

## **Response to Edinburgh City Council's 20mph zone Consultation**

**October 2014**

### **Summary**

Friends of the Earth Scotland welcomes the chance to feed into this consultation. We are extremely supportive of the Council's initiative to roll out 20 mile per hour zones across Edinburgh and congratulate the Council for taking a lead among Scottish cities in this regard.

20mph zones create safer, more attractive and more enjoyable streets. They are a straightforward and logical solution for addressing a range of local concerns including the need for **safer** and **less polluted** streets.

Our Air Pollution campaign aims to help central government and local authorities, in particular Edinburgh and Glasgow, to achieve compliance with air quality standards. To this end, we are mainly commenting on this consultation insofar as it relates to air quality.

In Section A we address some of the issues around the city's air pollution and the positive impact 20mph zones can have on tackling this serious problem.

Our main point is that 20mph zones will help reduce air pollution, because:

- (1) Edinburgh's air pollution problem is mainly caused by traffic fumes
- (2) Vehicles do not pollute more if they are driving at 20mph than if they are driving at 30mph
- (3) 20mph zones will discourage car use and encourage people to use more sustainable forms of transport, which will have a knock on benefit on air quality.

In Section B we make some comments on specific streets.

We must however caveat our response by stressing that 20mph zones are just one of several measures which the Council needs to introduce to tackle air pollution. Separately, it also must introduce a Low Emission Zone for the city, commit to a larger investment in walking and cycling, and must reopen the debate around Congestion Charging. We have called on the Council to quantify what the impacts of the measures it is taking on air quality are using modelling projections, to help itself to commit to a date by when Edinburgh will achieve European air quality standards which were supposed to be met in 2005.

## **Section A: 20mph zones have the potential to improve air quality**

### **Road traffic pollutes**

Edinburgh has 5 Air Quality Management Areas where levels of Nitrogen Dioxide are breaking Scottish safe standards which were supposed to be met at the end of 2005.<sup>1</sup> It has recently had to extend its City Centre Air Quality Management Area to include 1.77 new kilometres of road in the South (South Bridge through to Minto Street via Nicolson/Clerk St/South Clerk St/Newington Road) and 1.88 new kilometres of road in the South West (Dundee Street, Angle Park Terrace) (See Appendix A).

Air pollution is Edinburgh's biggest environmental health threat and public awareness of the problem has increased in recent years. Government figures show that the mortality burden of fine particles alone is 205 deaths per year in Edinburgh, that is to say, the equivalent of 205 deaths in Edinburgh are attributable to exposure to fine particles alone.<sup>2</sup> (See Appendix B)

Road traffic produces the vast majority of Edinburgh's air pollution.<sup>3</sup>

The majority of this pollution is caused by cars and not buses: the Council's Air Quality Progress Report 2014 shows what the split of vehicle sources of Nitrogen Dioxide emissions was from different vehicle classes at 9 polluted locations across the City. In 6 of these 9 locations (Cowgate, Easter Rd, Grassmarket, Bernard Street, Glasgow Road, and Ferry Road) cars caused more pollution than buses (see Appendix C).

Therefore, because this 20mph zone scheme has the potential to encourage a reduction in congestion and traffic levels (more detail on page 5), it will have a positive impact on air quality.

**It is a misperception that that vehicles pollute more if they are driving at 20mph than if they are driving at 30mph.**

This misperception is based on the idea that people drive in 2<sup>nd</sup> gear close to 20mph with a consequent high engine speed, compared with driving in a 3<sup>rd</sup> gear close to 30mph with lower revs. As car designs catch up with 20mph zones, gearing will alter and cars travelling at 20mph will emit significantly lower quantities of air pollutants.

The reality is that in urban environments with 30mph limits, traffic speeds up and slows down more whereas in 20mph zones, traffic flows more smoothly. Vehicles which accelerate and brake more produce more emissions than those which are driven at a constant, smoother speed.

This has been confirmed by an in-depth 2013 study conducted by the Transport and Environmental Analysis Group, Centre for Transport Studies at Imperial College

---

<sup>1</sup> Edinburgh City Council, "Air Quality Assessment and Review 2014 – Progress Report"

<sup>2</sup> Public Health England, "Estimating local mortality burdens associated with particulate air pollution" (April 2014), <https://www.gov.uk/government/publications/estimating-local-mortality-burdens-associated-with-particulate-air-pollution>

<sup>3</sup> Edinburgh City Council, "Air Quality Assessment and Review 2014 – Progress Report", Paragraph 3.4

London (the “ICL study”).<sup>4</sup> The Group conducted an evaluation of the impacts on vehicle emissions of a 20mph speed restriction in central London and found:

*“A greater range of vehicle speeds are seen on 30mph segments compared to 20mph segments. In addition, a greater proportion of time is spent in the acceleration and deceleration modes of vehicle operation on 30mph segments.”*

So, as long as 20mph zones are not being enforced through excessive traffic calming measures which cause braking and accelerating (e.g. including speed bumps) vehicles driving at 20mph do not pollute more than vehicles at 30mph.

The ICL study concluded:

*“it would be incorrect to assume a 20mph speed restriction would be detrimental to ambient local air quality”*

These findings are not restricted to this study alone.

An earlier study found that when 30km/h (18.6 mph) zones were introduced in Germany, car drivers changed gear 12% less often, braked 14% less often and required 12% less fuel.<sup>5</sup>

The UK’s Department for Transport also advises,

*“generally, driving more slowly at a steady pace will save fuel and reduce pollution, unless an unnecessarily low gear is used.”<sup>6</sup>*

Derek McKay, former Chief Scientific Adviser to the UK’s Department for Energy and Climate Change has written,

*“Speed limits are a simple knob that could be twiddled. As a rule, cars that travel slower use less energy. With practice, drivers can learn to drive more economically: using the accelerator and brake less and always driving in the highest possible gear can give a 20% reduction in fuel consumption.*

*“Another way to reduce fuel consumption is to reduce congestion. Stopping and starting, speeding up and slowing down, is a much less efficient way to get around than driving smoothly. Idling in stationary traffic is an especially poor deliverer of miles per gallon!”<sup>7</sup>*

---

<sup>4</sup> Transport and Environmental Analysis Group, Centre for Transport Studies Imperial College London “An evaluation of the estimated impacts on vehicle emissions of a 20mph speed restriction in central London”, (April 2013), <http://www.cityoflondon.gov.uk/business/environmental-health/environmental-protection/air-quality/Documents/speed-restriction-air-quality-report-2013-for-web.pdf>

<sup>5</sup> Report for Friends of the Earth by C Hass Klau, “An illustrated guide to traffic calming”, (1990), <http://www.alibris.co.uk/An-illustrated-guide-to-traffic-calming-Carmen-Hass-Klau/book/3127074>

<sup>6</sup> Department for Transport Circular 01/2013, SETTING LOCAL SPEED LIMITS, 2013, [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/63975/circular-01-2013.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/63975/circular-01-2013.pdf)

<sup>7</sup> David McKay, “Sustainable Energy Without the Hot Air”, (2008), [http://www.withouthotair.com/c20/page\\_124.shtml](http://www.withouthotair.com/c20/page_124.shtml)

Even the AA accepts that

*“targeted 20mph speed limits in residential areas are popular and improve safety. Along shorter roads with junctions and roundabouts, limiting acceleration to up to 20mph reduces fuel consumption”.*

But aside from the fact that vehicle per vehicle, cars driving at 20mph do not pollute more than those driving at 30mph, the bigger picture needs to be considered: 20mph zones can reduce congestion, lead to lower traffic levels, increase safety and therefore improve walking and cycling rates. All of these impacts have knock on benefits for urban air quality which is primarily degraded by road traffic.

**20mph zones work: they do lead to a reduction in traffic speeds and congestion levels....**

There is concern from some camps about how to enforce 20mph zones and a cynicism that if not properly regulated, the limits will be ignored.

The ICL 2013 Study found that in London, speed limits did generally work. It found,

*“Mean cruise speeds were 14.9mph on 20mph segments and 19.2mph on 30mph segments.”*

The ICL Study also found less congestion on 20mph than on 30mph streets:

*“A larger proportion of time was spent accelerating and decelerating on 30mph route segments.”*

Enforcement is not always needed to change behaviour and culture, and certainly, it is better if compliance with 20mph is self-enforcing and achieved by means of carrot rather than stick.

Limits work better when they are introduced through *zones* as opposed to limits on *selected streets*. When 20mph zones are the default option, compliance levels are higher. This is evidenced by the area-wide 20mph limit scheme in Portsmouth, where the introduction of signed-only 20mph limits reduced average traffic speeds by less than 20mph zones.<sup>8</sup> The UK's Department for Transport also recommends zones rather than select streets.<sup>9</sup>

It is also true that introducing a default 20mph speed limit rather than pockets or islands of 20mph speed limits or zones will help traffic move smoothly and therefore reduce traffic emissions.

The influential Webster and Mackie report reviewed the first 230 20mph zones in the UK. They found that average speeds reduced by 9mph, and that traffic flow within the zones fell by 27%.

---

<sup>8</sup> Brighton & Hove City Council Scrutiny Panel, “Speed Reduction Review: An Investigation into 20mph speed limits/zones” May 2010, <http://www.20splentyforus.org.uk/UsefulReports/BrightonAndHove/20%20mph%20Final%20Volume%202%20part%201.pdf>

<sup>9</sup> Department for Transport, “Traffic Calming” (2007), [http://books.google.co.uk/books/about/Traffic\\_calming.html?id=RxVuumMTcSAC](http://books.google.co.uk/books/about/Traffic_calming.html?id=RxVuumMTcSAC), Paragraph 3.2.5

However, they found that traffic flows on surrounding streets with higher speed limits increased by 12%.<sup>10</sup> So it is important that Edinburgh's 20mph zones are as comprehensive as possible and not patchwork, so as to prevent certain streets from becoming rat runs as a result of the scheme.

We have concerns that there is an inequitable distribution of proposals within the city, with, in particular, the North and East failing to benefit as widely from the proposed 20mph Zones and which, based on Webster and Mackie's research may even experience an increase in speeds. We address this in Section B.

### **... and therefore, 20mph zones lead to lower accident rates, and increased walking and cycling rates**

A report commissioned by Transport for London shows that a reduction in vehicle speeds generally leads to a reduction in the number and severity of accidents. Each 1 mph reduction in speed is expected to reduce the injury accident frequency by about 6%.<sup>11</sup>

The Webster and Mackie review of 20mph zones found that annual accident frequency fell by 60%, child accidents fell by 70%, and accidents involving cyclists fell by 29%.

One of the biggest barriers to walking and cycling is fear of speeding traffic.<sup>12</sup> It is the fear factor which stops people from engaging in active travel.

Cities in the Netherlands, Denmark, and Germany have lowered their speed limits to 30 kph (18 mph) and taken measures to limit through traffic in many instances. In the Netherlands, cycle rates are 27%, they are 18% in Denmark and 10% in Germany.<sup>13</sup>

We do not think that we can simply say that 20mph zones will in and of themselves lead to high levels of walking and cycling, but they can certainly play a part, along with increased walking and cycling infrastructure.

### **Additional comments:**

#### **- The AA's concerns over emissions and 20mph zones are misguided:**

There is an AA webpage which contains a number of inaccuracies which we would like to address. The webpage is called "20mph roads and CO<sub>2</sub> emissions: Lower limits can increase fuel consumption and CO<sub>2</sub> emissions" and dates from 2008.

Firstly, the results that speed limits can increase fuel consumption are based on the assumption that limits are enforced using speed bumps and furthermore, overlook the wider impact that 20mph zones can have on reduction in overall traffic and walking and cycling rates.

---

<sup>10</sup> Webster and Mackie (1996), cited in DfT, "Traffic Calming" (2007), Paragraph 3.2.2

<sup>11</sup> Report for the Department of the Environment, Transport and the Regions by M C Taylor et al, "The effects of drivers' speed on the frequency of road accidents", (2003)  
<http://20splentyforus.org.uk/UsefulReports/TRLREports/tr421SpeedAccidents.pdf>

<sup>12</sup> See, for example, Professor Colin Pooley, "Promoting walking and cycling New perspectives on sustainable travel" (2013)  
<http://www.policypress.co.uk/display.asp?K=9781447310082&sf1=keyword&st1=Pooley&m=1&dc=2#sthash.dxaRhHj5.dpuf>

<sup>13</sup> J Pucher, "Making cycling irresistible: lessons from the Netherlands, Denmark, and Germany," (2008), Transport Reviews 28 (4), 495–528, <http://policy.rutgers.edu/faculty/pucher/irresistible.pdf>

Secondly, the AA cites advice from the former Department of Environment, Transport and the Regions which advises against 20mph zones. This is outdated: the Department for Transport now advises,

*“Traffic authorities are asked ... to consider the introduction of more 20mph limits and zones, over time, in urban areas and built-up village streets that are primarily residential, to ensure greater safety for pedestrians and cyclists.”<sup>14</sup>*

Thirdly, the AA suggests that targeted 20mph streets are better than 20mph zones. It is generally understood that 20mph speed limits should be self-enforcing, and this is more easily achieved if there is a general rule and default 20mph speed limit across wider zones. This is confirmed by results from Portsmouth, cited above, and by recommendations from the UK's Department for Transport.<sup>15</sup>

### **- 20mph zones must be extended to more deprived parts of Edinburgh to reduce inequality**

There is a body of evidence from London that people living in the most deprived areas remain at higher risk of being a casualty in a road traffic accident, especially for pedestrians, for whom the risk of injury was over twice as high in the most deprived compared with least deprived areas.<sup>16</sup>

We therefore regret to see that some of the more deprived parts of Edinburgh have not been covered as extensively as some of the more affluent areas.

Grundy et al, writing from the London School of Hygiene and Tropical Medicine write,

*“As there is good evidence that reducing the speed and volume of traffic reduce casualty rates it is a reasonable inference that implementing traffic calming, and doing so particularly in areas where there are high rates of deprivation, might reduce not only overall casualty rates, but also area level inequalities in casualties.”<sup>17</sup>*

Air pollution also has a disproportionate health impact on those with poor health which often corresponds with people living in more deprived areas.

Unless the 20mph zones are therefore rolled out in a way which covers affluent and deprived areas equally, there is a danger that they may exacerbate social inequality.

---

<sup>14</sup> Department for Transport Circular 01/2013, “Setting Local Speed Limits” (2013)  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/63975/circular-01-2013.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/63975/circular-01-2013.pdf)

<sup>15</sup> Department for Transport, “Traffic Calming” (2007),  
[http://books.google.co.uk/books/about/Traffic\\_calming.html?id=RxVuumMTcSAC](http://books.google.co.uk/books/about/Traffic_calming.html?id=RxVuumMTcSAC), Paragraph 3.2.5

<sup>16</sup> P Edwards et al, “Deprivation and road safety in London: a report to the London Road Safety Unit, London” (2007),  
<http://www.tfl.gov.uk/cdn/static/cms/documents/deprivation-and-road-safety.pdf>

<sup>17</sup> Grundy et al, “The Effect of 20 mph zones on Inequalities in Road Casualties in London: A report to the London Road Safety Unit”, (2008)  
<http://www.tfl.gov.uk/cdn/static/cms/documents/the-effect-of-20-mph-zones-on-inequalities-in-road-casualties-in-london.pdf>

## **Section B: Specific comments to where 20mph zones should be:**

Here is a list of roads which we think should be 20mph roads

### **EAST:**

We welcome the proposed 20mph on most of Portobello High St, Abercorn Terrace Joppa Road, Brighton Place and Southfield Place, but the following roads should be 20mph:

- The North end of Portobello High Street
- The East end of Portobello Rd
- Milton Road
- Milton Road East

### **NORTH:**

The Council needs to introduce more 20mph zones in Trinity/Granton/West Granton/Pilton. We refer back to our comments on pp 4-6 that (a) streets which do not benefit from 20mph zones have been shown to experience increased congestion due to a spill over effect and (b) more deprived communities need to benefit from reductions in speed limits to reduce inequality.

The following roads should be 20mph:

- Craighall Road
- Granton Road: There is already a part-time 20mph zone outside Wardie Primary School. This would surely be much easier to enforce if the whole of Granton Rd were a 20mph zone. This is a very residential area.
- Crewe Road North: Again, this is a residential area which would benefit from being 20mph.
- Lower Granton Road: This is a narrow road with a lot of houses along it and a disproportionate number of road traffic accidents. Furthermore, it would greatly improve the character of Granton and Newhaven Harbours if the traffic was slowed here.
- Ferry Road: The Council could consider making this a 20mph road all the way to Crewe Toll, as there are often schoolchildren crossing at this busy junction.

In Leith, we are very supportive of and welcome the proposed changes, on Leith Walk, Constitution St, and Great Junction Street. We note that Great Junction Street is a declared Pollution Zone so it is appropriate to slow traffic in the area.

- Baltic Street: The proposed 20mph zone here is very welcome but needs to be extended to the junction of Salamander Place and Bath Road to cover the residential flats at the roadside and also the air quality monitoring station.

### **SOUTHSIDE:**

- Nicolson Street through to Minto St should be extended to at least the Blacket Ave/Duncan Street intersection. Edinburgh Council has recently declared it will extend the City Centre Air Quality Management Area by 1.7km along Nicolson Street/Clerk Street/Newington Road. The map in Appendix A shows

that the pollution zone is extended up until Minto Street and ends at the Blacket Ave/Duncan Street intersection. The Council should extend the 20mph zone until this point.

- Cluny Gardens/Charterhall Road: This could benefit from being a 20mph zone: this is a very residential area, and walkers, joggers and young children are frequent visitors to Blackford Hill and have to cross this busy and dangerous road.
- Blackford Avenue/West Mains Road: The Charterhall Road/Blackford Avenue intersection is dangerous and busy and this is a residential area. Pedestrians and students walking and cycling to King's Buildings would be much safer if West Mains Rd & the whole of Blackford were 20mph zones.
- Queens Drive: As one of the city's most cherished attractions, Arthur's Seat is visited by many tourists and locals every day who in their large part get to the hill on foot. Queen's Drive can be very intimidating for both walkers and cyclists: although there is a cycle path, it crosses over the Road meaning that cyclists and walkers have to contend with fast traffic which is difficult to see in parts because of the curve and incline of the road.

## References

- Brighton & Hove City Council Scrutiny Panel, "Speed Reduction Review: An Investigation into 20mph speed limits/zones" May 2010, <http://www.20splentyforus.org.uk/UsefulReports/BrightonAndHove/20%20mph%20Final%20Volume%202%20part%201.pdf>
- Department for Transport Circular 01/2013, "Setting Local Speed Limits" (2013) [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/63975/circular-01-2013.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/63975/circular-01-2013.pdf)
- Department for Transport, "Traffic Calming" (2007), [http://books.google.co.uk/books/about/Traffic\\_calming.html?id=RxVuumMTcSAC](http://books.google.co.uk/books/about/Traffic_calming.html?id=RxVuumMTcSAC)
- Edinburgh City Council, "Air Quality Assessment and Review 2014 Progress Report"
- P Edwards et al, "Deprivation and road safety in London: a report to the London Road Safety Unit, London" (2007), <http://www.tfl.gov.uk/cdn/static/cms/documents/deprivation-and-road-safety.pdf>
- Friends of the Earth Report by C Hass Klau, "An illustrated guide to traffic calming", (1990), <http://www.alibris.co.uk/An-illustrated-guide-to-traffic-calming-Carmen-Hass-Klau/book/3127074>
- Grundy et al, "The Effect of 20 mph zones on Inequalities in Road Casualties in London: A report to the London Road Safety Unit", (2008) <http://www.tfl.gov.uk/cdn/static/cms/documents/the-effect-of-20-mph-zones-on-inequalities-in-road-casualties-in-london.pdf>
- D McKay, "Sustainable Energy Without the Hot Air", (2008), [http://www.withouthotair.com/c20/page\\_124.shtml](http://www.withouthotair.com/c20/page_124.shtml)
- Professor Colin Pooley, "Promoting walking and cycling: New perspectives on sustainable travel" (2013), <http://www.policypress.co.uk/display.asp?K=9781447310082&sf1=keyword&st1=>

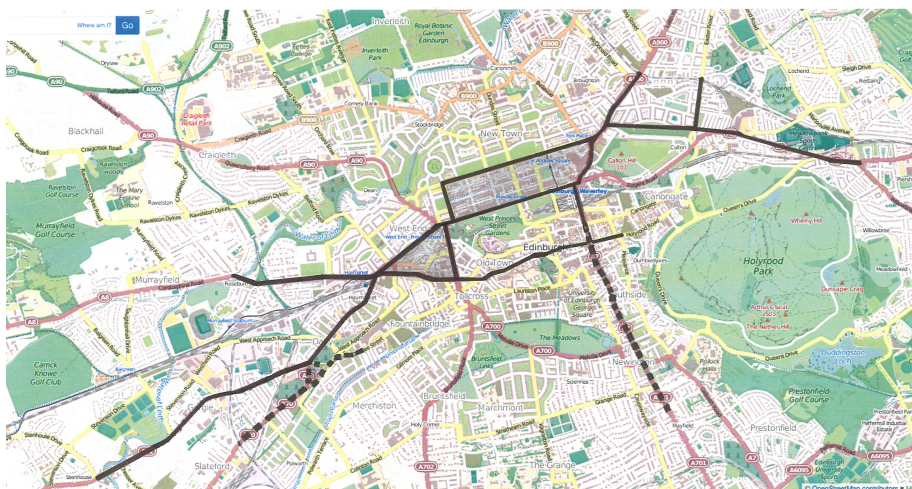


Pooley&m=1&dc=2#sthash.dxaRhHj5.dpuf

- Public Health England, “Estimating local mortality burdens associated with particulate air pollution” (April 2014),  
<https://www.gov.uk/government/publications/estimating-local-mortality-burdens-associated-with-particulate-air-pollution>
- J Pucher, “Making cycling irresistible: lessons from the Netherlands, Denmark, and Germany.” (2008) *Transport Reviews* 28 (4), 495–528,  
<http://policy.rutgers.edu/faculty/pucher/irresistible.pdf>
- Report for Department of the Environment, Transport and the Regions by M C Report for Transport for London by DC Webster, “Review of 20 mph zones in London Boroughs” (2003),  
<https://www.tfl.gov.uk/cdn/static/cms/documents/review-of-20mph-zones-in-london-boroughs-full-report.pdf>
- Taylor et al, “The effects of drivers’ speed on the frequency of road accidents”, (2003)  
<http://20splentyforus.org.uk/UsefulReports/TRLREports/trl421SpeedAccidents.pdf>
- Transport and Environmental Analysis Group, Centre for Transport Studies Imperial College London “An evaluation of the estimated impacts on vehicle emissions of a 20mph speed restriction in central London”, (April 2013),  
<http://www.cityoflondon.gov.uk/business/environmental-health/environmental-protection/air-quality/Documents/speed-restriction-air-quality-report-2013-for-web.pdf>

## Appendix A

Edinburgh City Council's proposed extensions to its City Centre Air Quality Management Areas as of August 2014. In black, existing Air Quality Management Areas. In dotted, extensions to the Air Quality Management Areas as of August 2014:



Map recreated by Friends of the Earth Scotland

## Appendix B

Extract from Public Health England Report, on Mortality Burden attributable to exposure to fine particles in Scotland

### ESTIMATING LOCAL MORTALITY BURDENS ASSOCIATED WITH PARTICULATE AIR POLLUTION

**TABLE 3 Scotland: baseline population, modelled population-weighted mean concentrations ( $\mu\text{g m}^{-3}$ ) and estimated effects on annual mortality in 2010 of anthropogenic  $\text{PM}_{2.5}$  air pollution**

Area	Population age 25+ ( $\times 10^3$ )	Deaths age 25+	Mean anthropogenic $\text{PM}_{2.5}$ ( $\mu\text{g m}^{-3}$ )*	Attributable fraction† (%)	Attributable deaths† age 25+	Associated life-years lost‡
<b>SCOTLAND</b>	<b>3660.5</b>	<b>53800</b>	<b>6.8</b>	<b>3.9</b>	<b>2094</b>	<b>22474</b>
<b>Council areas</b>						
Aberdeen City	150.6	2049	7.4	4.2	86	936
Aberdeenshire	172.3	2198	5.6	3.2	70	749
Angus	79.8	1233	6.0	3.4	42	436
Argyll & Bute	66.1	1087	4.7	2.7	29	302
Clackmannanshire	35.3	483	6.5	3.7	18	195
Dumfries & Galloway	109.1	1790	5.8	3.3	60	597
Dundee City	97.9	1677	7.3	4.1	69	774
East Ayrshire	84.9	1312	6.1	3.5	45	497
East Dunbartonshire	73.8	941	6.8	3.9	37	424
East Lothian	67.6	995	7.0	4.0	40	400
East Renfrewshire	61.5	847	6.8	3.9	33	339
Edinburgh, City of	339.5	4169	8.6	4.9	205	2269
Eilean Siar	19.4	349	4.2	2.4	8	85
Falkirk	107.4	1518	7.5	4.3	65	667
Fife	253.7	3770	6.8	3.9	146	1569
Glasgow City	408.3	6508	8.3	4.7	306	3333
Highland	160.2	2296	4.3	2.5	57	641
Inverclyde	56.9	989	5.7	3.3	32	339
Midlothian	56.2	794	7.5	4.3	34	352
Moray	62.6	904	4.7	2.7	25	261
North Ayrshire	95.7	1552	5.7	3.2	50	540
North Lanarkshire	224.6	3351	7.5	4.3	142	1573
Orkney Islands	14.6	212	4.7	2.7	6	56
Perth & Kinross	104.8	1492	6.1	3.5	52	533
Renfrewshire	120.0	1915	7.0	4.0	77	803
Scottish Borders	82.0	1251	6.1	3.5	44	427
Shetland Islands	15.6	210	4.8	2.8	6	63
South Ayrshire	81.4	1387	5.9	3.4	47	466
South Lanarkshire	219.1	3236	7.3	4.1	134	1450
Stirling	59.8	813	6.2	3.5	29	304
West Dunbartonshire	63.5	1067	6.5	3.7	39	413
West Lothian	116.4	1407	7.4	4.2	59	682

Notes to Table 3

\* **Mean anthropogenic  $\text{PM}_{2.5}$ :** Modelled population-weighted annual mean concentrations of fine particulate matter ( $\text{PM}_{2.5}$ ) arising from human activities. The pollution climate mapping (PCM) model uses dispersion modelling based on emissions data from the national atmospheric emissions inventory (NAEI), chemical transport modelling and measurement data for specific PM components to estimate the concentration of  $\text{PM}_{2.5}$  at background locations in each 1 km x 1 km grid square. The modelled concentrations are calibrated against monitoring data. Population statistics are applied to the modelled concentrations to calculate the population-weighted annual average modelled anthropogenic  $\text{PM}_{2.5}$  concentrations for each local authority area.

† **Attributable fraction:** the proportion of deaths estimated as due to long-term exposure to anthropogenic particulate air pollution.

‡ **Attributable deaths:** long-term exposure to anthropogenic particulate air pollution is estimated to have an effect on mortality risks equivalent to the number of attributable deaths. Air pollution is likely to contribute a small amount to the deaths of a larger number of exposed individuals rather than being solely responsible for the number of deaths equivalent to the calculated figure of attributable deaths.

§ **Associated life-years lost:** the years of life lost to the population due to increased mortality risk attributable to long-term exposure to particulate air pollution.

## Appendix C

Extract from the Council's Air Quality Assessment and Review 2014 – Progress Report (p 13):

Apportionment of local vehicle sources of nitrogen dioxide emissions from different vehicle classes calculated on the basis of their EURO engine rating from locations in AQMA's across the city.

Receptor	Buses		Cars		HGV's		LGV's	
	Traffic Vol.	NO <sub>2</sub> Contrib.	Traffic Vol.	NO <sub>2</sub> Contrib.	Traffic Vol.	NO <sub>2</sub> Contrib.	Traffic Vol.	NO <sub>2</sub> Contrib.
Cowgate	<1%	5%	85%	49%	3%	30%	12%	16%
Easter Road	3%	30%	83%	37%	2%	20%	12%	13%
Gorgie Road	4%	35%	80%	30%	3%	23%	13%	12%
Grassmarket	1%	13%	84%	47%	3%	27%	12%	13%
London Road	8%	56%	80%	25%	2%	10%	10%	8%
Bernard Street	2%	17%	82%	35%	5%	38%	11%	10%
Glasgow Road	1%	17%	86%	40%	4%	33%	9%	10%
Ferry Road	3%	29%	85%	37%	2%	21%	12%	13%
Inverleith Row	5%	44%	83%	33%	2%	13%	11%	10%