



Air Quality in Marlborough

A report prepared for Marlborough Area Board

by Transition Marlborough, December 2015



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Background

Clean air is considered to be a basic requirement of human health and well-being. However, air pollution levels continue to breach the World Health Organisation (WHO)/European Union (EU) safe limits in many of the UK's towns and cities.

Poor air quality alongside roads and in town centres is almost entirely due to exhaust fumes from diesel cars, buses and trucks. These fumes contain harmful pollutants, including nitrogen dioxide and ultra-fine particulates. Over the past decade, the number of diesel cars on Britain's roads has risen from 1.6 million to more than 11 million and now accounts for a third of vehicles. However, compared to petrol vehicles, diesel vehicles emit 10 times more ultra-fine particles and up to twice the nitrogen dioxide, which has been linked to 50,000 premature deaths each year. Children, the elderly and people with heart disease, respiratory illness and asthma are particularly vulnerable to this type of pollution.

In April 2015, the UK Supreme Court ruled that the Government must take immediate action to cut air pollution levels throughout the country. This means that the Environment Minister, is legally bound to produce plans that will reduce harmful emissions, such as nitrogen dioxide and particulates, down to levels that will not affect the health of vulnerable people. In 2010, Wiltshire Council designated 'Air Quality Management Areas' (AQMAs) in six towns in Wiltshire, including Marlborough, because the levels of harmful emissions are above the safe limit. Unitary Councillors have been tasked with developing Air Quality Action Plans for each AQMA through their Area Boards. In the meantime the levels of two of the most toxic emissions – Nitrogen dioxide and ultra-fine particulates are being continuously monitored within each of the AQMAs.

Nitrogen dioxide (NO₂)

NO₂ is a gas that is heavier than air; it is also a free radical which can damage human tissue and is therefore highly toxic to humans when inhaled. Although this gas is easily detectable by smell at low concentrations, it soon anaesthetises the nose, thus creating a potential for over-exposure. Short-term (acute) symptoms include cough, sore throat, shortness of breath, dizziness and headache. It also increases the risk of bronchitis in asthmatic children. The US Environmental Protection Agency's (EPA) health-based national air quality standard for NO₂ is just 5 micrograms¹ per cubic metre or 5 µg/m³ - as above this level it can irritate the lungs and lower resistance to respiratory infections such as influenza. According to the WHO long-term exposure to NO₂, at concentrations above 40 µg/m³, may decrease lung function and increase the risk of respiratory symptoms. The EU has set the NO₂ safe limit at an average of 40 µg/m³ year or up to 200 µg/m³ (hourly mean) no more than 18 times per year.

Ultra-fine particulates (<PM₁₀)

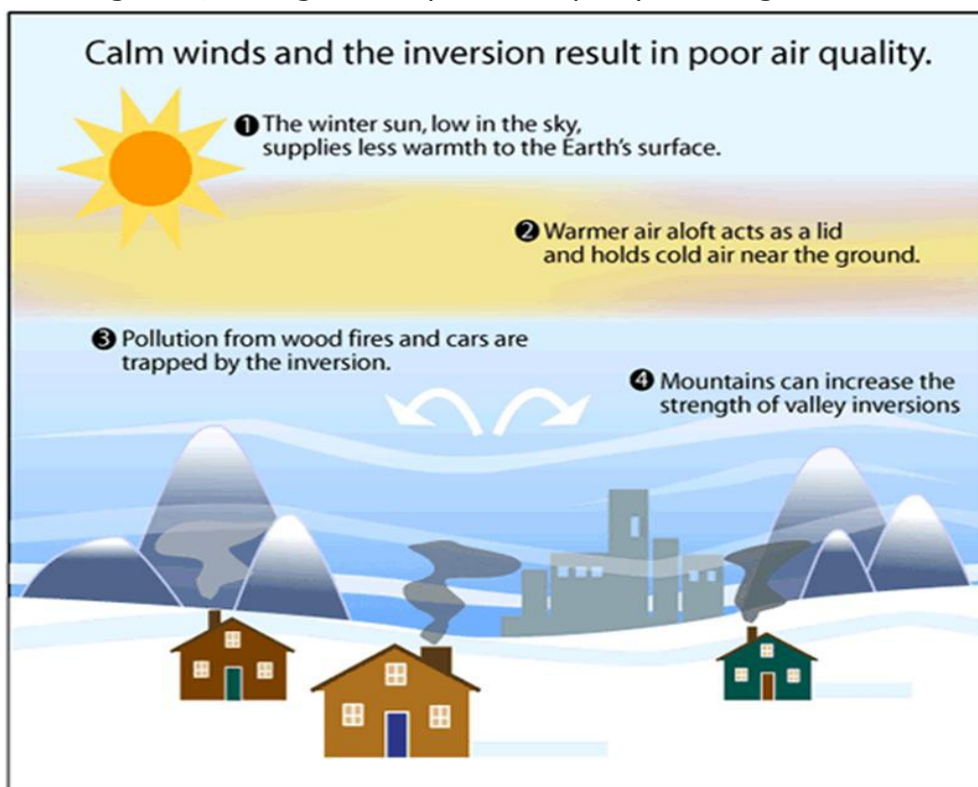
These invisible, ultra-fine particulates (PM) are released during engine combustion in diesel vehicles and abrasive wear and tear of the brakes and tyres of all vehicles. PM affects more

1. 1.0 microgram/µg = 1,000,000 milligrams/mg.

people than any other pollutant. The major components of PM are sulphate, nitrates, ammonia, sodium chloride, black carbon, heavy metal dust and water. It consists of a complex mixture of solid and liquid particles of organic and inorganic substances suspended in the air. The most health-damaging particles are those with a diameter of 10 microns or less, (< PM₁₀ or <PM_{2.5}) as these can penetrate and lodge deep inside the lungs, where they cause inflammation and worsen heart and lung diseases. Regular inhalation of ultra-fine particulates is also associated with asthma, emphysema, stroke and lung cancer. According to the WHO there is no safe level of PM, however the UK government recommends a safe limit of no more than 40 µg/m³ (annual mean) or 50 µg/m³ 24-hour mean, which must not be exceeded more than 35 times a year.

Other factors that reduce air quality in Marlborough

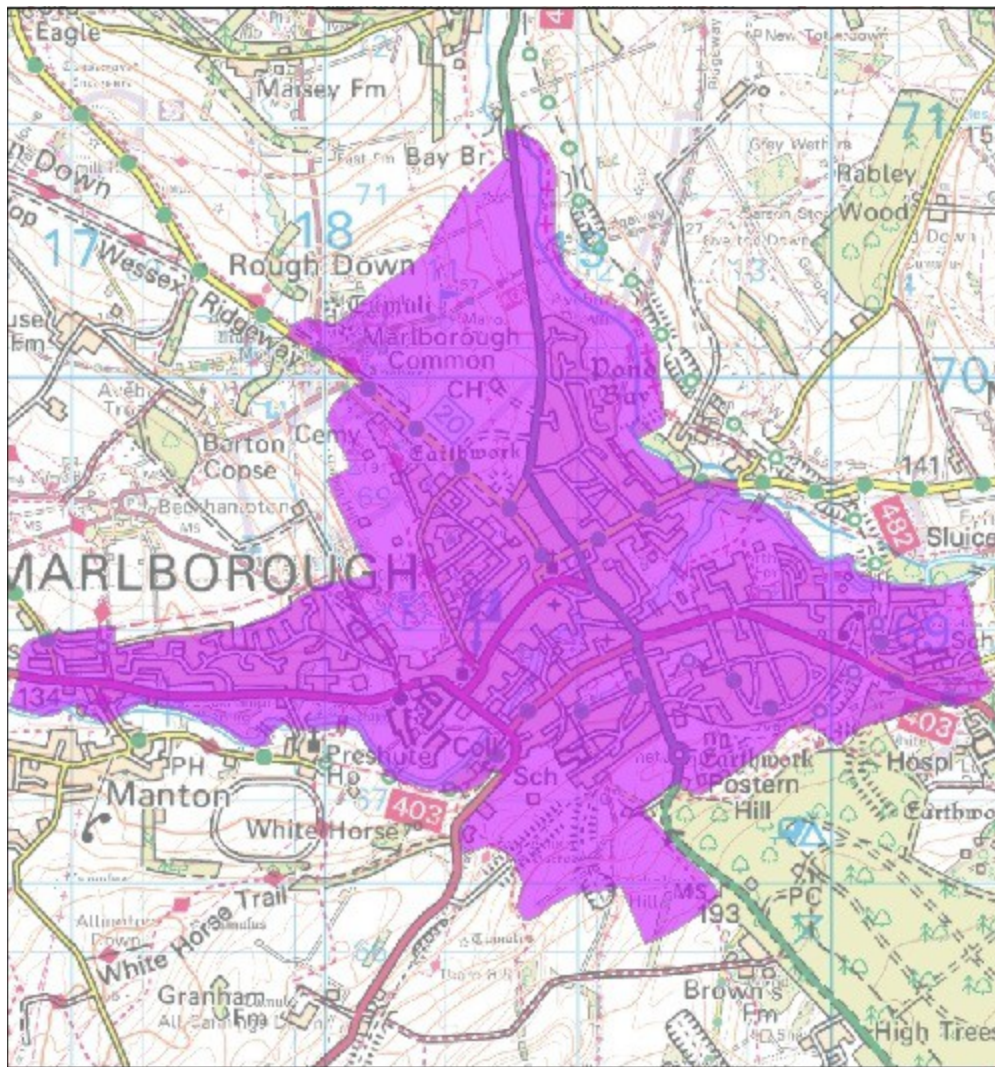
Marlborough town centre is within the Kennet valley and both major roads that criss-cross the town are lined with buildings that are close to the road and thus trap air pollution, particularly the heavier NO₂. This means that surface temperature inversions can also play a major role in reducing air quality, especially during calm winter days when these inversions are the strongest: The warm air above cooler air acts like a lid, suppressing vertical mixing and trapping the cooler air at the surface. As pollutants from vehicles are emitted into the air, the inversion traps these pollutants near the ground, leading to even poorer air quality. See diagram below.



Monitoring Air Pollution levels in Marlborough

Marlborough town centre was declared an 'Air Quality Management Area' (AQMA) in 2010, this includes the areas alongside the A4, between College Fields in the west and Barnfield in the east and the A346, between the roundabout at Blenheim Road in the south and the Common in the north, see map. NO₂ pollution at 6 Herd Street was first discovered to be over the safe limit in 2007, following a complaint from a local resident who said that the installation of the pedestrian crossing had led to a decline of Air Quality in the area. Passive diffusion tubes have since been installed at other congested, road-side sites along Barn Street, Herd Street, Salisbury Road,

London Road and close to the bus stop, outside Lloyds Bank, on the High Street. Monthly data collected from five of these tubes indicates that mean annual emissions of NO₂ continuously exceed 40µg/m³. Table 1 shows that five out of the six sites that were monitored between 2011 and 2014 had annual NO₂ means of more than 40µg/m³, with the sites in Herd Street, close to where traffic queues/accelerates away from the pedestrian crossing, registering the highest concentrations of this toxic gas.



Marlborough's Air Quality Management Area (shaded purple)

In the spring of 2014, officers from Wilts Council agreed to install an automatic particulate monitor on a lamp post, outside St Peter's School, on London Road. This would not only have provided valuable, real time information on particulate levels, including PM, but also would have enabled vulnerable people with respiratory problems to use Wilts Council's 'Know and Respond' text messaging service. Unfortunately, this monitor has yet to be installed. However, the neighbouring town of Calne, which has similar levels of NO₂ emissions as Marlborough, already has an automatic particulate monitor. This monitor shows PM levels that regularly exceed the safe limit.

Table 1. Nitrogen dioxide (NO₂) levels at seven sites in Marlborough, 2008 to 2014

Site of diffusion tube	Annual mean concentration of NO ₂ (µg/m ³)						
	2008	2009	2010	2011	2012	2013	2014
6 Herd Street	57	53	52	59	63	64	54
27 Herd Street	50	41	47	47	44	50	47
6 Barn street	—	41	—	44	42	47	44
13 Salisbury Road	—	—	41	43	44	43	41
War Memorial, London Road	—	—	—	33	34	36	33
115 London Road	—	—	—	47	42	44	41
Lloyds Bank bus stop, High Street	—	—	—	—	—	—	—

NO₂ safe limit = 40µg/m³

Sources of air pollution in Marlborough

The highest levels of NO₂ and PM are emitted when queues of diesel vehicles are forced to stop and start, with engines idling when they are stationary, at the many pedestrian/puffin crossings and mini-roundabouts that obstruct the A4 and A346, within the AQMA. There are three crossings within 0.5 mile on the A4, close to Marlborough College, while two puffin crossings are situated on steep inclines on the A346. HGVs, in particular, that are forced to stop and start on steep inclines are likely to be a major source of pollution, both from braking to slow down and stop and from the exhaust fumes that are released on accelerating away. There are also several mini-roundabouts at junctions between the A4 and A346 that are situated close to residential housing. Congested traffic is common at these roundabouts. Queues of vehicles often tail back as far as Savernake Forest on the A346, while there are queues backing up beyond the Manton turn-off, on the A4, in the mornings and late afternoons, especially during term times. NO₂ and Carbon monoxide (CO) is also emitted from the many buses and coaches that wait in the High Street with their engines idling.

During their 2008 traffic survey, Wilts. Council counted more than 7,000 vehicles passing along Herd Street/A346, every day between 7 am and 7 pm. Current regulations limit NO₂ emissions from diesel exhausts to 180 mg per km, which means that 7,000 vehicles could be emitting more than 1 kg of NO₂, each day, when travelling along the A346, between the war memorial and the golf club. Recent investigations by BBC Panorama indicate that many diesel vehicles are emitting three times the legal amount of NO₂.

Many of Marlborough's residents contribute to this air pollution by using their cars for both local and out-of town journeys. This is because the town is very poorly served by public transport: there are no bus services that can be used to get to and from work, either directly or via the nearest railway station. Many households require two or more cars, to ensure that every member of the family is able to get to work on time. This leads to high traffic flows in the mornings and late afternoons, Monday to Friday. Pedestrians and cyclists are at risk from air pollution because cars always take priority: pavements are narrow and tree-less and there are no safe cycle paths through the town centre. Shoppers are encouraged to bring their cars into the High Street by the provision of free parking. Cars parked in the free, '30 minute spaces' that line the High street pose a hazard to cyclists. Bus passengers who wait outside Lloyds Bank are at risk from exhaust fumes from idling engines of buses and coaches, as there is no protective bus shelter. Air pollution hot-spots can be found in the following locations in Marlborough (also see Appendix):

- Wherever there are high traffic flows along the A4 and A346, that is subject to continuous stopping and starting, due to single lanes and narrow streets, particularly at commuting times.
- Close to pedestrian crossings on busy roads, that cause stop-start traffic.
- Close to junctions and mini-roundabouts that cause bottle necks and stop-start traffic.
- Alongside buses waiting with idling engines, close to the bus stop at Lloyds Bank or outside One Stop.
- In the High Street, due to cars cruising round in search of free parking spaces.

Activities that risk inhalation of dangerous levels of NO₂ and PM

The people who are most at risk of air pollution are young children, especially babies in low push-chairs and anyone with lung disease. The following activities are high risk even for healthy people:

- Living close to where there are constant tail-backs and stop-start traffic due to pedestrian crossings and road junctions – unless domestic air purification measures have been installed.
- Waiting for a bus, close to lines of buses with idling engines.
- Cycling or jogging alongside heavy, stop-start traffic, particularly when going uphill.
- Spending time in out-door, street cafes, where there is heavy traffic.

Recommendations

Wilts. Council has been monitoring NO₂ levels outside 6 Herd street since the beginning of 2008. During this time, the level of NO₂ at this site has been consistently above 52 µg/m³. The response from Wilts Council has been to write annual 'progress reports' that simply confirm these exceedances, without making any practical recommendations to address the issue. Residents who live along the most polluted stretches of the A346 deserve some action to mitigate this serious public health problem. In order to reduce NO₂ (and PM) emissions to a safe level in Marlborough, traffic flows would need to be reduced by between 30 and 50%. This means that significant measures must be implemented in order to a) reduce traffic flows and eliminate pollution hot-spots and b) prevent further degeneration of air quality in the town. Full implementation of the following eight recommendations could achieve these objectives. It should be noted that TM has been lobbying Wilts. Council to implement many of these recommendations, during the past three years:

1. *Consider the impacts on air quality when installing pedestrian crossings*

The needs of pedestrians need to be balanced with those of surrounding residents. It was a local resident who first complained about the reduction in air quality following the installation of a puffin crossing on Herd Street in 2007. Since then two new pedestrian crossings have been installed on the A4, close to Marlborough College. No new pedestrian crossings should be installed without first assessing the impact on air quality.

2. *Improve public transport to reduce reliance on private cars*

In May 2012, TM presented a report entitled: "The Need for Joined-up Public Transport in favour of Marlborough's Commuters", to the Area Board meeting. Copies of this report were tabled to Wilts. Councillors. In this report we referred to the difficulty in commuting by public transport to employment centres, such as Reading, London or Bristol, due to the lack of integration between buses and train times, and the lack of buses early and late enough to allow travellers to catch the commuter trains, see Item 11 of the Minutes of 29 May 2012, Marlborough Area Board meeting. Although the recommendations made by this

report were in line with Wilts. Council's transport strategy, no improvements have been made to local bus services.

TM has also been campaigning for the restoration of the Marlborough rail link. Our on-line campaign attracted more than 1,000 supporters. A railway station in Marlborough would enable local residents to walk or cycle to the station, rather than drive to Bedwyn or Pewsey. We are currently seeking funds for a feasibility study.

3. *Improve the cycling infrastructure*

TM has been lobbying town and unitary councillors for improvements to the cycling infrastructure for the past three years. So far cycle racks have been installed at one end of the High Street, but we have been unsuccessful in getting racks installed in a more central location, outside Polly Tea Rooms. The path that links Manton with Marlborough has finally been resurfaced at Treacle Bolley. Cyclists can now use this path all year round. Although TM has established a cycle network in parts of the town, we are still waiting for the promised signage. Section 108 funding has been allocated to build a cycle path that links the Sustrans cycle network (which extends to Swindon) at Five Stiles Road with the Business Park. However, we are still waiting to hear when this work will be done. Unfortunately, cycling through the town centre, via the High Street is still a risky activity, especially for children, considering the heavy traffic and the lines of cars that are parked either side of the road, alongside the pavement. Improving the cycling infrastructure would encourage residents to cycle, rather than drive to school or the town centre.

4. *Discourage cars from parking in the town centre*

Drivers are currently encouraged to come into the town centre, due to the presence of free parking spaces. Many drivers cruise around the High Street until a free space becomes available. In January 2015, TM contributed to Wilts. Council's parking consultation and suggested that differential parking fees be introduced to discourage parking in the High Street. This would have made parking cheaper or free in out-lying car parks, whilst only allowing free parking for the disabled and those with zero emission/electric cars in the High Street (N.B. TM called for the provision of charging points for electric cars in the High Street in 2013). Such a scheme could lead to the construction of wider, tree-lined pavements, where pedestrians and cyclists would be prioritised and air quality much improved.

5. *Oblige bus drivers to turn off engines while waiting at Lloyds Bank bus stop*

An idling engine can produce up to twice as many exhaust emissions (including Carbon monoxide) as an engine in motion. Vehicle idling is an offence against the Road Traffic (Vehicle Emissions) (Fixed Penalty) (England) Regulations 2002, incurring a fixed penalty notice of £20. It is recommended that Wilts. Council erect signs close to the bus stops in the town centre, reminding drivers of this obligation.

6. *Do random checks on diesel vehicles to measure toxic emissions*

Random checks should be made on diesel vehicles entering Marlborough to ensure that they comply with the regulations on toxic emissions.

7. *Fit air purifiers in dwellings close to air pollution hot-spots*

More than 100 dwellings are situated close to the roads with the highest levels of toxic emissions. Many of these dwellings are terraced, without front gardens and are separated from the road only by a narrow pavement. The air quality inside these buildings should be regularly tested and air purifiers installed by Wilts. Council if necessary.

8. ***Constrain future developments in Marlborough within or adjacent to the AQMA***
According to Wilts. Council's 'Local Air Quality Management Detailed Assessment of Herd Street, Marlborough, August 2010': *following the declaration of an AQMA, the impact upon the Air Quality of any development proposed within or adjacent to the area will need to be assessed as a material planning consideration. While this would not necessarily prevent development, should an adverse impact upon the air quality be identified then it would need to be taken into account and if necessary remediation measures proposed to counter any likely degeneration in the air quality.*

References

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This report was written by Transition Marlborough's Sustainable Transport Group. For more information contact transport@transitionmarlborough.org

Appendix

Air Pollution Hot Spots in Marlborough



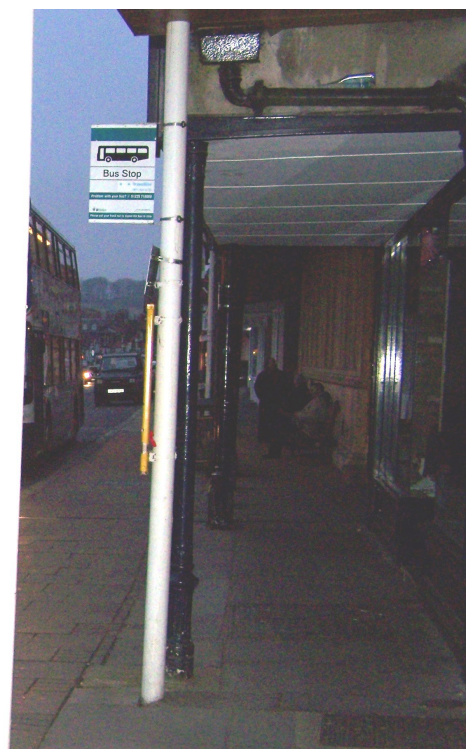
Vehicles queuing on Salisbury Road (A346) and tailing back to Savernake Forest



HGV thundering past 6 Barn Street



HGV accelerating past 6 Herd Street (A346)



Buses waiting at the bus stop, outside Lloyds Bank, on the High Street, with engines idling