Putting the Community First

BARNET
LONDON BOROUGH

Review and assessment of air quality

Updating and screening assessment report 2006

Executive Summary

The Environment Act 1995 and subsequent regulations, obliges local authorities to regularly review and assess air quality in their boroughs.

The review and assessment plays an important role in the continuing process of Local Air Quality Management, whereby the authorities aim to achieve the Air Quality Objectives for the following seven air pollutants: carbon monoxide, benzene, 1,3-butadiene, lead, nitrogen dioxide, sulphur dioxide and particles (PM_{10}). These pollutants are assessed due to their negative health impacts.

The predicted concentrations of the pollutants are compared to air Quality Objectives. Areas where these objectives are likely to be exceeded must then be designated as Air Quality Management Areas.

The first round of Review and Assessment in Barnet (1998 – 2002) resulted in Barnet declaring the whole borough as an AQMA for nitrogen dioxide and particles (PM_{10}). This was based on the likely exceedence of the 2005 annual mean objective for nitrogen dioxide and the 2004 24-hour mean objective for particles along large stretches of main roads in the borough.

The second round of Review and Assessment started with an Updating and Screening assessment in 2004. It concluded that there had been no significant changes to the findings of the first round and no further action was required.

The third round of Review and Assessment commences with the submission of this Updating and Screening Assessment. The aim of this assessment was to identify matters that have changed since the second round was completed. The conclusion is that there have been no significant changes, either in Barnet or in relevant locations in neighbouring authorities, to warrant a detailed assessment for any of the pollutants.

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Table of Contents

1.0 Introduction

1.1 Local authorities have an obligation under Part IV of the Environment Act 1995 to review and assess the air quality in their area "from time to time". The Air Quality Regulations 2000 and the Air Quality (England) (Amendment) Regulations 2002 prescribe air quality objectives for seven key pollutants to be achieved by a certain date. Local air quality management helps the UK meet its objectives under the EU Air Quality Framework and Daughter Directives.

1.2 In Barnet, the review of air quality started in 1997 through an air quality partnership with Middlesex University. An emissions inventory – a listing and analysis of the pollution sources in Barnet – was compiled as the first step towards a fuller understanding of air quality locally.

1.3 The first round of review and assessment culminated in April 2001, with the whole borough being designated an Air Quality Management Area (AQMA). This was declared because the air quality objectives were expected to be exceeded for nitrogen dioxide and particulates (PM10). The source of the poor air quality is traffic on Barnet's busiest roads. In January 2003, the council put in place an action plan towards improving the poor air quality that makes the AQMA necessary. .

1.3 The second round of Review and Assessment started in 2003 with a new two-stage approach. The first stage is an Updating and Screening Assessment of Air Quality (USA). This is carried out on a three year cycle to establish whether a second stage, a Detailed Assessment, is needed. The aim is to identify whether there are any significant changes since the last round, for each of the seven pollutants. The USA in Barnet, completed in February 2004, concluded that a detailed assessment was not necessary.

1.4 This report commences the third round of Review and Assessment with a new Updating and Screening Assessment of air quality in Barnet.

2.0 Methodology

2.1 This report is written using Technical guidance LAQM.TG(03). As this guidance was three years old, updated and revised advice has been given as a series of FAQs on the Review and Assessment Helpdesk website. Each of the seven pollutants will be considered in turn, using the prescribed checklist to assess whether or not a Detailed Assessment will be required for that pollutant.

Monitoring Data

2.2 Monitoring data was taken from the borough's own monitoring sites (see Appendix IV for the locations and more details). The Environmental Research Group, Kings College, London manage the quality assurance/ quality control (QA/QC) for the council's continuous monitors. Casella Stanger manage the QA/QC for the council's nitrogen dioxide tube survey.

2.3 For pollutants where the borough has not carried out its own monitoring, data was taken from neighbouring boroughs. This is appropriate because of their similarity to Barnet in terms of their sources, relevant exposure, and as neighbouring outer London Boroughs. In this case, data was accessed from the borough's own Updating, Screening and Assessments, the London Air Quality Network and the Automatic Urban and Regional Network.

Industrial sources

2.4 The Environment Agency are responsible for regulating Part A1 (and formerly Part A) large processes; currently, there are no such processes operating in Barnet. Local authorities are responsible for the smaller processes, Part A2 and B; currently, there are 54 of these in Barnet (including 35 petrol stations). Therefore, data on point sources such as industrial sites, new industrial sites and extended sites was obtained from these public registers for the sites available from the council's own public registers and the Environment Agency.

2.5 Information on the neighbouring borough's prescribed processes was obtained from the their Updating and Screening Assessments where available and communication with their Environmental Health departments.

3.0 Summary Checklist

Updating and Screening Assessment Summary Checklist for **Carbon Monoxide**

Item	Response
A) Monitoring data	The authority is currently not monitoring CO but the neighbouring authority Enfield monitors CO and the objective is not exceeded..
B) Very busy roads or junctions in built-up areas	There are no very busy roads or junctions where the current year background concentration is expected to be above 1mg/m^3.
Conclusion	There have been no significant changes with regards to CO emissions in this authority. A Detailed Assessment will therefore not be required.

Updating and Screening Assessment Summary Checklist for **Benzene**

Item	Response
A) Monitoring data outside an AQMA	Benzene is monitored at a site in London Bloomsbury. This site does not exceed the objectives.
B) Monitoring data within an AQMA	The authority is not monitoring benzene.
C) Very busy roads or junctions in built up areas	There are no very busy roads or junctions where the current year background concentration is expected to be above 2mg/m^3.
D) New industrial sources.	There are no industrial processes of relevance for benzene in the local authority, or in neighbouring authorities close to Barnet's borders. There has been no change in this position.
E) Industrial sources with substantially increased emissions, or new	

relevant exposure	
F) Petrol stations	There are no new petrol stations with an annual throughput of more than 2million litres of petrol per annum that are near to a busy road. There is no new relevant exposure.
G) Major fuel storage depots (petrol only)	There are no major fuel storage depots handling petrol in Barnet, or in neighbouring authorities close to Barnet's boundary. This position has not changed.

Updating and Screening Assessment Summary Checklist for **1,3-butadiene**

Item	**Response**
A) Monitoring data	Barnet does not currently monitor for 1,3-budadiene, and neither do neighbouring authorities.
B) New industrial sources.	There are no new industrial sources of 1,3-butadiene in Barnet, or surrounding authorities
C) Industrial sources with substantially increased emissions, or new relevant exposure	There are no industrial processes of relevance for 1,3-butadiene in the local authority, or in neighbouring authorities close to Barnet's borders. There has been no change in this position.

Updating and Screening Assessment Summary Checklist for **Lead**

Item	**Response**
A) Monitoring data	Barnet does not currently monitor for lead and neither do neighbouring local authorities.
B) New industrial sources.	There are no new industrial sources of lead in Barnet or in neighbouring local authorities close to Barnet's boundary
C) Industrial sources with substantially	There are no industrial processes that emit significant quantities of lead either in Barnet or in neighbouring

increased emissions, or new relevant exposure	authorities close to Barnet's boundaries. There has been no change in this position.

Updating and Screening Assessment Summary Checklist for **Nitrogen Dioxide**

Item	Response
A) Monitoring data outside an AQMA	This section is not applicable as the whole Borough is an AQMA.
B) Monitoring data within an AQMA	Monitoring results confirm that there are exceedences of the annual mean objective alongside the busiest roads in the Borough in locations with relevant exposure.
C) Narrow congested streets with residential properties close to the kerb	These locations were specifically assessed in Round 1.
D) Junctions.	These locations were specifically assessed in Round 1.
E) Busy streets where people may spend 1-hour or more close to traffic	These locations were specifically assessed in Round 1.
F) Roads with high flow of buses and/or HGVs.	There are no such roads in Barnet. There has been no change in this position.
G) New roads constructed or proposed since the previous round of R&A	There have been no new significant roads built in Barnet since the last round of Review and Assessment.

H) Roads with significantly changed traffic flows, or new relevant exposure	There have been no roads with significantly changed traffic flows since the last round of review and assessment. There is new relevant exposure, but this is alongside roads that have already been specifically assessed in Round 1.
I) Bus Stations	Bus stations in Barnet were considered in the last Updating and Screening Assessment. New monitoring has started using a diffusion tube.
J) New industrial sources.	There are no new industrial sources of nitrogen dioxide in Barnet.
K) Industrial sources with substantially increased emissions, or new relevant exposure	There are no industrial sources of relevance in Barnet or any of the neighbouring authorities. There has been no change in this position.
L) Aircraft	There are no airports within 1000m of Barnet's boundary so this section is not relevant.

Updating and Screening Assessment Summary Checklist for **Sulphur Dioxide**

Item	Response
A) Monitoring data outside an AQMA	Barnet does not monitor for sulphur dioxide. Neighbouring Boroughs do monitor, and do not exceed the objectives.
B) Monitoring data within an AQMA	Barnet has not declared an AQMA for sulphur dioxide.
C) New industrial sources.	There are no new industrial sources of sulphur dioxide in Barnet or nearby in neighbouring local authorities.
D) Industrial sources with substantially	There are no industrial processes that emit significant quantities of sulphur dioxide either in Barnet or in

increased emissions, or new relevant exposure	neighbouring authorities close to Barnet's boundaries. There has been no change in this position.
E) Areas of domestic coal burning	There are no areas in Barnet where there is high density of domestic coal burning
F) Small Boilers > 5 MW (thermal).	The 2003 USA concluded that there are no such boilers in Barnet. There has been no change in this position,
G) Shipping	There are no ships in Barnet.
H) Railway Locomotives	This was considered in the 2003 USA. There is no relevant exposure to stationary locomotives. There has been no change in this position.

Updating and Screening Assessment Summary Checklist for **PM_{10}**

Item	Response
A) Monitoring data outside an AQMA	This section is not applicable as the whole Borough is an AQMA.
B) Monitoring data within an AQMA	Monitoring results confirm that there are exceedences of the 24-hour mean objective alongside the busiest roads in the Borough in locations with relevant exposure.
C) Busy roads and junctions in Scotland	Not applicable.
D) Junctions.	These locations were specifically assessed in Round 1.
E) Roads with high flow of buses and/or HGVs.	There are no such roads in Barnet. There has been no change in this position.
F) New roads constructed or	There have been no new significant roads built in Barnet since

proposed since last round of R&A	the last round of Review and Assessment
G) Roads with significantly changed traffic flows, or new relevant exposure.	There have been no roads with significantly changed traffic flows since the last round of review and assessment. There is new relevant exposure, but this is alongside roads that have already been specifically assessed in Round 1.
H) Roads close to the objective during the second round of Review and Assessment	All roads likely to exceed the objective were specifically assessed in Round 1.
I) New industrial sources.	There are no new industrial sources of particulates in Barnet.
J) Industrial sources with substantially increased emissions, or new relevant exposure	There are no industrial sources of relevance in Barnet or any of the neighbouring authorities. There has been no change in this position.
K) Areas of domestic solid fuel burning	There are no areas of domestic solid fuel burning in Barnet.
L) Quarries / landfill sites / opencast coal / handling of dusty cargoes at ports etc.	These have been specifically assessed in previous rounds. .
M) Aircraft	There is no airport within 500m of Barnet's boundary.

4.0 Updating and Screening for Carbon Monoxide

4.1 The carbon monoxide objective is a maximum daily 8-hour running mean of 10.0mg/m^3 by 31 December 2003. .

4.2 The main source of carbon monoxide in the UK is road transport.

4.3 The 2003 USA concluded that it was unlikely that the objective was being exceeded and that there was no need to proceed to a Detailed Assessment.

A. Monitoring data

4.4 Barnet does not monitor carbon monoxide. Therefore data was taken from the London Borough of Enfield continuous air quality monitoring stations. Enfield is similar to Barnet in terms of sources of carbon monoxide, relevant exposure and as a neighbouring outer London Borough.

4.5 None of these sites exceeded the objective between 2000 and 2005. None of the monitoring sites in the London Air Quality Network exceeded the objective in 2003 and 2004, the latest year for which reports are available. It is therefore likely that the objective for carbon monoxide is being achieved in Barnet.

B. Very busy roads or junctions in built up areas

4.6 In order to assess whether traffic is likely to cause an exceedence of the 2003 air quality objective, the screening criteria is that there must be a very busy road where the current year background concentration is greater than 1mg/m^3. The annual mean background carbon monoxide value for 2006, as calculated from the estimated data from the UK National Air Quality Archive is lower than this at 0.324mg/m^3.

4.7 There are no roads meeting the screening criteria for proceeding to a detailed assessment.

Conclusion

4.8 Barnet is unlikely to have any exceedences of the air quality objective for carbon monoxide in 2006. A Detailed Assessment is not required at this stage.

5.0 Updating and Screening for Benzene

5.1 The benzene air quality objectives are as follows:
- a running annual mean of 16.25 μg/m^3 by 31 December 2003
- an annual mean of 5.00 μg/m^3 by 31 December 2010

5.2 The main sources of benzene in the UK are petrol-engined vehicles, petrol refining, and petrol station forecourts without vapour recovery systems.

5.3 The 2003 USA concluded that there were unlikely to be exceedences of either objective and so a Detailed Assessment was not required.

A. Monitoring data outside an AQMA

5.4 Barnet does not have any monitoring data on benzene. Enfield is the nearest Borough that monitors benzene, but this finished in 2002. This data was reported in the 2003 USA and concluded that there would be no exceedence of the 2003 and 2010 objectives.

5.5 There are not many sites that monitor benzene in London, therefore data from the London Bloomsbury site was taken from the air quality archive. The following table shows the annual mean concentrations from 2003 to 2005.

	2003	2004	2005
London Bloomsbury	**2.5**	**2.6**	**1.9**

5.6 There were no measured exceedences of the annual mean over the last three years at this site. It is unlikely that there will be any exceedences of either objective in Barnet.

B. Monitoring data inside an AQMA

5.6 This section is not applicable as there is no AQMA for benzene in Barnet.

C. Very busy roads or junctions in built up areas

5.7 In order to assess whether the traffic is likely to cause an exceedence of the 2010 air quality objective, one of the screening criteria is that there must be a very busy road in an area where the annual mean background concentration is expected to be greater than 2μg/m^3.

5.8 The highest annual mean background benzene concentration for 2010, as calculated from the estimated data in the UK National Air Quality Archive is

0.74μg/m^3 . There are therefore no roads meeting the screening criteria for proceeding to a detailed assessment.

D. New Industrial sources

5.-9 .There are no new relevant industrial sources in Barnet.

E. Industrial sources with substantially increased emissions or new relevant exposure.

5.10 The first two rounds of review and assessment for Barnet identified that there were no industrial processes that emitted significant quantities of benzene. There has been no significant change since then; either through changes to existing industrial processes or the addition of any new processes, in either Barnet itself or surrounding authorities

F. Petrol stations

5.11 There are no new petrol stations with an annual throughput of more than 2 million litres per annum with a busy road nearby that have not been covered by previous reports. Furthermore, there are no new developments that have introduced relevant exposure within 10m of the pumps.

G. Major fuel storage depots (petrol only)

5.12 There are no major fuel storage depots (for petrol) in Barnet or neighbouring authorities close to Barnet's boundary.

Conclusion

5.13 Barnet is unlikely to be exceeding the 2003 air quality objectives for benzene in 2006, or the more stringent objective in 2010. The screening above indicates that a Detailed Assessment is not required at this stage.

6.0 Updating and Screening for 1,3 – Butadiene

6.1 The 1,3-butadiene objective is a running annual mean of 2.25µg/m^3 by 31 December 2003.

6.2 The main source of 1,3-butadiene in the UK is emissions from motor exhausts.

6.3 The 2003 Updating and Screening Assessment concluded that a detailed assessment was not necessary for 1,3-butadiene.

A. Monitoring data

6.4 The 2003 USA looked at data from a monitoring campaign in Enfield in 1997 using diffusion tubes. Data was extrapolated forward to 2003, and the conclusion was that future concentrations would not exceed the air quality objectives. Correction factors in the guidance show that this trend is predicted to continue.

6.5 There are only a handful of sites in the AURN that measure for 1,3-butadiene. None of these have exceeded the 2003 objective in the years 2003 to 2005.

B. New industrial sources

6.6 There are no new industrial sources of 1,3-butadiene in Barnet, or surrounding authorities.

C. Industrial sources with substantially increased emissions, or new relevant exposure

6.7 The 2003 USA confirmed that there were no industrial processes that emitted significant quantities of 1,3-butadiene in Barnet or surrounding local authorities. There has been no change since then.

Conclusion

6.8 Barnet is unlikely to have any current annual means of 1,3-butadiene greater than the 2003. The screening above indicates that a Detailed Assessment is not required at this stage.

7.0 Updating and Screening for Lead

7.1 The lead air quality objectives are as follows:

- an annual mean of 0.5 µg/ m^3 by 31 December 2004
- an annual mean of 0.25 µg/ m^3 by 31 December 2008

7.2 The main source of lead in the UK is certain major industrial processes.

7.3 The 2003 USA concluded that a Detailed Assessment for lead was not required.

A. Monitoring data

7.4 Barnet does not monitor lead, so data was taken from the Air Quality Archive.

7.5 DEFRA monitors lead, using continuous automatic monitors, at an urban background site in Brent Park, Brent, and a roadside site in Kensington and Chelsea at Cromwell Road.

7.6 The table below shows the monitoring data from 2000 to 2004, the latest year of data..

Table of the annual mean for lead as measured for years 2000 - 2004 in the neighbouring borough of Brent and the central London borough of Kensington and Chelsea.

Location	Site type[1]	Year	Annual mean (µg/m^3)
LB Brent – Brent Park	UB	2000	0.024
		2001	0.03
		2002	0.022
		2003	0.021
		2004	0.015
LB Kensington and Chelsea	R	2000	0.032
		2001	0.031
		2002	0.027
		2003	0.025
		2004	0.020

Notes:
1.Site type abbreviations are as follows: R = roadsite; UB = urban background.

7.7 There have been no measured exceedences of the 2008 annual mean (0.25 µg/ m^3) over the last four years in Brent and Kensington and Chelsea. Given that these

levels would be similar to those found in similar sites in Barnet, it is likely that that the objective for lead will also be achieved in Barnet.

B. New industrial sources

7.8 There are no new industrial sources of lead in Barnet or in neighbouring local authorities close to Barnet's boundary.

C. Industrial sources with substantially increased emissions, or new relevant exposure

7.9 The 2003 USA confirmed that there were no industrial processes that emitted significant quantities of lead either in Barnet or in neighbouring authorities close to Barnet's boundaries. There has been no change in this position.

Conclusion

7.10 Barnet is unlikely to have any exceedences of the 2004 and 2008 air quality objectives. The screening above indicates that a Detailed Assessment is not required at this stage.

8.0 Updating and Screening for Nitrogen Dioxide

8.1 The nitrogen dioxide objectives are as follows:

- a one hour mean of 200 μg/ m^3 not to be exceeded more than 18 times a year by 31 December 2005.
- an annual mean of 40 μg/ m^3 by 31 December 2005.

8.2 The principal source of nitrogen dioxide in the UK is road transport.

8.3 The 2003 USA concluded that as the whole Borough was declared an AQMA in 2001, all of the exceedence areas would have been considered thoroughly with the Stage Four Review and Assessment report. Therefore a Detailed Assessment was not necessary.

A. Monitoring data outside an AQMA

8.4 Barnet declared the whole of the Borough as an AQMA for nitrogen dioxide on the basis of the findings of the first stages of its Review and Assessment. Therefore, this section is not applicable.

B. Monitoring data within an AQMA

Continuous Monitoring

8.5 Barnet has two air quality monitoring stations that monitor nitrogen dioxide. One continuous monitor is at Chalgrove School, Finchley: a background site. The other is at Tally Ho, North Finchley: a kerbside site. Further detail and a map of the locations of the monitoring sites is available in Appendix IV.

8.6 QA/QC is carried out by the Environmental Research Group (ERG) at Kings College London. Data have traceability to national standards and operational procedures defined for the London Air Quality Network (AURN).

8.7 The table below shows the annual mean for nitrogen dioxide as measured for years 2000 - 2005 and predicted for 2010 and the number of times the one hourly mean is greater than 200μg/m^3 as measured for years 2000 – 2005. Exceedences of the objectives for 2005 have been highlighted in bold type.

Site[1]	Annual mean (µg/m^3) Measured results from 2000 to 2005, and predicted forward results to 2010 for each year.									
	2001	**2010**	**2002**	**2010**	**2003**	**2010**	**2004**	**2010**	**2005**	**2010**
Tally Ho Corner (BN1) K	**58**	**43**	**69**	**53**	**74**	**58**	Note 2	n/a	**72**	**61**
Chalgrove School (BN2) UB	40	31	34	28	38	32	36	31	37	32

Site[1]	Number of 1-hour exceedences of 200µg/m^3					
	2000	**2001**	**2002**	**2003**	**2004**	**2005**
Tally Ho Corner (BN1) K	4	160.5µg/m^3 (99.8th percentile)[4]	6	**23**		3
Chalgrove School (BN2) UB		0	110.1µg/m^3 (99.8th percentile)[4]	0	5	2

Notes:
1. Site type abbreviations are as follows: K = kerbside; R = roadside; UB = urban background.
2. BN1 had only 17% data capture for 2004 so results not used.
3. Data after September 2005 not fully ratified
4. Where there was less than 90% data capture, the 99.8th percentile of hourly means was calculated.

8.8 The attainment year for achieving the nitrogen dioxide objectives has now been reached. The continuous data has not been fully ratified. However, it is clear that the annual mean objective was not achieved at Tally Ho Corner. This is not representative of relevant exposure as it is situated on a central island of a busy road. Measured data for Chalgrove school show the annual mean to be 37µg/m^3 in 2005. Projecting forward from 2004 (the last fully ratified calendar year gives a figure of 35µg/m^3 for 2005. This is a background site away from busy roads.

8.09 The hourly mean objective was not exceeded in 2005 at the two sites.

8.10 In conjunction with the diffusion tube results (discussed later), it can be extrapolated that there are areas near to busy roads where the annual mean objective is

exceeded in areas of relevant exposure. This corresponds with the findings of the Borough's first round of Review and Assessment.

Diffusion Tubes

8.11 Nitrogen dioxide is also measured using diffusion tubes. There are sixteen tubes supplied by Casella as part of the London Wide Environment Programme. Barnet is also working with the Highways Agency on two projects to measure nitrogen dioxide near to the M1. All data has been appropriately bias adjusted using the spreadsheet provided by Air Quality Consultants Ltd (Version 02/06).. Further information about the location, supply, analysis and QA/QC of the tubes are available in appendix IV.

8.12 The table below shows the annual mean for nitrogen dioxide as measured using diffusion tubes for years 2000 - 2005 and predicted for 2010. Where less than nine months data was available, the mean was adjusted using the ratio as calculated in the technical guidance. The 2010 annual mean was predicted using the latest spreadsheet on www.airquality.co.uk/archive/laqm/tools.php.

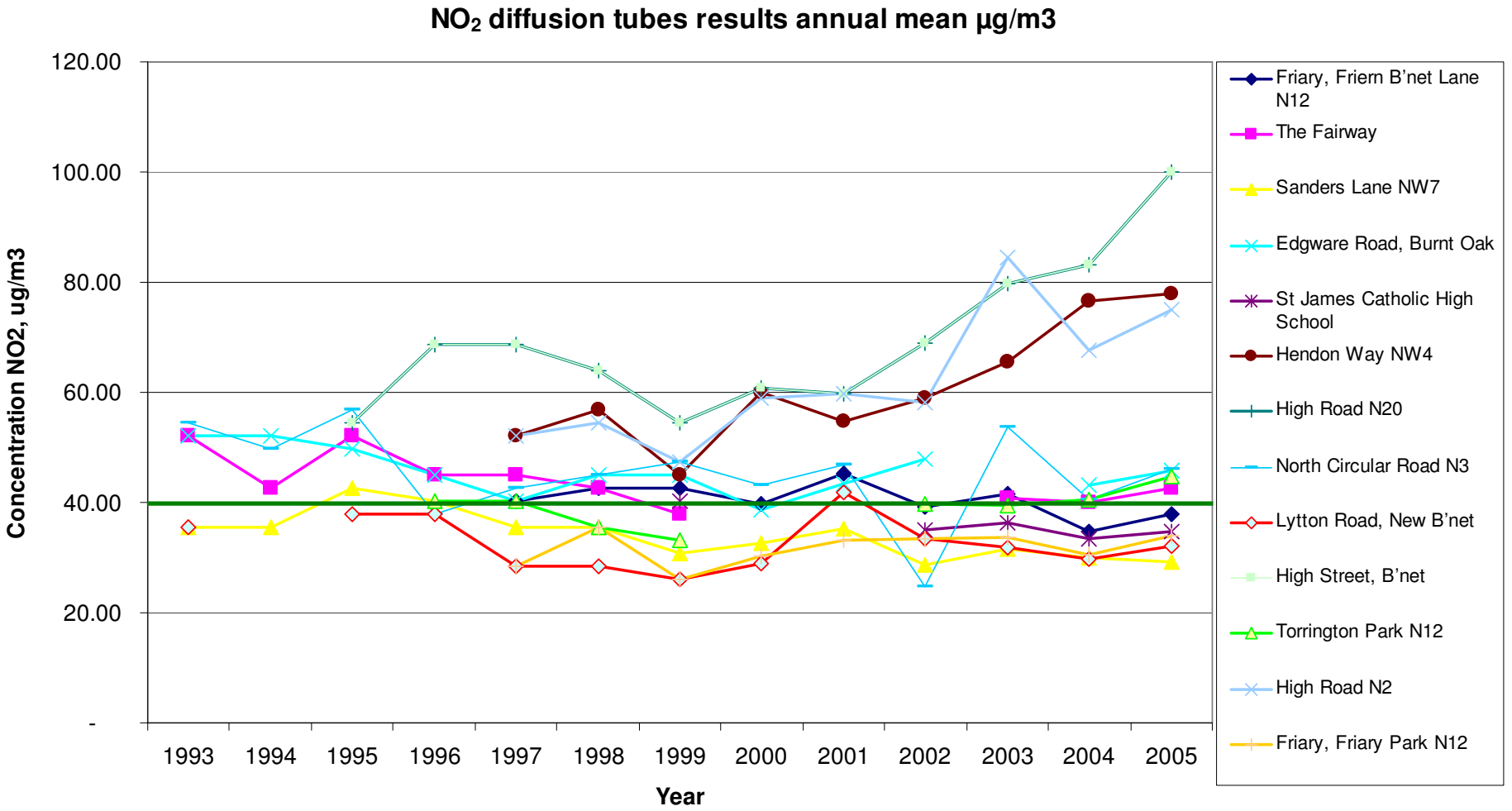
8.13 The previous USA highlighted Golders Green bus station as an area where new monitoring should take place. This started in August 2005. The table therefore includes data for this tube even though there was only five months data capture. The 2003 USA also recommended monitoring in Mill Hill Broadway Bus Station. The Highways Agency sponsored diffusion tube monitoring at the nearest residential receptors to the bus station and the M1 in Station Road Mill Hill commencing in 2004, monitoring inside the bus station commenced in April 2006.

Table. Nitrogen Dioxide diffusion tube results

National Air Quality objective for NO_2, to be achieved by the end of 2005, Air Quality Regulations (2000), annual mean of 40 µg/m^3

old tube code	Tube Code	Location	2000	2001	2002	2003	2004	2005	2010
BA70	**1**	Friary, Friern B'net Lane N12	39.8	45.4	39.2	41.5	34.7	37.9	31.9
BA56	**2**	The Fairway	0.0	0.0	0.0	40.7	40.1	42.5	35.8
BA59	**3**	Sanders Lane NW7	32.5	35.2	28.7	31.7	30.1	29.3	25.6
BA78	**4**	Edgware Road, Burnt Oak	38.7	43.4	47.9		43.1	45.7	38.5
BA73	**5**	St James Catholic High School			35.0	36.4	33.5	34.7	30.4
BA66	**6**	Hendon Way NW4	60.1	54.7	58.9	65.4	76.6	77.9	65.5
BA51	**7**	High Road N20	40.4	41.5	44.7	35.2	44.1	45.9	38.6
BA81	**8**	Tally Ho Monitoring Station						76.0	63.9
BA53	**9**	North Circular Road N3	43.2	46.9	24.7	53.6	40.5	46.0	39.5
BA62	**10**	Lytton Road, New B'net	28.9	41.8	33.4	31.9	29.6	32.0	28.0
BA63	**11**	High Street, B'net	60.9	59.9	69.1	79.8	83.2	99.9	84.1
BA64	**12**	Torrington Park N12	0.0	0.0	39.7	39.6	40.4	44.7	39.1
BA65	**13**	High Road N2	59.0	59.9	58.2	84.5	67.6	74.9	63.0
BA82	**14**	Tally Ho Monitoring Station						76.9	67.2
BA84	**15**	Golders Green Bus Station						74.9	63.0
BA69	**16**	Friary, Friary Park N12	30.4	33.1	33.5	33.8	30.5	33.9	29.7
	Discontinued								
BA52	old 8	Friern Barnet Town Hall	38.9	38.9	39.0	36.7			30.7
BA77	old 8	Chalgrove Primary School					33.3		28.6
BA60	old 20	ex Bernard House - kerbside	38.7	43.4	47.9				36.6
BA61	20	ex Bernard House - background			28.7				23.5
BA67	old 14	Victoria park	31.4	33.1	34.2	30.1			25.2
BA68	old15	Ballards Lane	34.0	40.5	35.4				27.1

Graph showing trends for long-term sites in Barnet



Highways Agency Tubes

8.14 This project started in March 2004. There is currently data up to and including January 2006. The following table shows the annual means for 2004 and 2005. Air quality was considerably worse in 2005 than 2004 at these locations. The tubes do represent relevant exposure and are important in Barnet due to the high number of residents living close to motorways.

Tube details				Annual Means (µg/m3)	
Tube	**Location**	**Northing, Easting**	**Distance from Road (m)**	**2004**	**2005**
Barnet 1	Junction of Mount Road & Park Road NW4	522333, 187951	25(M1)	**42.0**	**51.2**
Barnet 2	Hall Lane NW4	522266, 190507	38(M1)	**42.2**	**50.2**
Barnet 3	Station Road NW7	521352, 192002	20(M1)	**38.1**	**61.3**

Notes.
1. Barnet 3 had less than 9 months data capture in both 2004 and 2005. Therefore the mean was adjusted using the ratio as calculated in the technical guidance.
2. Bias adjustment factors were found using the Air Quality Consultants spreadsheet, version 02/06.

8.15 The results show a general worsening of air quality in terms of nitrogen dioxide from 2004 to 2005. In many cases the 2005 nitrogen dioxide concentrations are as high if not higher than concentrations in 2003, which was acknowledged as a bad pollution year.

8.16 The nitrogen dioxide tube results show several locations that are exceeding the annual mean objective in 2005. These locations are all close to busy roads and most are representative of relevant exposure. This corresponds with the findings of Stage Four of the Borough's first round of Review and Assessment, that there were likely to be exceedences alongside large stretches of the main roads across the borough.

C. Narrow congested streets with residential properties close to the kerb

8.17 The final stage (Stage Four) of the first round of Review and Assessment was carried out in May 2002 and this identified all roads where there were likely to be exceedences of the air quality objectives for nitrogen dioxide. The consultants, ERG, have confirmed that such streets would have been identified at this stage.

8.18 There have been no significant changes since this time, so a Detailed Assessment is not required at this stage.

D. Junctions

8.19 The final stage (Stage Four) of the first round of Review and Assessment was carried out in May 2002 and this identified all junctions where there were likely to be exceedences of the air quality objectives for nitrogen dioxide. The consultants, ERG, have confirmed that such junctions would have been identified at this stage.

8.20 There have been no significant changes since this time, so a Detailed Assessment is not required.

E. Busy streets where people may spend 1 hour or more close to traffic

8.21 The final stage (Stage Four) of the first round of Review and Assessment was carried out in May 2002 and this identified all streets where there were likely to be exceedences of the air quality objectives for nitrogen dioxide. The consultants, ERG, have confirmed that such streets would have been identified at this stage.

8.22 There have been no significant changes since this time, so a Detailed Assessment is not required at this stage.

F. Roads with high flow of buses and/ or HGVs

8.23 Barnet's traffic and highways section have confirmed that there are no such roads in Barnet, as defined in the LAQM TG(03) [5] criteria.

G. New roads constructed or proposed since the first round of Review and Assessment

8.24 There have been no new roads constructed or proposed since the previous USA that are likely to be significant according to the LAQM TG(03) [5] guidance. The Council has created and proposed new roads for new building estates but these are not significant.

H. Roads with significantly changed traffic flows, or new relevant exposure.

8.25 The data collection officer at Barnet has confirmed that there have been no roads with more than 10000 vehicles per day that have experienced a 25% increase in traffic flow since the last round of review and assessment.

8.26 There have been several developments approved or built in areas that exceed the annual mean nitrogen dioxide objective, since the last round of review and assessment. These are alongside the busy roads in the Borough that have already been assessed in the first round of review and assessment. These developments

are inevitable due to the pressure for new housing in London. In all cases mitigation against poor air quality is required.

8.27 There has been one case of refusal partly on air quality grounds. This was for the conversion of a warehouse close to the M1 motorway and train line into a school. It has not yet gone to appeal.

I. Bus stations

8.27 The Stage Four work predicted exceedances of the annual mean objective at Golders Green and Mill Hill Broadway bus stations, due largely to their proximity to a network of major roads. However there is no relevant exposure. On the other hand, both have relevant exposure to the one-hour mean objective. For example there is a café at Golders Green, and it is not improbable that people wait for long-distance buses for an hour.

8.28 The 2003 USA concluded that a further Detailed Assessment for the Golders Green and Mill Hill Broadway bus stations was not considered necessary for the following reasons:

1. The Stage Four work identified these sites as likely to exceed the nitrogen dioxide annual mean objective.
2. The whole of Barnet is an AQMA for nitrogen dioxide and particles and as a result, there is already an AQMA Action Plan in place to try to reduce nitrogen dioxide and particle emissions from buses.

8.29 As a result of the 2003 USA, a nitrogen dioxide diffusion tube was installed on North End Road next to Golders Green bus station in August 2005. Monitoring started at the nearest residential receptor on Station Road to the bus station in 2004 and inside Mill Hill Broadway bus station in April 2006. This will confirm whether the one hour mean is likely to be exceeded, and identify any other specific actions for the Action Plan.

J. New industrial sources

8.30 There are no new industrial sources of nitrogen dioxide in Barnet.

K. Industrial sources with substantially increased emissions

8.31 The first round of Review and Assessment for Barnet identified that there were no industrial processes that emitted significant quantities of nitrogen dioxide. There has been no significant change since then, either in Barnet or neighbouring authorities.

L. Aircraft

8.32 The nearest airport to Barnet is Elstree Aerodrome in Hertsmere borough which is 2.5 km outside of the borough. This is therefore not significant for Barnet.

Conclusion

8.33 Monitoring data indicates that Barnet is likely to have had exceedences of the 2005 annual mean air quality objective for nitrogen dioxide along large stretches of roads in the borough. These areas were specifically assessed in the first round of Review and Assessment, and so a Detailed Assessment is not required. Further monitoring at a bus station is now being carried out to assess the likelihood of exceedence of the one hour mean objective.

9.0 Updating and Screening for Sulphur Dioxide

9.1 The sulphur dioxide air quality objectives are as follows:

- a one hour mean of 350 μg/ m^3 not to be exceeded more than 24 times a year by 31 December 2004
- a 24 hour mean of 125 μg/ m^3 not to be exceeded more than three times a year by 31 December 2004
- a 15 minute mean of 266 μg/ m^3 not to be exceeded more than 35 times a year by 31 December 2005

9.2 The main sources of sulphur dioxide are power stations and other industrial combustion sources.

9.3 The 2003 USA for Barnet concluded that a detailed assessment was not required for sulphur dioxide.

A. Monitoring data outside an AQMA

9.4 Barnet does not monitor sulphur dioxide. However data monitoring is carried out in the nearby London Boroughs of Brent, Enfield and Harrow.

9.5 The table below shows that the sulphur dioxide objectives were achieved at all four monitoring stations.

Sulphur dioxide monitoring data in neighbouring London Boroughs

Location	Site type[1]	No. of times 24 hourly mean greater than 125μg/m^3 / Objective achieved? (x < 3)			No. of times one hour mean greater than 350μg/m^3 / Objective achieved? (x < 24)			No. of times 15 minute mean greater than 266 μg/m^3 / Objective achieved? (x < 35)		
		2003	2004	2005	2003	2004	2005	2003	2004	2005
Brent 1	UB	0 yes	0 yes	0 yes	0 yes	0 yes	0 yes	0 yes	0 yes	0 yes
Enfield 3	UB	0 yes	0 yes	0 yes	0 yes	0 yes	0 yes	2 yes	1 yes	0 yes
Enfield 4	R	0 yes	0 yes	0 yes	0 yes	0 yes	0 yes	0 yes	0 yes	0 yes
Harrow 1	UB	0 yes	0 yes	0 yes	0 yes	0 yes	0 yes	0 yes	0 yes	0 yes

Notes:
1.Site type abbreviations are as follows: R = roadsite; UB = urban background.
2. 2005 data not fully ratified

3. QA/QC is to AURN standard for Brent 1, and LAQN standard for the other three sites.

B. Monitoring data within an AQMA

9.6 Barnet has not declared an AQMA for sulphur dioxide. Therefore, this section is not applicable.

C. New industrial sources

9.7 There are no new industrial sources of sulphur dioxide in Barnet or nearby in neighbouring local authorities.

D. Industrial sources with substantially increased emissions, or new relevant exposure

9.8 The first round of Review and Assessment for Barnet and neighbouring boroughs identified that there were no industrial processes that emitted significant quantities of sulphur dioxide in Barnet or nearby in neighbouring local authorities. There has been no significant change since then.

E. Areas of domestic coal burning

9.09 There are no areas in Barnet where there is high density of domestic coal burning.

F. Small boilers with power ratings greater than 5MW

9.10 The existence of boilers burning coal or fuel oil was investigated for the 2003 USA, and no such boilers were found. There are no new boilers in Barnet, as determined by local knowledge.

G. Shipping

9.11 There are no ships in Barnet.

H. Railway locomotives

9.12 The 2003 USA found that the railway depot at Cricklewood in Barnet includes a couple of sites where diesel locomotives regularly stand with their engines running for periods that can be greater than 15 minutes, whilst they undergo maintenance. However, these locations are at least 30m away from residential gardens or any other areas where there may be relevant public exposure. There has been no change in this position.

9.13 Overall, there are no sites in Barnet where the public may be exposed to idling diesel engines for 15 minutes or more.

Conclusion

9.14 It is very unlikely that the objectives for sulphur dioxide are being exceeded in Barnet. There is no need to progress to a Detailed Assessment.

10.0 Updating and Screening for Particles (PM_{10})

10.1 The particles (PM_{10}) objectives are as follows:

- a 24 hour mean of 50 $\mu g/m^3$ not to be exceeded more than 35 times a year by 31 December 2004.
- an annual mean of 40 $\mu g/m^3$ by 31 December 2004.

10.2 There are provisional objectives for London in 2010, that have not been incorporated into the Air Quality Regulations:

- a 24 hour mean of 50 $\mu g/m^3$ not to be exceeded more than 10 to 14 times a year by 31 December 2010.
- an annual mean of 23$\mu g/m^3$ to 23$\mu g/m^3$ by 31 December 2010.

10.3 Barnet declared the whole Borough an AQMA for particles (PM10) during the first round of Review and Assessment. The major source was background concentrations (62% to 97%). Local major roads contributed between 3% and 33% depending on the location. The objectives were predicted to be exceeded alongside the busiest roads of the Borough. (A1, M1, A41, A406). The 2003 USA concluded that as the whole Borough was declared, all of the potential areas of concern had already been considered during Stage Four of review and assessment. Therefore a Detailed Assessment was not necessary.

A. Monitoring data outside an AQMA

10.4 Barnet declared the whole of the Borough as an AQMA for particles (PM_{10}). Therefore, this section is not applicable.

B. Monitoring data within an AQMA

10.5 Barnet has two continuous monitoring stations that monitor particles (PM10). One is at Chalgrove School, Finchley: a background site. The other is at Tally Ho, North Finchley: a kerbside site. Further detail and a map of the locations of the monitoring sites is available in Appendix IV.

10.6 QA/QC is carried out by the Environmental Research Group (ERG) at Kings College London. Data have traceability to national standards and operational procedures defined for the London Air Quality Network (AURN).

10.7 The table below shows the annual mean and the number of times the 24 hour mean is greater than 50$\mu g/m^3$ for particles (PM_{10}) between 2003 and 2005. Data is

ratified by ERG up until September 2005. As the data is collected by TEOM, it has been multiplied by 1.3.

Measured particulate concentrations in Barnet 2001-2005.

Location	Annual mean (µg/m^3)					No of times 24 hour-mean greater than 50 µg/m^3 (achieved objective?)				
	2001	2002	2003	2004	2005	2001	2002	2003	2004	2005
Tally Ho Monitoring Station, North Finchley (Kerbside)	32	37	33		27	19 (yes)	48 (no)	45 (no)		44.5µg/m^3 (yes, but see note)
Chalgrove School Monitoring Station, Finchley (Background)	23	24	26	23	24	6 (yes)	8 (yes)	25 (yes)	4 (yes)	8 (yes)

Notes
1. Tally Ho had only 17% capture for 2004, so results not used.
2. Tally Ho had only 70% capture for 2005, so result adjusted using ratio following technical guidance.
3. Tally Ho had only 70% capture for 2005, so the 90th percentile was used rather than the number of exceedences. This gives a result in µg/m^3. It is less than 50µg/m^3, so the objective is achieved.

10.8 The attainment year for achieving the objectives for PM10 was 2004. The annual mean objective was achieved at Chalgrove School where the concentration was 23µg/m^3. This represents urban background locations in Barnet. Although there is no data for Tally Ho in 2004, the annual mean was 27µg/m^3 in 2005. The annual mean objective is therefore being achieved at both locations, and therefore probably in most locations in Barnet.

10.9 The 24 hour mean is considered to be harder to achieve. This was the case in 2002 and 2003 at Tally Ho Corner, where it was exceeded. Although the 2005 results indicate an improvement in PM10, this is based on the 90th percentile, and so it would be prudent to continue monitoring PM10. The results show that the AQMA for PM10 should remain in place.

10.10 There is no relevant exposure at Tally Ho Corner for either objective, however there are similar locations in Barnet where there is exposure. Furthermore, locations adjacent to the trunk roads are likely to have higher concentrations as they will have a higher percentage of HGVs.

D. Junctions

10.11 The final stage (Stage Four) of the first round of Review and Assessment was carried out in May 2002 and this identified all streets where there were likely to be exceedences of the air quality objectives for particles. The consultants, ERG, have confirmed that such junctions would have been identified at this stage.

10.12 There have been no significant changes since this time, so a Detailed Assessment is not required.

E. Roads with high flow of buses and/ or HGVs

10.13 Barnet's traffic and highways section have confirmed that there are no such roads in Barnet, as defined in the LAQM TG(03) [5] criteria.

F. New roads constructed or proposed since last round of Review and Assessment

10.14 There have been no new roads constructed or proposed since the previous USA that are likely to be significant according to the LAQM TG(03) [5] guidance. The Council has created and proposed new roads for new building estates but these are not significant.

G. Roads with significantly changed traffic flows, or new relevant exposure.

10.15 The data collection officer at Barnet has confirmed that there have been no roads with more than 10000 vehicles per day that have experienced a 25% increase in traffic flow since the last round of review and assessment.

10.16 There have been developments approved or built in areas that exceed the 24-hour mean particulate (PM10) objective, since the last round of review and assessment. These are alongside the busy roads in the Borough that have already been assessed in the first round of review and assessment. These developments are inevitable due to the pressure for new housing in London. In all cases mitigation against poor air quality is required.

H. Roads close to the objective during the first round of Review and Assessment

10.17 The final stage (Stage Four) of the first round of Review and Assessment was carried out in May 2002 and this assessed all roads where there were likely to be exceedences of the air quality objectives for particulates. The entire Borough was declared an AQMA for particulates, to cover all such roads. It is therefore considered that these roads have already been adequately assessed.

I. New industrial sources

10.18 There are no new industrial sources of particles in Barnet.

J. Industrial sources with substantially increased emissions

10.19 The first round of Review and Assessment for Barnet identified that there were no industrial processes that emitted significant quantities of particles. There has been no significant change since then; either through changes to existing industrial processes or the addition of any new processes. There are no relevant sources in neighbouring authorities.

K. Areas of domestic solid fuel burning

10.20 There are no areas in Barnet where there is high density of domestic solid fuel burning. This was specifically considered in round two.

L. Quarries/landfill sites/opencast coal/handling of dusty cargoes at ports etc

10.21 These sources were specifically considered in the 2003 USA. There is no relevant source of particulates in Barnet. There has been no change in this position.

M. Aircraft

10.22 Work at Stage One of the Review and Assessment[2] identified that the nearest airport to Barnet was Elstree Aerodrome in Hertsmere borough which is 2.5 km outside of the borough; other airports are significantly further away. The only types of craft using this airport are light private aircraft and gliders, therefore its emissions were not thought to be significant at Stage One and are still not considered to be significant at this stage.

Conclusion

10.23 Barnet is likely to have exceedences of the 24 hour mean objective for particles along large stretches of some of the main roads across the borough. However, these areas were identified in detail in Stage Four of the last round of Review and Assessment and a Detailed Assessment is not required.

11.0 Overall Conclusion

11.1 This report fulfils the statutory requirement for the Updating and Screening Assessment of the air quality in the London Borough of Barnet.

11.2 All seven air pollutants have been assessed according to the criteria in the technical guidance provided by DEFRA and none of the pollutants meet the criteria for proceeding to a Detailed Assessment. The findings of this report confirm the earlier findings of the Review and Assessment process that the following two Air Quality Objectives are not being achieved in Barnet.

- annual mean of 40µg/m^3 by 2005 for nitrogen dioxide and
- 24 hourly mean of 50µg/m^3 not to be exceeded more than 35 times a year by 2004 for particles (PM_{10}).

11.3 These objectives are likely to be exceeded along large stretches of the main roads that cross the borough, such as the A406 and the A1. As a result of these original findings, Barnet was declared a borough wide Air Quality Management Area in 2001.

11.4 The London Borough of Barnet will not proceed to a Detailed Assessment in this round of review and assessment. However, it will continue with its air quality monitoring programme and Air Quality Action Plan implementation.

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13. LA Support Helpdesk.

Appendix I – Air Quality Objectives

The Air Quality Objectives from the Air Quality Regulations 2000 and (Amendment) Regulations 2002

Pollutant	Air Quality Objective		Date to be achieved
	Concentration	Measured as	
1,3 butadiene	2.25 μg/m^3	running annual mean	31.12.2003
benzene	16.25 μg/m^3 5 μg/m^3	running annual mean annual mean	31.12.2003 31.12.2010
carbon monoxide	10 mg/m^3	maximum daily running 8 hour mean	31.12.2003
lead	0.5 μg/m^3 0.25 μg/m^3	annual mean annual mean	31.12.2004 31.12.2008
nitrogen dioxide	200 μg/m^3 not to be exceeded more than 18 times per year (98 percentile) 40 μg/m^3	1 hour mean annual mean	31.12.2005 31.12.2005
Particles (PM_{10})	50 μg/m^3 (gravimetric) not to be exceeded more than 35 times per year 40 μg/m^3	24-hour mean annual mean	31.12.2004 31.12.2004
sulphur dioxide	266μg/m^3 not to be exceeded more than 35 times per year 350 μg/m^3 not to be exceeded more than 24 times per year 125 μg/m^3 not to be	15 minute mean 1 hour mean 24-hour mean	31.12.2005 31.12.2004 31.12.2004

	exceeded more than 3 times per year		

Appendix II – Exposure Criteria

Examples of where the Air Quality Objectives should or should not apply		
Averaging Period	**Objectives should apply at:**	**Objectives should generally not apply at:**
Annual Mean	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, libraries.	Building facades of offices or other places of work where members of the public do not have regular access. Gardens of residential properties. Kerbside sites or any other location where public exposure is expected to be short term.
24-hour Mean and 8-hour Mean	All locations where the annual mean objective would apply. Gardens of residential properties.	Kerbside sites, or any other location where public exposure is expected to be short term.

1-hour Mean	All locations where the annual mean, 24-hour, and 8-hour objectives apply. Kerbside sites (eg pavements of busy shopping streets). Those parts of bus stations, car parks, and railway stations etc which are not fully enclosed, where the public might reasonably be expected to spend 1 hour or more. Any outdoor locations to which the public might reasonably be expected to spend 1 hour or more.	Kerbside sites where the public would not be expected to have regular access.
15-minute Mean	All locations where members of the public might reasonably be exposed for a period of 15 minutes or longer.	

Appendix III – Summary of health effects

Carbon monoxide (CO)	Exposure to high concentrations can lead to the reduction in the oxygen carrying capacity of the blood. It can exacerbate existing diseases of the coronary arteries.
Benzene	The International Agency for Research on Cancer has classed benzene as a known carcinogen. Exposure to high concentrations can lead to a small, but definite increased risk of developing certain leukaemia.
1, 3- Butadiene	1, 3- butadiene is a known carcinogen. Exposure to high concentrations of 1,3 butadiene can lead to a marginally increased risk of developing cancers of the lymphoid system and bone marrow, lymphomas and leukaemia.
Lead	Exposure to high concentrations of lead can lead to problems with haemoglobin synthesis, erythropoiesis, the kidneys, joints, reproductive system, the nervous system and blood pressure. Even, at low levels, lead can result in toxic biological effects in people.

Nitrogen dioxide	Nitrogen dioxide is thought to have both acute and chronic effects on airways and lung function. As an acid gas irritant, even at low concentrations, it irritates the lining of the nose, throat and airways of the lung. It can exacerbate existing respiratory problems.
Sulphur dioxide	Exposure to high concentrations of sulphur dioxide can lead to the constriction of the respiratory system. It can exacerbate existing respiratory problems.
Particles (PM_{10})	Particle matter (PM_{10}) can penetrate deep into the lungs where there are no removal mechanism. Most recent evidence (2001) shows that particles are likely to have long term health effects, probably much more severe than the short term effects, on which all policy had previously concentrated. Long term exposure to particles can be responsible for causing premature deaths among those with pre-existing lung and heart disease and deterioration of the of the lung function. Short term exposure is thought to increase death rates amongst susceptible people, such as the very young.

Appendix IV – Air Quality Monitoring Locations in the Borough of Barnet

Nitrogen dioxide tube survey

There are sixteen tubes managed by Casella Stanger and analysed by the lab Gradko International. The preparation method is 50% TEA in acetone. The tube codes are BNT1 to BNT16.

Barnet is also working with the Highways Agency to monitor air quality next to the M1 motorway. Three Highways Agency tubes are analysed by Scientifics. The preparation method is also 50% TEA in acetone. The tube codes are S1 to S3. This project started in 2004.

The second set of two Highways Agency tubes are analysed by Gradko. The preparation method is 50% TEA in acetone. This project has just started in March 2006.

The following table provides information on the location and start date of all of the nitrogen dioxide tubes:

LONDON BOROUGH OF BARNET NITROGEN DIOXIDE TUBE NETWORK
Correct from March 2006

Order	Casella code	Barnet code	Site location and description of site	Classification and Distance from major road (m)	Dates (Start – Finish)	Grid reference		Comments	Web entry no.
						X	Y		
1	1 (old 17)	BA70	Entrance to Friary Park. 11 m from kerbside of Friern Barnet Lane	U4 4	1997 – ongoing	527462	192687	Tree Health Survey	9N
2	16	BA69	In middle of Friary Park (next to guttering of multi coloured building). Behind bush!	U4 200	1997 – ongoing	527286	192731	Tree Health Survey	10N
3	12	BA64	Outside Torrington Park Health Centre (on sign post 1m from kerb, near High Road).	U2 50	1997 – ongoing	526420	192467	London Wide NO_2 Survey Agenda 21	11N
4	8	BA81	Tally Ho at automatic station		01/03/05-				12N
5	14	BA82	Tally Ho at automatic station		01/03/05-				13N
6	13	BA65	Tally Ho Corner N12 (Outside pub under street lamp, other side of "keep dogs on lead" metal sign 6' high, 1m from kerb).	U2 0.5	1997- ongoing	526339	192172	London Wide NO_2 Survey Agenda 21	14N
7	9	BA53	Mortuary (North Circular Rd 3.5m from road on fence 1m to left of 1m high brick post. Access via Squires Lane and Avondale Road).	U4 5	1997 – ongoing	526315	190476	London Wide NO_2 Survey	15N
8	3 (old 19)	BA59	Turn right into Brownsea Walk. Sanders Lane allotments (metal posts on left hand side of allotments entrance)	U4 1400	1997 – ongoing	523754	191588	London Wide NO_2 Survey UK NO_2 Survey	4N
9	15	BA84	North End Road, next to Golders Green Bus Garage (opposite NatWest). On telegraph pole by National Express Stop 15.		2/8/05 -			New tube started as result of USA, to monitor effects of bus station.	16N
10	6 (old 22)	BA66	Outside 337 Hendon Way (on lamp post sign 2m from kerb).	U2 0.5	1997 – ongoing	523158	188157	London Wide NO_2 Survey	8N
11	S1		Highways Agency tube. Junction of Mount Road and Park Road NW4	25m		522333	187951		17N
12	013	N/A	Dallas Road, Overhead Gantry	7m	03/03/06-	522462	187734	RPS Tube.	
13	042	N/A	Dallas Road. Streetsign outside number 103.	13m	03/03/06-	522593	187636	RPS Tube	

Order	Casella code	Barnet code	Site location and description of site	Classification and Distance from major road (m)	Dates (Start – Finish)	Grid reference		Comments	Web entry no.
						X	Y		
14	S2	N/A	Hall Lane. NW4. On fence near to electricity sub station.	38m		522266	190507	Highways Agency Tube	18N
15	S3	N/A	Station Road, Mill Hill Broadway. Lamp post.	20m		521352	192002	Highways Agency Tube	
16	5 (old 21)	BA73	St James Catholic High School, Gt. Strand, Graham Park, NW9 (behind school sign)	U4 300	2000 – ongoing	521890	190507	Adopt a Tube Scheme	20N
17	4 (Old 20)	BA78 (near to old BA60)	Barnet Registry Office, Edgware Road, Burnt Oak. On back of sign post giving name of premises.	U2 10	Nov 2003 – ongoing	519 936	190720	Relocation of BA 60 for London wide NO_2 survey. Similar type site and location	5N
18	2 (old 18)	BA56	Fairway Junior School, 5m from main road on fence near beginning of underground walkway, The Fairway, NW7	U2 10	1997 – ongoing	520910	193445	London Wide NO_2 Survey	2N
19	11	BA63	Barnet Church (opp. Jenny's Burgers on High St, 6 High LHS of door in alcove with small metal barrier. Contact: Rev Esdale 020 8449 3894).	U1 0.5	1997 – ongoing	524572	196470	London Wide NO_2 Survey	21N
20	10	BA76 (near to old BA62)	Replacement site for 42 Lytton Road. On back of signpost for the cul de sac road Stockton Close.	U4 4	Nov 2003 -	526303	196327	Relocation of BA 62 for London wide NO_2 survey. Similar type site and location.	7N
21	7	BA51	Barnet House (1st floor reception window sill inside Housing Dept), Whetstone	U2 10	1997 – ongoing	526414	193878	London Wide NO_2 Survey	22N
DISCONTINUED TUBES									

Order	Casella code	Barnet code	Site location and description of site	Classification and Distance from major road (m)	Dates (Start – Finish)	Grid reference		Comments	Web entry no.
						X	Y		
	14	BA67	Victoria Park Recreation Ground. On metal left fence post on Tennis Courts nearest to Etchingham Park Road entrance	U4 250	1997 – Dec 2003	525874	191110	Tree Health Survey	
	15	BA68	Ballards Lane (entrance to Victoria Park) on Park information sign.	U4 4	1997 – Dec 2003	525714	191276	Tree Health Survey	
	10	BA62	42 Lytton Road (1st floor window).	U4 100	1997 - Oct 2003	526303	196327	London Wide NO_2 Survey UK NO_2 Survey	
	20	BA61	Barnard house (14m from A5 on window ledge of room 24 on first floor)	U4 14	1997 - Jan 2001	519995	190662	London Wide NO_2 Survey UK NO_2 Survey.	
	Old 8/24	BA52	Friern Barnet Town Hall (access committee room 110 on 1st floor).	U4 20	1997 - Nov 2003	527638	192103	London Wide NO_2 Survey	
	23	BA71	1 Rowsley Avenue, Hendon, NW4 1AP (on drain pipe, right of front door).	U4 400	2000 - Jan 2003	523097	189853	Adopt a Tube Scheme	
	Old 20	BA60	A5 (5m from kerb, rear of sign post outside Barnard House)	U2 2	1997 - Nov 2003	519987	190659	London Wide NO_2 Survey UK NO_2 Survey	
	24	BA72	175 Watford Way, A41 (outside front door on post).	U4 40	2000 - Jan 2003	522319	189468	Adopt a Tube Scheme	
	21	BA74	Foulds JMI School - RHS of Green sign on Byng Road entrance	U2 3	2000 - Jan 2003	523937	196782	Adopt a tube scheme	
	26	BA75	Christ Church Junior School bottom of Byng Road on Caretaker's bungalow LHS of window next to entrance	U4 149	2000 - Jan 2003	523760	197053	Adopt a tube scheme	
	8	BA77	Colocated tube (1) Chalgrove School, Chalgrove Gardens, Central Finchley. On back left side (nearest to house) of cage for monitoring station.	U4 25	Nov 2003 to Feb 2005	524374	189642	Colocation with continuous monitoring station	

Order	Casella code	Barnet code	Site location and description of site	Classification and Distance from major road (m)	Dates (Start – Finish)	Grid reference		Comments	Web entry no.
						X	Y		
	14	BA79	Colocated tube (2) Chalgrove School, Chalgrove Gardens, Central Finchley. On front left side (nearest to house) of cage for monitoring station.	U4 25	Dec 2003 to Feb 2005	524374	189642	Colocation with continuous monitoring station	
	15	Ba80	Colocated tube (3) Chalgrove School, Chalgrove Gardens, Central Finchley. On front left side (nearest to house) of cage for monitoring station.	U4 25	Dec 2003 to Feb 2005	524374	189642	Colocation with continuous monitoring station	
	15	BA83	Tally Ho at automatic station		01/03/05-2/8/05			Colocation with continuous monitoring station	

Codes

Kerbside U1 / Roadside U2 / Urban Background U4

Notes

There was a collocation of triplicate tubes at Chalgrove from Dec 03 to Feb 05. This study was then transferred to Tally Ho in March 05.
In August 05 it was decided to end the study and work out bias adjustment factors from national studies instead.

Continuous monitors

Barnet currently has two air quality monitoring stations that monitor nitrogen dioxide and fine particles (PM_{10}).

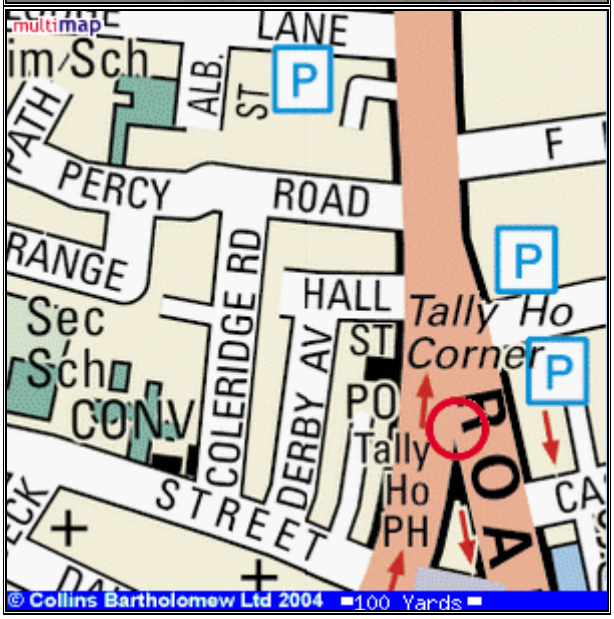
BNT 1 at Tally Ho, North Finchley is a kerbside site and is equipped with a Monitor Labs NO_2 Analyser and R&P TEOM for fine particles. The equipment is serviced by SupportingU on a six monthly basis. ERG, Kings College, process the data and in collaboration with NPL are responsible the QA/QC.

Classification:	Kerbside
QA/QC:	LAQN Standard
Monitoring Dates:	20 Dec 1998 to present (not operating in 2004)
Distance to Road:	1 metre
Sampling Height:	3 metres
Species Monitored:	Nitrogen Dioxide. PM10 Particulate (by TEOM).

Tally Ho station details, LAQN Standard - Data have traceability to national standards and operational procedures defined for the London Air Quality Network (AURN).

Tally Ho was decommissioned in March 2004 and re-commissioned in February 2005.

Note: The Tally Ho site is actually situated on a central island on the busy junction on the A1000. It could be thought of therefore as a double kerbside and is likely to provide slightly higher levels of concentrations than a kerbside site. It is not therefore likely to represent relevant exposure; rather, it provides a worst case scenario for exposure. However, this junction was predicted to exceed the annual mean objective for nitrogen dioxide in the findings of the Stage Four work.



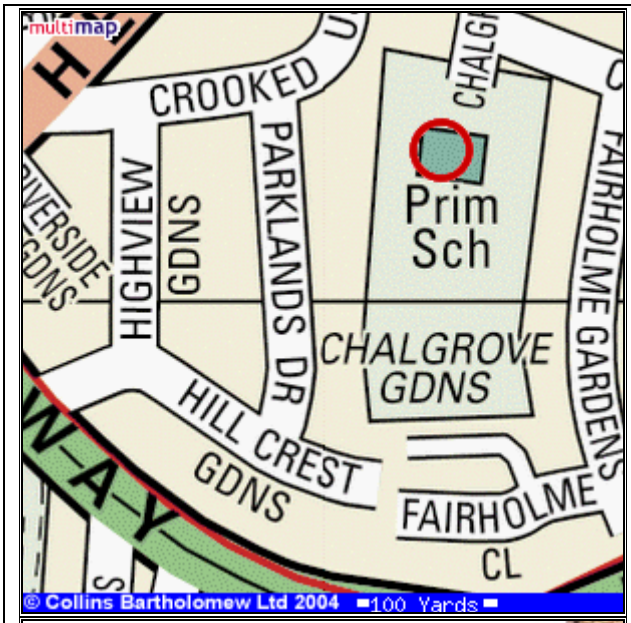
http://www.londonair.org.uk/london/asp/PublicDetails.asp?region=0&site=BN1&details=location&mapview=all&la_id

BNT 1 Tally Ho location

BNT 2 at Chalgrove School, Finchley is a background site and is equipped with an API 200X NO_2 Analyser and R&P TEOM for fine particles. The station is also equipped with weather sensors. ERG, Kings College, process the data and in collaboration with NPL are responsible QA/QC.

Classification:	Urban Background
QA/QC:	LAQN Standard
Monitoring Dates:	09 Aug 2000 to present
Distance to Road:	More than 200 m from main roads
Sampling Height:	3 m
Species Monitored:	Nitrogen Dioxide. PM10 Particulate (by TEOM). Weather sensors.

Chalgrove station details, LAQN Standard - Data have traceability to national standards and operational procedures defined for the London Air Quality Network (AURN).



http://www.londonair.org.uk/london/asp/PublicDetails.asp?region=0&site=BN1&details=location&mapview=all&la_id

Figure 1 BNT 2 - Chalgrove location

BNT3 – Discontinued. A third station, a mobile background site at Strawberry Vale, with the same equipment as BNT 2, was operated between 2000 and 2002 and decommissioned in June 2002. The Strawberry Vale site is background, but is close to both the North Circular (approximately 90m) and the A1000 (60m). Likewise the Strawberry Vale site was predicted to be at risk of exceeding the annual mean objective for nitrogen dioxide in the findings of the Stage Four work.

Appendix V – Quality Assurance and Control

nitrogen dioxide diffusion tubes

Casella Stanger Ltd manage the QA/QC for nitrogen dioxide diffusion tube monitoring. The site data used in this assessment is from the London Borough of Barnet. They subcontract the tube raw data analysis to Gradko International Ltd laboratories.

As part of their QA/QC process, Gradko participate in the Health and Safety Laboratories scheme of WASP Workplace Analysis Scheme for proficiency results on a monthly basis. This scheme is designed to help laboratories meet the European standard EN48210. Gradko also participate in the Network Field Inter Comparison Exercise, operated by NETCEN which complements the WASP scheme. Internally, Casella also carry out QA/QC using blank exposures and a study of to establish the bias in the results through collocation studies with continuous monitors. Gradko has UKAS accreditation.

The nitrogen dioxide tubes contain a mesh disc coated in triethanolamine – 50% v/v triethanolamine with acetone.

Nitrogen dioxide monitoring tube