

AIR QUALITY RESULTS

Ward(s) Affected:	All
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Purpose

To inform of Air Quality Monitoring Results.

Background

1. European concern over the health and environmental effects of pollution from industrial and road transport sources gave rise to the European Union Directive on Air Quality. This was adopted by the UK in the form of the Environment Act 1995. This introduced the concept of National Air Quality Strategies.
2. Part IV of the Environment Act 1995 introduced the Local Air Quality Management system, which requires local authorities to undertake regular review and assessment of air quality, with respect to the standards and objectives set in the Air Quality Strategy, and enacted through the Air Quality Regulations. In 1995, in accordance with the Environment Act, the Council began monitoring air quality.
3. There are currently 35 locations throughout the Borough where pollutants are measured utilising either diffusion tubes or a continuous analyser. Nitrogen dioxide diffusion tubes are used for ambient air monitoring and are capable of providing long term assessments at low cost. The continuous analyser provides real time measurements of both nitrogen dioxide and dust.
4. The Council is statutorily required to submit an annual report to central government on air quality throughout the Borough based on a number of factors including the results of monitoring. The latest Progress Report was submitted in July 2014 and included progress made with the Air Quality Action Plan relevant to the AQMA. It concluded full compliance at long term publicly accessible areas of the Borough with all of the seven pollutants identified in the Air Quality Objectives (Annex A).
5. Members will be aware that in 2002, as a result of studies that determined potential exceedence of the objectives for nitrogen dioxide and dust, the Council designated an area of land adjacent to the motorway an Air Quality Management Area. (AQMA). The AQMA is comprised of a 20m wide strip both sides of the edge of the M3 from J4 from the Frimley Road flyover to just north of the Ravenswood Roundabout. The Air Quality Action Plan was implemented in 2005 detailing measures that would help bring down the pollution levels in this area adjacent to the motorway. In regards to this the July 2014 report also concluded that there are no areas within it identified as now exceeding any of the Air Quality Objectives at locations of relevant exposure.
6. The report utilised actual monitoring results in reaching its conclusions.

7. A summary of the air quality monitoring results over the past fifteen to twenty years for our diffusion tubes and five for our continuous analyser is contained within this report (Annex B Charts 1 and 2).

Health Impacts of Air Pollution

8. Despite improvements in air quality over many decades poor air quality continues to impact upon public health and the environment. It has been estimated that poor air quality causes up to 50,000 deaths per year nationally and probably causes more mortality and morbidity than passive smoking, road traffic accidents or obesity. The equivalent to 29000 deaths and an average loss of six months life expectancy is also attributable alone to Particulate Matter (dust) air pollution.
9. The financial burdens from the health, economic and social impacts in the UK are considerable with additional costs to the NHS from respiratory hospital admissions triggered for conditions such as Asthma and Chronic Obstructive Pulmonary Disease (COPD). Air pollution is considered to be one of the potential causes and exacerbating factors for COPD
10. The UK like many other EEC Member States is having difficulty meeting EU Air Quality standards and is also at significant risk of infraction, especially with regard to nitrogen dioxide exceedence. This exceedence in part is caused by the poor abatement performance of euro standards for certain vehicle classes and increased use of diesel fuel by fleets.

Results of Monitoring

11. The Council uses two methods of measuring air pollution – passive and active.
12. Passive monitoring is carried out by way of diffusion tubes and Active by means of a continuous analyser.
13. Active Automatic Monitoring Data; Nitrogen Dioxide (NO₂) and Dust (PM₁₀)

Nitrogen Dioxide.

14. Since 2008 the council has undertaken continuous monitoring at the Camberley Castle Road site for NO₂. The site is located at the end of the Castle Road cul-de-sac next to the M3 motorway. The monitoring site is 17 m closer to the motorway than the nearest relevant residential receptor. Monitored NO₂ concentrations at this site are therefore worst-case and higher than NO₂ concentrations at the locations of relevant residential exposure in the vicinity.

15. The measured annual mean NO₂ concentration for this site in 2013 was 42.0µg/m³, which is above the annual mean NO₂ objective of 40µg/m³. Further analysis of the site, with the appropriate façade and distance calculations applied, identified that both the annual mean and one hour air quality objectives for nitrogen

dioxide were not exceeded at the nearest locations of relevant exposure (35.7µg/m³). A trend chart of NO₂ annual mean concentrations at the Camberley Castle Road site over the past five years (2009-2013) is shown within Annex B as Chart 2. Measurements from the past five years show an upward trend in measured concentrations.

16. Monitoring results determine that there have been no exceedences of the hourly mean NO₂ standard during 2013 or at any time since NO₂ monitoring commenced at the site in 2008. The one hour NO₂ objective was achieved in 2013 and has not been breached at any time since monitoring began at the site.

Particulate Matter (Dust PM10)

17. The Council has been monitoring PM10 since October 2006 at the Castle Road site. Between 2009 -2013 there were no exceedences of the annual mean PM10 objective of 40µg/m³. In 2013 the measured annual mean PM10 concentration was 18.0µg/m³.

18. Results of the latest annual mean and daily exceedences indicate that PM10 concentrations are well below the corresponding PM10 objectives of no more than 35 incidences of levels above 50ug/m³. As the nearest relevant exposure façade is located 17 metres further back from the road than the monitoring site, exceedences of the PM10 objectives at locations of relevant exposure are unlikely.

19. Passive monitoring sites have been scattered throughout the Borough since 1995 representing urban, rural, road and kerbside locations.

Passive Monitoring Results

20. Assessment of the 2013 results showed there to be nine sites (SH7, SH9, SH10, SH16, SH23, SH30, SH33, SH34 and SH15) where the annual mean objective for nitrogen dioxide (NO₂) was exceeded. The locations of the tubes are shown at Annex A Table 1.

21. Site SH7 is a motorway roadside site at which there is no relevant public exposure. Monitoring at a second site (site SH8) in the same locality as site SH7 however, indicates that the annual mean NO₂ concentration was well below the annual mean NO₂ objective at a distance of 62 metres from the roadside. Given that the nearest location of relevant exposure to site SH7 is located further back still from the roadside than site SH8, it is considered that the annual mean NO₂ objective was not exceeded at this location.

22. Sites SH9, SH23, SH33 and SH15 are also not at locations of relevant residential exposure. At locations of relevant exposure closest to these four sites, the calculated concentrations were well below the annual mean NO₂ objective. Site SH23 is however located on the east side of the road, while the nearest receptor is on the west side of the road, therefore estimated concentrations at the location of relevant exposure are less.

23. Sites SH10 and SH30 are located 100 metres from the nearest location of relevant exposure and as a result concentrations at this distance are unable to be calculated. These tubes have now been relocated closer to the nearest relevant receptor. Based on historical data these locations are not expected to exceed the objectives.

24. The remaining sites that exceeded the annual mean objective for nitrogen dioxide (SH16 and SH34) are located in the current Air Quality Management Area. No other likely exceedences of the annual mean air quality objective were identified.

AQMA

25. Under Section 84(2) of the Environment Act 1995, the Council was required to prepare an Air Quality Action Plan. The aim of this Action Plan was to identify a package of relevant measures for reducing levels of NO₂ within the AQMA

26. Since publishing the AQAP the Council has reported annual progress to Defra detailing how each measure is being progressed as well as reporting on those measures which have been successfully completed.

27. Of the original actions described in the 2005 Plan, most are now reported as either completed, or discontinued. The Council committed to continuing to implement the remaining actions in line with the relevant stakeholders, in pursuit of further improving air quality within the Borough although it should be noted that there are no local measures that can be carried out to reduce traffic emission levels on the M3 other than to support a speed restriction proposal.

M3 Widening and effect on Air Quality

28. In February 2014 the temporary and permanent air quality effects of the M3 Scheme were considered within an Environmental Impact Assessment that was submitted to the Council on behalf of the Highways Agency

29. The method of assessment utilised a dispersion model to predict pollutant levels at identified sensitive receptors. Modelling was undertaken for the effects in years 2015 and 2019 with and without a speed reduction in place. Also assessed were the temporary air quality effects of the construction work itself.

30. The recommendations of the assessment included the implementation of a speed restriction during the period of the widening works in order to reduce the impact of the change in pollutant levels. This mitigation measure was predicted to reduce the change in NO₂ levels at those Frimley receptors identified as exceeding the objective to an imperceptible one.

31. In the 2015 scenario within Surrey Heath, without the temporary speed limit of 60mph in operation during construction work, there were receptors in Wood Road, Newlands Road, Old Pond Close, James Road and Pans Gardens predicted to experience a detrimental change of more than 1% of the limit value that exceed the annual average NO₂ air quality objective. (See Map 1)

32. Officers of the Environmental Health Department reviewed the air quality sections of the Environmental Assessment and concluded to support the mitigation measure.

33. In spring 2014 the Government minister decided not to approve the Highways Agency proposal of a temporary speed limit as a mitigation measure and instead instructed them to rigorously investigate alternatives.

34. When completed and operational, the Highways Agency predicts that in 2019 there will be no receptors in the Borough within 200m of the M3 that exceed either the annual or one hour NO₂ limits and hence no need to consider mitigation measures. (See Map 2)

35. It is predicted that in 2019 the annual average PM₁₀ and 24 Hour PM₁₀ air quality objectives will be met at all locations in the Borough with or without the widening scheme.

36. To date no alternatives to the speed reduction have been proposed and it may well be that at the identified properties in Frimley there will be a short term worsening of air quality during the widening work. However the speed limit within the scheme is restricted to 50mph, some 10mph slower than that proposed as a mitigation measure.

37. Overall in the longer term after widening work has been completed local air quality effects are considered to be insignificant as the benefits of less congestion and smoother lane running take effect.

Summary and Proposals

38. An assessment of the current air quality situation within Surrey Heath Borough Council has been undertaken. The report has assessed all available air quality monitoring data within the Borough against national air quality objectives as well as any significant changes that have occurred within the Borough since the last round of review and assessment that could impact on local air quality.

39. Surrey Heath Borough Council monitors for NO₂ and PM₁₀ at one continuous monitoring station. NO₂ monitoring in the Borough is supplemented by a network of diffusion tubes. Surrey Heath Borough Council has examined the results from the monitoring in the Borough.

40. Continuous NO₂ monitoring data for 2013 showed NO₂ concentrations above the annual mean NO₂ objective, however there were no exceedences of the hourly NO₂ standard of 200µg/m³. The annual mean NO₂ concentration at the nearest relevant receptors (17 metres further back from the road than the analyser) is calculated to be below the objective (35.7µg/m³).

41. Assessment of the NO₂ diffusion tube network in 2013 showed concentrations within the AQMA that exceeded the annual mean objective for NO₂ at five sites (SH16, SH30, SH33 and SH34 and SH15). Concentrations at these sites appear to be higher in 2013 than in previous years.

42. Sites SH7, SH9, SH10 and SH23 are outside of the AQMA, but also showed exceedences of the annual mean objective. Resulting concentrations at nearby locations of relevant exposure however are below the air quality objective.

43. The monitoring results showed that exceedences of the relevant PM10 objectives are unlikely.

44. Overall the results indicate that air quality in the Borough is generally very good. There are no exceedencies at locations where residents may be exposed for any length of time.

45. The Council is confident that the work carried out as part of the Air Quality Action Plan has been sufficient in helping to achieve a reduction in traffic pollutants given that in 2010 a modelling study of pollution levels from the motorway was undertaken. Its findings are in keeping with our current air monitoring results which show that all nitrogen dioxide and dust annual means to be below the 40ug/m³ limit at relevant receptors.

46. As there is no clear trend in annual mean NO₂ concentrations, our proposal, in the knowledge of forthcoming and ongoing widening work on the M3, is to continue with the current continuous monitoring programme, retain the existing AQMA, and review the situation in the future Air Quality Updating and Screening Assessment/Progress Reports.

Annex A

National Air Quality Objectives

Table 1. Diffusion tube locations.

Annex B

Chart 1. Graph of 21 Year Pollution Level Trends

Chart 2. No₂ trends from auto site

Table 2. Diffusion Tube Results 09-13

Map 1. Receptor Locations and levels during M3 work.

Map 2. Receptor Levels in 2019

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Objectives included in the Air Quality Regulations 2000 and (Amendment) Regulations 2002 for the purpose of Local Air Quality Management. This table shows the objectives in units of microgrammes per cubic metre $\mu\text{g}/\text{m}^3$ with the number of exceedences in each year that are permitted (where applicable).

Pollutant	Air Quality Objective Concentration	Measured as
Benzene		
All authorities	16.25 $\mu\text{g m}^{-3}$	running annual mean
Authorities in England and Wales only	5.00 $\mu\text{g m}^{-3}$	annual mean
1,3-Butadiene	2.25 $\mu\text{g m}^{-3}$	running annual mean
Carbon monoxide		maximum daily running 8-hour mean
Authorities in England, Wales and Northern Ireland only	10.0 mg m^{-3}	
Lead	0.5 $\mu\text{g m}^{-3}$	annual mean
	0.25 $\mu\text{g m}^{-3}$	annual mean
Nitrogen dioxide	200 $\mu\text{g m}^{-3}$ not to be exceeded more than 18 times a year	1 hour mean
	40 $\mu\text{g m}^{-3}$	annual mean
Particles (PM₁₀) (gravimetric)^b	50 $\mu\text{g m}^{-3}$ not to be exceeded more than 35 times a year	24 hour mean
All authorities	40 $\mu\text{g m}^{-3}$	annual mean
Sulphur dioxide	350 $\mu\text{g m}^{-3}$ not to be exceeded more than 24 times a year	1 hour mean
	125 $\mu\text{g m}^{-3}$ not to be exceeded more than 3 times a year	24 hour mean
	266 $\mu\text{g m}^{-3}$ not to be exceeded more than 35 times a year	15 minute mean

Table 1

REFERENCE	LOCATION OF TUBE
SH1	A30 Bagshot
SH2	Windle Valley Daycare Centre
SH3	Snows Ride School Windlesham
SH4	Shaftesbury Road Bisley
SH5	Chestnut Avenue
SH6	Church Lane Bisley
SH7	M3 Brickhill roadside
SH8	M3 Brickhill 150m back
SH9	A30 Jolly Farmer
SH10	A30 Homebase
SH11	Watchetts School Camberley
SH12	High Street Camberley
SH13	Le Marchant Road
SH14	Badgers Copse
SH15	Castle Road AQM
SH16	Wood Road
SH17	Guildford Road, Bisley
SH20	Deepcut Bridge Road
SH21	Benner Lane
SH22	Castle Road AQM
SH23	Red Road/Maultway
SH24	High Street, Chobham
SH25	Castle Road AQM
SH26	College Ride, Camberley
SH27	361 Guildford Road, Bisley
SH28	Queens Road, Bisley
SH29	Classic Joinery, Bisley
SH30	Focus, Frimley Road
SH31	Old Pond Close
SH32	Two Hoots, Old Pond Close
SH33	Wood Road Garages
SH34	Brackendale Road
SH35	Prior End
SH36	Youlden Drive
SH37	Crawley Drive
SH38	Swift Lane