

conclusions



SUMMARY

The detrimental effects of air pollutants within our environment are well established although every year which passes sees the continued implication of airborne contaminants and pollution episodes in deleterious environmental and health incidents both locally and globally. From the smogs of the 1950's to acid rain in the 1980's the importance of air quality in terms of human health and environmental damage have been repeatedly demonstrated.

Newly identified effects tend to be more insidious in nature and require a great deal of attention in terms of monitoring before government responds to the evidence available. Standards set by international organisations, in particular from Europe, have led to significant changes in UK legislation and will continue to influence adopted standards. Considerations of transboundary pollution and its effects have superseded the UK's industrial discharge and disperse methods of pollution control.

Beyond the established increased mortality due to pollution a series of adverse effects can be demonstrated in particular those affecting vulnerable and susceptible groups and individuals. Morbidity is an increasingly important indicator. In the wider environmental sense certain pollutants retard plant growth, impoverish soil and threaten to irrevocably alter our planet's climate.

It is apparent that considerable improvement in air quality in Southwark has taken place over the last four decades. This has largely been driven by legislation enforced by the Council and similar results can be seen throughout the country. In general it is not possible to improve air quality in an urban area such as Southwark without matching improvements elsewhere - pollution

knows no boundaries. This aspect is particularly significant when considering the impact of both European and worldwide efforts to control pollution.

For a local authority such as Southwark, with a relatively small geographical area, air pollution monitoring has to be aimed at problems of local significance whilst still addressing the need to contribute to more strategic aims and longer term objectives.

This report only considers pollution up to 1992. There are two reasons for this otherwise arbitrary date;

- the change in the nature of pollution and
- the changes in monitoring techniques

Since the beginning of this century emphasis has shifted from considering air pollution *per se* to considering air quality as a whole. This subtle but significant shift recognises both the changing nature of pollutants and their effect on health and the greater awareness and demands of the public. Coupled with the obvious decline in the prevalence of certain pollutants this has focused attention on other potentially harmful pollutants and a closer examination of levels of the common pollutants.

It was at this time of changes in perception that Southwark instigated a new system of pollution monitoring which although still measuring individual pollutants was directed to provide information on air quality. This entailed the use of new equipment and monitoring techniques. Whilst some of the traditional methods are still in use, the advance in technology has resulted in remote and continuous sensing at fixed sites and the use of state-of-the-art mobile equipment.

VEHICLE POLLUTION

According to DoE and DoT figures there are nearly 25 million vehicles on Britain's roads. The vast majority, over 21 million, are cars and there are nearly $\frac{3}{4}$ million Heavy Goods Vehicles.

Some 32 million tonnes of petrol and diesel is used per year producing over 20% of the total CO₂ emissions. Road transport accounts for a significant proportion of other emissions as indicated in figure 9.1 below.

Since 1993 all new cars are fitted with catalytic converters. These reduce emissions of oxides of nitrogen, carbon monoxide and volatile organic compounds.

The number of vehicles is however forecast to rise to over 50 million by the year 2025. This increase is expected to negate any benefits from current and proposed measures to reduce the impact of pollution from road traffic.

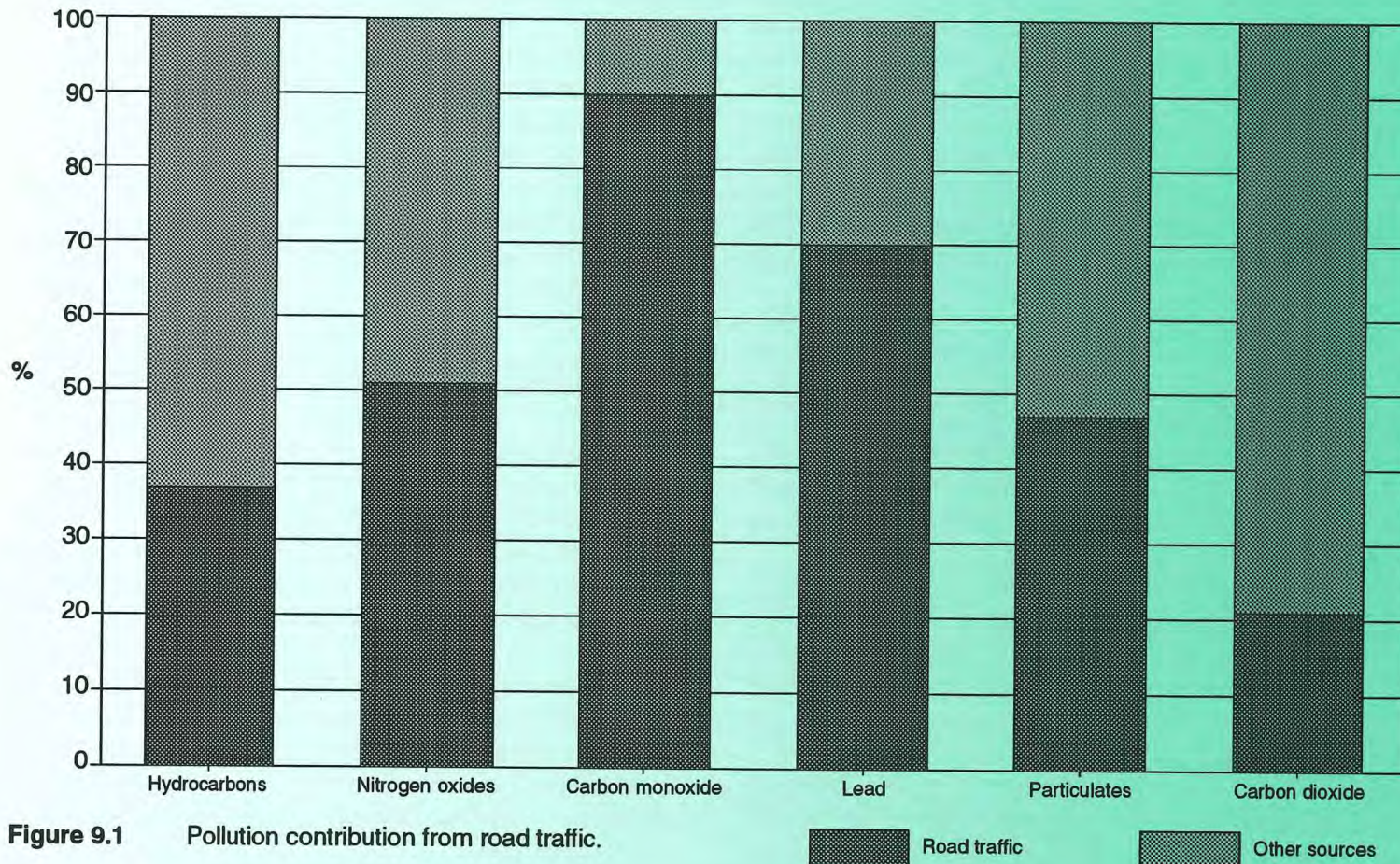


Figure 9.1 Pollution contribution from road traffic.

conclusions



conclusions



AIR AWARE

As part of the European LIFE initiative Southwark Council in 1993 was successful in bidding for funding to promote local air quality issues. The funding, amounting to approximately 50% of costs, was to be directed to four main objectives;

- to promote awareness about air quality;
- to test new technology in pollution monitoring;
- to encourage the "Polluter Pays Principle" and;
- to improve air quality.

With matching funding from Southwark Council an interdepartmental project, the Air-Aware campaign was launched. The project centres on the problems of the Old Kent Road (A2), London's principal commuter route to the suburbs and commuter towns of SE London and North Kent. From previous monitoring, some noted in this report, this road corridor has poor air quality and is subject to breaches of air quality standards for nitrogen dioxide.

Of interest here are those aspects of the campaign relating directly to pollution monitoring since they signify in part and mirror generally the changes in our methods of pollution monitoring. Two mechanisms for pollution monitoring form an integral part of the overall project namely remote real-time pollution monitoring and mobile infra-red vehicle emission monitoring.

The remote real-time pollution monitor comprises a fixed station located at the Livesey Museum in the Old Kent Road using similar equipment to our other established fixed station at Larcom Street off Walworth Road. The museum station currently monitors nitric oxide, nitrogen oxides, sulphur dioxide, hydrogen sulphide and carbon monoxide and relays data to our central computer for interpretation. This station

essentially provides background levels for the Old Kent Road and is also equipped with traffic counting facilities. The Larcom Street station currently monitors ozone, carbon monoxide, sulphur dioxide, nitrogen oxides and smoke. The two stations together represent the major element of Southwark's continuous ambient air monitoring and results from both also contribute to our local air quality information network.

In contrast, our use of the prototype infra-red monitor directly measures exhaust emissions from individual vehicles travelling along the Old Kent Road. The equipment is being used to demonstrate the viability of the equipment as an enforcement tool and also to test the hypothesis that approximately 50% of carbon monoxide is emitted by some 10% of all vehicles, the so-called Gross Polluters. The equipment, known as the Fuel Efficiency Automobile Test (FEAT), monitors exhaust emissions whilst vehicles are on the road without the need to stop individual vehicles. Thus this equipment complements the annual stationary MoT emission test to which the majority of vehicles are subject.

AIR QUALITY NETWORKS

Southwark participates in the London Air Quality Network coordinated by the South East Institute of Public Health (SEIPH). Data from our two ambient air monitoring stations together with other local authority sites in London are collected and processed by SEIPH for inclusion in quarterly and annual reports.

In addition Southwark provides pollution data for the national nitrogen dioxide survey from four of our ten diffusion tube sites. This ten year survey is coordinated by the National Environmental Technology Centre (formerly Warren Springs Laboratory) and will conclude in 2002.

POLLUTION TRENDS

FUTURE ACTION

In tackling the problems of current and future air pollution consideration must be given to the principal causes and available control mechanisms. These considerations must be made acknowledging local, national, continental and global needs. Southwark Council acts as a regulatory authority at the local level, contributes to and influences national information and policy and participates in European action and global initiatives. Although all of these actions are aimed at protecting our local environment and communities they invariably contribute to wider improvement.

It is clear from the findings of this report that, in Southwark, the major air pollution concerns derive from vehicle exhaust emissions rather than stationary sources which have been subject to significant and effective control by local authorities.

There are a wide range of options for tackling vehicle pollution which can be broadly defined within the following categories;

- technological improvement in vehicle design and fuel use
- vehicle user attitudes and responsibilities
- planning controls and transport policies

It is reasonable to expect however that no one solution from any one of these will provide an immediate sustainable remedy. Although it would not be reasonable to expect local authorities to act in the first category they can influence and promote changes in the second and take direct action in the third. In this area of direct action a number of specific measures exist illustrated by example in table 9.1 for the readers' consideration. Some options will require government approval or support.

Table 9.1 Vehicle pollution control options

Traffic management and control includes;

- traffic calming
- traffic bans
- traffic routing/vehicle priority schemes
- traffic signal and idling controls
- parking controls
- road pricing
- cycling policies
- pedestrianisation
- public transport investment

Emission control includes;

- control of transport infrastructure projects
- land use planning
- emission standards enforcement

Control of pollutant input includes;

- use of alternative fuels for Council fleet vehicles
- preferential access for 'cleaner' vehicles

Future Council action must also be considered in light of the reorganisation and changing rôle of local government as well as the actions of other existing bodies such as the Department of Transport and proposed bodies such as the Environment Agency.

It must also be recognised that we all rely, directly or indirectly, on road transport to maintain modern urban life and that this reliance must be balanced with the health and environmental problems it causes.

Finally consideration of traffic pollution must not lead to ignoring the need to maintain control of stationary sources from the single garden bonfire to the largest of our commercial/industrial activities.

conclusions



glossary

<i>Aerosol</i>	A suspension in air of dispersed liquid droplets or airborne clouds of solid particles.	<i>Morbidity</i>	A measure of the prevalence or incidence frequency of illness and disability within a community or population.
<i>Anthropogenic</i>	Of human origin. In pollution terms it means those emissions which are man-made in contrast to those of natural origin.	<i>Mortality</i>	A measure of the prevalence or incidence of death within a community or population.
<i>Cardiovascular</i>	Pertaining to the heart or blood-vessels.	<i>Oxidation</i>	A term originally meaning the combination of oxygen with a substance (or removal of hydrogen) and now more generally used to include any reaction in which an atom loses electrons.
<i>Combustion</i>	The chemical reaction in which a substance reacts rapidly with oxygen producing heat and light.	<i>Percentile</i>	A statistical term for the value below which fall a specified percentage.
<i>Concentration</i>	The amount of a substance in a given volume. The two most common forms for air pollution are micrograms per cubic metre ($\mu\text{g}/\text{m}^3$) and ppm (or ppb) - the number of parts by volume of the pollutants in one million (or billion) parts of the total gas.	<i>Photochemical</i>	Relating to chemical reactions which are initiated, assisted or accelerated by exposure to light, normally visible or ultraviolet light.
<i>Fossil fuel</i>	A generic term for fuels derived from organic deposits in past geological periods consisting mainly of carbon and hydrocarbons. Includes coal, oil and natural gas.	<i>Pulmonary</i>	Pertaining to the lungs or respiratory cavity.
<i>Hypoxia</i>	Shortage of oxygen.	<i>Synergy</i>	The increased effect of two substances acting together. In pollution terms this usually means a greater detrimental effect on health or the environment by the combination than by each pollutant separately.
<i>Metabolism</i>	The chemical processes associated with and fundamental to all living organisms.		



a	
acid deposition/acid rain	1, 8, 19, 57, 71
age	2, 37, 47
Air Aware	1, 73
air quality	1, 4, 7, 71, 73
air quality bands/categories	4, 9, 20
air quality standards	3, 9, 20, 21, 37, 47, 48, 58, 73
Air Quality Standards Regulations	9, 20, 58
analytical techniques	3
annual pollution reports	1, 73
asthma/asthmatics	2, 19, 33
atmospheric pressure	4
awareness	1, 3, 71, 73
b	
β -radiation	53
bacteria	20
Becquerel	54
Best Practicable Means	4
biological changes	19
biological material	33
black smoke	9
blood oxygen	19
blood stream	57
boats	6
bonfires	57, 74
brain damage	37
bronchitis	7, 19
building materials	8
buildings	52, 57
buses	6, 58
c	
canyon effect	52
car ownership	6, 72
carbon dioxide	47
carbon monoxide	1, 2, 3, 19, 47, 72, 73
cardiovascular disease	2
cars	6, 72
catalytic converters	8, 33, 72
cataracts	53
central heating	5
central nervous system	37

Chernobyl accident	54
cigarette smoke	47
Clean Air Acts	4, 5, 10, 20
climate	34, 57, 71
coal burning	5, 10, 60
commuter routes	6, 73
continuous monitoring	3, 71
Control of Pollution Act	4
Control of Smoke Pollution Act	4

d	
definition of air pollution	2
demolition	5, 58, 60
deposit gauges	3
deposition	57
diesel	6, 8, 58, 72
diet	37
dispersion of pollutants	3, 52
district heating	5, 58
dock areas	6
DoE Air Quality/bands	4, 9, 20, 34
domestic pollution	4, 58
dust particles	2

e	
emission controls	3
emphysema	7, 57
enforcement	4
environmental awareness	1, 71
Environmental Health	1, 4, 60
Environmental Protection Act	4, 60
EU directives	4, 9, 20, 34, 37, 58
EU values	4
exhaust emissions	20, 74

f	
fabric	57
fallout	37, 53, 54
flatted estates	5
food/food chain	37, 53
fossil fuel	6, 7, 8, 19, 20
fuel	4, 6, 7, 8, 19, 20, 37, 57, 60, 74
fungi spores	2

index



index

- g**
- γ-radiation 53
 - global implications 1, 71, 74
 - greenhouse effect 1
 - greenhouse gas 47
 - grit and dust deposit gauges 3
 - ground contamination 37
 - ground level entrapment 52
- h**
- haemoglobin 19, 47
 - health 1, 2, 4, 7, 33, 57, 71
 - Health and Safety Executive 4
 - health risk 2, 34, 54, 74
 - heating 5, 20, 47, 58
 - hereditary defects 53
 - HM Inspectorate of Pollution 4
 - housing 5
 - hydrocarbons 2, 57
 - hydrogen sulphide 8, 73
- i**
- improvement in air quality 71, 73, 74
 - incinerators 58
 - industrial emissions 4, 8, 37, 47, 58, 60
 - industry in Southwark 6, 8, 58
 - infra-red monitor 73
 - Ionising Radiations Regulations 53
 - International Commission on Radiological Protection (ICRP) 53
- l**
- lead 1, 6, 37, 38
 - lead based paints 37
 - lead free petrol 37, 38
 - lead in petrol 37, 38
 - legislative controls 3
 - LIFE project 1, 73
 - London Air Quality Network 3
 - lung cancer 53, 73
- m**
- medical condition 2
 - metals 8, 19, 37
 - methane 2, 47
 - monitoring 1, 3, 5, 21, 34, 71, 73
 - morbidity 2, 57, 71
 - mortality 2, 57, 71
 - motor vehicles 8, 20, 58
- n**
- nitric acid 19
 - nitric oxide 19, 73
 - nitrogen dioxide 1, 19, 20, 21, 22, 33, 73
 - nitrogen oxides 3, 19, 20, 33
 - nuclear electricity generation 53
 - nuclear weapons testing 53
- o**
- open fire coal burning 5
 - organic lead 37
 - oxides of nitrogen 19, 72
 - oxidising agents/oxidants 33
 - ozone 1, 19, 21, 33, 34, 73
 - ozone depletion 1
 - ozone layer 1, 33
 - Ozone Monitoring and Information Regulations 34
- p**
- particulate emissions from vehicles 58
 - particulate matter/particulates 1, 7, 9, 57, 58, 60
 - passenger trains 6
 - petrol 6, 8, 37, 38, 47, 72
 - photochemical oxidants 33
 - photochemical process 19, 21, 33
 - photochemical production of ozone 21
 - photochemical smog 19
 - PM₁₀ 57
 - pneumoconiosis 57
 - pneumonia 19
 - police 4
 - pollen 2
 - Polluter Pays Principle 4, 73



pollution episodes 2, 3, 4, 7, 34, 71
 population 2, 5, 33
 populations at risk 2
 power generation 8, 20, 58
 pre-adolescent children 2
 pregnant women 2
 prescribed processes 4, 60
 primary particulates 57
 Public Health Act 4
 pulmonary emphysema 7

R

radiation 1, 53
 radioactivity 53
 radon 53, 54
 rail 6
 real-time pollution monitoring 73
 respiratory diseases 2, 7, 33, 47
 roads/road usage 6, 21, 38, 57, 60, 72
 road transport 6, 47, 72
 Road Traffic Acts 4, 58

S

sampling 3, 9
 secondary air pollutants 19, 33
 secondary particulates 57
 SEIPH 3, 73
 sex 2
 slum clearance 5
 smoke 2, 3, 7, 58, 73
 smoke control 10, 60
 Smoke Control Areas 5
 smoke filters 3
 smoke stain reflectometers 3
 smokeless zones 5
 smokers 33, 47
 social and economic changes 5
 South East Institute of Public Health 3, 73
 Southwark Health Charter 1
 statutory nuisance 4
 steam trains 6
 sterility 53
 sulphur dioxide 1, 3, 7, 8, 9, 10, 73
 sulphur trioxide 7
 sulphuric acid 7

summertime smog 33
 synergism 1, 7, 19, 57

T

tenement buildings 5
 terraced houses 5
 textiles 19, 33
 thoron 53
 town gas 47
 trams 6
 transboundary pollution 8, 71
 transport 5, 6, 74

U

unborn children 2

V

vegetation 19, 47
 vehicle emissions 4, 8, 20, 47, 57, 74
 vehicle pollution 1, 21, 58, 60, 73, 74
 viral infections 19
 visibility 57
 volatile organic compounds 72
 volcanic activity 20, 58
 volumetric apparatus 3

W

Warren Springs Laboratory 3, 73
 waste incineration 47
 weather conditions 47, 52
 WHO guidelines 4, 9, 20, 21, 34, 37, 47, 48

X

x-rays 53

index



