

The State of our Air

From a chemist's point of view, the atmosphere of our planet is simply impossible. It is made up of gasses which react with each other and with substances on the surface. What keeps this whole unlikely mixture stable and able to support life is a complex interplay of living things, energy from the sun, and chemical reactions. As far as we know, an atmosphere which is formed by living things and which is able to sustain life is unique to our earth.

Watch the clouds swirling, forming and reforming, dropping rain to the Earth and being sustained by evaporated water from the oceans, rivers and forests of the surface. The dynamics of oxygen, carbon dioxide, nitrogen and other, less common gasses of the atmosphere aren't visible, but they are at least as complex and subtle. And while life couldn't exist without these gasses, the quantities of them are remarkably small; compressed to a liquid, the atmosphere would cover the earth to a thickness about the same as the sole of your shoe.

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Small wonder that our fragile atmosphere is being changed for the worse by human activities. Air pollution causes global problems like the ozone hole and the greenhouse effect, and local problems like the brown haze that hangs over Auckland on a still afternoon, and the carbon monoxide and fine particles that make cycling down Great North Rd uncomfortable and exhausting. All of these are part of the same basic problem; our lifestyles are putting more of some gasses into the atmosphere than natural processes are able to remove, and are throwing the whole complex system out of balance.

As Waitakere City grows, and as the number of vehicles increases, the City's air quality is declining. This is of immediate concern to the community of Waitakere.

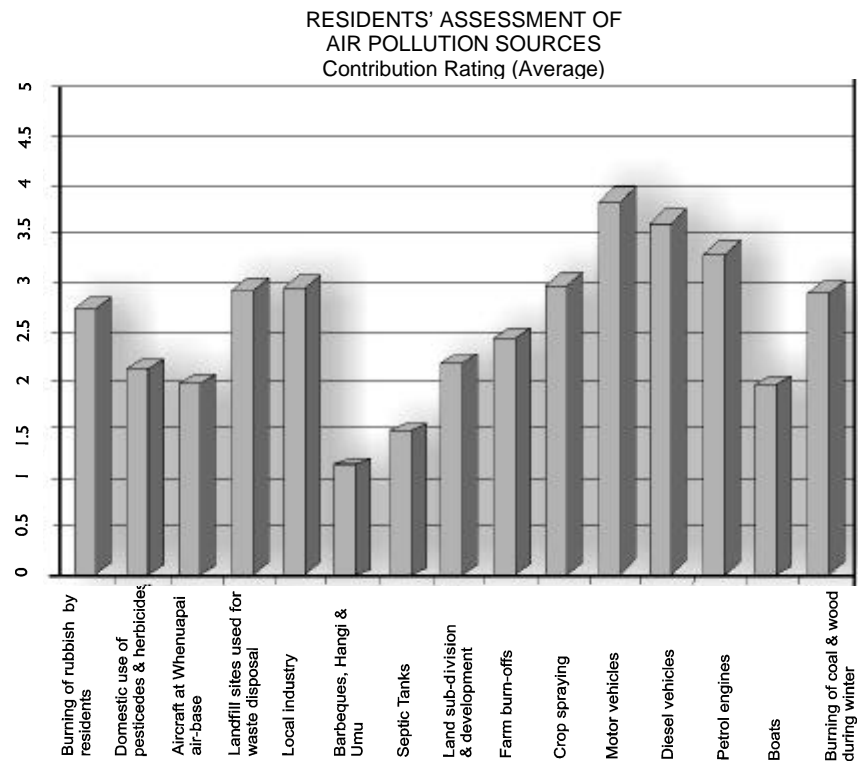
An Air Quality Perception Survey of 300 residents was conducted by ESR research in August 1999. Over 90% of those surveyed believe it is important to maintain clean air. Two thirds of those surveyed believe that there are major sources of air pollution in Waitakere City. Residents identified a wide range of sources as contributing to air pollution in Waitakere City.

Updated as at 1 September 2002
 Updates @ www.waitakere.govt.nz

These are shown in the graph below.

This chapter highlights the following key issues:

1. **POLLUTANTS WITH GLOBAL EFFECTS**
2. **POLLUTANTS WITH HUMAN HEALTH EFFECTS**
3. **POLLUTANTS WHICH IMPAIR VISIBILITY**
4. **OTHER ISSUES**



CONTRIBUTION RATINGS

0= no contribution to air pollution, 5= high contribution to air pollution.

Source: Air Quality Perception Survey. Prepared for Waitakere City Council by ESR research, August 1999.

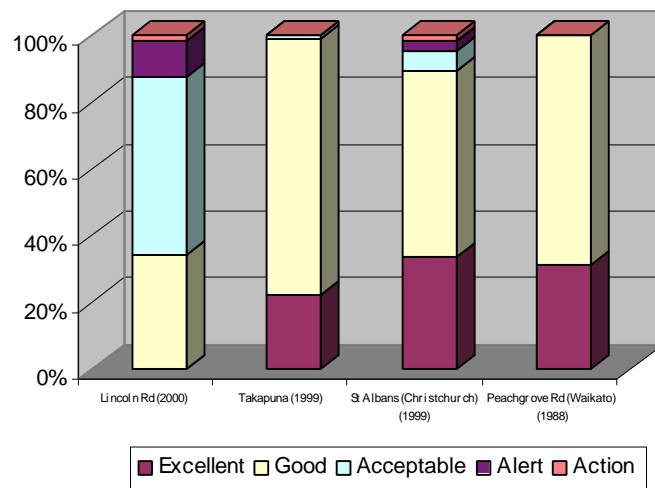
KEY INDICATOR

Days when levels of fine particulates (less than 0.01 mm) in Lincoln Rd exceed health standards – 7 days in 2000 calendar year.

Fine particulates come from diesel vehicles, household fires and other sources. They are a health concern because the very fine particles lodge deep in the lungs and can cause significant health problems, especially for people who already have asthma or other respiratory problems.

Compared to other areas for which data on particulates has been collected, Lincoln Rd stands out as having a problem especially because of the low number of days when particulate levels were “excellent” or “good”. However other high traffic areas in the Auckland Region are likely to also have high particulate levels.

Levels of particulate in Lincoln Rd and other Auckland areas



Source: NIWA/Auckland Regional Council (www.aqdb.niwa.cri.nz/indicators)

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Particulate matter is therefore a significant health concern in Lincoln Rd and is likely to be a problem in other areas of the City.

“Particulate matter is therefore a significant health concern in Lincoln Road.”

The majority of complaints which the Council receives relating to air quality are about backyard burning of rubbish. The Council also has a role, alongside the Auckland Regional Council, in regulating industrial emissions of pollutants and dust. Noise is also a concern to the community.

The most significant pollutants of the City’s air are:

1. POLLUTANTS WITH GLOBAL EFFECTS

- Carbon dioxide – our contribution to the greenhouse effect
- Chlorofluorocarbons – which deplete the ozone layer

2. POLLUTANTS WITH HUMAN HEALTH EFFECTS

- Carbon monoxide
- Fine particulate matter

3. POLLUTANTS WHICH IMPAIR VISIBILITY

- Fine particulate matter
- Nitrogen oxides

4. OTHER ISSUES

- Spray drift
- Noise

2. POLLUTANTS WITH HUMAN HEALTH EFFECTS

Air quality monitoring in New Zealand is mainly aimed at identifying concentrations of pollutants which can affect human health. Five pollutants are measured, of which two – carbon monoxide and fine particulates – are likely to be a cause of, or contributor to, health problems in Waitakere City.

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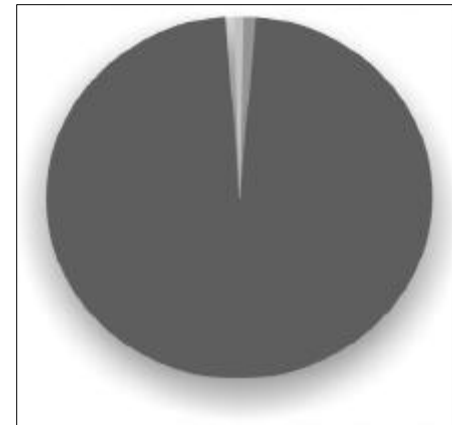
The Auckland Regional Council is responsible for a monitoring programme measuring these key pollutants at six locations in the region. Only one of these six locations, Lincoln Rd, is in Waitakere City.

• **CARBON MONOXIDE**

Carbon monoxide is a highly toxic gas produced by the incomplete burning of carbon fuels. It is the presence of carbon monoxide, which impairs the ability of the blood to absorb oxygen from the lungs, which makes car exhaust fumes fatal at high concentrations. Even at relatively low concentrations, carbon monoxide can be a significant danger to health, especially for people who already have respiratory problems.

Vehicles are the main source of carbon monoxide in Waitakere City. Domestic fires also contribute to carbon monoxide pollution in the winter months.

CARBON MONOXIDE EMISSIONS FROM WAITAKERE CITY VEHICLES



- 97.7% Cars & light vehicles (<3.5 tonnes) – petrol
- 0.7% Cars & light vehicles (<3.5 tonnes) - diesel
- 0.8% Heavy vehicles - petrol
- 0.8% Heavy vehicles - diesel

Source: Resource Use Inventory. Prepared for Waitakere City Council by ESR Research, October 1999

AIR QUALITY STANDARDS – CARBON MONOXIDE

NZ Ambient Air Quality Guideline	10 mg/m ³ for 8 hour period
Typical New Zealand Urban Actual	5-10 mg/m ³ for an 8 hour period

Based on this data, carbon monoxide levels were “excellent” or “good” for over 99% of the time, and did not reach “Alert” or “Action” levels. While continued monitoring of carbon monoxide is important, the data do not warrant any major concern at the Lincoln Rd site. However high levels of carbon monoxide have been measured in Waitakere City in some specific areas with poor air circulation and very high traffic volumes.

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CARBON MONOXIDE LEVELS AT LINCOLN RD FOR 2000

Excellent	<1 mg/m ³ for 8 hour period	Of little concern	77.3% of results are at this level
Good	1-3 mg/m ³	Unlikely to impact air quality	22.3%
Acceptable	3-7 mg/m ³	May be of concern, but does not warrant dramatic action	0.4%
Alert	7-10 mg/m ³	Warning level – can lead to excesses if trends are not curbed	0%
Action	>10 mg/m ³	Unacceptable by national and international standards	0%

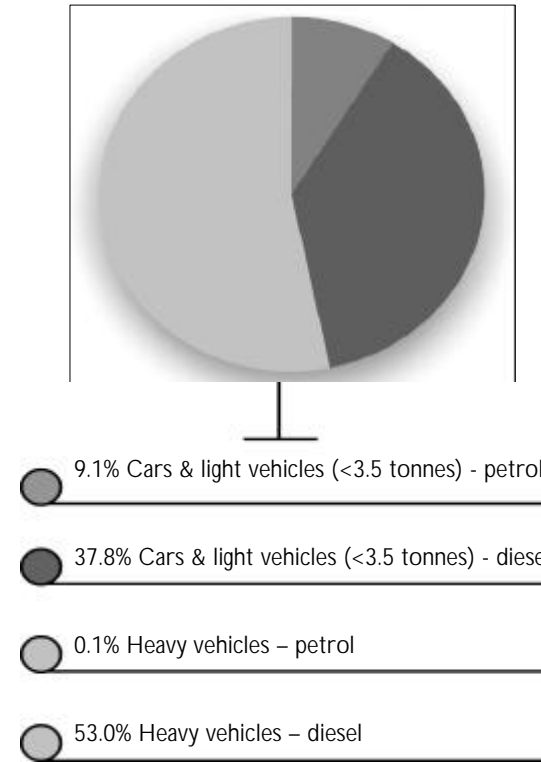
Source: NIWA/ARC (www.aqdb.niwa.cri.nz/indicators/)

• **FINE PARTICULATES**

This is the fine black soot and airborne particles emitted from vehicles, fires and other sources. The very fine particles can lodge deep in the lungs and cause significant health effects, especially for people with asthma or other respiratory problems. Increases in mortality rates have been documented for levels of fine particulates similar to those experienced in Waitakere City (*Environmental Health Risks and Needs in the Auckland Region; Auckland Healthcare Services, 2000*). Diesel vehicles and household fires are the main source of fine particulates in Waitakere City.

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**PARTICULATE MATTER EMISSIONS FROM
 WAITAKERE CITY VEHICLES**



Source: Resource Use Inventory. Prepared for Waitakere City Council by ESR Research, October 1999

Because it is the finest particles which have the greatest effects on human health, only the smallest particles, with diameters of less than 10 microns (thousandths of a millimetre), are monitored as an indicator of air quality.

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PARTICULATE LEVELS AT LINCOLN ROAD FOR 2000

Excellent	<5 mg/m ³ for 8 hour period	Of little concern	No results are at this level
Good	5-15 µg/m ³	Unlikely to impact air quality	33.9% of results are at this level
Acceptable	15-30 µg/m ³	May be of concern, but does not warrant dramatic action	53.6%
Alert	30-50 µg/m ³	Warning level – can lead to excesses if trends are not curbed	10.7%
Action	>50 µg/m ³	Unacceptable by national and international standards	1.8%

Source: NIWA/ARC (www.aqdb.niwa.cri.nz/indicators/)

AIR QUALITY STANDARDS – PARTICULATE MATTER, LESS THAN 10 MICRONS

NZ Ambient Air Quality Guideline	50 µg/m ³ for a 24 hour period
Typical New Zealand Urban Actual	25-35 µg/m ³ for a 24 hour period

Based on these results, particulate matter is a significant health concern in Lincoln Road and is likely to be a problem in other areas of the City.

The State of our Air

CASE STUDY

SOLVENT REDUCTION:

Laundry and Dry Cleaning Services Ltd

Solvents which evaporate into the air in industrial processes cause air pollution. There are many examples of industries changing their practices to reduce the use of solvents and thereby reducing air pollution.

Laundry and Dry Cleaning Services Ltd (LDC) is a privately owned commercial dry cleaning and laundry company, which is based in Kelston and has been servicing the Auckland region since the 1960s.

“
eliminating solvents has
reduced air pollution.”



Over the years, LDC had improved its energy efficiency at every opportunity. Diesel had been replaced by natural gas in 1982 as the fuel for the company's 14.9 hp steam boilers. Steam pipes were lagged.

LDC's latest development in eliminating solvents as part of its dry cleaning process has had a significant impact on reducing air pollution.

LDC uses one of the latest technological alternatives to dry cleaning: a water based garment cleaning machine that eliminates the use of halogenated or petroleum based solvents (Perchloroethylene). The 'Wet Clean System' produces a high standard of clean clothing which is used for specific applications.

Further information about the benefits of this process is available from the Project Manager Cleaner Production, Waitakere City Council (Ph 839 0400).

WHAT THE COUNCIL IS DOING:

- Encouraging high quality medium density housing, close to passenger transport – This will make the biggest difference to air quality in the long run through giving people choices about whether or not to use their car.
- Planting trees - The Council plants around 30,000 eco-sourced native trees each year. This doesn't solve all pollution problems, but it does help to remove carbon dioxide and some local pollutants and it cools the city down.
- Cleaner production programmes – The Council is working with local businesses to reduce pollution, including air pollution, through less wasteful and more efficient processes.
- Enforcing the regulations limiting air discharges in the City.

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WHAT YOU CAN DO:

- Walk, cycle, take public transport, or just do things from home – most people use their car far more than they need to.
- If you own a car, keep it well tuned - especially if it runs on diesel.
- When choosing where to live, think hard about the transport choices you are locking yourself into. Will you have choices about how to get to work, or will you have to drive? Will the children be able to walk to school? Include the costs of transport in your estimates when you decide on a house you can afford.
- Don't burn rubbish – especially plastics.
- If you use a wood or coal burning fire to heat your house, make sure it's in an energy efficient fireplace and that the fuel you burn is dry.

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