.6	59.3	37.1	**46.6**	
Gorgie Road 87	**80c**	51.7	M	51.0	M	47.7	M	M	37.8	46.3	M	61.7	M	**N/A**	
Gorgie Road 549	**80b**	**2.0**	28.3	40.5	45.6	M	45.0	42.0	33.4	45.4	40.4	61.0	M	**N/A**	**42.4** *
Gorgie Road/Glen Lea	**80a**	39.5	33.4	40.3	M	49.3	M	40.9	30.6	M	39.6	63.3	36.7	**41.5**	
Gorgie Road 8	**18**	51.6	51.0	52.6	64.1	63.0	60.6	56.4	49.3	57.4	50.4	68.7	57.1	**56.9**	
Gorgie Road 8	**18**	44.6	52.9	52.3	59.9	70.4	55.4	52.2	44.4	61.6	**<1.0**	73.7	56.7	**N/A**	**56.7** *
Gorgie Road - Delhaigh	**80**	55.1	52.3	48.9	M	52.1	47.4	46.0	40.9	57.1	47.8	65.7	42.9	**50.6**	
Gorgie Road/Murieston Road	**5**	56.1	56.6	64.4	65.1	56.5	52.2	45.0	48.3	57.0	57.1	67.1	77.9	**58.6**	
Henderson Terrace	**76d**	51.6	M	41.5	39.2	46.8	40.5	38.0	35.8	42.9	43.3	52.1	47.8	**43.6**	
Lanark Road 610	**11**	27.3	20.1	28.2	24.2	28.6	29.6	24.4	26.4	32.1	25.1	36.3	27.4	**27.5**	
Slateford Road 51	**77a**	61.2	53.4	39.6	48.4	42.6	42.2	35.6	40.7	44.7	42.0	61.8	54.4	**47.2**	
Slateford Road 93/95	**77b**	58.6	58.0	M	53.8	48.6	49.8	41.6	38.2	51.7	47.4	59.5	54.8	**51.1**	
Slateford Road 97	**77**	51.6	45.2	M	55.6	46.9	57.5	46.9	M	51.7	39.8	57.4	M	**50.3**	
Slateford Road/The Maltings	**78**	44.5	38.9	M	33.9	30.7	34.4	M	M	40.2	33.6	52.6	M	**N/A**	**34.0** #

Notes for raw data;

* Data corrected having regard to outliers or problematic data

Data corrected - estimation of annual mean concentrations from short term monitoring

M – Tube missing on collection

N/A – Data not applicable. Mean corrected

Figures in bold red – Problematic data not used

INV – Tube inverted on collection; any data not used

Appendix D: Passive Diffusion Tube Distance Correction Calculations

SITE NO.	1	2	4	5	8	9a	9c	11	13	14
Step 1 How far from kerb was measurement made (m)	0.54	0.5	1.6	0.3	0.7	1.47	2.65	1.5	2.7	2.0
Step 2 How far from kerb is receptor in metres (m)	2.34	5.7	26.6	5.2	3.5	5.37	4.7	5.2	7.8	6.0
Step 3 Local background concentration of NO_2	20.2	21.7*	21.6	24.6	20.1	21.8	21.8	15.6	21.7*	19.7
Step 4 Annual mean bias corrected value	39.1	58.8	34.5	43.4	23.6	40.6	31.2	20.4	30.3	26.6
Result; Predicted annual mean at receptor	**34.1**	**42.8**	**26.4**	**34.7**	**22.5**	**35.3**	**29.8**	**19.1**	**28.0**	**24.8**

SITE NO.	15	16	21	23	31	32	35	36	38	39
Step 1 How far from kerb was measurement made (m)	4.0	1.8	1.16	0.23	1.8	2.6	2.4	5.5	2.8	1.6
Step 2 How far from kerb is receptor in metres (m)	7.8	6.2	4.56	2.53	6.7	7.3	9.7	8.2	12.8	5.75
Step 3 Local background concentration of NO_2	27.4	23.9	26.7	21.9	19.2	16.8	21.7*	21.7*	21.7	20.6
Step 4 Annual mean bias corrected value	38.6	45.6	35.1	45.7	28.0	32.0	29.6	34.1	24.1	35.9
Result; Predicted annual mean at receptor	**36.5**	**39.5**	**32.7**	**36.8**	**25.4**	**28.1**	**26.9**	**32.6**	**23.2**	**31.5**

* Measured background data used (from St Leonard's AURN monitoring station).

SITE NO.	40b	40f	47	49	50a	52	53	55c	56	57
Step 1 How far from kerb was measurement made (m)	2.1	2.6	9.0	2.2	3.5	1.65	4.6	4.28	2.57	3.6
Step 2 How far from kerb is receptor in metres (m)	7.0	5.17	2.5	4.6	5.07	6.25	6.17	5.34	7.17	12.1
Step 3 Local background concentration of NO_2	18.4	20.4	21.7*	21.7*	15.1	19.7	19.7	20.6	20.6	19.5
Step 4 Annual mean bias corrected value	29.7	31.8	41.1	39.3	29.2	32.7	34.5	29.3	31.9	39.4
Result; Predicted annual mean at receptor	**26.5**	**29.8**	**50.1**	**36.2**	**27.8**	**28.8**	**33.2**	**28.8**	**29.0**	**32.8**

SITE NO.	58	61	64	73a	73e	73g	75a	75b	140	SJ1
Step 1 How far from kerb was measurement made (m)	2.8	2.8	1.49	2.8	2.5	4.5	0.6	2.5	1.3	0.278
Step 2 How far from kerb is receptor in metres (m)	8.0	15.3	10.69	4.78	4.5	12.9	5.7	8.6	4.8	2.533
Step 3 Local background concentration of NO_2	27.4	17.5	17.5	20.2	20.2	20.2	21.7*	21.7*	23.2	20.2
Step 4 Annual mean bias corrected value	51.9	26.3	68.5	38.4	36.3	29.6	34.5	28.6	35.4	36.4
Result; Predicted annual mean at receptor	**45.4**	**22.5**	**46.5**	**35.9**	**34.0**	**26.7**	**29.2**	**26.5**	**32.0**	**30.7**

* Measured background data used (from St Leonard's AURN monitoring station).

SITE NO.	**SJ2**	**SJ3**	**Queensferry Road (Automatic Data)**
Step 1 How far from kerb was measurement made (m)	0.371	1.148	1.7
Step 2 How far from kerb is receptor in metres (m)	9.519	15.623	8.2
Step 3 Local background concentration of NO_2	20.2	20.2	17.5
Step 4 Annual mean bias corrected value	30.1	35.4	46
Result; Predicted annual mean at receptor	**24.7**	**27.2**	**35.9**

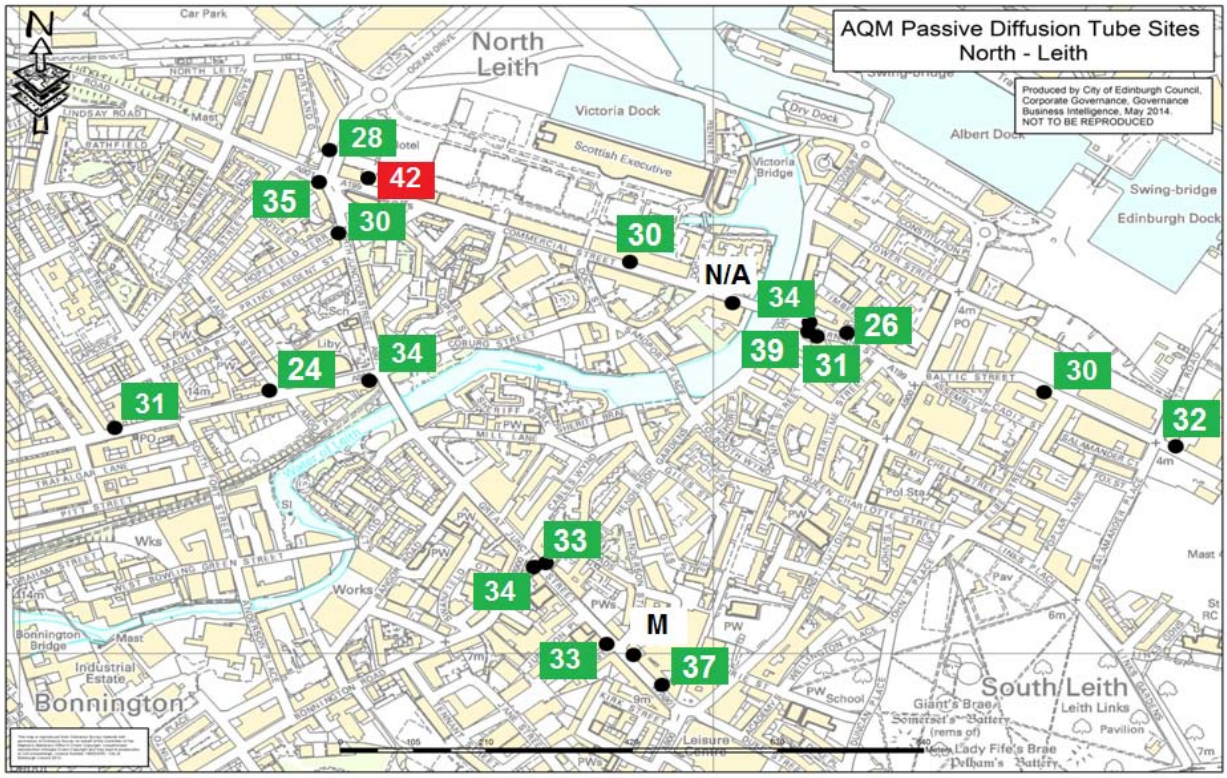
Appendix E: Passive Diffusion Tube data used in trend analysis

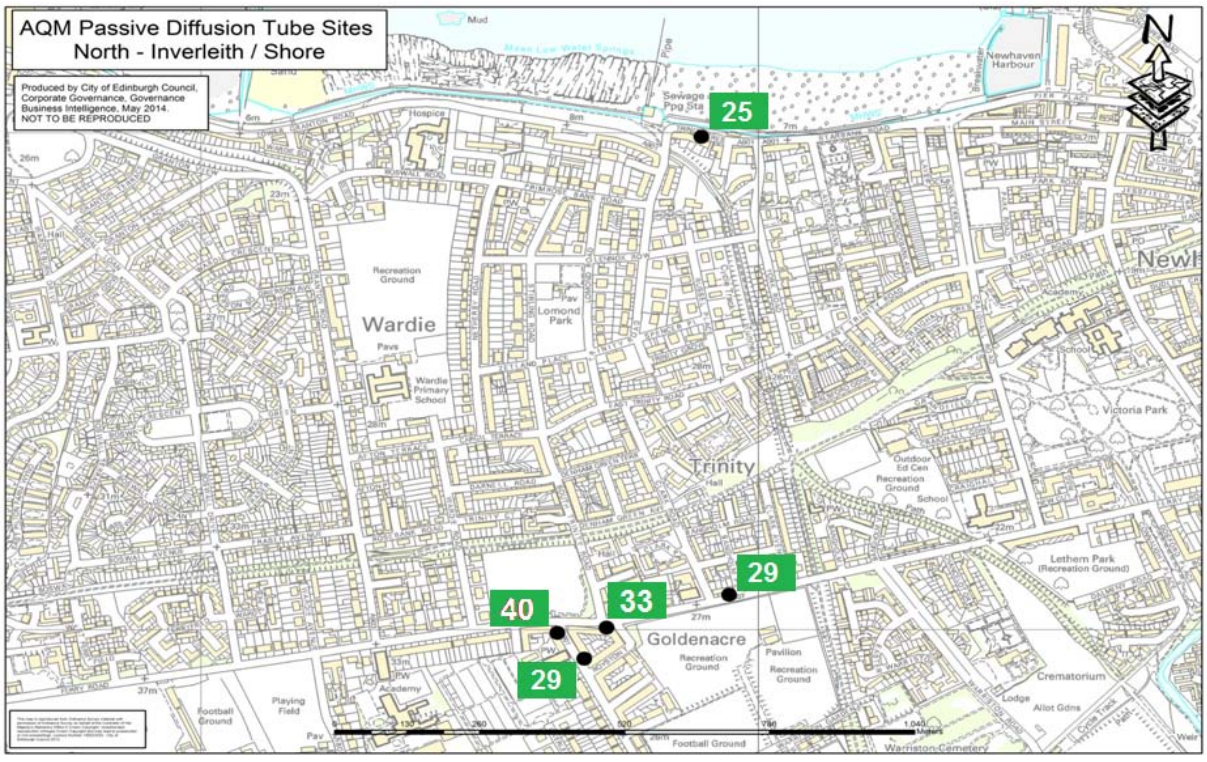
Data which was used to establish the trend of concentration of nitrogen dioxide at passive diffusion tube sites within the AQMAs.

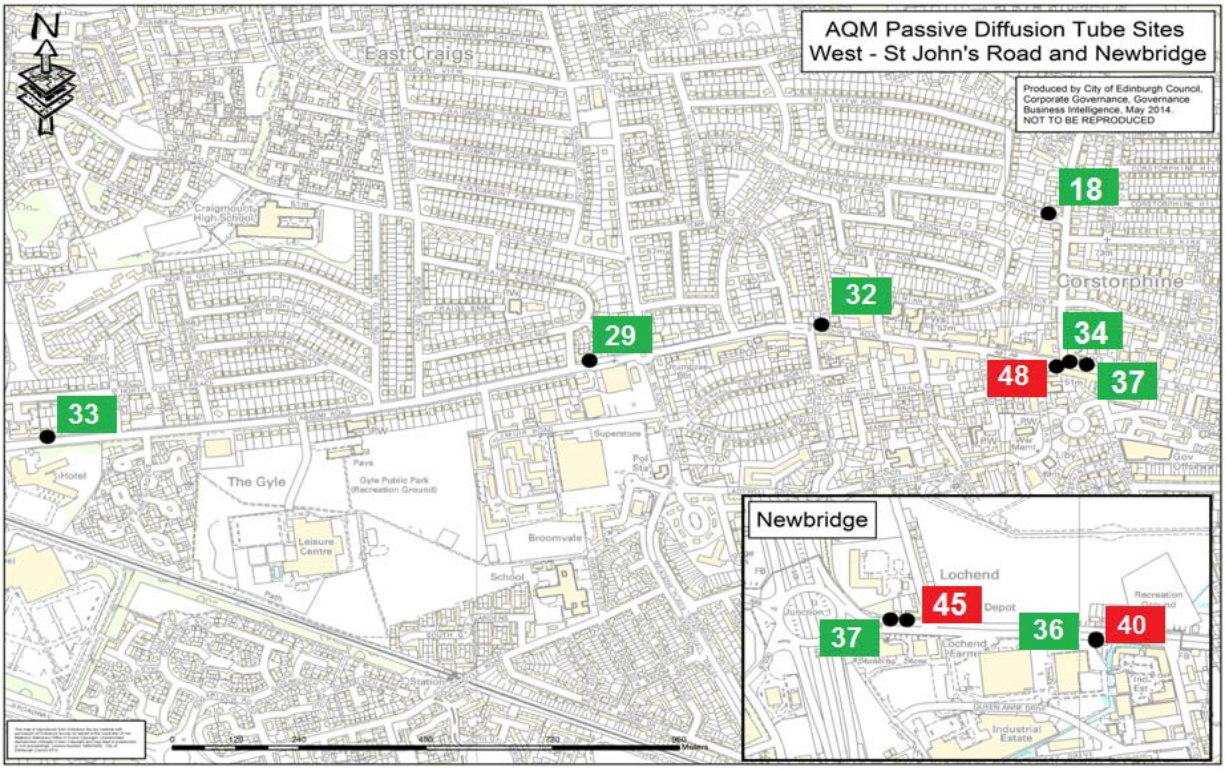
Site ID	Name	Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
		Bias	0.91	0.89	0.89	0.87	0.9	0.88	0.86	0.85	0.81	0.76	0.75	0.74
1	St John's Rd		46	45	52	57	54	50	43	47	39	43	42	39
1b	St John's Rd		-	41	59	51	51	49	44	44	38	44	41	37
1d	St John's Rd		-	66	79	80	82	76	58	59	56	52	52	48
2	West Maitland St		78	77	85	96	104	97	57	73	75	50	*50*	59
3	Torphichen Place		63	72	87	77	87	67	65	64	63	54	48	43
18	Gorgie Road		46	43	43	48	47	52	45	55	48	49	45	42
21	Leith Walk		41	39	38	42	47	44	40	41	36	39	36	35
23	Roseburn Terrace		47	40	49	52	70	67	48	58	41	45	41	46
27	North Bridge		58	54	49	52	56	52	48	49	49	52	47	48
36	York Place		44	42	46	44	52	54	38	41	37	43	29	34
28b	Westport		-	-	-	68	65	73	67	62	57	61	52	*56*
		Average	53	52	59	61	65	62	50	54	49	48	44	44

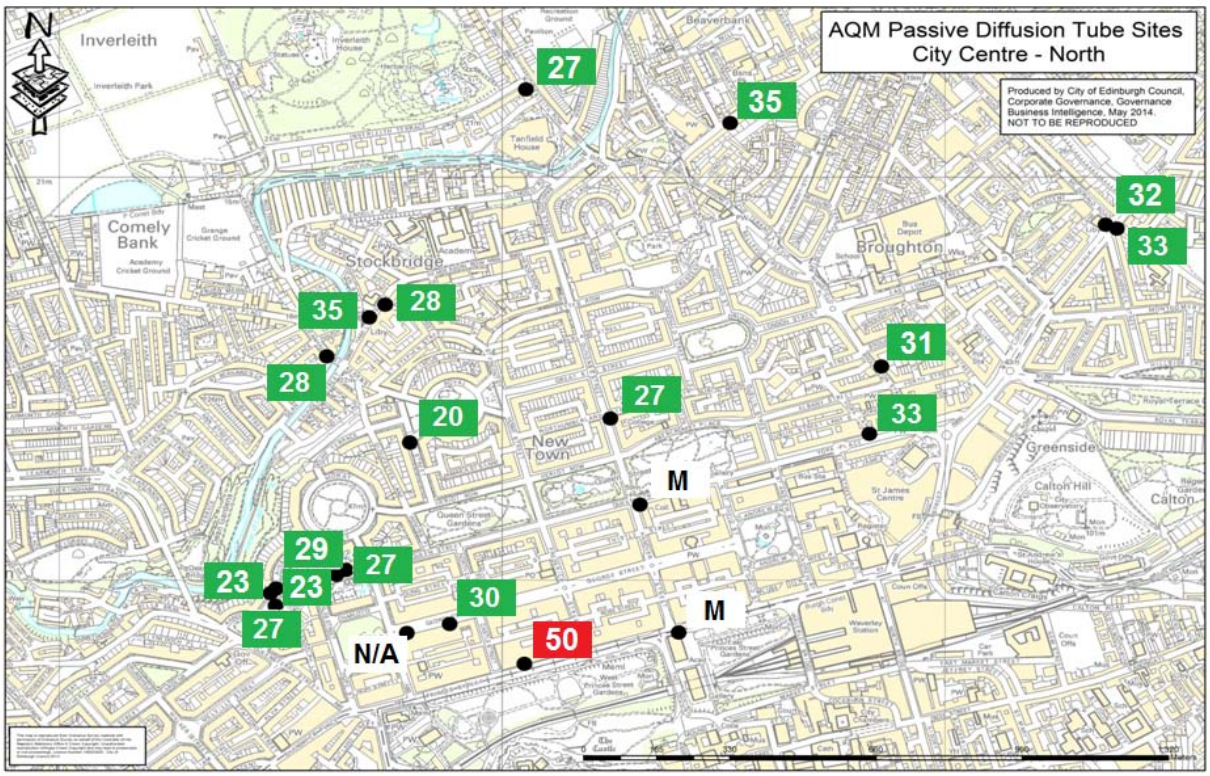
Note, from 2013 *italics* show data that had poor data capture and therefore results were annualised following Technical Guidance 09.

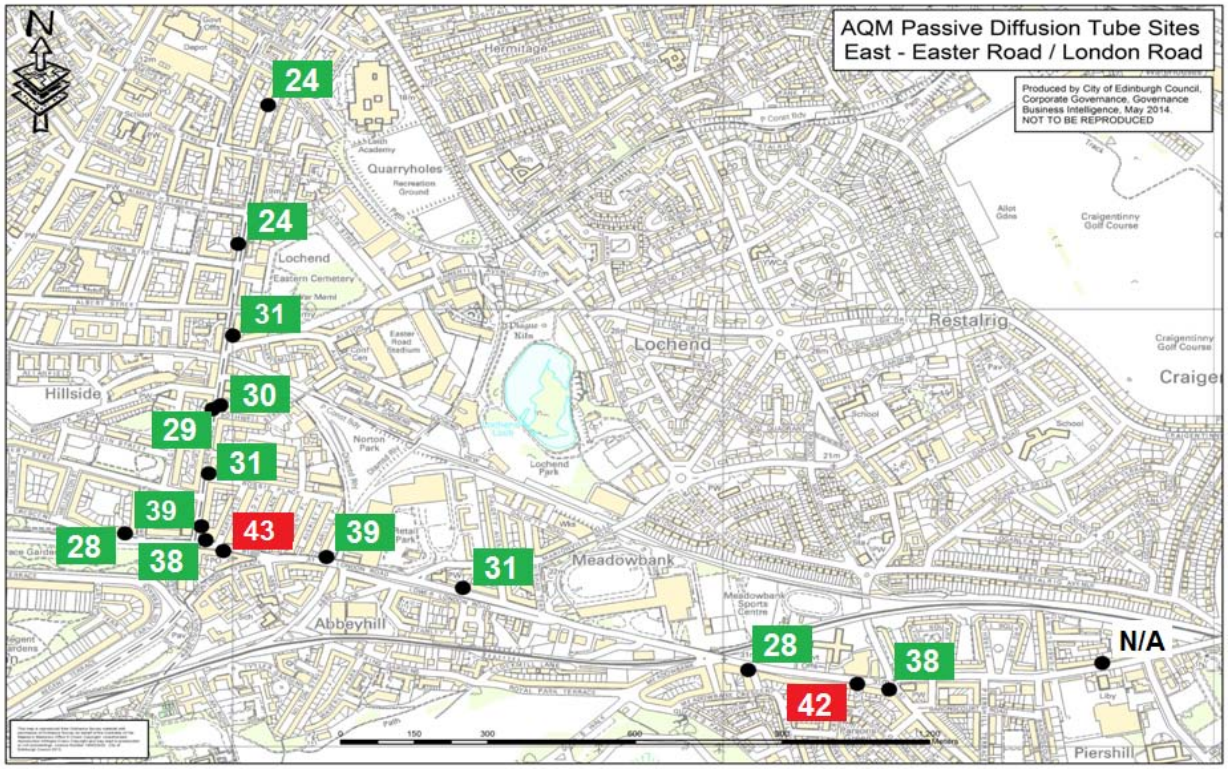
Appendix F: Maps of Air Quality Monitoring Passive Diffusion Tube Data



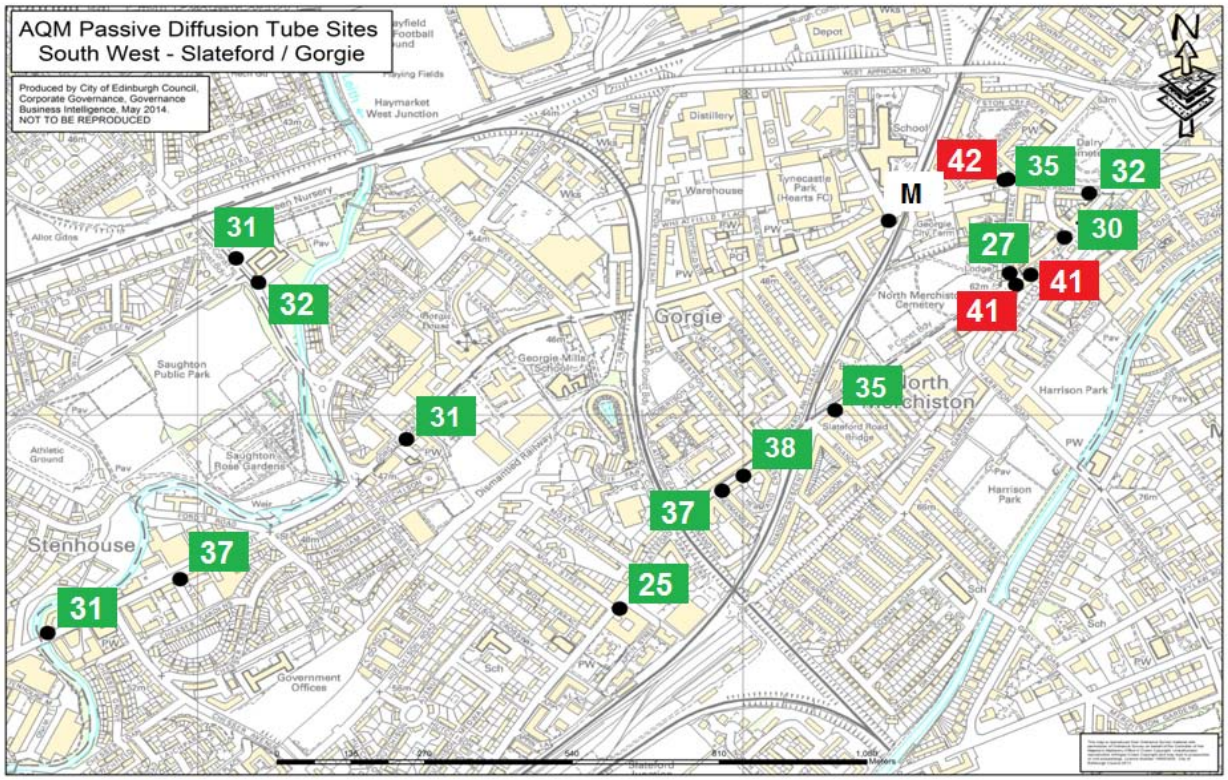


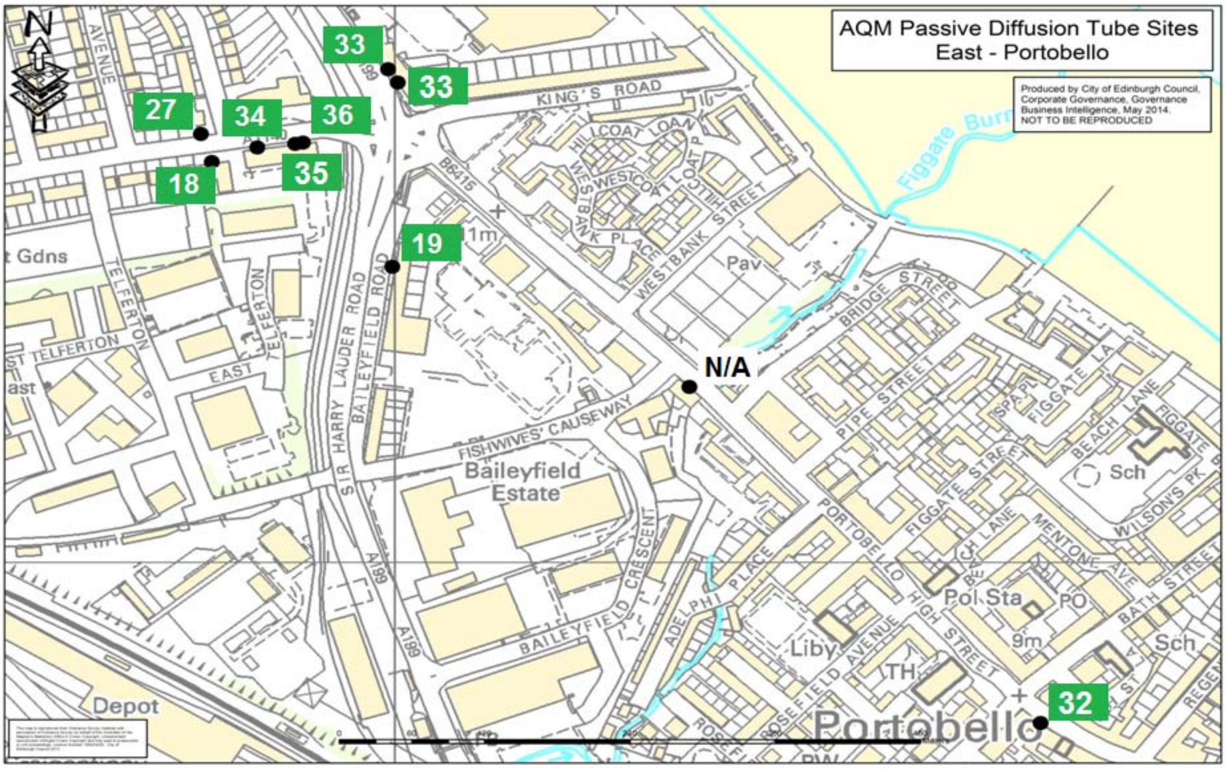

AQM Passive Diffusion Tube Sites
West - St John's Road and Newbridge
Produced by City of Edinburgh Council, Corporate Governance, Governance Business Intelligence, May 2014. NOT TO BE REPRODUCED
East Craigs
Corstorphine
The Gyle
Broomvale
Newbridge
Lochend
Industrial Estate
18
32
29
34
48
37
33
45
36
40
37

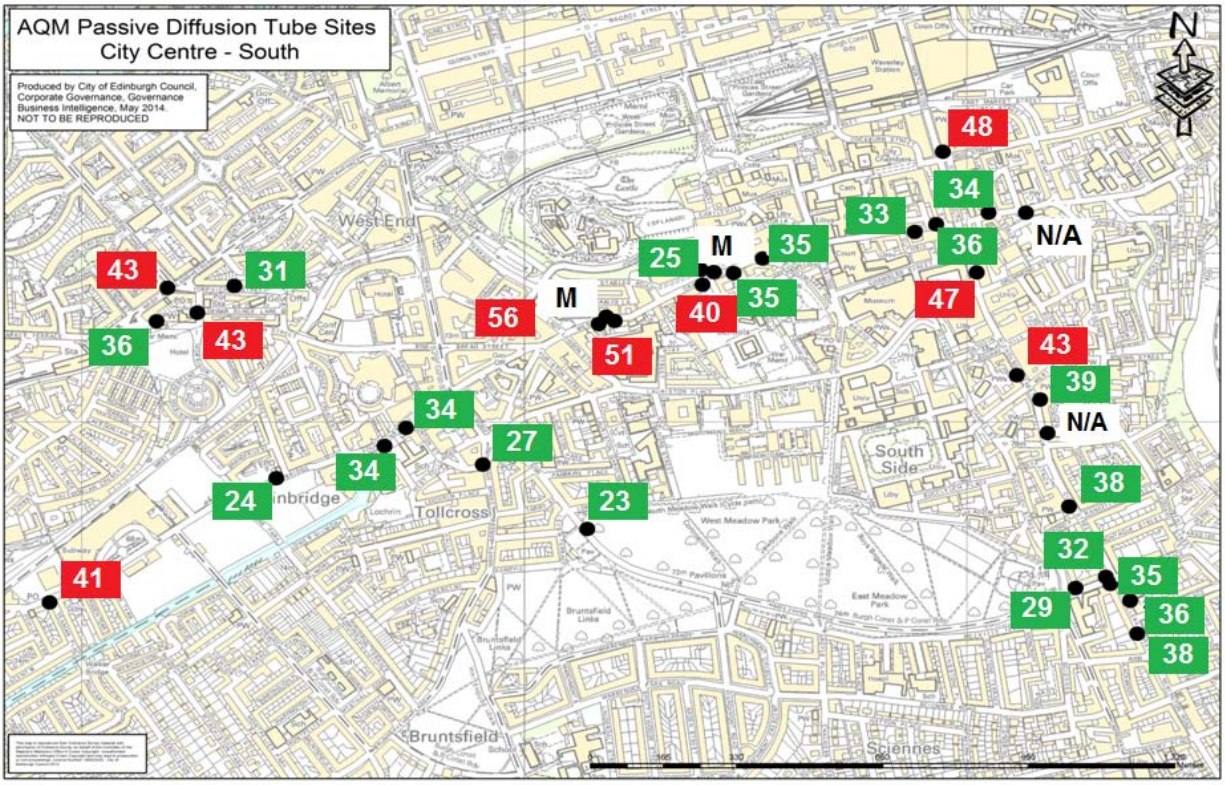

AQM Passive Diffusion Tube Sites
City Centre - North
Produced by City of Edinburgh Council, Corporate Governance, Governance Business Intelligence, May 2014. NOT TO BE REPRODUCED
Inverleith
Comely Bank
Stockbridge
New Town
Broughton
Greenside
Calton Hill
Calton
27
35
32
33
35
28
28
20
31
27
33
M
29
27
23
23
27
30
M
N/A
50

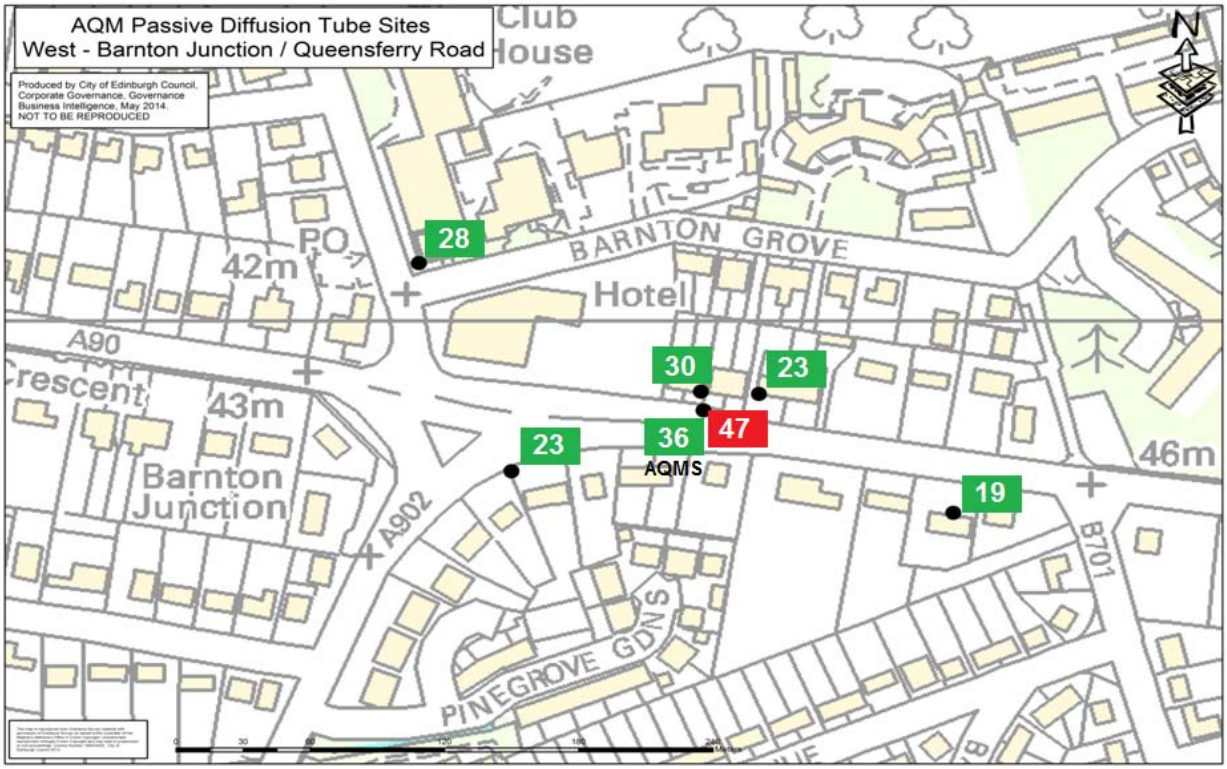

AQM Passive Diffusion Tube Sites
East - Easter Road / London Road
Produced by City of Edinburgh Council, Corporate Governance, Governance Business Intelligence, May 2014. NOT TO BE REPRODUCED
24
24
31
30
29
31
39
28
38
43
39
31
28
38
42
N/A
Hillside
Lochend
Restalrig
Meadowbank
Abbeyhill
Piershill

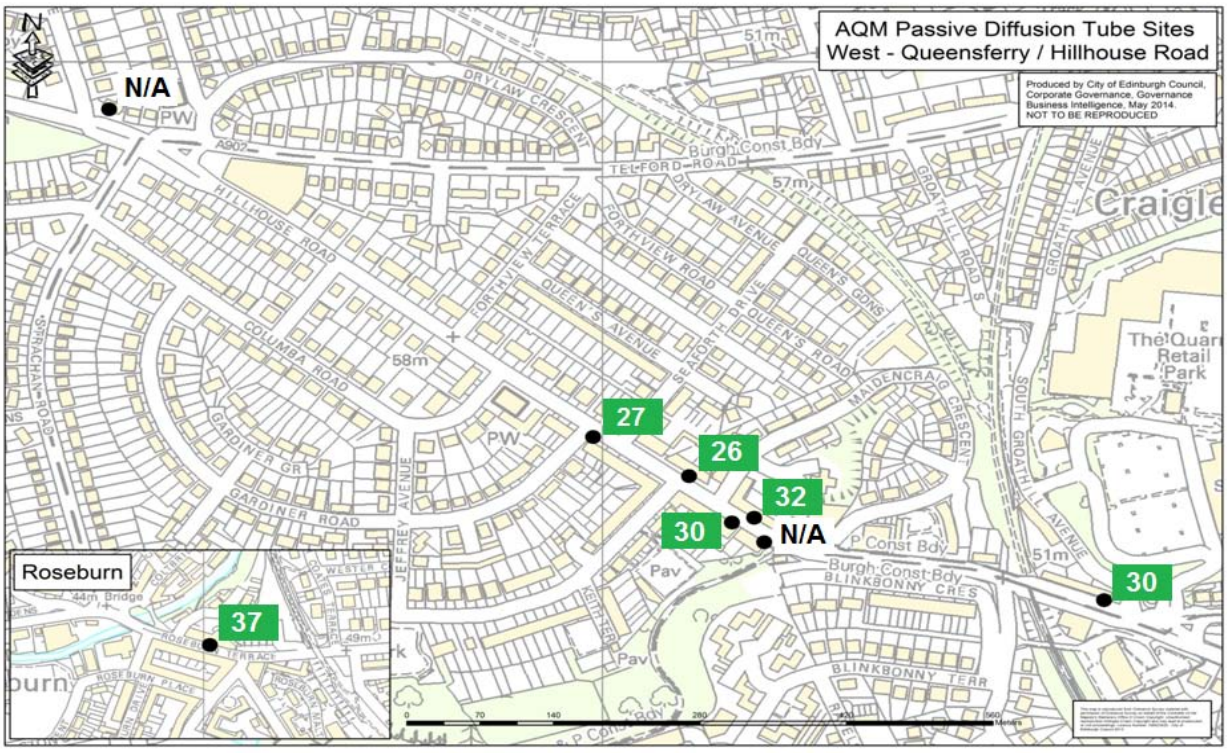
.

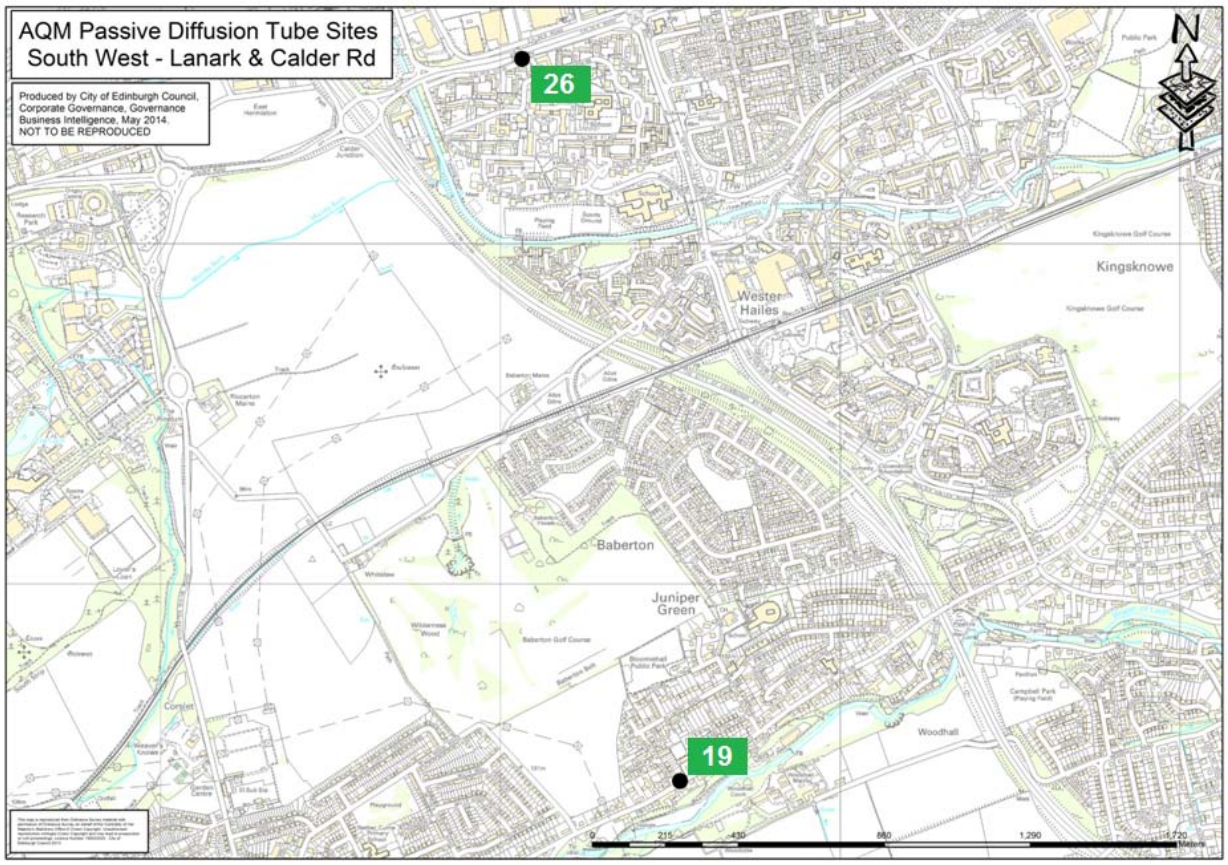

AQM Passive Diffusion Tube Sites
South West - Slateford / Gorgie
Produced by City of Edinburgh Council, Corporate Governance, Governance Business Intelligence, May 2014. NOT TO BE REPRODUCED
42
35
32
30
27
41
41
31
32
31
35
38
37
37
25
31
Gorgie
Stenhouse
Saughton Public Park
Harrison Park

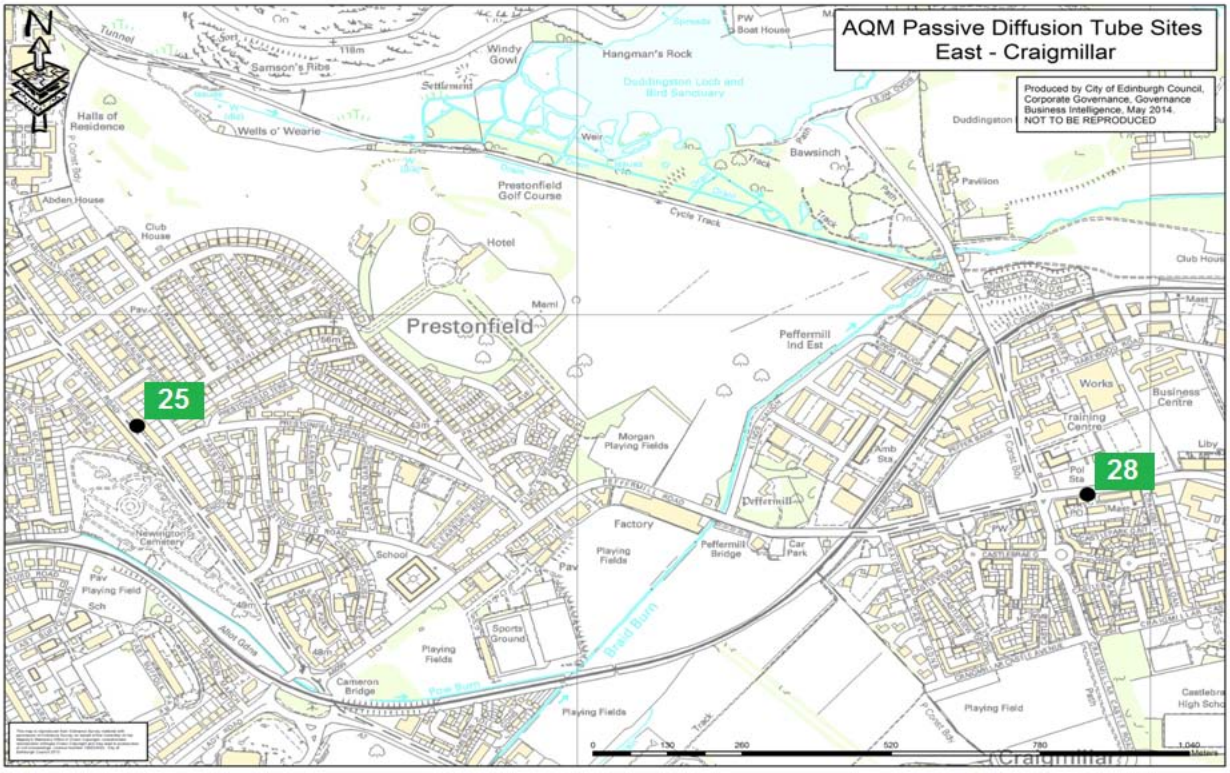

AQM Passive Diffusion Tube Sites
East - Portobello
Produced by City of Edinburgh Council, Corporate Governance, Governance Business Intelligence, May 2014.
NOT TO BE REPRODUCED
33
33
27
34
36
35
18
19
N/A
32
KING'S ROAD
FISHWIVES' CAUSEWAY
Baileyfield Estate
SIR HARRY LAUDER ROAD
BAILEYFIELD ROAD
PORTOBELLO HIGH STREET
Portobello
Depot


AQM Passive Diffusion Tube Sites
City Centre - South
Produced by City of Edinburgh Council, Corporate Governance, Governance Business Intelligence, May 2014.
NOT TO BE REPRODUCED
48
34
33
N/A
36
35
25
M
35
40
47
43
31
36
43
56
M
51
43
39
N/A
34
27
34
24
23
38
41
32
35
29
36
38
West End
Tollcross
South Side
Bruntsfield
Sciennes


AQM Passive Diffusion Tube Sites
West - Barnton Junction / Queensferry Road
Produced by City of Edinburgh Council, Corporate Governance, Governance Business Intelligence, May 2014. NOT TO BE REPRODUCED
28
30
23
36
47
AQMS
23
19
BARNTON GROVE
Hotel
A90
Crescent
43m
Barnton Junction
A902
PINEGROVE GDNS
B701
46m
42m
PO


AQM Passive Diffusion Tube Sites
West - Queensferry / Hillhouse Road
Produced by City of Edinburgh Council, Corporate Governance, Governance Business Intelligence, May 2014. NOT TO BE REPRODUCED
N/A
27
26
32
30
N/A
30
37
Roseburn
HILLHOUSE ROAD
COLUMBA ROAD
GARDINER ROAD
QUEEN'S AVENUE
FORTHVIEW ROAD
DRYLAW AVENUE
TELFORD ROAD
MAIDENCRAIG CRESCENT
BLINKBONNY CRES
BLINKBONNY TERR
58m
57m
51m





Notes
N/A = not available due to PDT being discontinued or moved elsewhere
M = missing. PDT data for some months not available to allow calculation of annual mean