

Isle of Wight Council

Detailed Air Quality Assessment Report 2007

Introduction

The 2006 Air Quality Updating and Screening Assessment for the Isle of Wight (USA 2006) indicated that there may be exceedances of the air quality objectives for Nitrogen dioxide, at two kerbside locations.

By letter dated 22 September 2006, Eko Deinne of the Air, Environment Quality Division of the Department for Environment, Food and Rural Affairs indicated that the Detailed Assessment could be carried out using triplicate diffusion tubes at each of the two locations.

A Detailed Assessment for Nitrogen Dioxide was therefore carried out during the period August 2006 to January 2007, by enhanced diffusion tube monitoring at those sites.

No change has been identified in sources of other pollutants since the USA 2006. For this reason, the only pollutant species mentioned in this Report is Nitrogen dioxide.

Monitoring of nitrogen dioxide had been carried out by exposing single diffusion tubes at each of nine sites on the Isle of Wight, since 2000. However, results at seven of those sites had been consistently very low. A decision was therefore taken in 2005 that, from April 2005, monitoring would only be undertaken at the two sites showing the highest levels of NO_x.

This report details the reasons for the Detailed Assessment, how it was carried out, and the results.

Choice of monitoring location

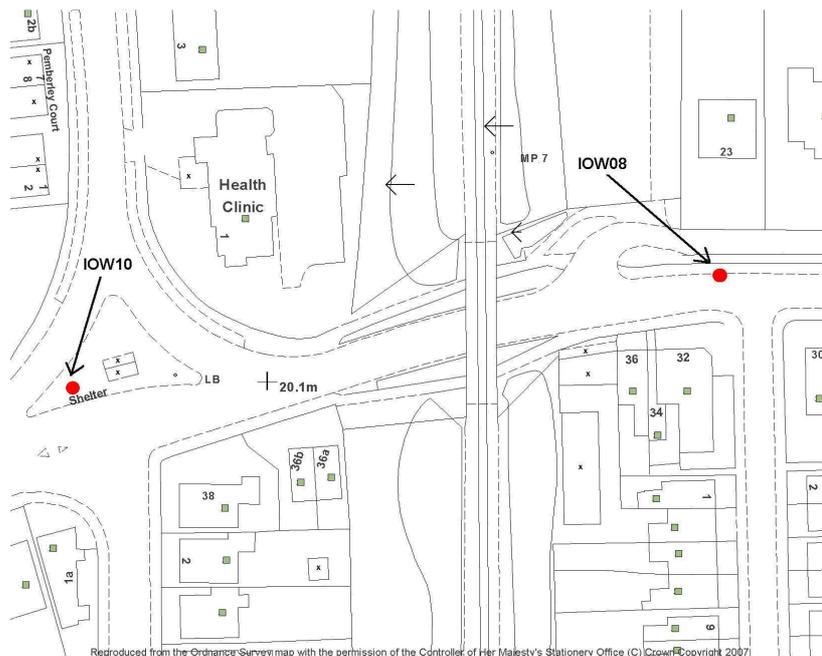


Map showing monitoring locations



IOW 04 51 Fairlee Road Newport NGR SZ 50378 89557
(sited on sign/lamp post outside 51 on footpath)

This site is on the main road out of Newport towards Ryde. There is terraced housing on both sides of the road at this location, and therefore there is likely to be exposure for an hour or more.



IOW 08 Lake Hill Lake **NGR SZ 59112 83738**
(sited on sign post opposite 32 Lake Hill)

This site is on Lake Hill, the main road between the seaside resorts of Ventnor, Shanklin and Sandown and the resort of Ryde. There are two Solent crossings from Ryde: the FastCat to Portsmouth, and the Hovercraft to Southsea. There is heavy traffic on this road.

This site was reviewed for this Detailed Assessment. The diffusion tube was fixed to a lamp post at about 3 m above pavement level, on the North side of Lake Hill. On this side of the road there is a concrete retaining wall, battered at an angle of about 80°, supporting ground at a higher level. The diffusion tube is only about 0.5m above the top of the bank at this point. A road known as The Mall is located at this higher level, with houses set back from the far side of the Mall, away from Lake Hill.

It was considered that it was unlikely that anyone would stay in the area for an hour or more. There are houses on the other (South) side of Lake Hill; however, there is no embankment on the South side. The presence of the bank could restrict dispersion of road traffic pollutants; an effect not present on the South side. It was therefore felt that monitoring results at this particular location would not necessarily be representative of pollutant concentrations outside the houses on the South side.

It is therefore considered that this location does not comply with the recommendations of the Guidance, as there is unlikely to be exposure of persons for an hour or more.

An alternative location was therefore selected.

IOW 10 The Fairway Lake **NGR SZ 59017 83721**
(sited on a lamp post on the green)

This site is close to the same road, and therefore subject to similar levels of pollution from traffic. However, it is also an area where there is likely to be exposure for an hour or more. Lake Health Clinic is on the North-East corner, and The Old Manor House public house on the North-West.

Assessment Methodology

Consideration was given to the use of continuous monitoring equipment. However, the pavement at Fairlee Road is very narrow, and the front gardens of the houses are small. There would be limited room to install an air-monitoring cabinet without obstructing the footway. There would be no guarantee that agreement would be reached with any householder for the installation of the equipment in a front garden.

It was decided to use diffusion tubes, but to expose more of them at each location. The use of three tubes at each site would give more confidence in the reliability and accuracy of the results.

In addition, the single tube at IW08 was retained, to provide a comparison with the new site at IW10.

Results

The following table gives the raw results of the six months of enhanced monitoring, from August 2006 to January 2007.

	August	September	October	November	December	January	August to January mean
IW4a	38.62	41.87	40.09	44.77	37.03	36.28	
IW4b	36.84	35.94	42.03	44.30	39.49	37.80	
IW4c	39.88	33.79	41.97	45.53	37.93	39.97	39.67
IW8	42.14	45.68	38.92	39.16	33.15	33.74	38.80
IW10a	17.66	20.90	24.86	24.36	19.71	19.78	
IW10b	20.13	27.93	24.86	23.55	22.85	18.69	
IW10c	18.98	23.55	26.57	25.30	23.84	19.61	22.40

Correction to yearly average

To correct between the average for the six-month period, August 2006 to January 2007, a correction is needed. To obtain the correction, the results for IW8 (Lake Hill) were examined. Results for IW10 were sufficiently low that correction would be unlikely to result in a figure exceeding the guideline limit. However, results for Fairlee Road were close to the limit. A correction local to Fairlee Road is therefore needed.

The ratio between the six months August to the following January divided by the annual average for January to December were as follows:

2003: 0.94; 2004: 0.86; 2005: 1.12; 2006: 1.05

The average of the four ratios is 0.995. Reducing this to 2 decimal places gives 1.00. The annual average for each year is therefore taken to be the same as the six-month average.

Diffusion tube bias correction

The bias correction for 2006 was taken from the spreadsheet published on the Air Quality Review and Assessment website (<http://www.uwe.ac.uk/aqm/review/>). The laboratory is Bureau Veritas (Gradko; 50% TEA in acetone). The overall bias adjustment of 1.04 was used.

Corrected annual averages:

IW4: 41.26 microgrammes per cubic metre

IW8: 40.35 microgrammes per cubic metre

IW10: 23.29 microgrammes per cubic metre

Correction from kerbside to building façade

IW4 and IW8 are both kerbside sites. It is unlikely that there will be exposure of an hour or more at the kerbside for either site.

IW8 has been discounted for reasons outlined above. IW4 is at the kerbside (on a lamp-post), At this location, the façade of the nearby house is about 2 m from the back of the pavement.

The FAQ for roads and NO₂ on the Air Quality Review and Assessment website gives the following guidance:

FAQ 9: Kerbside data are not relevant for most of the objectives.

FAQ7: To convert from the kerbside to the building façade, multiply the kerbside data by a factor which depends on the distance of the façade from the kerbside.

In this case, the factor recommended (for 2 – 5 metres) is 0.95.

This gives a corrected annual average at the building façade of $41.26 \times 0.95 = 39.2$

Future years correction

From Box 6.6 of LAQM.TG(03), the correction factor for 2006 is 0.863. The correction factor for 2010 is 0.734.

The corrected annual averages therefore need to be adjusted by a factor of $0.734/0.863 = 0.8505$. The following, therefore, gives the likely annual average Nitrogen Dioxide concentrations at the sites monitored in 2010:

IW4: 35.09 microgrammes per cubic metre

IW8: 34.32 microgrammes per cubic metre

IW10: 19.81 microgrammes per cubic metre

Paragraph 4.2 of the report “Analysis of the relationship between 1 hour and annual mean Nitrogen dioxide at UK roadside and kerbside monitoring sites” suggests that the hourly average is unlikely to be exceeded at sites where the annual mean is less than 60 microgrammes per cubic metre.

Conclusion

The corrected annual average concentrations of Nitrogen Dioxide, as monitored by diffusion tubes, appears to exceed the 2005 objective at one of the sites monitored:

IW8 Lake Hill 40.35 microgrammes per cubic metre (kerbside).

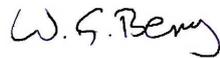
However, Lake Hill has been discounted as an appropriate site for reasons given elsewhere in this report.

Both the annual average and the hourly 2005 objective for Nitrogen dioxide is likely to be met on the Isle of Wight in 2007 and future years.

The Future Years correction indicates that both the annual average and the hourly objectives for 2010 are likely to be met at both sites.

It is therefore concluded that it will not be necessary to declare an Air Quality Management Area on the Isle of Wight.

However, any change in traffic patterns that results in a significant increase of traffic on Fairlee Road may affect this conclusion. Therefore, these results will be brought to the attention of those within the Isle of Wight Council who are responsible for Traffic Management.



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Tuesday, 15 May 2007