Air Quality Monitoring and Noise Control Unit

Annual Report 2008

Air Quality Monitoring and Noise Control Unit
Environment & Engineering Department
Dublin City Council
Block 3, Floor 1
Civics Offices
Wood Quay
Dublin 8

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Introduction

This Annual Report deals with the activities of the Air Quality Monitoring and Noise Control Unit of Dublin City Council during 2008. These activities include:

- Enforcement of air pollution control legislation
- Monitoring of environmental noise and enforcement of noise control legislation
- Air quality monitoring
- Research and provision of expertise on an ongoing basis to other services and departments in Dublin City Council

The areas of enforcement of air pollution and noise control legislation continued to be a major challenge during 2008. While overall the number of complaints for air pollution and noise decreased, it is evident that there is increase in the complexity of the issues dealt with.

Air quality during 2008 continued to be generally good. Levels of lead, sulphur dioxide, black smoke and carbon monoxide have been satisfactory. Levels of nitrogen dioxide remain a concern and particular attention will be required to this challenge in the coming years.

Investigation of complaints made by the public in relation air quality and noise is a major element of the Unit's work. In 2008, 137 air pollution complaints and 529 noise complaints were investigated.

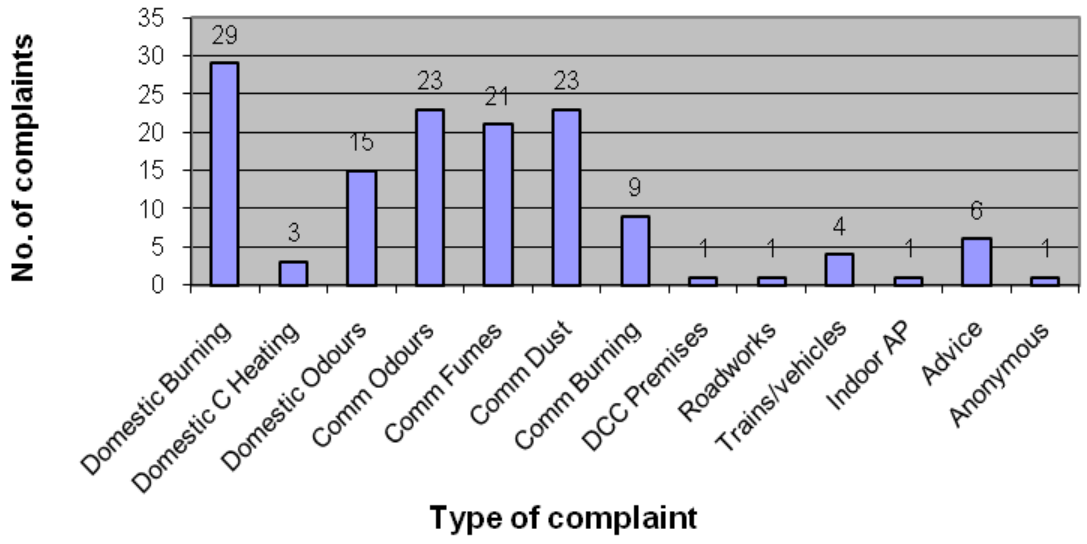
Air Pollution complaints

The Unit investigates complaints made by individuals aggrieved by an air pollution incident or an ongoing air pollution issue. Complaints range from emissions from car spray booths to odours from food premises or factories, dust from construction sites or neighbours carrying our backyard burning of waste.

The variety and complexity of complaints make each investigation unique. Should the issue remain unresolved after initial intervention by this Unit, and if nuisance is established, a notice may be served under Section 26 of the Air Pollution Act 1987. Non-compliance with the notice can lead to court proceedings but in the majority of complaints this proves to be unnecessary.

There were 137 complaints recorded by the Unit in 2008. There is a noticeable change in the number of commercial dust complaints received by this Unit between 2007 and 2008. In 2007 52 complaints were received and in 2008 only 23 were received. This reflects the current economic downturn as the majority of this category of complaint relate to dust from construction and demolition works.

Figure 1: Air pollution complaints in Dublin 2008



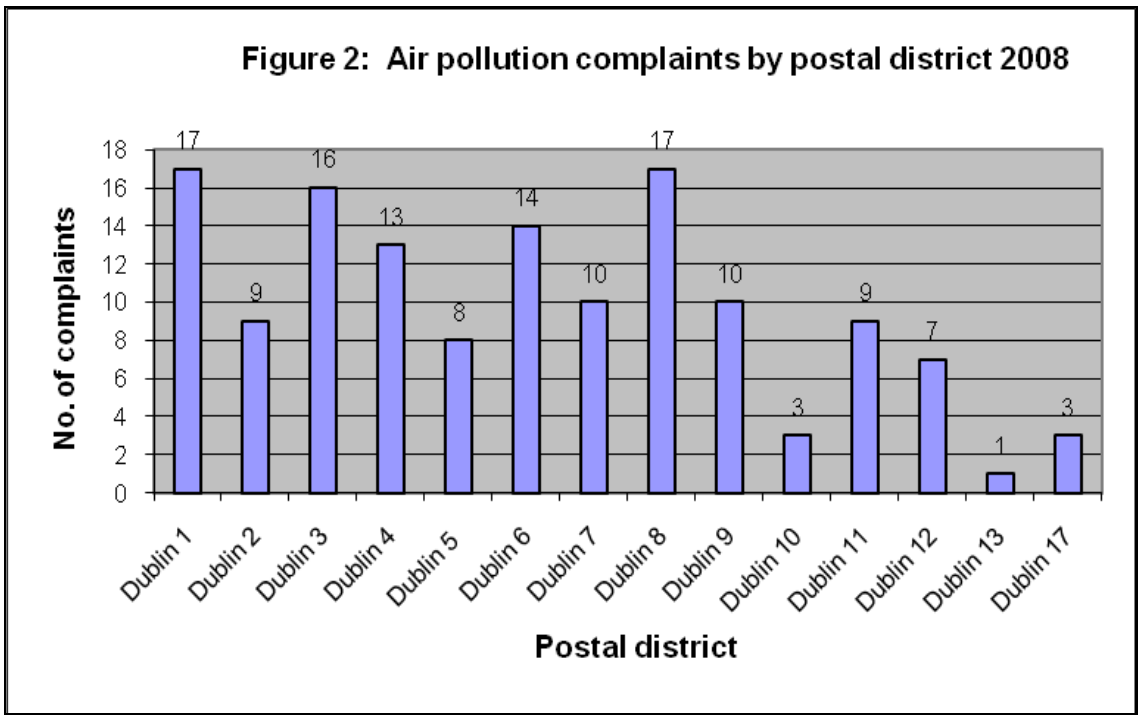


Figure 2: Air pollution complaints by postal district 2008
No. of complaints
18
16
14
12
10
8
6
4
2
0
17
9
16
13
8
14
10
17
10
3
9
7
1
3
Dublin 1
Dublin 2
Dublin 3
Dublin 4
Dublin 5
Dublin 6
Dublin 7
Dublin 8
Dublin 9
Dublin 10
Dublin 11
Dublin 12
Dublin 13
Dublin 17
Postal district

Noise complaints

The Unit also deals with complaints in relation to noise pollution from commercial and industrial premises. The Unit does not deal with neighbour noise nuisance complaints as there is provision in the legislation for individuals to deal with this on their own behalf. Environmental Health Officers (EHO's) offer advice to the public about how they can go about taking their own action. The complaint procedure is similar to the air pollution complaints.

A notice can be served in relation to any *"premises, processes or works"* causing the nuisance. Failure to comply with the terms of the Notice within the time period specified on the notice can lead to the initiation of legal proceedings. An EHO may also serve a Section 108 notice where appropriate. If this notice results in a court case, the local authority will seek an order to be made by the court to eliminate the noise nuisance.

The number of complaints dealt with by the unit in 2008 was 529. As can be seen from Figure 3, the city centre postal districts of Dublin 1 and Dublin 8 proved to be the busiest areas of the city.

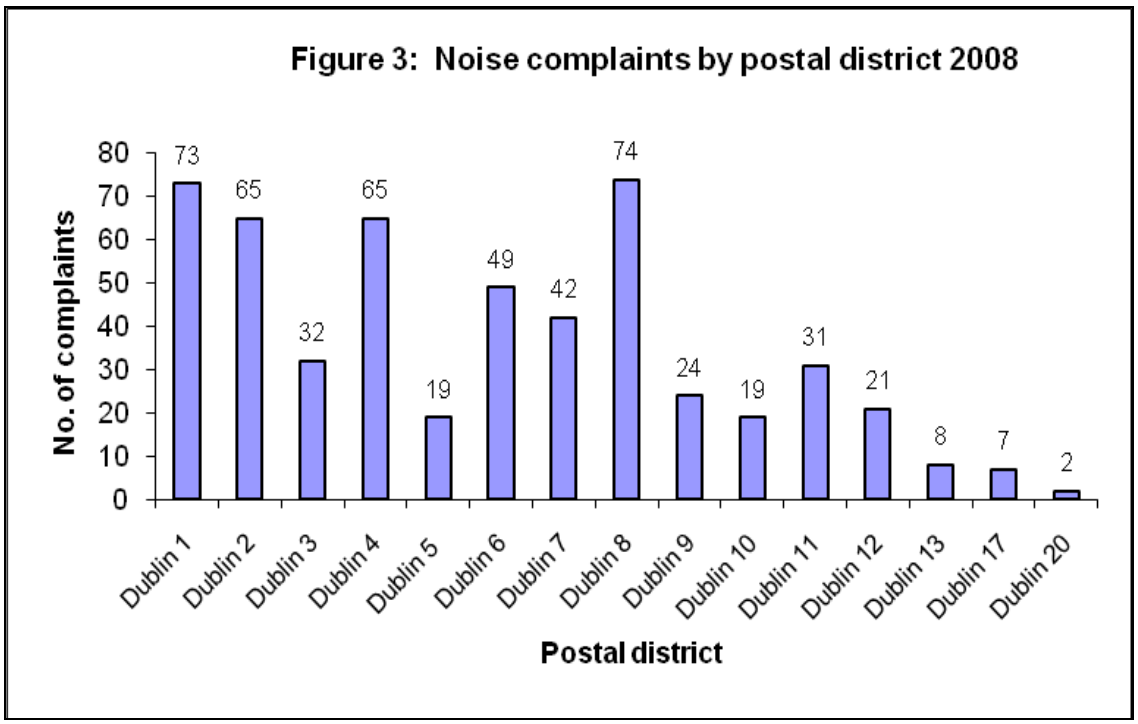
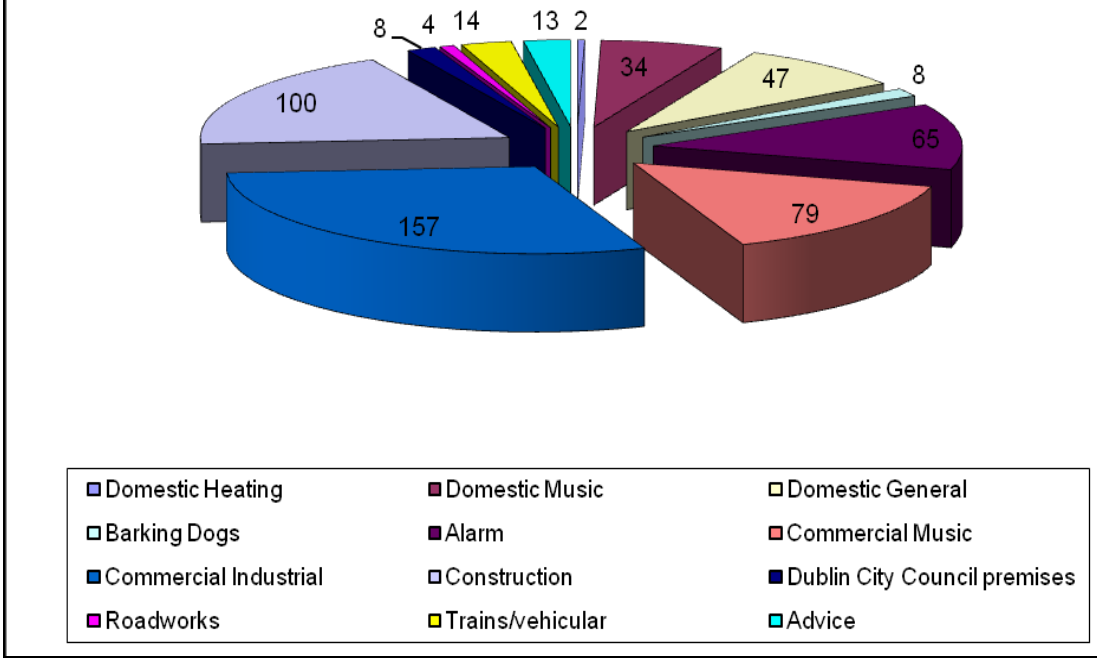


Figure 4: Noise complaints by category 2008



As in the case of air pollution complaints, the commercial sector contributed significantly to the total number of complaints made with a total of 157 complaints. Complaints from commercial properties typically include noise emanating from music venues, extraction systems, ventilation systems and early morning deliveries to retail units.

Outdoor events in Dublin 2008

The wide variety of outdoor events held in Dublin annually contributes to the vibrant social scene in the city. The Unit carries out noise monitoring at the larger outdoor music events.

Members of the Unit liaise with promoters, organisers and other departments of Dublin City Council involved in the event. The guide for compliance used is the UK Noise Council Code of Practice on Environmental Noise Control at Concerts 1995. A noise level of 75dB(A) at the nearest noise sensitive building is set for outdoor events in the city.

Table 1: 2008 Outdoor Events

Date	Location	Artist
May 2nd 2008	RDS	Linkin Park
May 3rd, 4th, 5th 2008	Dublin Castle	Green Energy
May 23rd 2008	RDS	Bruce Springsteen
May 30th 2008	Croke Park	Celine Dion
June 1st 2008	Croke Park	Westlife
June 13th-15th 2008	Royal Hospital Kilmainham	Leonard Cohen
June 14th 2008	Croke Park	Neil Diamond
June 16th 2008	Royal Hospital Kilmainham	Iggy & The Stooges
June 28th 2008	Royal Hospital Kilmainham	Morrissey
June 29th 2008	RDS	Boyzone
July 27th 2008	Donnybrook Stadium	Michael Bublé
July 30th, 31st August 1st	Phoenix Park	Tom Waits
September 13th 2008	Royal Hospital Kilmainham	Kraftwerk

Outdoor music events with a capacity for more than 5,000 people are subject to planning permission or licence issued by Dublin City Council's Planning Department. As part of this process, the EHOs impose noise conditions and carry out noise monitoring at these events.

Enforcement proceedings in 2008

In 2008, the Air Quality Monitoring and Noise Control Unit served notices under various articles of the Air Pollution Act 1987 and the Environmental Protection Agency Act 1992 in order to resolve complaints.

There was 1 Notice served under the Air Pollution Act 1987.

Under the Environmental Protection Agency Act 1992, 19 Section 107 Notices dealing with noise complaints were served.

No court action was initiated during 2008 following the service of the notices.

Fuel Regulations

Enforcing the Air Pollution Act 1987 (Marketing, Sale and Distribution of Fuel) Regulations 1998 & 2000 involves random inspections of fuel depots, vehicles and retail outlets around the city. Due to staffing issues, the inspection programme was scaled back in 2008.

The Unit carried out 61 inspections in the 2008 winter period. The breakdown of inspections is shown in Table 2 below.

Table 2: Fuel Regulations inspections 2008	
Vehicles	1
Shops/Garages	60

Air Quality Monitoring

There are a number of air monitoring sites around Dublin City that are operated and maintained by the Air Quality Monitoring and Noise Control Unit. The Air Quality Standards Regulations 2002 sets out the requirements for monitoring pollutants, and the limit values for each pollutant.

Several of the sites are deemed to be 'multi-pollutant', i.e., monitoring two or more pollutants at one location. The multi-pollutant sites at Winetavern Street, Coleraine Street and Ballyfermot have been in operation for a number of years and provide a good picture of air quality in populated areas of the city.

The analysers used to monitor SO_2, NO_2, and CO at the multi-pollutant sites run continuously, producing data every 15 minutes.

Sites:

Along with the multi-pollutant sites, there are other individual sites operated by the Unit. All of the sites have been incorporated into the Quality Management System.

Multi-pollutant sites

Winetavern Street – PM_{10}, NO_2, CO, SO_2, Lead
Coleraine Street - PM_{10}, NO_2, CO, SO_2, Lead
Ballyfermot – PM_{10}, NO_2, SO_2

PM10 only sites

Marino
Phoenix Park
Rathmines

Lead

Kilbarrack
Rathmines

Black Smoke

Ringsend
Crumlin
Finglas
Cabra

Sulphur Dioxide (SO_2)

Sources

The main source of SO_2 in Dublin is space heating from residential and industrial premises.

Health and environmental effects

There are a number of health effects associated with exposure to high levels of SO_2, including breathing problems and worsening respiratory and cardiovascular disease. People with asthma, or chronic lung disease or heart disease are the most sensitive to SO_2.

SO_2 along with NO_2, is a precursor of acid rain. It is therefore responsible for acidification of lakes and streams and accelerated corrosion of buildings.

The limit values for SO_2 are found in Schedule 1 of the Air Quality Standards Regulations 2002. They are as follows:

Table 3: Limit values for SO_2

	Averaging Period	Limit Value
Hourly limit value for the protection of human health	1 hour	350μg/m^3 not to be exceeded more than 24 times a calendar year
Daily limit value for the protection of human health	24 hours	125μg/m^3 not be exceeded more than 3 times a calendar year
Limit value for the protection of ecosystems	Calendar year and winter (1 Oct-31 Mar)	20μg/m^3

Results and discussion

Levels of SO_2 in Dublin at the three multi-pollutant sites are outlined below. The results are extremely low and well within the limits set out in the Standards.

Table 4: SO_2 results for Dublin City 2008		
Site	**Annual Daily mean μg/m^3**	**Hourly mean μg/m^3**
Coleraine Street	1.1	0.8
Winetavern Street	0.4	0.4
Ballyfermot	1.0	1.0

The data capture for each site was high for 2008. Winetavern Street recorded data for 95% of the time, while Coleraine Street and Ballyfermot recorded valid date 94% and 98% of the time respectively.

Overall, the SO_2 levels were very low, and all analysers performed well throughout the year.

Nitrogen Dioxide (NO_2)

Nature and Sources

Nitrogen Dioxide (NO_2) is a gas produced from the burning of fossil fuels in vehicles, industrial plant, power plants and other commercial and residential sources that burn fuel.

Health and Environmental effects

NO_2 irritates the lungs and lowers resistance to respiratory infection, especially for those already suffering with breathing difficulties e.g. asthma, bronchitis.

NO_2 along with SO_2, is a precursor of acid rain. It is therefore responsible for acidification of lakes and streams and accelerated corrosion of buildings.

Table 5: Limit Values for Nitrogen Dioxide

	Averaging Period	Limit Value
Hourly Limit Value for the protection of human health	I hour	200 $\mu g/m^3$ not to be exceeded more than 18 times in a calendar year
Annual limit value for the protection of human health	Calendar year	40 $\mu g/m^3$

Results and discussion

There are 3 Dublin City Council sites monitoring NO_2 continuously – Ballyfermot, Winetavern Street and Coleraine Street. The site at Ballyfermot is located some distance from the main traffic route while the other two sites are situated adjacent to heavily trafficked roads. As can be seen from the results below, the Air Quality Standards Regulations 2002 have been met at all of the sites.

Table 6: NO_2 results for Dublin City 2008		
Site	**Annual mean μg/m³**	**No. of times NO2 hourly level >200μg/m³**
Coleraine Street	36	0
Winetavern Street	34	0
Ballyfermot	17	0

There were no exceedances at any of the sites in 2008.

Carbon Monoxide (CO)

Nature and sources

Carbon monoxide (CO) is colourless, odourless gas produced during the incomplete combustion of fuels. The main source of environmental CO is traffic.

Health and environmental effects

CO interferes with the distribution of oxygen in the blood to the rest of the body. Depending on the level of exposure, the symptoms include fatigue, headache, disorientation, nausea and dizziness. These symptoms are similar to that of flu or food poisoning so it may prove difficult to diagnose. However, it has the potential to kill or poison in high levels, especially in poorly ventilated premises.

Table 7: Limit Value for Carbon Monoxide for protection of human health	
Averaging Period	**Limit Value**
Maximum Daily 8-hr mean	10 mg/m^3

Results and discussion

There are two sites monitoring CO in the city, at Winetavern Street and Coleraine Street. As can be seen from Table 8 below, the results remain very low in comparison with the limit set out in the legislation.

Table 8: Carbon Monoxide results for Dublin City 2008	
Site	**Annual mean 2008 (mg/m^3) 8-hr rolling mean**
Winetavern St	0.3
Coleraine St	0.5

Particulate Matter (PM_{10})

Health and environmental effects

The main sources of particulate matter (PM) are vehicles, dust from construction sites, construction equipment and any crushing and grinding operations. Indoors, the main sources are tobacco smoke, wood burning stoves, fireplaces and other home heating sources.

When inhaled, the particles can evade the body's natural defence system and lodge in the lungs. Symptoms of exposure include a sore throat, persistent cough, wheezing, shortness of breath and chest pain. PM can increase the number of asthma attacks, or aggravate bronchitis depending on the exposure. However, those already susceptible are a greater cause for concern. This includes children, the elderly and those already suffering with breathing difficulties.

There are different types of PM, but the coarse particles known as PM_{10} are monitored at 6 sites around the city. Schedule 3 of the Air Quality Standards Regulations 2002 provides legal requirements for monitoring PM_{10}.

Table 9: Limit Value for PM10

	Averaging Period	Limit Value
24 hour limit value for the protection of human health	24 hours	50μg/m^3 Pm_{10} not to be exceeded more than 35 times in a calendar year
Annual limit value for the protection of human health	Calendar year	40μg/m^3 PM_{10}

Results and discussion

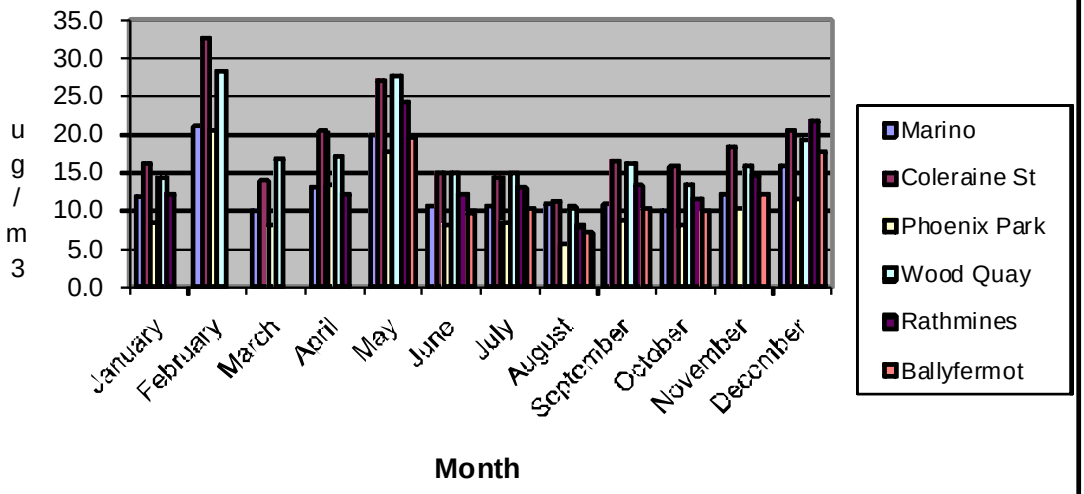
The results from 6 monitoring sites in 2008 were almost identical to the results from the previous year.

All of the sites except Ballyfermot reported days where the limit value of 50μg/m^3 was exceeded. Coleraine Street site had the highest number of exceedances with 11 days. The annual mean for all sites was below the 40ug/m^3 allowable in the Regulations.

Table 10: PM10 results for Dublin City 2008		
Location	**2008 Annual Mean ($\mu g/m^3$)**	**No. of days >50($\mu g/m^3$)**
Phoenix Park	11	1
Coleraine St	19	11
Marino	13	3
Rathmines	15	2
Winetavern St	17	7
Ballyfermot	12	0

The graph indicates the average PM_{10} at all sites throughout the year. The highest averages were in February 2008.

Figure 5: Average monthly PM10$\mu g/m^3$ Dublin



Atmospheric Lead (Pb)

Health and environmental effects

Lead was widely used in petrol until the early 1990s in Ireland but since the introduction of lead free petrol, the levels have dramatically reduced, almost to a point where it is no longer detectable.

Lead is a highly toxic substance, exposure to which can produce a wide range of adverse health effects such as fatigue, irritability, loss of appetite and insomnia. Lead poisoning in children can result in brain and kidney damage, learning disabilities, hyperactivity and behavioural problems.

Table 11: Limit value for Lead		
	Averaging period	**Limit value**
Annual limit value for the protection of human health	Calendar year	0.5μg/m^3

The limit value for lead is set out in Schedule 4 of the Air Quality Standards Regulations 2002.

Results and discussion

There were 4 sites operating in 2008 - Winetavern Street, Coleraine Street, Rathmines and Kilbarrack. The filters were placed out on site for 14 days, retrieved and sent for external analysis.

Table 12: Lead results for Dublin City 2008		
Site	**2008 Mean μg/m^3**	**2008 Median μg/m^3**
Coleraine St	0.01	0.01
Winetavern St	0.01	0.01
Kilbarrack	0.01	0.01
Rathmines	0.01	0.00

2008 was the final year for monitoring lead in Dublin city. The results from previous years have indicated that levels are extremely low and of no significance to public health. The site at Kilbarrack finished up in June 2008 and the rest of the sites were closed by the end of the year.

Future air monitoring requirements

The Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations are due to come into legislation in 2009. The Regulations specify target values to be attained and also specify monitoring requirements for mercury and other toxic metals. There is a requirement on the Environmental Protection Agency (EPA) to assess the current concentrations in the ambient air and deposition rates of the pollutants concerned and to undertake the monitoring necessary for this purpose.

The Regulations will help provide results and information on the variety of metals found in ambient air that are currently not being monitored. The Regulations specify target values to be attained from December 2012. They will also make provision for the dissemination of public information including information any exceedances of the target values, the reasons for the exceedances, the areas in which they occurred and appropriate information regarding effects on health and impact on the environment.

Fine particulate matter or $PM_{2.5}$ will also have to be monitored in the coming years by local authorities in larger urban areas under Directive 2008/50/EC on Ambient Air Quality and Clean Air for Europe.

Background Air Quality Monitoring

Daily black smoke

The original Smoke and SO_2 network comprised approximately 15 sites back in the 1980s and mid-1990s. This provided information on weekly air quality at all of these sites during the particularly bad years of smog in the city. Results were sent to the Department of the Environment as soon as they became available. However, with the great improvement in air quality since the introduction of the coal ban, the sites have been dramatically scaled down in number and there are currently only 4 sites operational – Finglas, Cabra, Crumlin and Ringsend.

Black smoke monitoring is now carried out as a form of background monitoring, using the benchmark of EU Directive 80/779/EEC as a guide.

Results and discussion

The results for 2008 indicate that the sites all comply with EU limit values.

The maximum level of smoke was recorded at Finglas with 21μg/m^3. This is lower than last year's maximum of 38μg/m^3 at Crumlin.

Table 13: Smoke results for Dublin City 2008

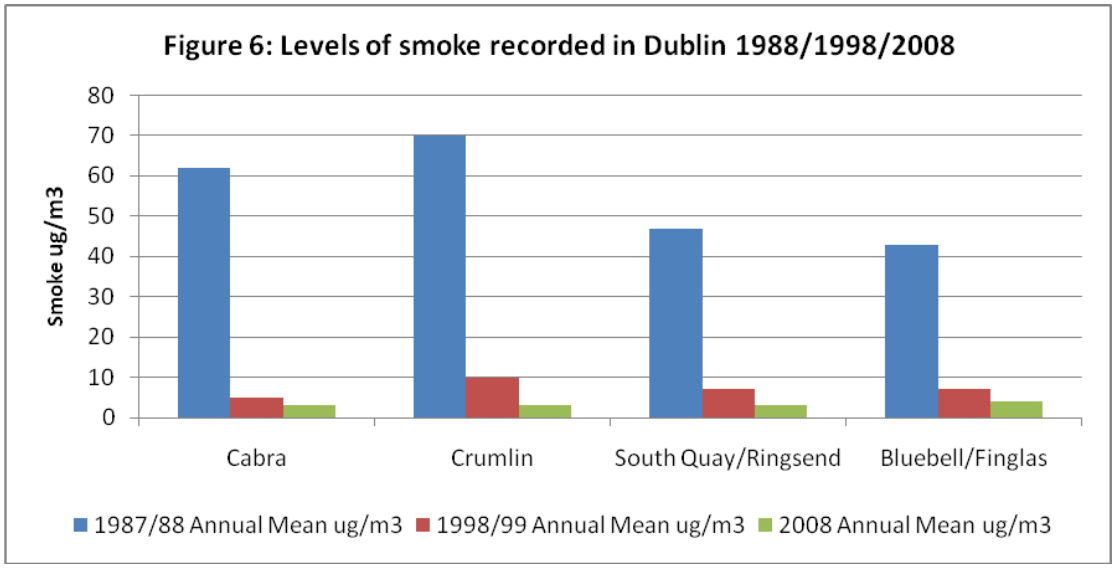
Site	Annual Mean Smoke μg/m^3	Annual Median Smoke μg/m^3	Maximum Smoke μg/m^3
Ringsend	3	2	17
Cabra	3	2	14
Crumlin	3	2	17
Finglas	4	3	21

The bad old days!

Comparing results to those of the 1980s and 1990s, there have been tremendous improvements in air quality in this category. As mentioned, at the height of the smog problem in Dublin, there were up to 15 sites operating with results being reported daily to the Department of the Environment. Looking back at the annual reports, a huge amount of time was dedicated to keeping the Department of the Environment and the public informed about the daily air quality.

Some sites, such as Ballyfermot, were reporting up to 90 exceedances of the daily mean value of 150$\mu g/m^3$ annually. In fact all of the sites in 1986/87 and 1987/88 exceeded the regulations on numerous occasions. On 9th December 1987, four city centre sites recorded smoke levels higher than 1000 $\mu g/m^3$ on that day.

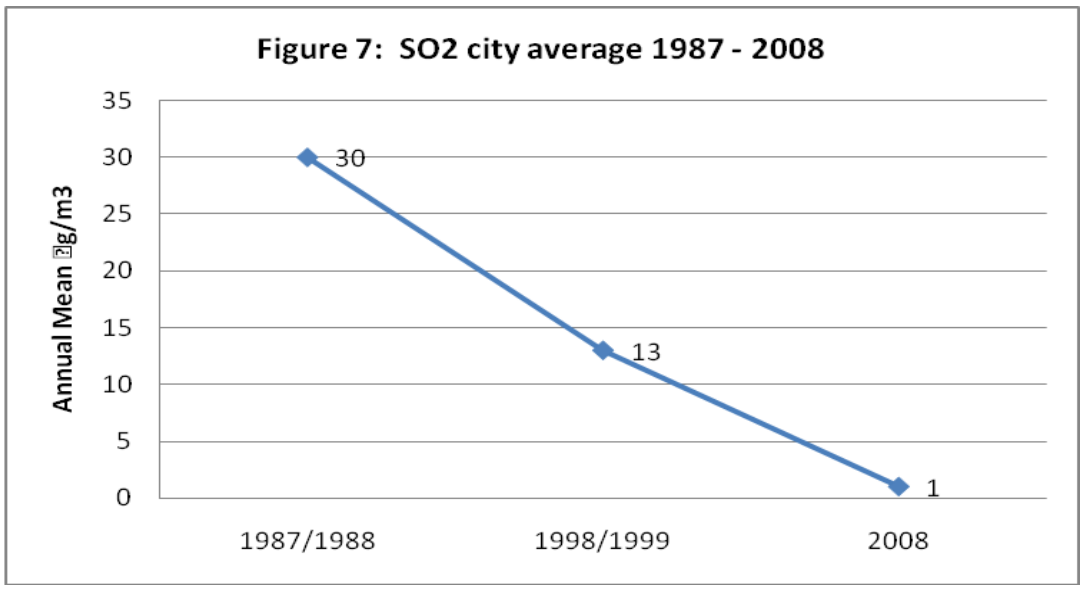
The graph below compares the results from years 1987/88, 1998/99 and 2008 to assess the average annual Smoke results within the past two decades. Although the sites at Cabra and Crumlin have remained at the same locations, Finglas and Ringsend were not part of the original network so similar sites have been substituted in order to draw comparisons (Bluebell and South Quay respectively).



The initial reduction took place in the first decade after the introduction of the Air Pollution Act 1987 and its associated regulations e.g. The Marketing Sale and Distribution of Fuel Regulations 1990. The significantly reduced levels of Smoke show the vast improvement in air quality following the restrictions placed on the sale and marketing of bituminous coal in Dublin city.

Although the SO_2 methodology has changed to continuous monitoring in the past twenty years, it is interesting to see the drop in the recorded levels since the mid 1980s.

The sites that have traditionally monitored SO_2 are not equipped to carry out continuous SO_2 monitoring so direct comparisons could not be drawn.



This graph demonstrates a city average of SO_2 over a 20 year period for Dublin. As mentioned above, results are not directly comparable due to changes in monitoring locations and also the reporting periods. However, the graph clearly demonstrates the overall dramatic reduction in SO_2 levels in the city over the past 20 years.

As mentioned previously, the introduction of the Fuel Regulations in 1990 made changes to the sulphur content of bituminous coal and it had an immediate impact on the results, and the local environment.

Research

AIRMEX project

In May – June 2007 Dublin City council collaborated with the Joint Research Centre of the European Union and University College Dublin in the AIRMEX project. This project studied indoor air quality in a number of locations across a range of European cites.

The Dublin City Council properties included Civic Offices, a crèche and a library. The first report indicated that various indoor pollutants (both chemical and biological) are at very low levels within these premises and well below any levels that might give rise to any public health concern.

The exercise was repeated in February- March 2008 at the same locations, with similar results being produced during the winter period for indoor air pollutants. The results from the Dublin City Council properties suggest that there are few particles present in the environments examined that can cause inflammation of the airways and lungs.

Copies of the report are available on request.

Control of Volatile Organic Compounds (VOCs)

VOCs are air pollutants which can have detrimental effects on human health by contributing to respiratory illnesses, and some VOCs are mutagenic or toxic to reproduction and harmful to the unborn. They also have harmful environmental effects (crop, vegetation and materials damage, reduced visibility) when they chemically react with oxides of nitrogen and sunlight to form ground-level ozone. Potential sources include vehicle emissions, fuel combustion and domestic solvent usage. Other major sources of VOCs include commercial and industrial activities using organic solvents.

Role of Dublin City Council

Under two distinct pieces of legislation, the Air Monitoring and Noise Control Unit is involved in the assessment of applications for Certificates of Compliance in relation to solvent use. If the designated officer is satisfied that the premises meets the requirements of the Regulations, a Certificate of Compliance is issued.

The Emissions of Volatile Organic Compounds from Organic Solvents Regulations 2002 introduced controls on emissions of VOCs from various commercial activities ranging from dry cleaning and pharmaceutical manufacture to vehicle respraying.

In 2008, under the Regulations, the Unit issued 19 Certificates of Compliance, along with 17 annual renewals to facilities using solvents. These were all dry cleaning operations.

Under the Limitations of Volatile Organic Compounds due to the use of Organic Solvents in certain Paints, Varnishes and Vehicle Refinishing Products Regulations 2007 any premises carrying out spraying or refinishing of vehicles apply for a Certificate of Compliance to the Council.

In 2008, 45 premises were issued with Certificates of Compliance, all of which were car spraying operations. The renewal of Certificates under the 2007 Regulations is every 2 years.

Reference Material and Internet Addresses

For information on services provided by Dublin City Council:

http://www.dublincity.ie/

For Information on real-time air quality monitoring:

http://www.epa.ie/whatwedo/monitoring/air/data/

For updates on developments at European Union level on air quality:

http://ec.europa.eu/environment/air/index.htm

For information on developments at European Level on noise control:

http://ec.europa.eu/environment/noise/home.htm

For information on national environmental issues:

http://www.environ.ie/en/

For information on the European Commission Joint Research Centre

http://ec.europa.eu/dgs/jrc/index.cfm