Watford Borough Council

Review and Assessment of Air Quality under the Environment Act 1995

Updating and Screening Assessment

Author: Richard Brown

July 2007

Environment, Health and Licensing Service
Town Hall
Watford
Herts
WD17 3EX

Watford Borough Council

Draft Review and Assessment of Air Quality under the Environment Act 1995

Updating and Screening Assessment

Contents **Page**

Appendices

CHAPTER 1 EXECUTIVE SUMMARY

Part IV of the Environment Act 1995 requires each local authority to review and assess air quality within its geographical area. Predicted concentrations for seven key pollutants, carbon monoxide, lead, benzene, 1,3-butadiene, nitrogen dioxide, sulphur dioxide and PM_{10} particles must be compared against the standards and objectives specified in the Air Quality Regulations 2000 (as amended).

This is the third Review and assessment carried out by Watford Borough Council. In each case, the review and assessment for each pollutant has been carried out in accordance with the methodology laid out in Technical Guidance LAQM.TG(03) for that specific pollutant, contrasting known and predicted/calculated pollution data with targets set out in the Regulations.

Based on the approach detailed in the technical guidance, the results of the updated screening and assessment are summarised in the table below:

Results of Updating and Screening Assessment for Each Pollutant

Pollutant	See Section	Detailed Assessment Required?
Carbon Monoxide	3	No
Lead	4	No
Benzene	5	No
1,3-Butadiene	6	No
Nitrogen Dioxide	7	No
Sulphur Dioxide	8	No
PM_{10} Particles	9	No

The overall findings of the updating and screening assessment process for the Borough of Watford are that a more detailed assessment does not need to be carried out for any of the prescribed pollutants.

The conclusions arrived at for Carbon Monoxide, Lead, 1,3-Butadiene, Sulphur Dioxide and PM_{10} Particles are straightforward; no part of the Screening Assessments for these pollutants indicated the need to progress to a Detailed Assessment. The conclusion reached for Nitrogen Dioxide needs interpretation. For all screening criteria, other than monitoring data, the conclusion is that there is no need to progress to a Detailed Assessment.

The monitoring data, in particular the nitrogen dioxide diffusion tube data, suggests that there are 3 areas where a Detailed Assessment should be carried out. These are:

1. Some locations along St.Albans Road
2. The junction of Vicarage Road, Merton Road, Farraline Road, and Wiggenhall Road, otherwise known as the 'Hornets' interchange.
3. The junction of Lower High Street, Eastbury Road, Chalk Hill, Pinner Road and Aldenham Road, otherwise known as Bushey Acres.

However these locations all fall within existing Air Quality Management Areas, for which further assessment of air quality is already underway.

The Council is therefore proposing not to proceed to a Detailed Assessment of nitrogen dioxide in these three areas, focussing its attention instead on carrying out the further assessment of air quality within the already declared Air Quality Management Areas (AQMAs) as well as producing the associated Air Quality Action Plan that aims to improve air quality within these areas.

CHAPTER 2 INTRODUCTION

Background

This updating review and screening assessment of local air quality was carried out by Watford Borough Council as part of the next phase of the continuing local air quality management process, as prescribed in Part IV of the Environment Act 1995 and subsequent Regulations. It is the third Review and Assessment carried out by the Council.

The purpose of this review and assessment of air quality is to enable local authorities to appraise current and future air quality for their geographical area, against the current AQS objectives for 7 pollutants, for future years. These are set out in the Air Quality Regulations 2000 and Air Quality (Amendment) Regulations 2002, and are reproduced in the table below.

Air Quality Objectives from the Air Quality Regulations 2000 (as amended)

Pollutant	***Objective***	***To Be Achieved By End Of Year***
Carbon monoxide	*10mg/m^3 running 8 hour mean*	*2003*
Lead	*0.5µg/m^3 annual mean concentration* *0.25µg/m^3 annual mean concentration*	*2004* *2008*
Benzene	*16.25 µg/m^3 annual mean concentration* *5 µg/m^3 annual mean concentration*	*2003* *2010*
1,3-Butadiene	*2.25 µg/m^3 running annual mean concentration*	*2003*
Nitrogen dioxide	*200 µg/m^3 one hour mean maximum of 18 exceedences per year* *40 µg/m^3 annual mean*	*2005* *2005*
Sulphur dioxide	*266 µg/m^3 - 15 minute mean maximum of 35 exceedences per year* *350 µg/m^3 one hour mean maximum of 24 exceedences per year* *125 µg/m^3 24 hour mean maximum of 3 exceedences per year*	*2005* *2004* *2004*
PM_{10} particles	*50µg/m^3 fixed 24 hour mean, maximum of 35 exceedences per year* *40µg/m^3 annual mean*	*2004* *2004*

Watford is a concentrated urban area situated to the North West of London, with a population of circa 79,600. It is a well established regional shopping centre with major rail and road communication links: it has both mainline and metropolitan line train stations; the M1 lies along the northern boundary of the borough and the M25 is situated to the west; and the borough is also served by several major trunk roads, including the A41, A411, A412 and A405.

Methodology

This particular round of updating and screening assessment of local air quality management has been carried out in accordance with the Technical Guidance provided by DEFRA in LAQM TG(03). It also refers to the updated guidance produced by the University of the West of England in January 2006.

It aims to review the findings of the previous Round One (Stages 1 to 3) Review and Assessment of Air Quality, completed and reported in December 2000, and the Second Review and Assessment which was completed in June 2003.

For each of the 7 pollutants, a screening assessment has been carried out in accordance with the Updating and Screening Checklist contained within the technical guidance, using data and methodologies contained within the guidance and also further data obtained from local sources.

Data Sources

The principle data sources for this phase of the Updating and Screening Assessment have been:

1. National Network data contained in Technical Guidance LAQM. TG(03)
2. Ratified local pollution monitoring data obtained from the Herts & Beds Air Pollution Network and its associated website: www.hertsbedsair.org.uk
3. Traffic data provided by Hertfordshire County Council
4. The UK Air Quality Archive: www.airquality.co.uk
5. Watford Borough Council Updating and Screening Assessment, June 2003
6. Watford Borough Council Detailed Assessment, March 2004
7. Watford Borough Council Progress Report, July 2005
8. Watford Borough Council Further Assessment (draft) June 2007

Findings of the First Round of Review & Assessment of Air Quality in Watford

- The combined effect of the stage one and stage two reports of the first round review and assessment suggested that a stage 3 review and assessment need only be carried out for two pollutants: Nitrogen dioxide; and PM_{10} Particles. This revealed that exceedances of the Air Quality Regulation objectives were predicted close to some of major roads
- A public exposure assessment was carried out, which concluded that there were no domestic properties within the areas of exceedence. Accordingly no Air Quality Management Areas were declared.

Details of the first review and assessment are shown in Appendix F, and all of the reports can be viewed on line via the Herts & Beds Air Pollution Network website:

Findings of the Second Round of Review & Assessment of Air Quality in Watford

The Updating and Screening Assessment undertaken as part of this review identified 23 areas that required a detailed assessment. These areas are listed in Appendix F. The Detailed Assessment recommended that the Council declare Air Quality Management Areas for 7

locations in the Borough, based on likely exceedances of the annual mean nitrogen dioxide objective. A public exposure assessment was carried out, and in February 2006 the Council declared 6 Air Quality Management Areas as follows:

Watford no 1	St Albans Road	Residential properties at: 1B & 1C Wellington Road 155 – 157 St Albans Road 211-215 St Albans Road 164 – 454 St Albans Road
Watford no 2	Vicarage Road	Residential properties at: 28A – 30A Vicarage Road (flats above shops) 85A-87A Vicarage Road (flats above shops)
Watford no 3	Aldenham Road	Residential accommodation above The Railway Arms, Aldenham Road
Watford no 4	Chalk Hill	Residential property at: 12 Chalk Hill
Watford no 5	A405/Horseshoe Lane	Residential properties at: 3A – 5A Horseshoe Lane 887 St Albans Road 1026 St Albans Road
Watford no 6	M1/Meriden	Residential properties at: 16, 17 & 18 Ravenscroft 1 – 5 The Gossamers 31 The Gossamers 63 – 65 The Gossamers 95 – 97 The Gossamers 62, 64, 69 Eastlea Avenue

The reports making up the second review and assessment, as well as full details of the AQMA declaration process can be viewed online.

Further Assessment

At the time of writing (July 2007) a further assessment of air quality within the 6 declared AQMAs. Initial results suggest that it may be appropriate to revoke AQMA no.6 (close to the M1) AQMA no. 5 (A405/Horseshoe Lane). The further assessment work suggests that the other 4 AQMAs need to remain in place, but that their boundaries may need to be revised.

CHAPTER 3 CARBON MONOXIDE

Objective:

10mg/m^3, expressed as a maximum daily running 8-hour mean concentration, to be achieved by the end of 2003.

Approach

The checklist laid out in LAQM.TG(03) Update – January 2006 was used to consider the following sources:

A Monitoring Data
B Very Busy Roads

3.1 MONITORING DATA

3.1.1. Collate all monitoring data

Data from the Herts and Beds Air Quality Monitoring Network (2003-2006), and the national monitoring networks (2003-2006) was considered during the previous review and assessment. The data is shown in tables 3.2, and 3.3. Carbon monoxide monitoring in Watford ceased in 2001.

3.1.2. Ratify Monitoring Data

Data from the Herts and Beds Air Quality Monitoring Network is subject to detailed validation and ratification. This involves daily internal calibration and fortnightly external calibration using traceable gases. Further details are given in Appendix A.

3.1.3. Identify Maximum Daily running 8-hour concentrations during each year of measurement.

The London Air Quality Network gives the following data:

	Annual Maximum Daily Running 8-Hour Mean Values (mg/m^3)		
	2004	**2005**	**2006***
Church Street (Enfield)	8.8	9.1	7.5
Cromwell Road (Kensington & Chelsea)	4.0	5.1	3.5
Kingsbury Roadside (Brent)	5.2	8.3	6.2

* Not yet ratified.

Table 3.2 London Air Quality Monitoring Network maximum 8 hour rolling mean carbon monoxide concentrations

In addition three sites within the Herts and Beds Air Quality Monitoring Network have operated continuous carbon monoxide analysers in recent years. These are Hertsmere (Borehamwood),

Luton, St. Albans and Watford. Maximum daily running 8-hour mean data for each year from these sites is as follows:

	Annual Maximum Daily Running 8-Hour Mean Values (mg/m^3)				
	2002	**2003**	**2004**	**2005**	**2006***
Watford Roadside	-	-	-	-	-
Hertsmere Background	2.55	3.2	2.7	3.0	-
Luton Background	2.55	3.6	3.3	3.9	4.9
St. Albans Roadside	3.25	-	-	-	-

* Not yet ratified.

Table 3.3 Herts and Beds Air Quality Monitoring Network maximum 8 hour rolling mean carbon monoxide concentrations

3.1.4 Are any current maximum daily concentrations greater than 10 mg/m^3?

Monitoring data demonstrates that there will be no maximum daily concentrations greater than 10 mg/m3 so it is not proposed to proceed to a Detailed Assessment for Carbon Monoxide on the basis of monitoring data.

3.2 VERY BUSY ROADS

3.2.1 Identify 'very busy' roads and junctions in areas where the 2003 background is expected to be above 1 mg/m^3.

This source was considered during the second round of review and assessment. No new roads have been built since the assessment was carried out.

Up to date traffic information is contained within Appendix B of this report. None of the roads meet the 'Very Busy' definition laid out Box 2.2 of LAQM.TG(03) Update – January 2006: USA Checklist, as follows:

- Single carriageway roads with daily average traffic flows which exceed 80,000 vehicles per day.
- Dual carriageway (2 or 3-lane) roads with daily average traffic flows which exceed 120,000 vehicles per day.
- Motorways with daily average traffic flows which exceed 140,000 vehicles per day.

Reference no.	Source, location or data that need to be assessed	See section	Proceed to Detailed Assessment?
A	Monitoring data	3.1	No
B	Very Busy Roads	3.2	No

OVERALL CONCLUSION: THERE IS NO NEED TO PROCEED TO A DETAILED ASSESSMENT FOR CARBON MONOXIDE

CHAPTER 4 LEAD

Objectives:

Annual mean concentration of 0.5µg/m^3, to be achieved by the end of 2004

Annual mean concentration of 0.25µg/m^3, to be achieved by the end of 2008.

Approach

The checklist laid out in LAQM.TG(03) Update – January 2006 was used to consider the following sources:

A Monitoring Data
B New Industrial Sources
C Industrial Sources With Substantially Increased Emissions.

4.1 MONITORING DATA

There is no lead monitoring data available for Watford. This was the case for the previous round of review and assessment. That assessment relied on National Network Concentrations and concluded that there was no need to proceed to a Detailed Assessment of lead on the basis of monitoring results.

4.2 NEW INDUSTRIAL SOURCES

No new industrial sources that may give rise to lead emissions have commenced operating in or near to the Borough since the previous round of review and assessment.

4.3 INDUSTRIAL SOURCES WITH SUBSTANTIALLY INCREASED EMISSIONS

Not applicable, as no lead emission sources identified during previous review and assessment round.

Conclusions:

Reference no.	Source, location or data that need to be assessed	See section	Proceed to Detailed Assessment?
A	Monitoring data outside an AQMA	6.1	No
B	New Industrial Sources	6.2	No
C	Industrial Sources with Substantially increased emissions	6.3	No

OVERALL CONCLUSION: THERE IS NO NEED TO PROCEED TO A DETAILED ASSESSMENT FOR LEAD.

CHAPTER 5 BENZENE

Objectives:

Annual mean concentration of 16.25µg/m^3, to be achieved by the end of 2003

Annual mean concentration of 5µg/m3, to be achieved by the end of 2010

Approach

The checklist laid out in LAQM.TG(03) Update – January 2006 was used to consider the following sources for benzene:

A Monitoring data
B Very busy roads or junctions in built up areas
C Industrial Sources
D Petrol Stations
E Major Fuels storage depots (petroleum only

5.1 MONITORING DATA

Data from the Herts and Beds Air Quality Monitoring Network, and the national network was considered in the second review and assessment. This concluded that there was no need to proceed to a detailed assessment for benzene on grounds of monitoring data. The previous assessment also established that there was a downwards trend in roadside benzene concentrations, even at the busiest locations.

Looking at recent data from other networks, the London Wide Environment Programme Benzene Diffusion Tube Survey Annual Report 2005 concludes that 'In 2005 annual mean concentrations at all sites were below the Standard and Objective of 16.25µg m^{-3} and the future long term objective of 5µg m-3 to be met by the end of 2010'. It is therefore not proposed to proceed to a Detailed Assessment for Benzene on the basis of monitoring data.

5.2 VERY BUSY ROADS OR JUNCTIONS IN BUILT UP AREAS

Identify 'very busy' roads and junctions in areas where the 2010 background is expected to be above 2 µg/m^3.

This source was considered during the previous round of review and assessment. It was concluded that there was no need to proceed to a detailed assessment of benzene of the grounds on very busy roads. No new roads have been built since that Review and Assessment, so it is proposed to proceed to a Detailed Assessment for Benzene on the basis of very busy roads.

5.3 INDUSTRIAL SOURCES

Use the Checklist in Annex 2 of LAQM.TG(03) to determine whether there are any Industrial Sources of Benzene that need to be considered further:

This source was considered during the previous round of review and assessment. An updated list of prescribed processes operating in Watford is shown in Appendix C. With reference to the checklist set out in Annex 2, there are no Part A or Part B processes in Watford associated with the potential to emit significant quantities of Benzene, so it is not proposed to proceed to a Detailed Assessment for Benzene on the basis of industrial sources.

5.4 PETROL STATIONS

5.4.1 Identify all petrol stations with an annual throughput of more than 2000m^3 of petrol (2 million litres per annum) and with a busy road nearby.

Petrol Stations situated in the Borough of Watford are show in Appendix D, together with the most up to date values for their annual throughput.

This source was considered during the last review and assessment. Whilst it was established that that there were 5 petrol stations in Watford that have an annual throughput in excess of 2 million litres and that are situated on or near to busy roads, none of them had relevant exposure within 10m of their pumps.

No new petrol stations have been built in Watford since that assessment, and for the 5 petrol stations that had annual throughput in excess of 2 million litres and that are situated on or near to busy roads, there is still no relevant exposure within 10m of their pumps. It is therefore not proposed to proceed to a detailed assessment of benzene on the grounds of petrol stations

5.5 MAJOR FUEL STORAGE DEPOTS (PETROL ONLY)

Identify any major fuel storage depots handling petrol.

This was considered during the previous review and assessment. There are still no major fuel storage depots within the Borough of Watford.

Conclusion:

The following table summarises the findings for benzene:

Reference no.	Source, location or data that need to be assessed	See section	Proceed to Detailed Assessment?
A	Monitoring data	5.1	No
B	Very busy roads or junctions in built up areas	5.2	No
C	Industrial Sources	5.3	No
D	Petrol Stations	5.4	No
E	Major Fuels storage depots (petroleum only)	5.5	No

OVERALL CONCLUSION: THERE IS NO NEED TO PROCEED TO A DETAILED ASSESSMENT FOR BENZENE

CHAPTER 6 1,3-BUTADIENE

Objectives:

Maximum running annual mean concentration of 2.25µg/m^3, to be achieved by the end of 2003.

Approach

The checklist laid out in LAQM.TG(03) Update – January 2006 was used to consider the following sources:

A Monitoring data
B New Industrial sources
C Existing Industrial sources with significantly increased emissions

6.1 MONITORING DATA

6.1.1. Collate all 1-3 butadiene monitoring data

There is no monitoring data for 1,3-butadiene from the Herts and Beds Air Quality Monitoring Network (1999-2002). A summary of monitoring data from the national network is shown in table 6.2 below.

6.1.2. Ratify Monitoring Data

Data from the national network is subject to rigorous ratification.

6.1.3. Calculate Annual Means for 1,3-butadiene (µg/m^3) and Identify the Highest Values

		Maximum running annual mean concentration of 1,3-butadiene (µg/m^3)	
Site	**Site classification**	**2005**	**2006**
London Marylebone Road	Kerbside	0.57	0.45
London Eltham	Kerbside	0.15	0.11

Table 6.2: National Network Data[1]

None of the monitoring results are above 2.25µgm-3, so there is no need to proceed to a Detailed Assessment for 1,3-butadiene on the basis of monitoring data.

6.2 NEW INDUSTRIAL SOURCES

6.2.1 Check whether an air quality assessment has already been carried out for the new industrial source, or use the checklist in Annex 2 to determine whether the source needs considering further.

[1] Source, UK National Air Quality Archive

A list of the prescribed processes currently operating in the Borough is shown in Appendix C, together with the emissions that could be of concern. No new processes that could give rise to 1,3-butadiene emissions have commenced operating since the previous round of Review and Assessment work carried out by the Council. With reference to Annex 2, the only general processes that may be of concern in relation to 1,3-butadiene emissions are:

Part A Processes	Part B Processes
Petroleum processes	Rubber processes
Petrochemical processes	
Manufacture and use of organic chemicals	

There are no such processes currently based in Watford at the present time, so is not proposed to proceed to a Detailed Assessment for 1,3-butadiene on the basis of any new industrial sources.

6.3 INDUSTRIAL SOURCES WITH SUBSTANTIALLY INCREASED EMISSIONS

6.3.1 Determine whether any of the sources identified during the first round of review and assessment as potentially significant have substantially increased emissions.

No relevant Part A or Part B industrial process emission sources for 1,3-butadiene were identified in the previous round of Review and Assessment work carried out by the Council, so there is no need to consider whether emissions have increased and no need to proceed to a Detailed Assessment for 1,3-butadiene on the basis of industrial sources with substantially increased emissions.

Conclusions:

Reference no.	Source, location or data that need to be assessed	See section	Proceed to Detailed Assessment?
A	Monitoring data	6.1	No
B	New Industrial sources	6.2	No
C	Existing Industrial sources with significantly increased emissions	6.3	No

OVERALL CONCLUSION: THERE IS NO NEED TO PROCEED TO A DETAILED ASSESSMENT FOR 1,3-BUTADIENE

CHAPTER 7 NITROGEN DIOXIDE

Objectives:

An annual mean of 40µg/m^3, to be achieved by 2005

1-hour mean of 200µg/m^3. To be exceeded no more than 18 times per year

Approach

The checklist laid out in LAQM.TG(03) Update – January 2006 was used to consider the following sources:

A Monitoring data outside an AQMA
B Monitoring data within an AQMA
C Narrow congested streets with properties close to the kerb
D Junctions
E Busy Streets where people spend 1 hour or more close to traffic
F Roads with high flows of buses and/or HGVs
G New roads constructed or proposed since the first round of review and assessment
H Roads with significantly changed traffic flows
I Bus Stations
J New industrial sources
K Industrial sources with substantially increased emissions
L Aircraft

7.1 MONITORING DATA OUTSIDE AN AQMA

And

7.2 MONITORING DATA WITHIN AN AQMA

As explained in the introduction the Council has declared 6 Air Quality Management Areas on the basis of likely exceedances of the nitrogen dioxide annual average objective, as follows:

1. St.Albans Road
2. Farraline Road
3. Aldenham Road / Pinner Road
4. Chalk Hill
5. Horseshoe Lane
6. M1

Further assessment work is underway in all of these areas.

7.1.1. Collect all Monitoring Data

Recent roadside nitrogen dioxide monitoring data from the Herts and Beds Air Quality Monitoring Network, and the Council's network of diffusion tubes as shown below:

		Broxbourne	East Herts	Stevenage	Watford
2004	Annual mean	46	31	29	38
	No of 1 hour exceedances	0	0	0	0
2005	Annual mean	48	33	33	38
	No of 1 hour exceedances	3	0	0	0
2006	Annual mean	48	31	30	37
	No of 1 hour exceedances	3	0	0	0

Table 7.2 Ratified nitrogen dioxide monitoring data from the Herts and Beds Monitoring Network (µg/m^3)

Diffusion Tube data

Recent nitrogen dioxide results, in µgm-3 are shown below.

	2004	2005	2006
Hospital Vicarage Road	46	42	46
Grove Pumping Station	20	24	25
Leisure Centre	27	30	30
Pinner Road	53	64	67
High Road Leavesden	42	41	41
Osprey Close	33	39	39
St.Albans Road	48	48	52
Westland Road	38	44	47
Town Hall	38	42	41
Horseshoe Lane	50	46	50
St.Albans Road / Leavesden Road	57	55	59
St.Albans Road/ Hatfield Road	52	47	52
St.Albans Road / Balmoral Road	30	43	42
Queens Road	45	48	47
Farraline Road	67	65	67
Chalk Hill	86	98	103
St.Albans Road / Wellington Road	59	52	46

The Council's Diffusion tubes are analysed at Harwell Scientifics Laboratory. The procedure used (50% acetone: 50% TEA) is currently estimated to have a bias correction factor of 0.80[2]. This correction factor is needed to compare diffusion tube readings to real-time chemiluminescence readings. Applying this correction factor to the values above gives the following results:

	2004	2005	2006	Average
Hospital Vicarage Road	37	33	37	36
Grove Pumping Station	16	19	20	18

[2] At July 2007

Leisure Centre	22	24	24	23
Pinner Road	43	51	54	49
High Road Leavesden	34	32	33	33
Osprey Close	26	31	31	29
St.Albans Road	38	38	42	39
Westland Road	30	35	38	34
Town Hall	30	34	33	32
Horseshoe Lane	40	37	40	39
St.Albans Road / Leavesden Road	38	44	47	43
St.Albans Road/ Hatfield Road	41	38	32	40
St.Albans Road / Balmoral Road	24	35	34	31
Queens Road	36	38	38	37
Farraline Road	54	52	54	53
Chalk Hill	69	78	82	76
St.Albans Road / Wellington Road	47	41	37	42

7.1.2 Ratify your monitoring data

Data from the Herts and Beds Air Quality Monitoring Network is subject to detailed validation and ratification. This involves daily internal calibration and fortnightly external calibration using traceable gases. Details are given in Appendix A.

The Council's Diffusion tubes are analysed at Harwell Scientifics Laboratory. The procedure used is UKAS accredited. Details are shown in Appendix A2.

7.1.3 Calculate annual means and the number of 1-hour exceedances of 200µgm-3

There are no sites within the Herts and Beds Network where 1-hour mean of 200µg/m^3 exceeded more than 18 times in a year. There is no evidence to suggest that the 1-hour mean of 200µg/m^3 will be exceeded at any location more than 18 times per year

7.1.4 Are any annual means in 2005 greater than 40µgm/m3?

There are no sites within the Herts and Beds Network where the annual mean exceeds 40µgm/3. There are four diffusion tube monitoring sites where, after carrying out the bias correction procedure, are annual averages are consistently above 40µg/m^3:

1. Pinner Road
2. St.Albans Road /Leavesden Road
3. St.Albans Road / Hatfield Road
4. Farraline Road
5. Chalk Hill
6. St.Albans Road / Wellington Road

All of the above sites are currently located within existing AQMAs. Further assessment work on air quality within these areas is already underway and it is therefore not proposed to proceed to a separate detailed assessment on the basis of monitoring data.

7.3 NARROW CONGESTED STREETS WITH RESIDENTIAL PROPERTIES CLOSE TO THE KERB

This source was considered in detail in the previous two rounds of review and assessment. There has been no change to this source since then and it is not proposed to proceed to a detailed assessment

7.4 JUNCTIONS

This source was considered in detail in the previous two rounds of review and assessment. DMRB calculations were undertaken for a number of locations, and these showed nitrogen dioxide concentrations to be 34µgm-3 at most. There has been no change to this source since then and it is not proposed to proceed to a detailed assessment based on junctions.

7.5 BUSY STREETS WHERE PEOPLE MAY SPEND 1 HOUR OR MORE CLOSE TO TRAFFIC

This source was considered in detail in the previous two rounds of review and assessment. DMRB calculations were undertaken for a number of locations, and these showed nitrogen dioxide concentrations to be 37µgm^{-3} at most. There has been no change to this source since then and it is not proposed to proceed to a detailed assessment based on busy streets.

7.6 ROADS WITH HIGH FLOW OF BUSES AND OR/ HGVS.

This source was considered in detail in the previous two rounds of review and assessment (no roads in the Borough where heavy-duty vehicles make up greater than 20% of the traffic flow) There has been no change to this source since then and it is not proposed to proceed to a detailed assessment based on junctions.

7.7 NEW ROADS CONSTRUCTED OR PROPOSED SINCE LAST ROUND OF REVIEW AND ASSESSMENT.

The previous review and assessment advised that there is currently a proposal to construct a new road that will link Wiggenhall Road to Vicarage Road. It further advised that outline planning permission had been granted and an air quality assessment was carried out as part of the application procedure, and that this had demonstrated that there would be no exceedances of the objectives for nitrogen dioxide at any relevant receptors.

No other roads have been constructed or proposed since the previous assessment, so it is not proposed to proceed to a detailed assessment based on this source.

7.8 ROADS WITH SIGNIFICANTLY CHANGED TRAFFIC FLOWS

7.8.1 Identify any roads with more than 10000 vehicles per day (AADT) that have experienced 'large' increases in traffic.

Updated traffic flow data has been obtained from Hertfordshire County Council. This is shown in Appendix B. Whilst there have been some increases, there are non that satisfy the criteria laid out on LAQM.TG(03) Update – January 2006: This states that a 'large' increase can be taken to be more than 25% increase in traffic flow.

There is therefore no reason to proceed to a detailed assessment on the basis of increased traffic flow.

7.9 BUS STATIONS

There is a bus station within Watford. However it is an enclosed bus station, and need not be considered further.

7.10 NEW INDUSTRIAL SOURCES

A list of the prescribed processes currently operating in the Borough is shown in Appendix C, together with the emissions that could be of concern. No new processes that could give rise to nitrogen dioxide emissions have commenced operating since the previous round of Review and Assessment work carried out by the Council and it is not proposed to proceed to a Detailed Assessment of nitrogen dioxide on the basis of any new industrial sources.

7.11 INDUSTRIAL SOURCES WITH SUBSTANTIALLY INCREASED EMISSIONS

A list of the prescribed processes currently operating in the Borough is shown in Appendix C, together with the emissions that could be of concern. There are no processes operating in the Borough that fall within categories that could give rise to nitrogen dioxide emissions so there is no need to consider any increased emissions.

7.12 AIRCRAFT

There are no airports in, or in the vicinity of, the Borough.

Reference no.	Source, location or data that need to be assessed	See section	Proceed to Detailed Assessment?
A	Monitoring data outside an AQMA	7.1	No
B	Monitoring data within an AQMA	7.2	No
C	Narrow congested streets with properties close to the kerb	7.3	No
D	Junctions	7.4	No
E	Busy Streets where people spend 1 hour or more close to traffic	7.5	No
F	Roads with high flows of buses and/or HGVs	7.6	No
G	New roads constructed or proposed since the first round of review and assessment	7.7	No
H	Roads with significantly changed traffic flows	7.8	No
I	Bus Stations	7.9	No
J	New industrial sources	7.10	No
K	Industrial sources with substantially increased emissions	7.11	No
L	Aircraft	7.12	No
OVERALL CONCLUSION: THERE IS NO NEED TO PROCEED TO A DETAILED ASSESSMENT FOR NITROGEN DIOXIDE			

CHAPTER 8 SULPHUR DIOXIDE

Objectives:

15-minute mean of 266 µg/m^3, not to be exceeded more than 35 times a year, by the end of 2005

1-hour mean of 350 µg/m^3, to be exceeded no more than 24 times per year, by the end of 2004

24-hour mean of 125 µg/m^3, to be exceeded no more than 3 times per year, by the end of 2004

Approach

The checklist laid out in LAQM.TG(03) Update – January 2006 was used to consider the following sources:

A Monitoring data outside an AQMA
B Monitoring data within an AQMA
C New Industrial Sources
D Industrial Sources with substantially increased emissions
E Areas of domestic coal burning
F Small boilers (>5MW$_{(thermal)}$) burning coal or oil
G Shipping
H railway Locomotives

8.1 and 8.2 MONITORING DATA

8.1.1. Collect all Monitoring Data

Sulphur Dioxide monitoring data was considered in the previous round of Review and Assessment. This concluded that there was no reason to proceed to a detailed assessment for sulphur dioxide on the basis of monitoring data. Updated monitoring data has been taken from the Herts and Beds Air Quality Monitoring Network, and is shown in Table 8.1

8.1.2. Ratify Monitoring Data

Data from the Herts and Beds Air Quality Monitoring Network is subject to detailed validation and ratification. This involves daily internal calibration and fortnightly external calibration using traceable gases. Details are given in Appendix A.

	Number of exceedances											
	15 min > 266 µg/m3				**1 hour > 350 µg/m3**				**24 hour > 125µg/m3**			
Year	2003	2004	2005	2006	2003	2004	2005	2006	2003	2004	2005	2007
Luton Bgnd	0	0	0	0	0	0	0	0	0	0	0	0
St. Albans Bgnd	0	0	13	0	0	0	0	0	0	0	2	0

Table 8.2: Herts and Beds Air Quality Monitoring Network Sulphur Dioxide data

8.1.3 Quantify the number of exceedances of the objectives.

In the Herts and Beds Air Quality Monitoring Network:

- The 15-minute mean of 266 µg/m3 is not exceeded more than 35 times per year.
- The 1-hour mean of 350 µg/m3 is not exceeded more than 24 times per year.
- The 24-hour mean of 125µg/m3 is not exceeded more than 3 times per year.

National Network data:

The previous review and assessment established that the only site in the national network that experienced any exceedances was Belfast East and that this was associated with widespread domestic coal burning in the area. There is no domestic coal burning in the Watford Area, so it is not proposed to proceed to a Detailed Assessment for sulphur dioxide on the basis of any monitoring data.

8.3 NEW INDUSTRIAL SOURCES

A list of the prescribed processes currently operating in the Borough is shown in Appendix C, together with the emissions that could be of concern. No new processes that could give rise to sulphur dioxide emissions have commenced operating since the previous round of Review and Assessment work carried out by the Council so it is not proposed to proceed to a Detailed Assessment for sulphur dioxide on the basis of any new industrial sources.

8.4 INDUSTRIAL SOURCES WITH SUBSTANTIALLY INCREASED EMISSIONS

A list of the prescribed processes currently operating in the Borough is shown in Appendix C, together with the emissions that could be of concern. During the previous round of Review and Assessment work carried out by the Council, as no processes were identified as potential sources of sulphur dioxide emissions, there is no need to consider increased emissions.

8.5 AREAS OF DOMESTIC COAL BURNING

There are no areas of domestic coal burning in the Borough – Smoke Control Areas exist across the entire Borough.

8.6 SMALL BOILERS (>5MW$_{(THERMAL)}$) BURNING COAL OR OIL

The previous round of review and assessment identified one small boiler (Watford Laundry) in the Borough that fitted the above criteria. Emissions from this operation were assessed as part of the Review and Assessment, and it was concluded that there was no need to proceed to a detailed assessment.

8.7 SHIPPING

There are no ports, or any major shipping in the vicinity of the Borough.

8.8 RAILWAY LOCOMOTIVES

There are no locations in the Borough where diesel locomotives are regularly stationary for periods of 15 minutes or more.

Reference no.	Source, location or data that need to be assessed	See section	Proceed to Detailed Assessment?
A	Monitoring data outside an AQMA	8.1	No
B	Monitoring data within an AQMA	N/A	N/A
C	New Industrial Sources	8.3	No
D	Industrial Sources with substantially increased emission	8.4	No
E	Areas of domestic coal burning	8.5	No
F	Small boilers (>5$MW_{(thermal)}$) burning coal or oil	8.6	No
G	Shipping	8.7	No
H	railway Locomotives	8.8	No

OVERALL CONCLUSION: THERE IS NO NEED TO PROCEED TO A DETAILED ASSESSMENT FOR SULPHUR DIOXIDE

CHAPTER 9 PM_{10} PARTICLES

Objectives:

Annual mean of 40 µg/m^3, to be achieved by the end of 2004.

Fixed 24-hour mean of 50 µg/m^3, to be exceeded no more than 35 times per year, to be achieved by the end of 2004

Approach

The checklist laid out in LAQM.TG(03) Update – January 2006 was used to consider the following sources:

A Monitoring data outside an AQMA
B Monitoring data within an AQMA
C Busy roads and junctions in Scotland
D Junctions
E Roads with high flows of buses and/or HGVs,
F New roads constructed or proposed since the first round of review and assessment
G Roads with significantly changed traffic flows
H Roads close to the objective during the second round of review and assessment
I New industrial sources
J Industrial sources with substantially increased emissions
K Areas with domestic coal burning
L Quarries, landfill sites, open cast coal, handling of dusty cargoes at ports
M Aircraft

9.1 MONITORING DATA OUTSIDE AN AQMA

Monitoring data has been taken from the Herts and Beds Air Quality Monitoring Network as well as from the national monitoring network sites. The Council operates a TEOM, monitoring PM_{10} particles at a site on Rickmansworth Road. The data is shown in Tables 9.2.

Recent roadside PM10 monitoring data from the Herts and Beds Monitoring network is shown below:

		2003	2004	2005	2006
Broxbourne	annual mean concentration (µgm-3)	29	26	27	31
	Day where 24-hour mean > 50µg/m3	32	4	11	26
East Herts	annual mean concentration(µgm-3)	29	24	26	30
	Day where 24-hour mean > 50µg/m3.	22	25	5	18
Stevenage	annual mean concentration(µgm-3)	28	24	25	26
	Day where 24-hour mean > 50µg/m3.	24	5	4	6
Watford	annual mean concentration(µgm-3)	28	25	26	27
	Day where 24-hour mean > 50µg/m3.	26	7	4	12

NB All above data are gravimetric equivalents (TEOM values x 1.3)

Table 9.2 Particulate Monitoring data from the Herts and Beds Monitoring Network

Data from the Herts and Beds Air Quality Monitoring Network is subject to detailed validation and ratification. This involves daily internal calibration and fortnightly external calibration using traceable gases. Data from the National Network is also subject to rigorous ratification. Details are given in Appendix A1.

There are no sites within the Network that have an annual mean concentration greater than 40 $\mu g/m^3$. There are no sites within the network that experienced more than 35 days where the 24-hour mean was greater than 50µg/m3. So it is not proposed to proceed to a Detailed Assessment of PM10 particles on the basis of monitoring data

9.2 MONITORING DATA WITHIN AND AQMA

No AQMAs declared for PM_{10} particles Watford

9.3 BUSY ROADS AND JUNCTIONS IN SCOTLAND

Not applicable.

9.4 JUNCTIONS

This source was considered in detail during the second round of review and assessments. A number of junctions were identified as fitting the criteria of a busy junction and having relevant receptors. DMRB screening was carried out which in turn led to a Detailed Assessment. This confirmed that it was unlikely that objectives were likely to be breached in these areas and no AQMAs for PM10 were declared.

As the situation in Watford as not changed it is not proposed to proceed to a Detailed Assessment.

9.5 ROADS WITH HIGH FLOW OF BUSES AND OR/ HGVS

This source was considered in detail in the previous two rounds of review and assessment (no roads in the Borough where heavy-duty vehicles make up greater than 20% of the traffic flow) There has been no change to this source since then and it is not proposed to proceed to a detailed assessment based on junctions.

9.6 NEW ROADS CONSTRUCTED OR PROPOSED SINCE LAST ROUND OF REVIEW AND ASSESSMENT.

The previous review and assessment advised that there was a proposal to construct a new road that will link Wiggenhall Road to Vicarage Road. This has not been constructed but outline planning permission has been granted and an air quality assessment was carried out as part of the application procedure. This demonstrated that there would be no exceedances of the objectives for PM_{10} particles at any relevant receptors, accordingly it is not proposed to proceed to a detailed assessment as a result of consideration of this source.

9.7 ROADS CLOSE TO THE OBJECTIVE DURING THE SECOND ROUND OF REVIEW AND ASSESSMENT

The updating and screening assessment carried out as part of the second round of review and assessment did identify a number of locations that needed to be assessed in more detail. These were considered as part of the Detailed Assessment which concluded:

"It is recommended that Watford Borough Council do not declare an Air Quality Management Area for particulate matter PM10. The assessment has been based on monitoring data for a relatively high pollution year 2002, has conservatively taken account of resuspended dusts, and has considered the effects of buses waiting at bus stops. Even so the 24 hour objective is only just approached at the most exposed locations close to bus stops on St Albans Road. We believe that the conservative nature of this assessment provides an adequate margin of protection."

As stated, these results were obtained using a conservative approach so even with the slight increase in the local background concentration there is no need to progress to a detailed assessment.

9.8 ROADS WITH SIGNIFICANTLY CHANGED TRAFFIC FLOWS

9.8.1 Identify any roads with more than 10000 vehicles per day (AADT) that have experienced 'large' increases in traffic.

Updated traffic flow data has been obtained from Hertfordshire County Council. This is shown in Appendix B. Whilst there have been some increases, there are non that satisfy the criteria laid out on LAQM.TG(03) Update – January 2006: This states that a 'large' increase can be taken to be more than 25% increase in traffic flow.

There is therefore no reason to proceed to a detailed assessment on the basis of increased traffic flow.

9.9 NEW INDUSTRIAL SOURCES

A list of the prescribed processes currently operating in the Borough is shown in Appendix C, together with the emissions that could be of concern. No new processes that could give rise to PM10 emissions have commenced operating since the previous round of Review and Assessment work carried out by the Council, so it is not proposed to proceed to a Detailed Assessment of PM10 particles on the basis of any new industrial sources.

9.10 INDUSTRIAL SOURCES WITH SUBSTANTIALLY INCREASED EMISSIONS

A list of the prescribed processes currently operating in the Borough is shown in Appendix C, together with the emissions that could be of concern. There are two processes operating in the Borough that fall within categories that could give rise to PM_{10} emissions, as follows:

1. Neogene Paints Limited, 14 Caxton Way, Watford, WD18 8UJ Coating Manufacture
2. Sun Chemicals, Sandown Road, Watford, WD24 7XH Coating Manufacture

These processes were all considered as part of the first round of review and assessment and found not to be significant PM_{10} emitters.

Inspections of these processed have been carried out on an annual basis. No significant increases in PM_{10} emissions have been identified. In addition, Sun Chemicals has ceased operating since the previous round of review and assessment.

9.11 Areas of domestic solid fuel burning

There are no significant areas of solid fuel burning in the Borough – Smoke Control Areas exist across the entire Borough.

9.12 Quarries/landfill sites/opencast coal/ handling of dusty cargos at ports etc.

There are no such activities in the Borough.

9.13 Aircraft

There are no airports in, or in the vicinity of, the Borough.

Reference no.	Source, location or data that need to be assessed	See section	Proceed to Detailed Assessment?
A	Monitoring data outside an AQMA	9.1	No
B	Monitoring data within an AQMA	9.2	N/A
C	Busy roads and junctions in Scotland	9.3	N/A
D	Junctions	9.4	No
E	Roads with high flows of buses and/or HGVs	9.5	No
F	New roads constructed or proposed since the first round of review and assessment	9.6	No
G	Roads close to the objective during the first round of review and assessment	9.7	No
H	Roads with significantly changed traffic flows	9.8	No
I	New industrial sources	9.9	No
J	Industrial sources with substantially increased emissions	9.10	No
K	Areas with domestic coal burning	9.11	No
L	Quarries, landfill sites, open cast coal, handling of dusty cargoes at ports	9.12	No
M	Aircraft	9.13	No

- **OVERALL CONCLUSION: THERE IS NO NEED TO PROCEED TO A DETAILED ASSESSMENT FOR PM_{10} PARTICLES**

APPENDIX A

HERTS AND BEDS AIR QUALITY MONITORING NETWORK RATIFICATION DETAILS

The QA/QC procedures for the Herts and Beds Air Quality Monitoring Network are equivalent to that of the AURN with the following exceptions:

- No chart recorders are used.
- NO2 span gas is used at routine site visits.

QA/QC procedures are detailed in the UK Automatic Network Site Operator's Manual available on www.airquality.co.uk.

Broadly speaking, the QA/QC procedures for the AURN are:

Data measured by the analysers are retained by the data loggers as 15 minute, raw averages. These values are collected remotely every 12 hours by telemetry automatically by the central computer, where calibration factors are applied to calculate scaled 15 minute average pollutant concentrations. At each polling, algorithms are used to apply automatic validity checks and flag any suspect measurements for possible future editing, rescaling or rejection. In addition to the automatic systems, trained staff inspect the results each morning (365 days per year) and investigate any suspicious data. The resulting provisional data sets are then released as data or statistics to the network internet pages and distributed to interested parties via daily or weekly emails.

In addition to this initial screening process, data are further scrutinised in monthly blocks, then again at the end of each calendar year, in order to provide a final ratified dataset. These definitive results are suitable for publication and use by local authorities for LAQM analysis. This data ratification process requires the detailed examination of a variety of site and analyser outputs. These include site records, calibration records, network intercalibration results, site servicing and equipment records supplied by the site operators and equipment engineers.

APPENDIX B

HERTFORDSHIRE COUNTY COUNCIL TRAFFIC DATA

Site Location	2001 AAWD	2001 Vehs per hr (peak Hour)	2001 % LGV	2001 % HGV	Road Type	Hcc Site Number	2006 AAWD	% increase 2001 to 2006	2006 % LGV	2006 % HGV
M1 Jn 5-6, Meriden	72000	-	10.73	13.53	Motorway	N/A	85605	18.9		
A41 North Western Ave, Watford	31650	2679	10.63	6.43	Single CW	155	32841	3.8		
A405 North Orbital Road, Kingsway	17980	2000	9.5	4	Dual CW	160	19558	8.8	8.5	3.3
A41 Colne Way, Watford	35070	2717	10.63	6.43	Dual CW	153	34235	-2.4		
A411 Hempstead Road, Watford	23920	2241	10.43	5.03	Single CW	208	25267	5.6		
A412 St Albans Road, Garston	20290	1591	10.43	5.03	Single CW	214	19079	-6.0		
A412 St Albans Road, Watford	15470	1152	10.43	5.03	Single CW	215	15698	1.5		
A4178 Wiggenhall Road, Watford	25130	2687	11.3	3.2	Single CW	361	22360	-11.0	10.6	2.8
A4008 Stephenson Way, Watford	42910	4271	12	4.7	Dual CW	378	45803	6.7	11.8	4.2
A4145 Vicarage Road, Watford[2]	20120	1879	10.4	3	Single CW	424	18642	-7.3	10.9	3.2
C74 Whippendell Road, Watford[2]	10870	1002	10.83	3.63	Single CW	423	10369	-4.6		
C88 Horseshoe Lane, Leavesden	8480	823	10.83	3.63	Single CW	453	8276	-2.4		
C80 High Road, Leavesden	5870	561	10.83	3.63	Single CW	454	6163	5.0		

[1] Estimate
[2] Speed monitoring site
[3] Value used is from trafstats (see Appendix J) data

APPENDIX C

AUTHORISED PROCESSES IN THE WATFORD BOROUGH COUNCIL AREA

PART A PROCESSES

	Address of Premises	Date of Application to regulator	Type of Premises	Emissions of concern
1.	Technicast Moulds Unit 1 Garnett Close Greycaine Industrial Estate Watford, WD2 4JZ	1992	Beryllium & Copper Casting Manufacturer	Beryllium Copper Lead

PART B/A2 PROCESSES

	Address of Premises	Date of application to regulator	Type of Premises	Emissions of concern
1.	ACL Engineering, Anglia House, Sandown Road Watford, WD2 4UB	1992	Waste Oil Burner	None
2.	Neogene Paints Limited 14 Caxton Way Watford WD18 8UJ	1993	Coating Manufacture	PM10
3.	Pennings Limited 12-14 Greenhill Crescent Watford Business Park Watford, WD1 8QU	1999	Vehicle Respray	None
4.	Cemex Imperial Way Watford, WD2 4YX	1992	Concrete Batching	None
5.	London Concrete Ltd, Orphanage Road Yard, Watford Junction, Watford	2004	Concrete Batching	None
6.	W T Boroughs Colonial Way Watford, WD2 4JX	1992	Vehicle Respray	None

7.	Arriva The Shires Limited Watford Bus Garage, 934 St Albans Road Watford, WD2 6NN	1999	Vehicle Respray	None
8.	BP Mitchell Queens Road Watford,	2003	Mobile Concrete Crusher (storage only)	None

APPENDIX D

PETROL STATIONS IN THE WATFORD BOROUGH COUNCIL AREA

Ref	Name & Location	Date of application to regulator	Throughput [1]	Busy Road [2]	Relevant Exposure [3]
1	Shell Sceptre St Albans Road Watford, WD2 6AE	1998	10	Yes	No
2	Total 112 St Albans Road Watford, WD2 4AE	1998	3.1	No	No
3	Esso Service Station North Orbital Road Watford, WD2 6LZ	1997	8	No	No
4	Colne Filling Station Wiggenhall Road Watford, WD1 8AS	1998	Unknown	No	No
7	Asda St Albans Road Watford, WD2 5RE	1998	7.1	Yes	No
8	Sainsburys The Dome St Albans Road Watford, WD2 7PL	1998	12	Yes	No
9	Tesco High Street Watford, WD1 2BD	1999	> 2	Yes	No
10	Shell Garage 175-193 Rickmansworth Rd Watford, WD1 7HJ	1999	?	No	No

[1] Million litres pre annum
[2] Busy road defined as >30,000 vehicles per day
[3] Relevant exposure defined as being within 10m of pumps

APPENDIX E

BACKGROUND POLLUTANT CONCENTRATIONS

The following information was obtained from the LAQM tools website.

Kilometre square		CO 2001 mg/m^3 annual mean	PM10 2004 µg/m^3 grav. annual mean	NO2 2005 µg/m^3 annual mean
X	Y			
508500	197500	0.398	20.6	28.1
509500	195500	0.421	21	29.1
509500	196500	0.422	21	29
509500	197500	0.424	21	29.4
509500	198500	0.412	20.8	29.2
509500	199500	0.396	20.7	29.3
510500	195500	0.43	21	29.4
510500	196500	0.434	21.1	29.7
510500	197500	0.437	21	29.9
510500	198500	0.424	20.8	29.6
510500	199500	0.408	20.7	29.5
510500	200500	0.406	20.9	31.3
510500	201500	0.4	21.1	32.9
511500	195500	0.437	21.1	29.8
511500	196500	0.441	21.2	30.2
511500	197500	0.443	21.1	30.4
511500	198500	0.43	20.9	30.1
511500	199500	0.412	20.7	29.8
511500	200500	0.405	20.9	31.3
512500	198500	0.43	21	30.3
512500	199500	0.409	20.7	29.7

APPENDIX F

DETAILS OF FIRST PHASE REVIEW AND ASSESSMENT

Watford Council completed its First Phase Review Assessment of Air Quality in December 2000. The Report suggested that the objectives for Nitrogen Dioxide and PM_{10} particles would not be met close to major roads. The exceedance areas were expressed in terms of meters from the centre of the roads, as follows:

	PM_{10} particles		Nitrogen Dioxide	
	Worse case scenario	Best case scenario	Worse case scenario	Best case scenario
M1	**35m**	17m	31m	25m
A41	**10m**	-	-	-
A4008 (Pinner Rd.)	**10m**	-	7m	-
A4178 (Cassio Rd./ Wiggenhall Rd.)	**10m**	-	-	
A411 (Hempstead Road)	**5m**	-	-	-
A412 (Rickmansworth Rd.)	**5m**	-	-	-

It should be noted that the results of the review and assessment gave possible best case and worst case scenarios for each pollutant. The Council carried out its consideration of public exposure using the worse case scenarios for each road, highlighted in bold in the above table.

Investigation identified that there were no domestic properties within the areas of exceedance, and we were satisfied that at that time there was no significant public exposure. Accordingly, no Air Quality Management Areas were declared.

DETAILS OF SECOND PHASE REVIEW AND ASSESSMENT

The updating and screening assessment indicated that a Detailed Assessment was needed for 23 areas in the Borough, as follows:

	PM10	NO2
Bushey Mill Lane	✓	✓
M1	✓	✓
A41	✓	✓
Pinner Road	✓	✓
Cassio Road	✓	
Wiggenhall Road	✓	
Hempstead Road	✓	✓
Rickmansworth Road	✓	✓
A405, Horseshoe Lane, St.Albans Road Junction	✓	
Hempstead Road, St.Albans Road Junction	✓	
Cassio Road, Rickmansworth Road Junction	✓	✓
Wiggenhall Road, Whippendell Road Junction	✓	
Wiggenhall Road, Vicarage Road Junction	✓	
Vicarage Road		✓
St.Albans Road		✓
Horseshoe Lane		✓

Hagden lane		✓
Chalk Hill		✓
Farraline Road		✓
Woodford Road		✓
Leavesden Road		✓
Balmoral road		✓
Whippendell Road		✓

The Detailed Assessment, subsequent public exposure assessment and declaration of Air Quality Management Areas is discussed in more detail in the Introduction part of this report.