Putting the Community First

BARNET
LONDON BOROUGH

Review and assessment of air quality

Annual Progress Report 2010

In fulfilment of Part IV of the Environment Act 1995

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Executive Summary

A Detailed Assessment has been completed that confirmed the one-hour mean objective for nitrogen dioxide is being exceeded in and around Golders Green Bus Station.

Re-modelling of the whole borough was completed in July 2009. This highlighted pollution hotspots, primarily at junctions of the A1, M1, A406, and A41. Many of these hotspots were also identified as being likely to exceed the one-hour mean objective for nitrogen dioxide.

The locations of the nitrogen dioxide tube survey were changed in January 2009 to assess air quality in High Street locations where people may spend one hour or more, as well as to ensure monitoring sites were of good quality. The new data from the diffusion tubes is showing likely exceedences of the one-hour mean objective for nitrogen dioxide at many High Street locations.

The AQMA order has been amended (July 2010) to include the exceedences of the one-hour mean nitrogen dioxide objective. This is in addition to the annual mean nitrogen dioxide objective and the daily mean particulates (PM10) objective.

This annual progress report summarises the work undertaken in 2009/2010 on Local Air Quality Management under the Environment Act 1995. No additional detailed assessment is required.

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1 Introduction

1.1 Description of Local Authority Area

The London Borough of Barnet is in north London. In 2008 it had a population of 331 522, the second largest population of the 33 London boroughs. The borough is continuing to grow, and as a result of major regeneration and development an extra 16,000 new homes will be built by 2016. The major source of air pollution in Barnet is traffic on its roads.

1.2 Purpose of Progress Report

Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the Local Air Quality Management process.

They are not intended to be as detailed as Updating and Screening Assessment reports, or to require as much effort. However, if the Progress Report identifies the risk of exceedence of an Air Quality Objective, the Local Authority (LA) should undertake a Detailed Assessment immediately, and not wait until the next round of Review and Assessment.

1.3 Air Quality Objectives

The air quality objectives applicable to Local Air Quality Management (LAQM) in England are set out in the Air Quality (England) Regulations 2000 (SI 928), and the Air Quality (England) (Amendment) Regulations 2002 (SI 3043). They are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre $\mu g/m^3$ (for carbon monoxide the units used are milligrammes per cubic metre, mg/m^3). Table 1.1. includes the number of permitted exceedences in any given year (where applicable).

Table 1.1 Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in England.

Pollutant	Concentration	Measured as	Date to be achieved by
Benzene	16.25 $\mu g/m^3$	Running annual mean	31.12.2003
	5.00 $\mu g/m^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu g/m^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu g/m^3$	Annual mean	31.12.2004
	0.25 $\mu g/m^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu g/m^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu g/m^3$	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 $\mu g/m^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu g/m^3$	Annual mean	31.12.2004
Sulphur dioxide	350 $\mu g/m^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu g/m^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu g/m^3$, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

The whole borough was designated an Air Quality Management Area (AQMA) in April 2001. The designation was for the predicted exceedence of the following objectives: nitrogen dioxide measured as an annual mean, and particulates (PM10) measured as a 24-hour mean. The primary source of the pollutants is traffic along the main roads within the Borough. Appendix B shows the areas within the London Borough of Barnet which were predicted to exceed the objectives.

The second round of review and assessment culminated in a Detailed Assessment of the one-hour mean nitrogen dioxide objective at two bus stations – Golders Green and Mill Hill Broadway. This confirmed that the objective was being exceeded at Golders Green bus station more than the 18 times allowed in one year. The report and proposals to amend the AQMA to include the one-hour mean objective was submitted in March 2009. The proposals have been approved by the GLA and Defra. The original AQMA Order was amended in July 2010 to include the one-hour mean objective for nitrogen dioxide.

The third round of review and assessment started with an updating and screening assessment submitted in July 2009. This concluded that there had been no significant changes and that no detailed assessments were necessary.

The following table summarises the previous review and assessments:

Report	Date	Outcome
Stage Four	2001	AQMA declared for whole Borough for NO2 and PM10
USA 2004	2004	No significant changes since first round; no further action required.
USA 2006	2006	Detailed Assessment Required for the one-hour mean nitrogen dioxide Objectives at Golders Green and Mill Hill Broadway bus stations
Interim Detailed Assessment	June 2007	Reported on progress with Detailed Assessment
Detailed Assessment	August 2009	AQMA not required at Mill Hill Broadway bus station; AQMA amendment required to incorporate exceedences of the one-hour mean for nitrogen dioxide at and around Golders Green Bus Station – 42 exceedences of one-hour mean in 6 months. Report submitted in August 2009 and approved by Defra and GLA.
USA 2009	July 2009	No significant changes since second round; no further action required

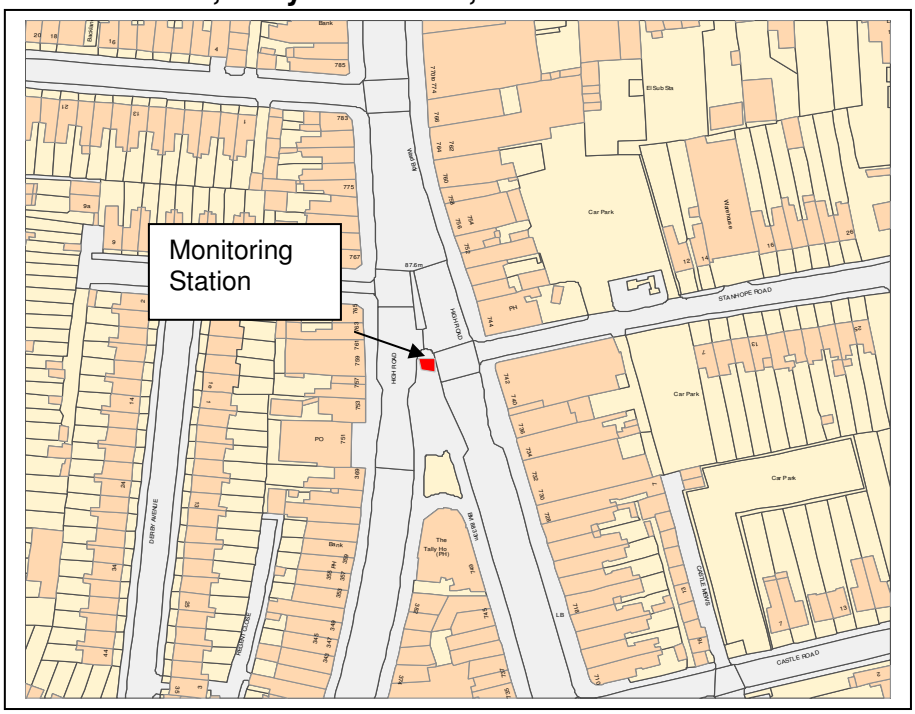
2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

The London Borough of Barnet has two automatic monitoring sites, both monitoring nitrogen oxides and particulates, PM10.

1. Barnet One, Tally Ho Corner, N12



2. Chalgrove Primary School, Chalgrove Gardens,

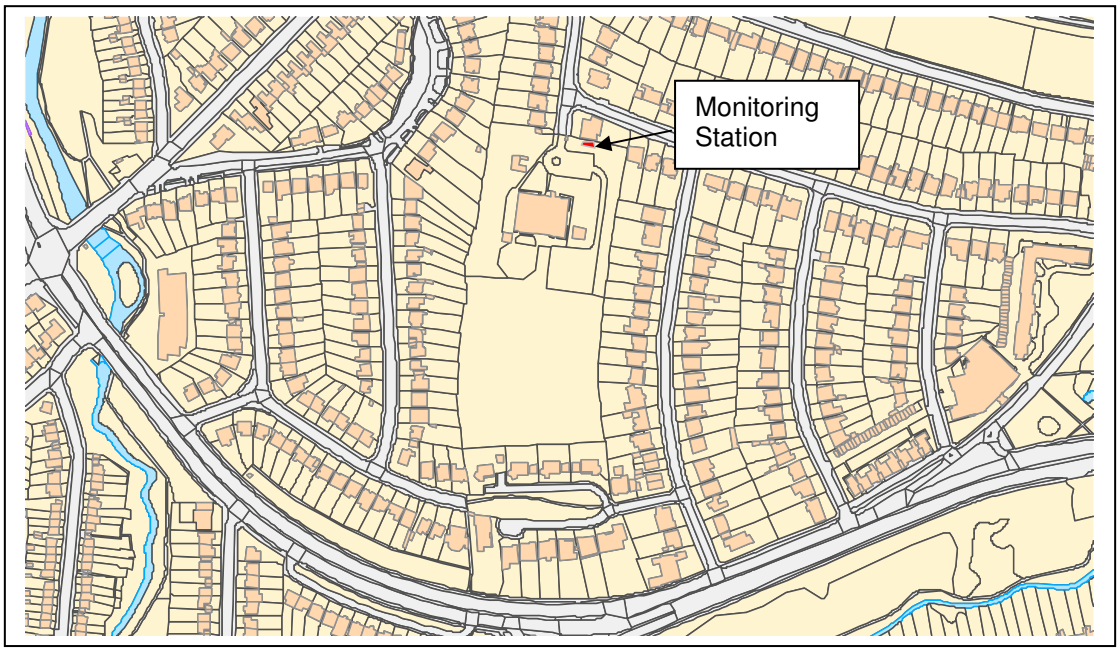


Table 2.1 Details of Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA ?	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Worst-case Location ?
Barnet One (Tally Ho Corner)	Kerbside	X526350 Y92166	NO_2 and PM10	Y	Y(6m)	1m	Y
Barnet Two (Chalgrove School)	Urban background	X524328 Y189599	NO_2 and PM10	Y	Y (3m)	N/A	N

2.1.2 Non-Automatic Monitoring

The London Borough of Barnet currently has 20 long-term nitrogen dioxide diffusion tubes. In January 2009 a review of the tube locations was carried out and many of the tubes repositioned. The reasons were twofold. Firstly, we received advice that some tubes were incorrectly positioned. That is, there would be inadequate air circulation around the tube. Secondly, it was decided to assess the air quality in high street locations where people may reasonably be expected to be present for 1 hour, and thus be exposed to exceedences of the one-hour mean objective for nitrogen dioxide. Further details of this reassessment of the diffusion tube study can be found in Appendix E.

In addition, the Council manages three diffusion tubes on behalf of the Highways Agency, that measure nitrogen dioxide from junctions one and two of the M1 motorway.

Table 2.2 Details of Non- Automatic Monitoring Sites

Site Number	Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA ?	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Worst-case Location ?
1	1 Pointails Close	Near Road	X526278 Y190444	NO_2	Y	Y (6m)	13m	Y
2	71 Ballards Lane	Roadside	X525410 Y190980	NO_2	Y	Y(2m vertically)	4m	Y
3	Sanders Lane Allotments	Urban background	X523754 Y191588	NO_2	Y	N	N/A	n/a
4	Feather and Blacks 42 Falloden Way	Roadside	X526073 Y188982	NO_2	Y	Y (2m above)	4m	Y
5	St James Catholic High School	Urban Background	X521885 Y190489	NO_2	Y	Y (5m)	2m	n/a
6	337 Hendon Way	Roadside	X523158 Y188157	NO_2	Y	Y(10m)	2m	Y
7	Waitrose Temple Fortune	Roadside	X524815 Y188730	NO_2	Y	N	5m	Y
8	Tally Ho monitoring station	Roadside	X526350 Y92166	NO_2	Y	N	1.2m	Y
9	52 Golders Green Road	Roadside	X524965 Y187505	NO_2	Y	Y (2m above)	5m	Y
10	Greggs, Barnet High Road	Roadside	X524493 Y196612	NO_2	Y	Y(0m)	3m	Y
11	80 East Barnet Road	Roadside	X526663 Y196090	NO_2	Y	Y (0m)	2.5m	Y
12	1295 High Road Whetstone	Near Road	X526379 Y194055	NO_2	Y	Y (0m)	6m	Y
13	Courtland Avenue, A1	Near Road	X520968 Y193457	NO_2	Y	Y(3m)	22m	Y
14	William Hill, Station Road Edgware	Roadside	X519497 Y192075	NO_2	Y	Y(0m)	5m	Y
15	184 Burnt Oak Broadway	Near Road	X519925 Y190740	NO_2	Y	Y(for 1 hour mean, and in line with residential)	9m	Y
16	HSBC, 75 Mill Hill Broadway	Near Road	X521521 Y192154	NO_2	Y	Y(for 1 hour mean)	9m	Y
17	National Express Bus Stop, Golders Green Bus Station	Bus station	X525207 Y187425	NO2	Y	Y(for 1 hour mean)	n/a	Y
18	Tube to rear of Golders Green Bus Station	Bus station	X525275 Y187441	NO_2	Y	Y (for one hour mean)	n/a	Y
20	Flats above 16 Cricklewood Lane	Near Road	X523885 Y185764	NO_2	Y	Y(0m)	6m	Y

2.2 Comparison of monitoring results with air quality objectives

2.2.1 Nitrogen dioxide

The London Borough of Barnet has two automatic monitoring stations and 20 nitrogen dioxide diffusion tubes. All of the monitoring is within the council's Air Quality Management Area, due to the entire borough being designated as such.

Automatic monitoring data – annual mean

The automatic monitoring data shows that the UK air quality objective for nitrogen dioxide measured as an annual mean continues to be exceeded at Barnet One. The data shows that following reductions in concentrations in 2007 and 2008, the level of nitrogen dioxide rose again at this location in 2009. Longer term trends described in figure 2.3 show the concentration is as high now as it was in 2002. This indicates that roadside concentrations of nitrogen dioxide are not decreasing in the London Borough of Barnet.

This site does not represent relevant exposure for the annual mean. It is on a traffic island in the middle of a busy high street. However it has proved very useful for assessing long-term trends of roadside pollutant concentrations and provides an indication of exceedence of the one-hour mean nitrogen dioxide objective.

The annual mean objective for nitrogen dioxide was achieved at Barnet Two. However there was not a further decrease on the 2008 concentrations in 2009. This indicates that background sites in Barnet continue to achieve the objective but that concentrations have stabilised instead of continuing to fall.

Table 2.3a Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA?	Data Capture for full calendar year 2009 %	Annual mean concentrations (µg/m^3)			
				2006	2007	2008	2009
Barnet One	Tally Ho Corner, , N12	Y	95	**74**	**66**	**63**	**68**
Barnet Two	Chalgrove Primary School, Chalgrove Gardens	Y	98	38	37	33	33

Note: 1. Data after 1st January 2009 is not fully ratified
2. Monitoring was carried out for the full calendar year.

Figure 2.3 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Automatic Monitoring Sites.

The following graph shows the yearly trend in nitrogen dioxide concentrations, measured as an annual mean at the two automatic monitoring stations:

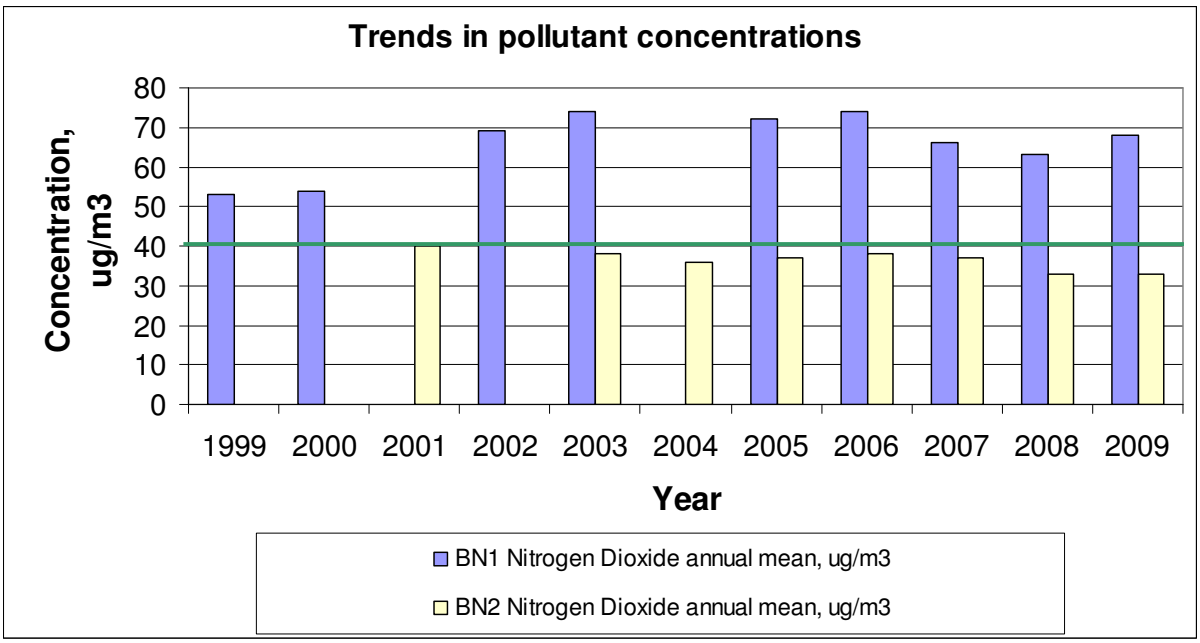


Table 2.3b Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective

Site ID	Location	Within AQMA ?	Data Capture for full calendar year 2009 %	Number of Exceedences of hourly mean (200 µg/m^3)			
				2006	2007	2008	2009
Barnet One	Tally Ho Corner, N12	Y	97	9	15	15	**23**
Barnet Two	Chalgrove Primary School, Chalgrove Gardens	Y	100	1	8	5	0

Note: 1. Data after January 2009 not fully ratified

The hourly mean objective for nitrogen dioxide was exceeded at Barnet One in 2009 but not at Barnet Two. Over 18 exceedences denotes a breach of the objective. This is of concern as the objective has been achieved in recent years. In 2007 there were pollution episodes causing 25 exceedences of the one-hour mean at Barnet Two. These were due to cold, calm weather conditions with light winds, and so were not a localised effect. These look to have been removed as "exceedences" during the ratification process. When the data for 2009 is fully ratified this may reduce the number of exceedences as they may be attributable to site audits, servicing and calibrations.

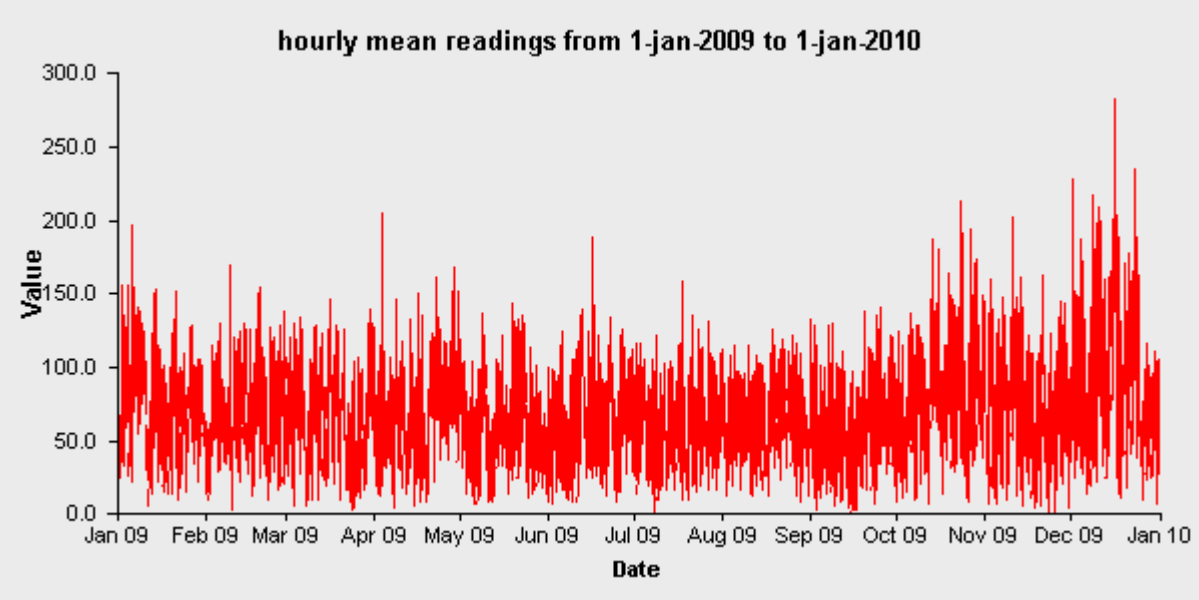


Figure: Graph showing the 25 exceedences of the hourly mean for nitrogen dioxide in 2009. Source is the London Air Quality Network at Kings College London.

List of exceedence days:

Date	Number of exceedences of hourly mean
03/04/09	1
23/10/09	1
01/12/09	3
08/12/09	1

10/12/09	2
15/12/09	1
16/12/09	9
23/12/09	4

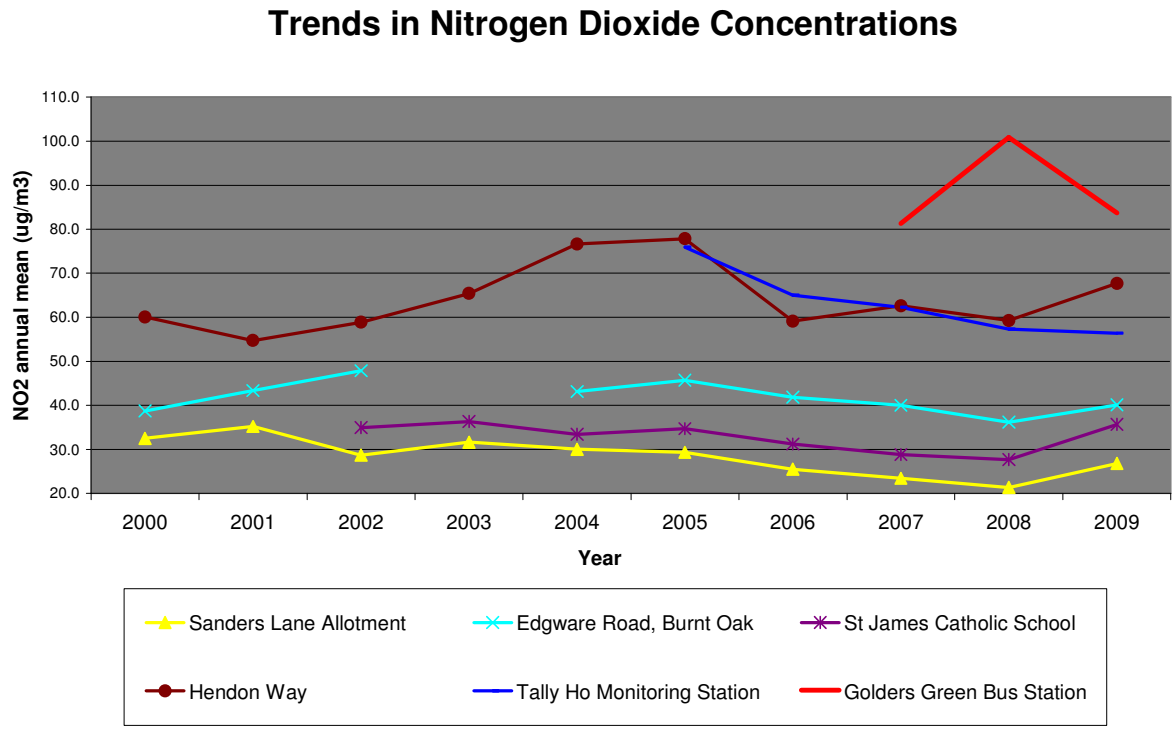
There were no widespread pollution episodes reported by the environmental research group at Kings College London. Initial screening of other nearby boroughs' data shows several exceedences on 23/12/09 but few on 16/12/09. There were also elevated levels of PM10 on both 16th and 23rd December (according to tools on the London air quality network site.

Once the data is fully ratified the number of exceedences will be verified.

Diffusion Tube Monitoring Data

This section provides the results of the nitrogen dioxide diffusion tubes, described in section 2.1.2 above.

Figure 2.4 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites.



1. Long-term trends

Five sites have been chosen to keep for long term trends. Sanders Lane allotments and St James Catholic School are background sites. These continue to be below the annual mean objective of 40µg/m^3. However in 2009 the concentration went up from that in 2008 by 5µg/m^3 for Sanders Lane allotments and 8µg/m^3 for St James School.

This increase in nitrogen dioxide concentration was mirrored in two roadside sites, Edgware Road and Hendon Way. The tube at Edgware Road was slightly re-positioned to remove it from behind a signpost so this may be the reason. However the concentration at Hendon Way went up considerably, by 8 µg/m^3.

The air quality at Tally Ho Monitoring Station has continued to slowly improve. The monitoring at Golders Green Bus Station has shown an improvement since 2008.

The trends show that the long downward trend in nitrogen dioxide concentrations stopped in 2009. Whilst the background sites do continue to meet the objective, roadside sites and the bus station remain above the objective.

2. New diffusion tubes

The majority of the remainder of the diffusion tubes have been spread out across the borough in High Street locations where members of the public may reasonably be expected to spend one hour. In addition most of these locations have residential flats above them. The purpose was to assess whether the one-hour mean objective for nitrogen dioxide was being exceeded. Current advice is that where the annual mean concentration of nitrogen dioxide is above 60µg/m^3, then this should be a trigger for considering a likely exceedence of the hourly mean nitrogen dioxide objective[1]. The diffusion tubes have been in place since January 2009.

The following locations had concentrations close to 60µg/m^3:

Feather and Blacks, Falloden Way
Waitrose Temple Fortune
52 Golders Green Road
1295 High Road Whetstone
William Hill, Station Road Edgware
HSBC, Mill Hill Broadway
Flats above 16 Cricklewood Lane

These sites are spread across the borough. The first year of data indicates that there is an exceedence of the one-hour mean objective for nitrogen dioxide along busy high streets in the borough. The technical guidance LAQM.TG(09) states that where an AQMA has been designated for the annual mean, then the authority should amend its AQMA order and review its Air Quality Action Plan for the one-hour mean.

The council amended its AQMA order in July 2010 following the detailed assessment of air quality for Golders Green bus station. This amendment includes the exceedences of the one-hour mean at high street locations.

Table 2.4 Results of Nitrogen Dioxide Diffusion Tubes

The following table shows the nitrogen dioxide diffusion tube results for 2009. Sites that exceeded the annual mean objective of 40µg/m^3 are highlighted in bold.

Notes:
1. all monitoring was carried out over the whole calendar year. In some months the tube was missing – this is reflected in the data capture percentage.
2. Where monitoring data is missing, the results have been "annualised" as in Box 3.2 of TG(09)
3. Data has been bias adjusted.

Site Number	Site Name	In AQMA ?	Data capture for full calendar year 2009[b] %	Annual mean concentrations (µg/m^3)		
				2007	2008	2009
1	1 Pointails Close	Y	92			**41.2**
2	71 Ballards Lane	Y	92			**55.3**
3	Sanders Lane Allotments	Y	83	23.5	21.4	27.1
4	Feather and Blacks 42 Falloden Way	Y	75			**59.6**
5	St James Catholic High School	Y	50	28.8	27.7	35.69
6	337 Hendon Way	Y	67	62.6	59.3	**67.67**
7	Waitrose Temple Fortune	Y	92			**58.8**
8	Tally Ho monitoring station	Y	75	62.3	57.3	**56.4**
9	52 Golders Green Road	Y	83			**57.9**
10	Greggs, Barnet High Road	Y	92			**53.1**
11	80 East Barnet Road	Y	83			**55.4**
12	1295 High Road Whetstone	Y	83			**58.8**
13	Courtland Avenue, A1	Y	92			**41.2**
14	William Hill, Station Road Edgware	Y	92			**63.9**
15	184 Burnt Oak Broadway	Y	75	40.0	36.2	**40.1**
16	HSBC, 75 Mill Hill Broadway	Y	92			**56.2**
17	National Express Bus Stop, Golders Green Bus Station	Y	92	81.3	100.9	**83.7**
18	Tube to rear of Golders Green Bus Station	Y	58			**56.56**
20	Flats above 16 Cricklewood Lane	Y	75			**64.3**

2.2.2 PM_{10}

The annual mean objective of 40µg/m^3 was not exceeded at either site. Although there were exceedences of the daily mean objective of 50 µg/m^3, both sites had less than the 35 permitted exceedences.

The Chalgrove School site is representative of relevant public exposure. The Tally Ho site is in the centre of a road. It should therefore be treated as a worst-case scenario and not relevant public exposure.

Tally Ho Corner has higher particulate levels than Chalgrove school which is to be expected as it is next to a road and Chalgrove School is a background site. The annual mean concentration at both sites has stabilised since 2007 and has neither increased or decreased.

The number of exceedences of the daily mean objective has decreased significantly at both sites since 2007.

Table 2.5a Results of PM_{10} Automatic Monitoring: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA?	Data Capture 2009 %	Annual mean concentrations (µg/m^3)		
				2007	2008	2009
Barnet One	Tally Ho Corner	Y	99	23	24	24
Barnet Two	Chalgrove School	Y	95	20	19	21

Note 1: Monitoring was carried out for the whole calendar year.
Note 2: All results from TEOM PM10 analysers have been converted to reference equivalence using the volatile correction method by the environmental research group[2].
Note 3: Data from 1st January 2009 is not fully ratified

Table 2.5b Results of PM_{10} Automatic Monitoring: Comparison with 24-hour Mean Objective

Site ID	Location	Within AQMA?	Data Capture 2009 %	Number of Exceedences of daily mean objective (50 µg/m^3) *If data capture < 90%, include the 90th %ile of daily means in brackets.*		
				2007	2008	2009
Barnet One	Tally Ho Corner	Y	99	16	9	8
Barnet Two	Chalgrove School	Y	95	11	5	3

Note 1: Monitoring was carried out for the whole calendar year
Note 2: : All results from TEOM PM10 analysers have been converted to reference equivalence using the volatile correction method by the environmental research group. Ref. Previous years have also been corrected.

2.2.3 Sulphur Dioxide

The council does not monitor for sulphur dioxide.

2.2.4 Benzene

The council does not monitor for benzene

2.2.5 Other pollutants monitored

The council does not monitor for any other pollutants.

2.2.6 Summary of Compliance with AQS Objectives

The London Borough of Barnet Council has examined the results from monitoring in the borough. The entire borough is already an AQMA for exceedences of the annual mean nitrogen dioxide objective and the daily mean particulates (PM10) objective.

A recent detailed assessment and modelling study confirmed that the one-hour mean nitrogen dioxide objective is being exceeded at and around Golders Green Bus Station.

Diffusion tube monitoring in 2009 has shown that the one-hour mean nitrogen dioxide objective is likely to be exceeded at busy high street locations in the Borough.

A modelling study highlighted several places in the borough, in particular busy road junctions, where the one-hour mean nitrogen dioxide objective is likely to be exceeded.

The latest guidance states that there is no need to proceed to a detailed assessment for exceedences of the one-hour nitrogen dioxide mean when the location is already in an Air Quality Management Area. However the AQMA Order has been amended and the air quality action plan will need to be amended.

3 New Modelling Data

3.1 Modelling of whole borough

In the 2008/09 financial year the London Borough of Barnet Council successfully applied for a Defra grant along with the north London air quality cluster group. The grant was for modelling the entire borough for nitrogen dioxide and particulates concentrations. The reason for the updated modelling was that the previous study had been in 2002. Since this time, emissions factors and guidance have changed. We wanted to know whether the pattern of poor air quality had changed. Bureau Veritas were the consultants who did the work.

The study identified 15 hotspots for the annual mean nitrogen dioxide objective. Of these, 9 were identified as also being at risk of exceeding the one-hour mean nitrogen dioxide objective. 10 of the hotspots were also predicted to exceed the daily mean PM_{10} objective and 1 was predicted to exceed the annual mean PM_{10} objective.

These hotspots are primarily connected with junctions on the A406 North Circular Road, A41, A1 Great North Way, and M1.

In addition the modelling showed a wider exceedence of the air quality objectives than the previous modelling study in 2002. This is probably not due to decreasing air quality, but down to changes in methodology and improved accuracy with model developments.

The list of hotspots and maps showing modelled exceedences are reproduced in Appendix C.

3.2 Modelling of air quality in and around Golders Green Bus Station

Following the 2006 updating and screening assessment it was highlighted that Barnet needed to progress to a detailed assessment of air quality at Golders Green bus station. In the 2007/08 financial year the council received a Defra grant to install a continuous monitoring station in the bus station for six months. In the 2008/09 financial year the council received a grant for a modelling study of the bus station and surroundings.

The aim was to supplement the information gained by monitoring and to further inform the detailed assessment and further assessment. Concentrations of nitrogen

dioxide were modelled within and around the bus station to provide a picture of the extent of the exceedence of the one hour mean. Hour by hour emissions data for buses and coaches was generated to aid source apportionment. This study was completed in May 2009 and the consultants were Air Quality Consultants working with TRL.

The relevant receptors are residential properties near to the bus station and people waiting for long-distance buses within the bus station.

The modelling conclusions were that buses and coaches make up between 23% and 38% of the total concentration of nitrogen dioxide at the residential receptors with other vehicles making up between 10% and 16%. Within the bus station, buses and coaches make up for more than half of the total concentration.

There were between 28 and 61 exceedences of the one-hour mean objective at residential receptors outside the bus station. Within the bus station there were between 111 and 161 exceedences.

The existing AQMA order has been amended to include exceedences of the one-hour mean objective for nitrogen dioxide.

4 New Local Developments

4.1 Road Traffic Sources

There are no new/newly identified road traffic sources.

4.2 Other Transport Sources

There are no new/newly identified non-road traffic sources.

4.3 Industrial Sources

There are no new/newly identified industrial sources.

4.4 Commercial and Domestic Sources

Since the 2009 updating and screening assessment there have been four planning applications that have included biomass boilers:

1. 111-113 Leicester Road
2. Travelodge, 1446 High Road Whetstone
3. Littleberries, The Ridgeway, NW7 1EH
4. Ingliss Barracks (district energy centre), Frith Lane, Mill Hill, NW7

These require air quality assessments as part of the planning process, however they will be reported on in the next USA.

4.5 New Developments with Fugitive or Uncontrolled Sources

There are no new/newly identified uncontrolled sources.

The London Borough of Barnet Council has identified the following new or previously unidentified local developments which may impact on air quality in the Local Authority area:

4 planning applications for biomass boilers

These will be taken into consideration in the next Updating and Screening Assessment, scheduled for 2012.

5 Conclusions and Proposed Actions

5.1 Conclusions from New Monitoring Data

The whole of the London Borough of Barnet is currently an Air Quality Management Area. There is no new evidence from monitoring results that would result in a detailed assessment being required.

Monitoring results show that roadside concentrations of nitrogen dioxide remain above the air quality objectives and are not decreasing significantly. Background concentrations of nitrogen dioxide remain below the air quality objectives but have remained static.

Diffusion tubes at High Street locations show likely exceedences of the one-hour mean objective for nitrogen dioxide in many cases.

Monitoring of particulates does not show exceedences of the objectives; however modelling (below) at busier locations does.

5.2 Conclusions relating to New Local Developments

The next Updating and Screening Assessment will need to consider biomass boilers that have been installed or have had planning permission to be installed. This does not give rise to a Detailed Assessment at this stage, and is unlikely to as new boilers are fully assessed during the planning process.

5.3 Other Conclusions

New modelling studies that have been undertaken as part of a detailed assessment of Golders Green bus station, and also a borough-wide modelling update have confirmed the likelihood of exceedences of the one-hour mean objective for nitrogen dioxide. As a result of modelling and monitoring the Air Quality Management Area Order has been officially amended to include the one-hour mean nitrogen dioxide objective.

5.4 Proposed Actions

The new monitoring data has not identified the need to proceed to a Detailed Assessment.

The diffusion tube monitoring programme was changed in January 2009 to incorporate High Street locations. Monitoring will be continued here for a short while longer to get accurate results. The council will consider whether to do some diffusion tube monitoring at the hot-spots identified by the borough-wide modelling study. This would require relocation of some of these sites.

The existing AQMA has been amended to include exceedences of the one-hour mean for nitrogen dioxide. Areas of exceedence include Golders Green bus station, many High Street locations, and several junctions of major A roads.

Currently there are no outstanding LAQM tasks. The next course of action will be to submit the 2011 Progress Report.

6 References

1. AEA Energy and Environment. “Analysis of the relationship between annual mean nitrogen dioxide concentration and exceedences of the 1-hour mean AQS Objective.” http://www.airquality.co.uk/reports/cat18/0806261511_TG_NO2relationship_report_draft1.pdf accessed 10th May 2010

2. London Air Quality Network. “Explanation of particulate pollution.” http://www.londonair.org.uk/london/asp/advstatsaqobjresults.asp?info=part&site1=BN1&site2=BN2&site3=&site4=&site5=&site6=&sday=1&smonth=jan&syear=2009&eday=&emonth=&eyear= accessed 10th May 2010

Appendix A: QA:QC Data

Diffusion Tubes

The nitrogen dioxide diffusion tubes are supplied and analysed by Gradko International. The preparation method is 50% TEA in acetone. The Review and Assessment website was used to determine the bias adjustment factor used. The bias adjustment factor used is 0.99, taken from 03/10 version of bias adjustment spreadsheet available at http://www.uwe.ac.uk/aqm/review/R&Asupport/diffusiontube310310.xls

Gradko follow the procedures set out in the Harmonisation Practical Guidance. They have received a good rating under the WASP scheme (Workplace Analysis Scheme for Proficiency). No local co-location study has been carried out to assess precision.

QA/QC of automatic monitoring

The two automatic monitoring sites in the London Borough of Barnet are part of the London Air Quality Network. The data has traceability to national standards and operational procedures defined for the London Air Quality Network (AURN).

Routine calibrations are carried out every 2.5 weeks by the Local Authority. Site audits are carried out every six months by NPL (National Physical Laboratory). The sites are serviced every six months by Supporting U. Data is validated and ratified by the Environmental Research Group at Kings College London.

PM Monitoring Adjustment

The two automatic monitoring sites in Barnet measure particulates, PM10, using a TEOM. The data is ratified by Kings College London. Results from the TEOM PM10 analysers have been converted to reference equivalence using the volatile correction method.

Short-term to Long-term Data adjustment

Diffusion tubes with a data capture of less than 9 months have been adjusted using the method outlined in Box 3.2 of the Technical Guidance LAQM.TG(09).

Tube 5

Site	Site Type	Annual Mean	Period Mean	Ratio
Barnet 2	Background	33µg/m^3	Jan-Jun 2009 35.4µg/m^3	0.93
Haringey Priory Park	Background	34 µg/m^3	Jan-Jun 2009 36.5 µg/m^3	0.93
			Average	0.93

Tube 6

Site	Site Type	Annual Mean	Period Mean	Ratio
Barnet 2	Background	33µg/m^3	Jan-Aug 2009 32.6µg/m^3	1.012
Haringey Priory Park	Background	34 µg/m^3	Jan-Aug 2009 32.2µg/m^3	1.0559
			Average	1.03

Tube 18

Site	Site Type	Annual Mean	Period Mean	Ratio
Barnet 2	Background	33µg/m^3	Jan-Apr 2009 42.4µg/m^3 Oct-Dec 2009 38.1 µg/m^3	0.778 0.866
Haringey Priory Park	Background	34 µg/m^3	Jan-Apr 2009 43.4µg/m^3 Oct-Dec 2009 40.1µg/m^3	0.783 0.8478
			Average	0.7805 Jan-Apr 0.85697 Oct – Dec

Appendix B - Exceedence Maps from Stage Four of the first round of Review and Assessment

Figure 1 - Predicted annual mean NO2 objective for 2005 in the London Borough of Barnet (based on 1999 met. year)

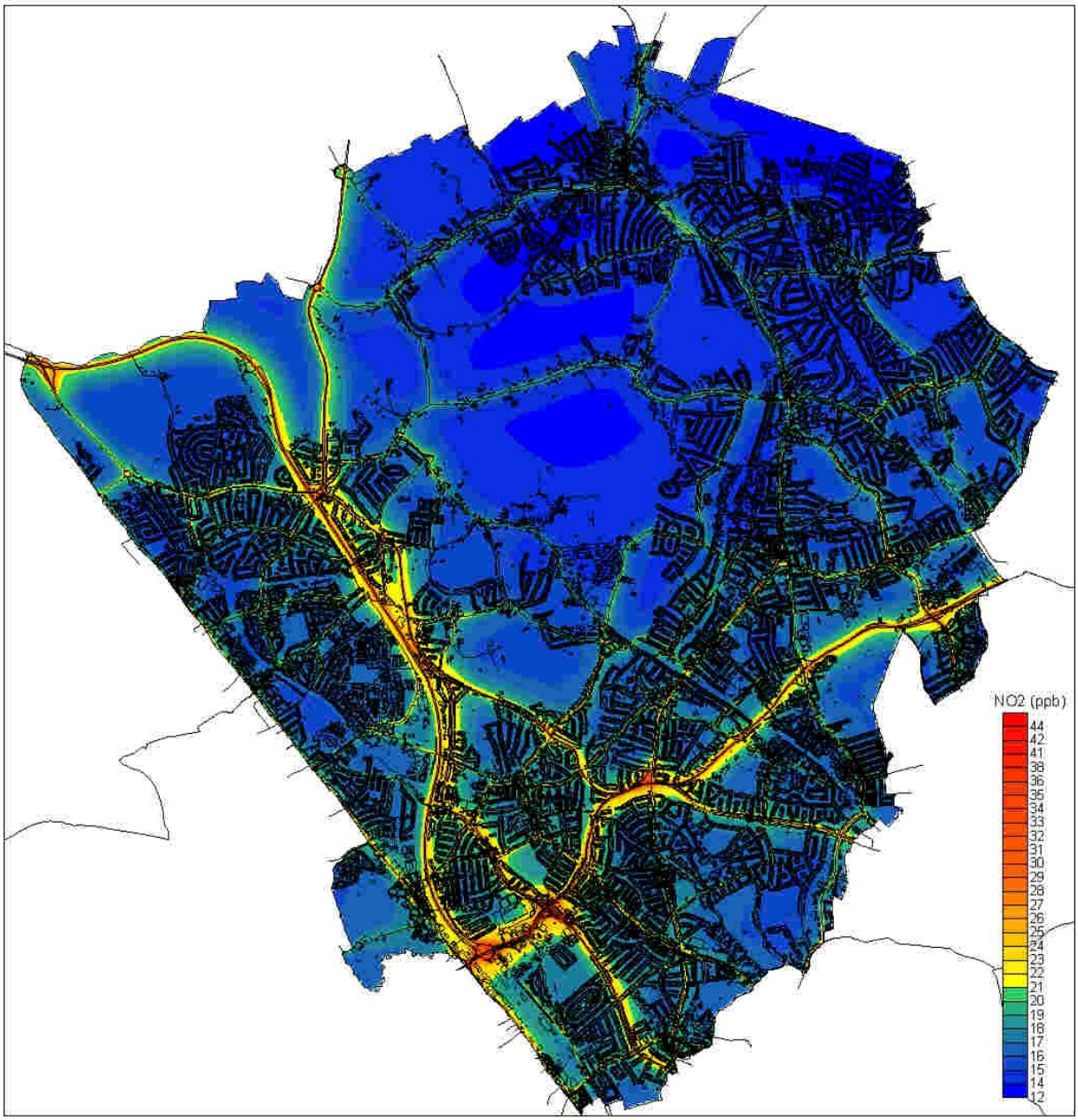
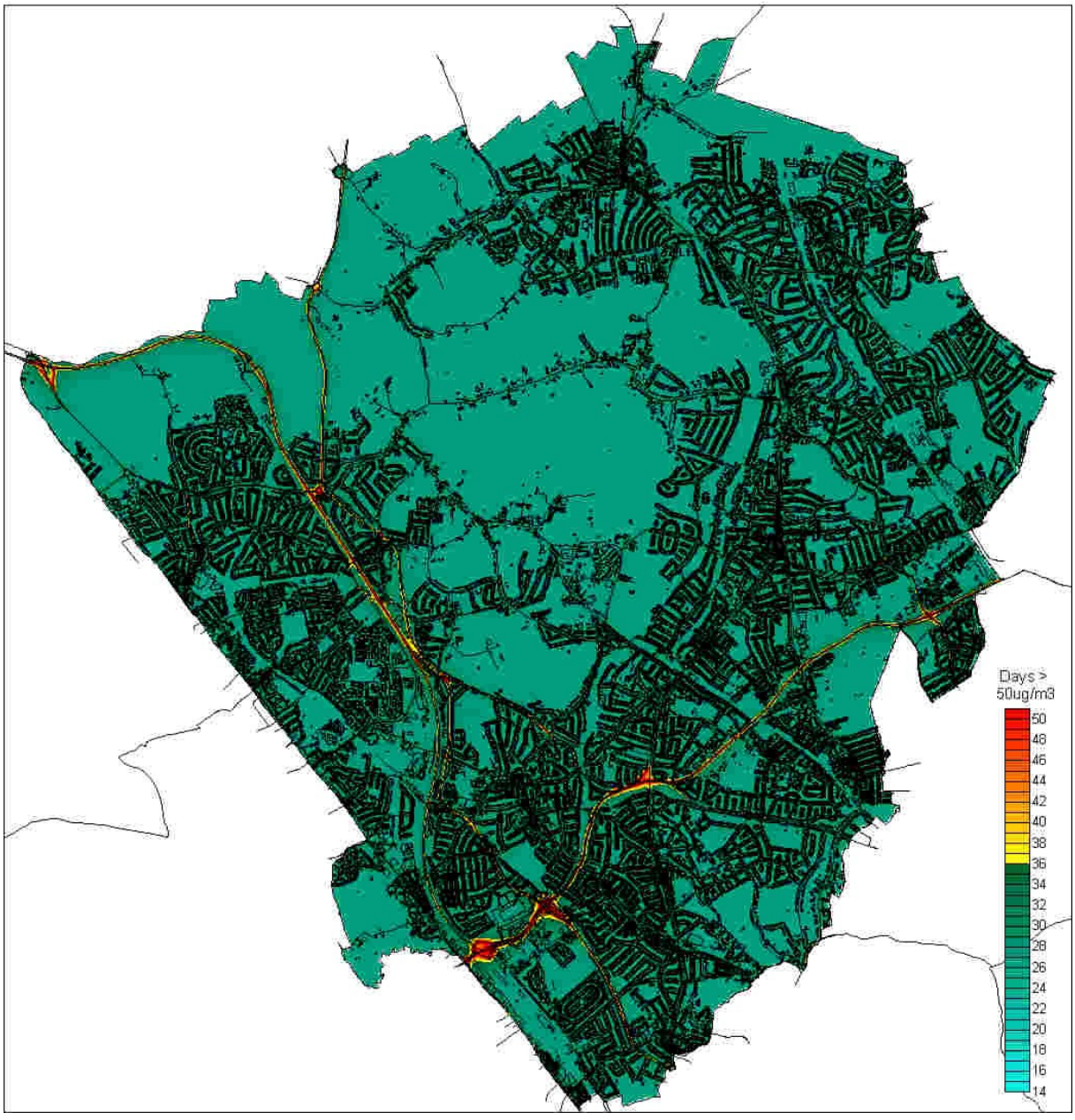


Figure 2 - Predicted 24 hour mean PM10 objective for 2004 in the London Borough of Barnet (based on 1996 met. year)



Appendix C

Areas highlighted by 2009 modelling study to exceed the UK air quality objectives

The hotspots are listed as follows:

1. Nitrogen Dioxide

- Area 1 - Adjacent to the M1 just off Glendor Gardens near the Northway Circus roundabout. This area has been predicted to exceed 60µg/m^3 for annual mean NO_2.
- Area 2 - The junction of Woodhouse Road A1003 and Friern Barnet Road A1003 with Friern Barnet Lane B550 and Colney Hatch Lane B550. This area is a hot spot with annual mean concentrations of NO_2 above the 40µg/m^3 objective.
- Area 3 - The junction of the A1 Great North Way (Barnet By Pass) and Watford Way A41 where they meet the M1. This area has been predicted to exceed 60µg/m^3 for annual mean NO_2.
- Area 4 - The junction of the Great North Way A1 and Parson Street B552. This area is a hot spot with annual mean NO_2 concentrations above the 40µg/m^3 objective.
- Area 5 - The junction of Watford Way A41 where it meets Colindeep Lane A5150. This area has been predicted to exceed 60µg/m^3 for annual mean NO_2
- Areas 6 to 10 - Five other areas along the A406 have been identified, including properties around the Brent Cross Flyover (Area 10), and close to the junctions with the A1 (Areas 6 and 7, near Great North Way / Falloden Way). There are high concentrations of NO_2 predicted along these stretches of the A406, and a number of receptors in this area are predicted to be within the 60µg/m^3 annual mean NO_2 contour.
- Area 11 - Residential properties near the junction of the A406 North Circular Road and the M1. This area has been predicted to exceed 60µg/m^3 for annual mean NO_2.
- Area 12 - The junction of A1 Lyttelton Road and The Bishops Avenue. This area is a hot spot with annual mean concentrations of NO_2 above the 40µg/m^3 objective.
- Areas 13 and 14 - Two locations have been identified along Hendon Way A41. These areas are hot spots with annual mean concentrations of NO_2 above the 40µg/m^3 objective.
- Area 15 – Residential properties near the junction of the A598 Finchley Road and the A407 Hermitage Lane / Cricklewood Lane. This area has been predicted to exceed 40µg/m^3 for annual mean NO_2.

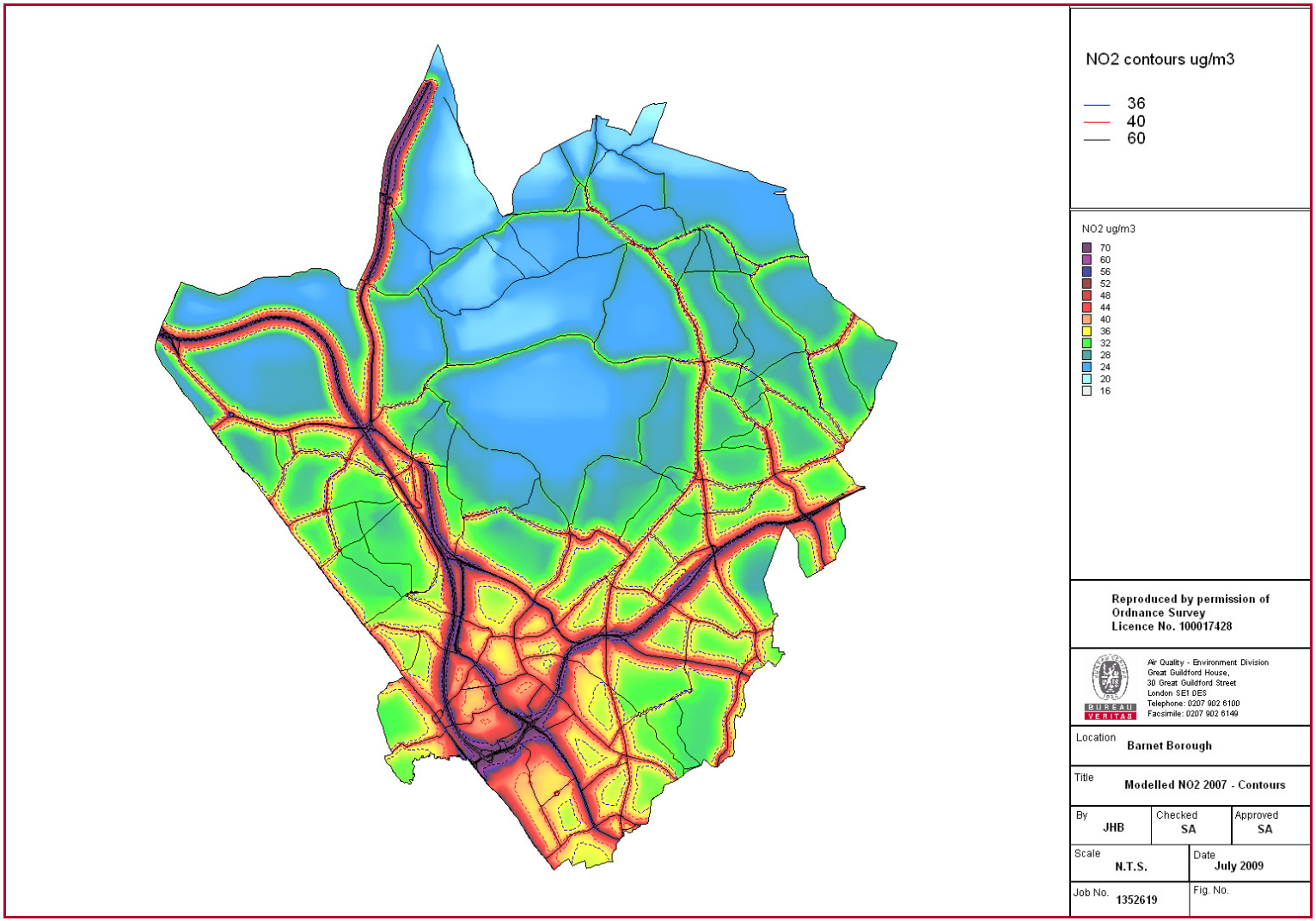
2. Particulates, PM10

The following areas were predicted to exceed the daily mean PM10 objective:

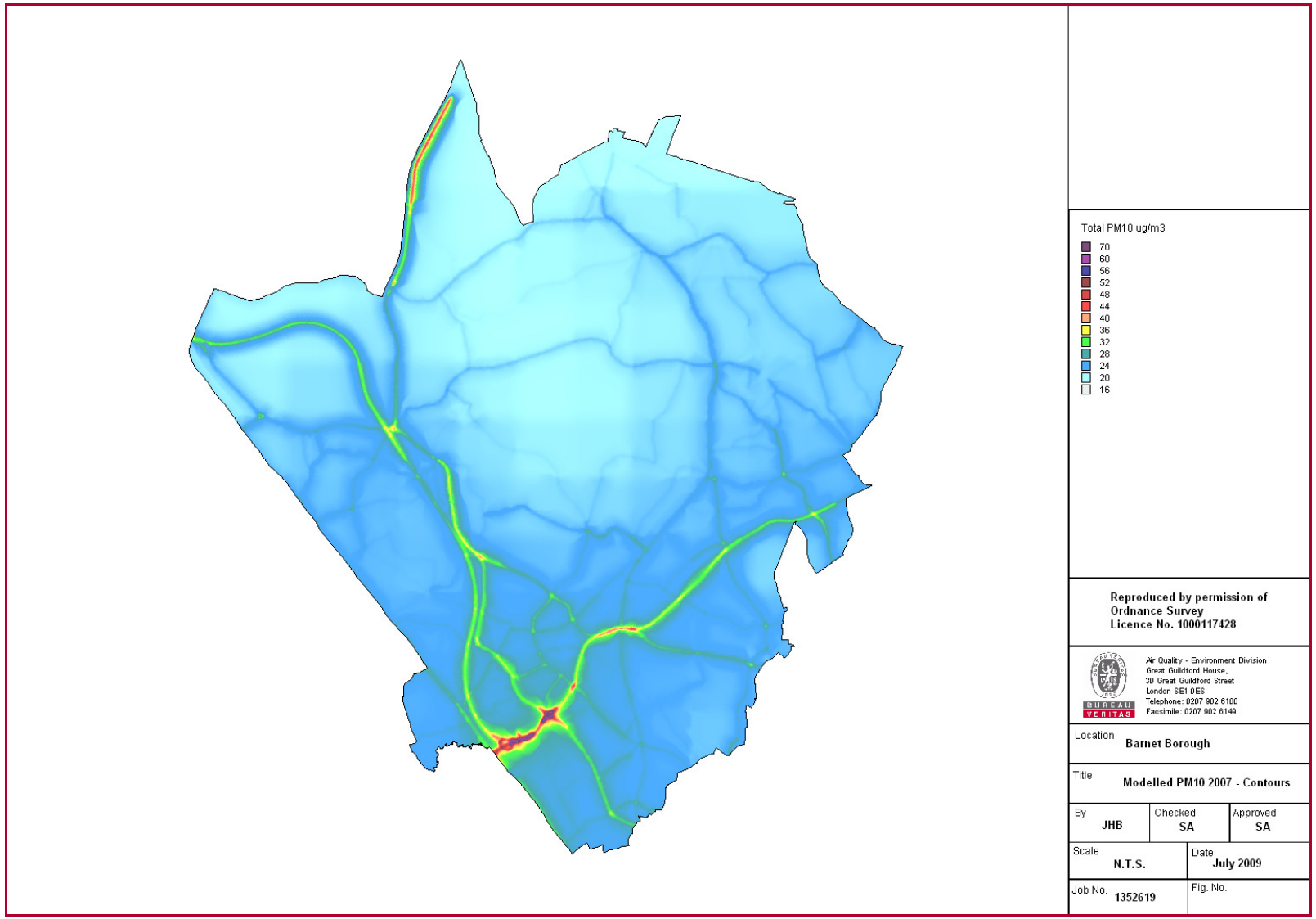
- Area 1 - Adjacent to the M1 just off Glendor Gardens near the Northway Circus roundabout

- Area 3 - The junction of the A1 Great North Way and Watford Way A41
- Area 5 - The junction of Watford Way A41 and Colindeep Lane A5150
- Areas 6 to 11, along the A406 North Circular Road. (Area 10 also predicted to exceed the annual mean PM10 objective)
- Area 14 – near the junction between the A41 Hendon Way and the A407 Cricklewood Lane

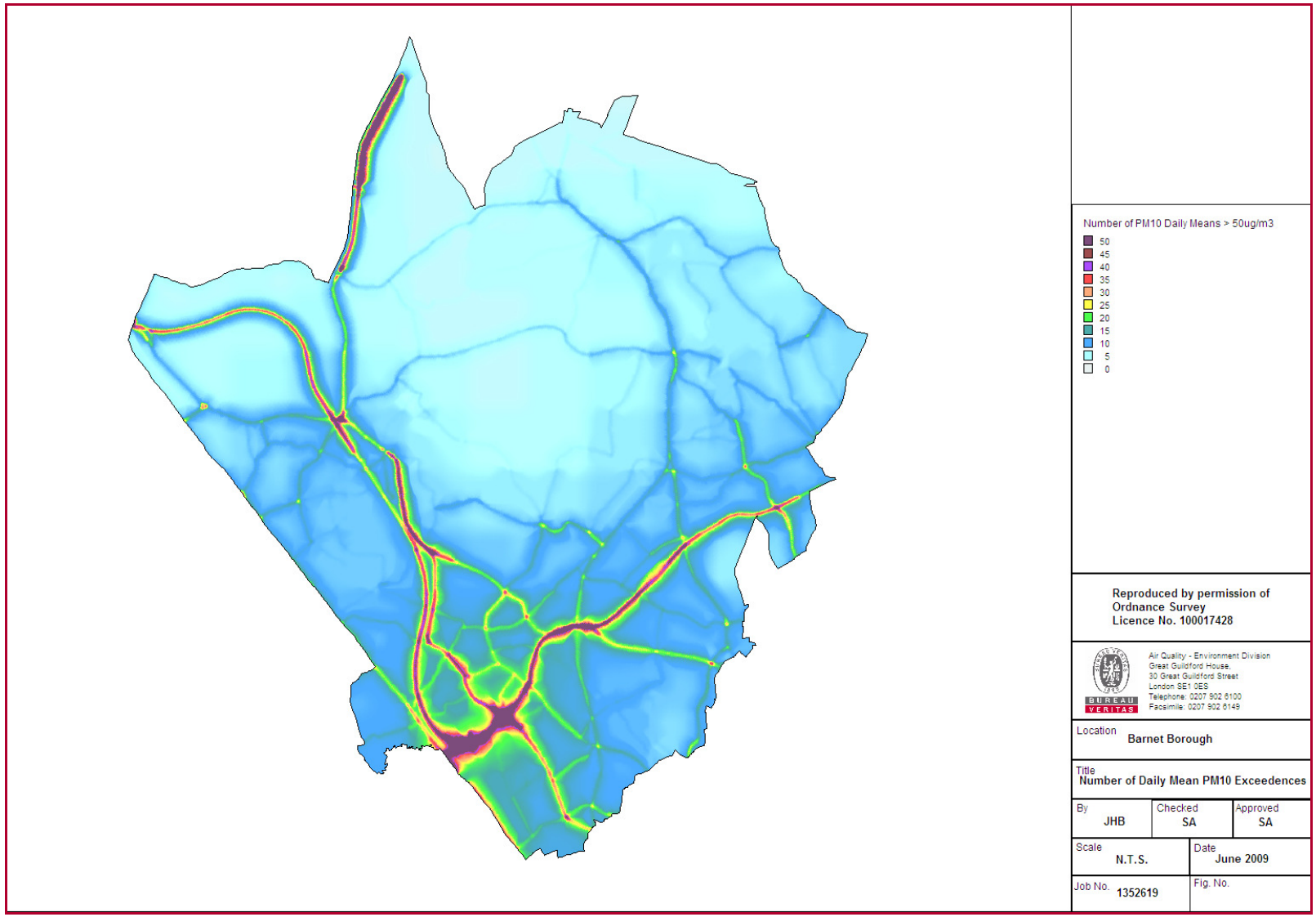
Modelled NO_2 Annual Mean 2007



Modelled PM_{10} Annual Mean 2007



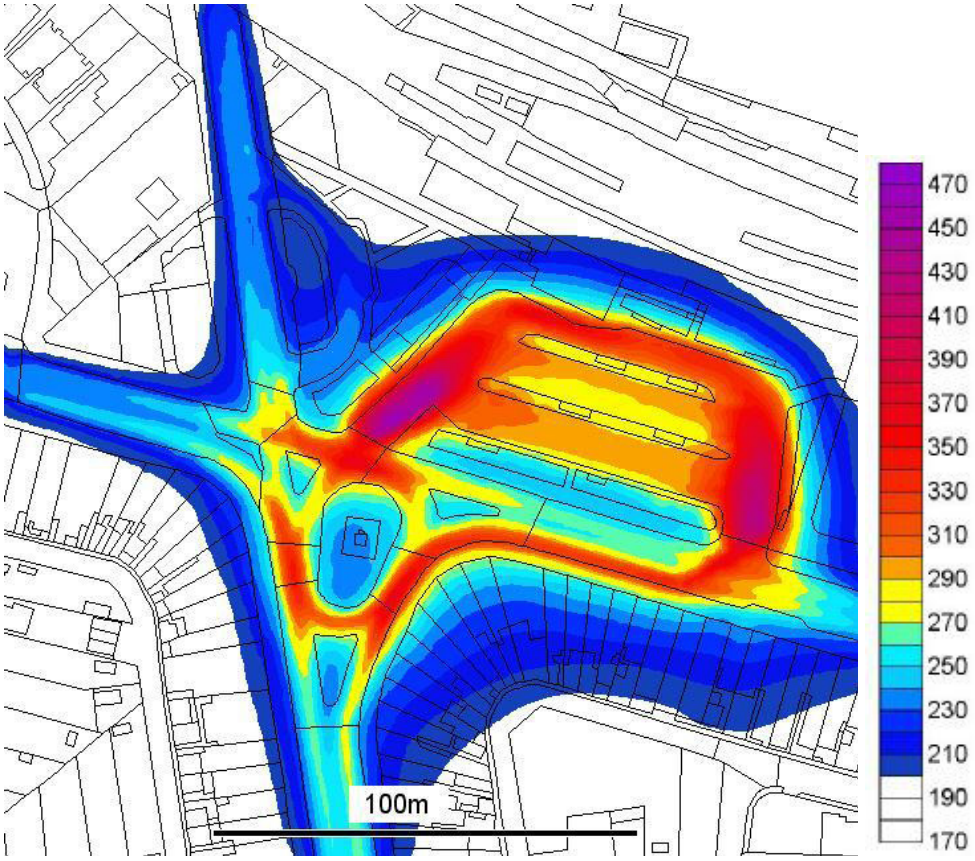
Modelled PM_{10} Daily Mean 2007



Appendix D

Modelled concentrations of nitrogen dioxide in and around Golders Green Bus Station

The following figure is taken from the AQC and TRL report, "Nitrogen dioxide concentrations in and around Golders Green bus station, Barnet. May 22nd 2009."



Predicted 99.79th Percentiles of 1-hour Mean Nitrogen Dioxide Concentrations around Golders Green Bus Station in 2008 (mg/m3)

Appendix E

Re-assessment of diffusion tube study

The following table shows the reasoning for keeping or discontinuing each nitrogen dioxide diffusion tubes since January 2009:

Site Number	Site Name	Site Type	OS Grid Ref	Reason for keeping or discontinuing tube
1	Entrance to Friary Park	Urban background	X527462 Y192687	This site often had the tube missing. It was on the back of a fence with poor air circulation. It is in an area that does not exceed the air quality objectives.
2	Fairway Junior School	Roadside	X520910 Y193445	This site was on the back of a fence with poor air circulation. Tube was relocated to nearby location to measure NO2 from A1.
3	Sanders Lane Allotments	Urban background	X523754 Y191588	Site kept for long term trends. Good site for background concentrations away from influence of main roads.
4	Barnet Registry Office	Roadside	X519936 Y190720	The tube was behind a signpost with poor air circulation. New site is within 10m to continue monitoring of A5. (considering as same location for purpose of trends)
5	St James Catholic High School	Urban Background	X521890 Y190507	Tube repositioned to nearby lampost as original site was behind signpost with poor air circulation. (considering as same location for purpose of trends)
6	337 Hendon Way	Roadside	X523158 Y188157	Site kept as it is to show long term trend from busy A41.
7	Barnet House	Roadside	X526414 Y193878	Site was not relevant exposure. Now been moved to nearby high street location.
8	Tally Ho monitoring station	Roadside	X526350 Y92166	Site kept as at monitoring station and for long term trends.
9	Mortuary	Roadside	X526315 Y190476	Tube was surrounded by too much foliage; and no relevant exposure. Now moved to within 30m to continue assessment of A406 North Circular Road. (considering as same location for purpose of trends)
10	Lytton Road	Urban Background	X526303 Y196327	Tube not in area of exceedence.
11	Barnet Church	Kerbside	X524572 Y196470	Not relevant exposure. Tube moved to new High Street location 100m away.
12	Torrington Park Health Centre	Urban Background	X526420 Y192467	Not in area of exceedence
13	Tally Ho Corner by Wetherspoon	Roadside	X526339 Y192172	Nearby to tube at Tally Ho Monitoring Station so moved to new location.
14	Mill Hill Broadway Bus Station	Bus station	X521328 Y191991	Assessment of bus station completed so discontinued tube.
15	North End Road by Golders Green Bus Station	Roadside	X525207 Y187418	Amount of tubes at bus station reduced due to completion of detailed assessment. This tube was discontinued.
16	Middle of Friary Park	Urban Background	X527286 Y192731	Tube was behind a bush with poor air circulation. Also not in area of exceedence.
17,18,19	Triplicate tubes inside Golders Green Bus Station	Bus station	X525210 Y187423	These tubes had been co-located with a temporary automatic monitor for the detailed assessment. Kept one tube only.
20	Station Road, Mill Hill	Roadside	X521357 Y191994	This tube was discontinued as the assessment of Mill Hill Bus station was completed.