City of Nottingham

Local Air Quality Management

Updating and Screening Assessment: October 2003

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Local Air Quality Management

In September 2001 DEFRA commissioned a detailed evaluation of the first round of air quality reviews and assessments undertaken by local authorities under Part IV of the Environment Act 1995. The evaluation report was published in March 2002 and made a number of recommendations for future reviews and assessments of air quality.

A key recommendation was that the next round should be carried out in two steps:

- An **Updating and Screening Assessment** (USA) for identifying those aspects that have changed since the first round of reviews and assessments; and

- A **Detailed Assessment** of those pollutants and specific locations that are identified in the USA as requiring further work.

The administrative framework LAQM.PG (03) Policy Guidance and LAQM.TG (03) Technical Guidance were published in February 2003 which advised Local Authorities to follow the guidance on the recommended phased approach to the review and assessment process set out in LAQM.TG (03).

The Detailed Assessment should conclude by identifying:

- Whether an existing Air Quality Management Area (AQMA) needs to be amended or revoked;

- Whether any further AQMAs need to be designated;

- That there isn't a need to designate any further AQMAs.

This new review and assessment process replaces the former 3-4 stage review and assessment process. However, LAQM.PG (03) states **'Those authorities that are undertaking a further assessment within an AQMA (formerly known as a Stage 4) as a result of the first round of reviews and assessments at the same time as undertaking the second round of reviews and assessments will also use the further assessment results to determine whether an existing AQMA needs amending or revoking.'**

Completion of Round 2 Reviews and Assessments
The Government expects local authorities to complete their second round of reviews and assessments by **April 2004**.

Local Authorities are expected to submit their Updating and Screening Assessments to DEFRA and other statutory consultees **by the end of May 2003**.

The Government and devolved administrations recognise that Local Air Quality Management is fundamental to helping it achieve the Air Quality Objectives (AQOs) in the Air Quality (England) Regulations 2000 (as amended), many of which reflect legally binding EU limit values. It therefore recommends Local Authorities carry out their LAQM duties according to the timescales detailed in the following Table.

LAQM Activity	Completion Date	Which Authorities?
Updating and Screening Assessment (USA)	End of May 2003	All authorities
Detailed Assessment	End of April 2004	Those authorities which have identified the need for one in their April 2003 USA
Progress Report	End of April 2004	Those authorities which identified that there was no need for a Detailed Assessment in their April 2003 USA
Progress Report	End of April 2005	All Authorities
USA	End of April 2006	All Authorities
Detailed Assessment	End of April 2007	Those authorities which identified that there was no need for a Detailed Assessment in their April 2006 USA
Progress Report	End of April 2008	All authorities
USA	End of April 2009	All authorities
Detailed Assessment	End of April 2010	Those authorities which have identified the need for one in their April 2009 USA
Progress Report	End of April 2010	Those authorities which identified that there was no need for a Detailed Assessment in their April 2009 USA

Future air quality reviews and assessments: Review and assessment Progress Reports

DEFRA recommends that local authorities should prepare annual air quality Progress Reports between subsequent rounds of reviews and assessments to ensure continuity in the LAQM process. It is also requested that monitoring data be reported over the period of a calendar year. Thus the Progress

Reports due by the end of April 2005 and April 2008 will report data gathered during 2004 and 2007 respectively. Where, following the Updating and Screening Assessments in April 2003, 2006 and 2009, it is determined that Detailed Assessments are not required, authorities will be expected to submit Progress Reports in April 2004, 2007 and 2010.

Public exposure

The Regulations make clear that likely exceedances of the objectives should be assessed in relation to '*the quality of the air at locations which are situated outside of buildings or other natural or man-made structures, above or below ground, and where members of the public are regularly present*'. Reviews and assessments should thus be focussed on those locations where members of the public are likely to **be regularly present and are likely to be exposed over the averaging period of the objective**, and **not** consider exceedances of the objectives at any location **where relevant public exposure would not be realistic**.

Examples of where the Air Quality Objectives should/should not apply.

Averaging Period	***Objectives should apply at***	***Objectives should generally not apply at***
Annual mean	All locations where members of the public might be regularly exposed. Facades of residential properties, schools, hospitals, libraries	Building facades of offices or other places of work. Gardens of residential properties. Kerbside sites or locations where public exposure is likely to be short term.
24-hour mean, 8-hour mean	All locations where the annual mean objective would apply. Gardens of residential properties.	Kerbside sites or any other location where public exposure is expected to be short term.
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside sites (e.g. pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where the public might reasonably be expected to spend 1-hour or more. Any outdoor locations to which the public might reasonably be expected to spend 1-hour or longer.	Kerbside sites where the public would not be expected to have regular access.
15-mean	All locations where members of the public might reasonably be exposed for a period of 15 minutes or longer	

The Air Quality (England) Regulations 2000 (as amended)

Substance	***Air quality objective levels***	***Air quality objective dates***
Benzene	16.25 micrograms per cubic metre or less, when expressed as a running annual mean 5 micrograms per cubic metre or less, when expressed as an annual mean	31st December 2003 31st December 2010
1,3 - Butadiene	2.25 micrograms per cubic metre or less, when expressed as a running annual mean	31st December 2003
Carbon monoxide	10 milligrams per cubic metre or less, when expressed as a maximum daily running 8 hour mean	31st December 2003
Lead	0.5 micrograms per cubic metre or less, when expressed as an annual mean 0.25 micrograms per cubic metre or less, when expressed as an annual mean	31st December 2004 31st December 2008
Nitrogen dioxide	200 micrograms per cubic metre, when expressed as an hourly mean, not to be exceeded more than 18 times a year 40 micrograms per cubic metre or less, when expressed as an annual mean	31st December 2005 31st December 2005
PM_{10}	50 micrograms per cubic metre or less, when expressed as a 24 hour mean, not to be exceeded more than 35 times a year 40 micrograms per cubic metre or less, when expressed as an annual mean	31st December 2004 31st December 2004
Sulphur dioxide	125 micrograms per cubic metre or less, when expressed as a 24 hour mean, not to be exceeded more than 3 times a year 350 micrograms per cubic metre or less, when expressed as an hourly mean, not to be exceeded more than 24 times a year 266 micrograms per cubic metre or less, when expressed as a 15 minute mean, not to be exceeded more than 35 times a year	31st December 2004 31st December 2004 31st December 2005

When assessing likely exposure with respect to the long-term objectives LAQM.TG(03) cites ‘in the case of the 24-hour objectives, a relevant location would be one where members of the public may be exposed for 8 hours or more in a day, while for the annual mean objectives this might be where people are exposed for a cumulative period of 6 months in a year’.

Air Quality Management Areas: declaration, amendment or revocation

The review and assessment process should make an authority confident that it has identified all locations and pollutants for which it is likely that the air quality objective will be exceeded in the relevant future year and beyond.

There is also the potential that the review and assessment process may result in the need for an existing AQMA to be amended or revoked. It will be necessary for an authority to be able to demonstrate the same degree of confidence in its decision to revoke or amend an AQMA, as was provided for the original declaration.

It is envisaged that a Detailed Assessment will be required to support a decision to amend or revoke an AQMA. The Updating and Screening Assessment may be sufficient in circumstances where:

- It can be demonstrated that the source(s) giving rise to the original AQMA declaration have been removed, for example the closure of an industrial process or road;

- The pollutant emissions assumed for the original AQMA declaration have significantly changed, for example, due to the construction of a bypass around a town centre, or modification to an industrial process.

All decisions to amend or revoke an AQMA will be subject to full consultation.

Updating and Screening Assessment - Methodology

To ensure consistency and completeness the guidance LAQM.TG(03) recommends the USA is undertaken with reference to the tables and lettered checklist scheme contained within the guidance. The USA for each pollutant is thus broken down into lettered parts.

Nottingham City Council’s USA has been designed to allow easier verification with the guidance by linking each part of the USA to the total number of parts which comprise the USA.

Note.
A summary of monitoring data from the AURN (Clinton Street East) and AQMS (QMC/Dunkirk) is included for reference.

Summary of automatic monitoring data 2000- 2002 (AURN)

Pollutant of Concern	2000	2001	2002
Nitrogen Dioxide (NO2)			
Annual mean concentration (ug/m3)	40	36	34
No. of exceeds of annual mean AQO	1	0	0
No of exceeds of hourly mean AQO	0	0	0
Particles (PM10)			
Annual mean concentration (ug/m3)	23	26	25
No. of exceeds of annual mean AQO	0	0	0
No of exceeds of daily mean AQO	0	0	0
Carbon Monoxide (CO)			
No. of exceeds of 8 hour mean AQO	0	0	0
Sulphur Dioxide (SO2)			
No of exceeds of 15-min mean AQO	0	0	0
No of exceeds of hourly mean AQO	0	0	0
No of exceeds of daily mean AQO	0	0	0

Note.

Monitoring results are preferably reported on a calendar year basis, for clarity as to the measurement period and to allow monitoring over the full range of a year's weather conditions.

Operationally it is not practicable to relocate monitoring equipment at the end of a year. Thus monitoring results for the AQMS are for the period from July 2002-May 2003 (a few weeks after its relocation), and a full 12 months of monitoring to encompass possible seasonal effects on air quality.

Summary of automatic monitoring data June 2002 – May 2003 (AQMS)

Pollutant of Concern	**2002-2003**
Nitrogen Dioxide (NO2)	
Annual mean concentration (ug/m3)	42
No. of exceeds of annual mean AQO	1
No of exceeds of hourly mean AQO	0
Particles (PM10)	
Annual mean concentration (ug/m3)	28
No. of exceeds of annual mean AQO	0
No of exceeds of daily mean AQO	0
Carbon Monoxide (CO)	
No. of exceeds of 8 hour mean AQO	0
Sulphur Dioxide (SO2)	
No of exceeds of 15-min mean AQO	0
No of exceeds of hourly mean AQO	0
No of exceeds of daily mean AQO	0

The Updating and Screening Assessment: Lead (Pb)

Air Quality Objective

An Air Quality Objective of 0.5 ug/m^3, measured as an annual mean to be achieved by 31st December 2004 has been adopted for lead.

The National Perspective

A major source of environmental lead, leaded petrol, was withdrawn from sale from the 1st January 2000. Emissions of lead are now restricted to a variety of industrial activities, such as battery manufacture, pigments in paints and glazes, alloys, radiation shielding, tank lining and piping.

Nationally, no AQMA's have been declared with respect to the 2004 or 2008 Air Quality Objectives following the first round of review and assessments. Therefore only authorities with relevant locations in the vicinity of major industrial processes that emit significant quantities of lead, need to progress beyond the Updating and Screening Assessment.

The Environment Agency reports that the only sites currently exceeding the 2004 objective are near a small number of secondary non-ferrous metal smelters.

The Local Perspective

Nottingham City Council's First Stage & Second Stage Air Quality Review and Assessment (April 2000) concluded that the adopted Air Quality Objective of 0.5 ug/m^3 as an annual mean, and the proposed objective of 0.5 ug/m^3 as an annual mean to be achieved by 31st December 2004, were unlikely to be exceeded.

USA Checklist Parts A,B,C

Monitoring Data (A)

Nottingham City Council did not identify any sources of lead emissions likely to cause an exceedance of the Air Quality Objective. It has not designated any AQMA's with respect to lead and does not therefore undertake any monitoring of airborne lead.

Monitoring undertaken nationally by the Environment Agency shows a steady decline in the concentration of lead in ambient air.

Sources (B,C)

Industrial sources

Nottingham City Council is not aware of any new industrial processes of a size requiring authorization or permitting under the Industrial Pollution Prevention and Control regime.

Reference was made to the Environment Agency's process and emission database. It was determined that lead emissions from Part A processes in the City area have reduced annually since 1999. The main industrial source of lead emissions in the City, J McIntyres Ltd, closed during 2002.

Conclusion for lead

It is not necessary to proceed to a Detailed Assessment.

The Updating and Screening Assessment: carbon monoxide (CO)

Air Quality Objective

An Air Quality Objective of 10 mg/m^3, measured as a maximum daily running 8-hour mean to be achieved by 31st March 2003 has been adopted for carbon monoxide.

The National Perspective

The main source of carbon monoxide in the UK is road transport, accounting for 67% of total releases in 2000. Annual emissions of CO have been falling steadily since the 1970's and are expected to continue to do so. Current projections indicate that road transport emissions will decline by a further 42% between 2000 and 2005.

Carbon monoxide concentrations adjacent to major roads have been modelled at a national level and the results of the assessment suggest that existing policies will be sufficient to reduce maximum daily running 8-hour mean concentrations of carbon monoxide below 10 mg/m^3 by about 2003. It is expected that national policies will be the major influence on future carbon monoxide levels.

The Local Perspective

Nottingham City Council's First Stage & Second Stage Air Quality Review and Assessment (April 2000) concluded that the Air Quality Objective of 10 mg/m^3, when expressed as a maximum daily running 8-hour mean to be achieved by 31st December 2003, was unlikely to be exceeded.

USA Checklist Parts A,B

Monitoring Data (A)

Nottingham City Council's Air Quality Monitoring Station monitors a number of pollutants including CO. However, the unit has never been located at a 'roadside' site location nor is the AURN considered 'roadside' (they are both located approximately 20 metres from roadsides), and are referred to as 'Urban Centre' locations.

However the CO levels at such locations are influenced by local sources particularly nearby roads and therefore will measure higher than 'background' concentration of carbon monoxide.

Site	2001	2002	June 2002 – May 2003
AURN	5.7	2.3	
AQMS (Dunkirk)	-	-	3.2

maximum daily running 8-hour mean in mg/m^3.

Sources

Roads and Junctions (B)

Very busy roads are identified in TG (03) as single carriage roads with daily average traffic flows in excess of 80,000 vehicles per day or dual carriage ways in excess of 120,000 vehicles per day (it recommends that at junctions the flows should be added).

Two junctions have been identified where total vehicle flows exceed the criteria: Derby Road/ A6514:A52 junction and A52/Beeston Rd/Abbey Street. However there are no locations in the vicinity of the junctions which constitute 'relevant exposure'.

Conclusion for carbon monoxide

It is not necessary to proceed to a Detailed Assessment..

The Updating and Screening Assessment: benzene

Air Quality Objective

An Air Quality Objective of 16.25 ug/m^3 measured as a running annual mean to be achieved by 31st December 2003 has been adopted for benzene. An objective of 5 ug/m^3 as a running annual mean to be achieved by the end of 2010 has also been adopted.

The National Perspective

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

Forecasts based on national mapping suggest that policy issues currently in place will achieve the 2003 objective at all urban background and roadside/kerbside locations.

No AQMA's have been declared from the first round of reviews and assessments in respect of the 2003 air quality objective, supporting studies

carried out at a national level. Only those authorities with relevant locations in the vicinity of major industrial processes that store, handle or emit benzene, will need to progress beyond the Updating and Screening Assessment for the 2003 objective.

The Local Perspective

Nottingham City Council's First Stage & Second Stage Air Quality Review and Assessment (April 2000) concluded that the Air Quality Objective of 16.25 *u*g/m^3, when expressed as a running annual mean and the proposed air quality objective of 5 *u*g/m^3, when expressed as a running annual mean to be met by 2010, were unlikely to be exceeded.

USA Checklist Parts A,B,C,D,E

Monitoring Data (A)

Nottingham City Council did not identify any sources of benzene emissions likely to cause an exceedance of the Air Quality Objective. It has not designated any AQMA's with respect to benzene and does not therefore undertake any monitoring of benzene.

Monitoring is undertaken at the DEFRA AURN station (classed as an urban centre) using a pumped sampler. Monitoring commenced in March 2002. Data for the period 14th March 2002 to 12th September 2002 is available from the Netcen archive.

The average concentration for the six month period was 1.29 ug/m^3. The maximum recorded concentration was 1.82 ug/m^3.

The measured concentrations are likely to be primarily influenced by road traffic some 20 metres away. These levels are expected to fall as emissions from vehicles fall.

Background concentrations 2001, 2003, 2010

The highest estimated background concentrations of benzene for the years 2001, 2003 and 2010 in the Nottingham City area are 1.17 ug/m^3, 1.03 ug/m^3 and 0.788 ug/m^3 respectively.

Roads and Junctions (B)

Very busy roads are identified in TG (03) as single carriage roads with daily average traffic flows in excess of 80,000 vehicles per day or dual carriage ways in excess of 120,000 vehicles per day (it recommends that at junctions the flows should be added).

Two junctions have been identified where total vehicle flows exceed the criteria: Derby Road/ A6514:A52 junction and A52/Beeston Rd/Abbey Street. However background concentrations are not predicted to exceed 2 ug/m^3.

Sources (C)

Industrial

Nottingham City Council is not aware of any new industrial processes of a size requiring authorization or permitting under the Industrial Pollution Prevention and Control regime.

Reference was made to the Environment Agency's process and emission database. It was determined that there are no significant benzene emissions from Part A processes in or adjacent to, the City area.

Petrol Stations (D)

A number of petrol stations were identified that either satisfied or were close to the throughput criteria of 2000m^3. There were no locations of 'relevant exposure' within 10m of the pumps.

Major Fuel Storage (E)

There are no major fuel storage facilities in the City area. The closest facility is located in Gedling Borough Council's area, approximately 1 kilometre from the City's Administrative Boundary and nearest area of 'relevant exposure'.

Benzene monitoring reported in the First Stage and Second Stage Review and Assessment, showed an annual average for 1998 of 2.3 ug/m^3. Since that time the quantity of petrol transferred/stored has reduced, likely to lead to a reduction in fugitive emissions.

Guidance contained in TG(03) does not list the site as a major fuel storage facility and does not therefore require further consideration.

Conclusion for benzene

It is not necessary to proceed to a Detailed Assessment.

The Updating and Screening Assessment: 1,3 butadiene

Air Quality Objective

An Air Quality Objective of 2.25 ug/m^3 measured as a running annual mean to be achieved by 31st December 2003 has been adopted for 1,3 butadiene.

The National Perspective

The main sources of 1,3 butadiene emissions in the UK are emissions from motor vehicle exhausts, and industrial chemical manufacture.

A number of policy measures, and the increasing number of vehicles equipped with three way catalysts will significantly reduce emissions of 1,3 butadiene. These measures are expected to deliver the air quality objective by the end of 2003.

It is expected that national policies will be the major influence on future benzene levels.

The Local Perspective

Nottingham City Council's First Stage and Second Stage Air Quality Review and Assessment (April 2000) concluded that the Air Quality Objective of 2.25 ug/m^3, when expressed as a running annual mean, was unlikely to be exceeded.

No AQMA's have been declared from the first round of reviews and assessments in respect of the 2003 air quality objective, which supports studies carried out at a national level.

USA Checklist Parts A,B,C

Monitoring Data (A)

Nottingham City Council did not identify any sources of 1,3 butadiene emissions likely to cause an exceedance of the Air Quality Objective. It has not designated any AQMA's with respect to 1,3 butadiene and does not therefore undertake any monitoring of 1,3 butadiene.

Background concentrations 2001 and 2003

The highest estimated background concentrations of 1,3 butadiene for the years 2001 and 2003 in the Nottingham City area are 0.431 ug/m^3, and 0.336 ug/m^3 respectively.

Sources (B,C)

Industrial sources

Nottingham City Council is not aware of any new industrial processes of a size requiring authorization or permitting under the Industrial Pollution Prevention and Control regime.

Reference was made to the Environment Agency's process and emission database. It was determined that there are no significant 1,3 butadiene emissions in, or adjacent to (within 5km), the City area.

Conclusion for 1,3 butadiene

It is not necessary to proceed to a Detailed Assessment.

The Updating and Screening Assessment: sulphur dioxide (SO_2)

Air Quality Objectives

Three Air Quality Objectives have been set for sulphur dioxide;

266 ug/m^3 measured as a 15-minute mean not to be exceeded more than 35 times in a year by the end of December 2005,
350 ug/m^3 measured as a 1-hour mean to be exceeded no more than 24 times in a year, by the end of 2004,
125 ug/m^3 measured as a 24-hour mean to be exceeded no more than 3 times in a year by the end of 2004,

The National Perspective

The main source of sulphur dioxide in the UK is power stations, accounting for more than 71% of emissions in 2000. There are also significant emissions from other industrial combustion sources. Domestic sources now only account for 4% of emissions, but can be significant at a local level, particularly in areas where domestic solid fuel is still the primary source of heating.

Local exceedances of the objectives (principally the 15-minute mean objective) may occur in the vicinity of small combustion plant (less than 20 MW) which burn coal or oil, and in areas where solid fuels are the predominant source of domestic heating.

Nationally a small number of AQMAs have been declared.

The Local Perspective

Nottingham City Council's Second Stage & Third Stage Air Quality Review and Assessment (September 2001) concluded that, in the vicinity of a large coal fired boiler, all three Air Quality Objectives for sulphur dioxide were likely to be exceeded. An AQMA was declared in the vicinity of the Nottingham City Hospital.

USA Checklist Parts A,B,C,D,E,F,G,H

Monitoring data (A,B)

Background concentrations

The highest estimated background concentration for 2001 was 7.43 ug/m^3 as an annual mean.

Continuous automatic monitoring is undertaken at two sites;

DEFRA AURN, Clinton Street East, Nottingham
Nottingham City Council's Air Quality Mobile Station (AQMS) located at the Queens Medical Centre since March 2002.

Site	2001	2002	June 2002 – May 2003
AURN	19*	11*	
AQMS (Dunkirk)	-	-	4.6*

* annual mean

Monitoring for 2001 and 2002 did not record any exceedances of the AQO's

Sources

Reference was made to the Environment Agency's process and emission database.

Industrial (C,D)

Nottingham City Council is not aware of any new industrial processes of a size requiring authorization or permitting under the Industrial Pollution Prevention and Control regime.

Three major combustion processes exist in and adjacent to the City area. However, their annual emissions are less than 10 tonnes per annum, which is below the lower limit for use of the TG (03) Nomogram (Fig 7.1) and do not therefore, need to be considered further.

Domestic (E)

The whole of the Nottingham City area is within 'Smoke Control Areas' and no areas of 'significant' solid fuel use (more than 100 properties in a 500m x 500m area) have been identified.

Small Boilers (F)

Emissions from the City Hospital Boiler Plant were reassessed as part of the Fourth Stage Review and Assessment. The Fourth Stage Review and Assessment resulted in the proposed revocation of the AQMA. Subsequent to this there has been no material change to the plant or increase in fuel consumption. The conclusions from the Fourth Stage Review and Assessment therefore remain valid and it is not necessary to proceed to a Detailed Assessment with respect to emissions from the boiler plant.

Shipping (G)

Not applicable.

Railway Locomotives (H)

Nottingham Railway Station is only served by diesel powered locomotives. A number of services commence from Nottingham and generally run their diesel engines to power ancillary systems and heating whilst waiting to depart.

TG(03) advises that locations outside the station as well as on the station should be considered if there is a potential for members of the public to be exposed for periods of 15-minutes or more.

Information received from the local rail operator detailed typical operating scenarios for the two classes of locomotive operating from the station. Of the two classes only the older High Speed Trains are required to operate one of their locomotive units for periods which can exceed 15 minutes. The rail operator has advised that there are typically 12 occasions Monday to Saturday and five occasions on Sunday when a locomotive is stationary with its engine running for more than 15-minutes.

In such situations TG(03) requires a Detailed Assessment to be undertaken.

Conclusion for sulphur dioxide

It is necessary to proceed to a Detailed Assessment for sulphur dioxide only in the vicinity of the Nottingham mainline station.

The Updating and Screening Assessment: PM_{10} (particles)

Air Quality Objectives

Two Air Quality Objectives have been set for PM_{10};

40 ug/m^3 measured as an annual mean,
50 ug/m^3 measured as a 24-hour mean to be exceeded no more than 35 days per year, to be achieved by the end of 2004,

The Government has also set provisional objectives as;

50 ug/m^3 measured as a 24-hour mean to be exceeded no more than 7 times per year, to be achieved by the end of 2010,
20 ug/m^3 measured as an annual mean, to be achieved by the end of 2010.

The National Perspective

There is a wide range of emission sources that contribute to PM_{10} concentrations in the UK. These sources can be broken down into 3 main categories;

Primary particle emissions are derived directly from combustion sources, Secondary particles are formed by chemical reactions in the atmosphere, and comprise principally sulphates and nitrates.

Coarse particles comprise emissions from a wide range of sources including resuspended dusts from road traffic, construction works, wind-blown dusts and soils and biological particles.

Both national and international policies are expected to reduce PM_{10} concentrations in future years. An analysis of PM_{10} projections concluded with national policy measures and atypical meteorology that exceedances of the 2004 objectives might be found in the following areas:

- urban background sites in central London;
- areas adjacent to busy roads, particularly within major urban areas;
- areas which have significant emissions from the domestic burning of solid fuels;
- areas in the vicinity of industrial plant, or which have significant uncontrolled or fugitive emissions (e.g. quarrying, materials handling facilities)

The Local Perspective

Nottingham City Council's Second Stage & Third Stage Air Quality Review and Assessment (September 2001) concluded that the Air Quality Objective of 40 ug/m3, when expressed as a running annual mean and the air quality objective of 50 ug/m3, when expressed as a 24-hour mean not to be exceeded more than 35 days per year, were unlikely to be exceeded. Consequently no Air Quality Management Areas have been declared in the Nottingham City Area for PM10.

USA Checklist Parts A,B,C,D,E,F,G,H,I,J,K,L,M

Monitoring data (A,B)

Background concentrations

The highest estimated background concentration for 2001 was 25.1 ug/m^3 as an annual mean.

Monitoring for the period 2001 to April 2003 was undertaken at two sites.

DEFRA AURN, Clinton Street East, Nottingham
Nottingham City Council's Air Quality Mobile Station (AQMS) at
Queens Medical Centre since May 2002,

Site	**2001**	**2002**	**June 2002 – May 2003**
AURN	26*	25*	
AQMS (Dunkirk)	-	-	28*

*=gravimetric equivalent

Monitoring during 2001 and 2002 did not record any exceedances of either of the AQOs.

Estimated annual mean concentrations

Site	2004	2010
AURN	24.9	23.2
AQMS (Dunkirk)	27.6	24.7

Estimated no. of exceedances of 24-hour AQO.

Site	2004	2010
AURN	12	9
AQMS (Dunkirk)	20	12

Sources

Reference was made to the Environment Agency's process and emission database, and Traffic Flow data from the Transportation Team.

Busy roads and junctions in Scotland (C)

Not applicable

Junctions (D)

The Second and Third Stage Review and Assessment considered a number of busy junctions in detail using both Design Manual for Roads and Bridges (DMRB) and Advanced Dispersion Modelling System (ADMS) it was concluded the Air Quality Objectives for 2004 and beyond were unlikely to be exceeded.

Roads with high flow of buses and/or HGV's (E)

There are no roads in the Nottingham City area where 20% of the Annual Average Daily Traffic flow (AADT) comprises buses/HGV's.

New Roads (F)

No new roads have been constructed or proposed for completion by the AQO dates.

Roads close to the Objective during First and Second Round of Review and Assessment (G)

Major arterial routes and junctions were considered in detail during the Second and Third Stage Review and Assessment using both DMRB and ADMS. Complex modelling predicted the 90^{th} percentile (which approximates to 35 exceedances of the 24-hour mean) as 46 ug/m^3. This is less than the 50 ug/m^3 criteria specified in LAQM.TG(03) for proceeding to a Detailed Review and Assessment.

Roads with Significantly changed flows (H)

The AADT figures provided for 2001 and predicted for future years do not indicate 'large' increases (greater than 25%) in flow.

Industrial (I,J)

Nottingham City Council is not aware of any new industrial processes of a size requiring authorization or permitting under the Industrial Pollution Prevention and Control regime.

Two Part A processes were identified from the Environment Agency's process and emission database in the City area. One of the processes has ceased operating. The remaining processes' annual emissions are less than 10 tonnes per annum, which is below the lower limit for use with the TG(03) Nomogram and does not therefore, need to be considered further.

Domestic (K)

The whole of the Nottingham City area is within designated 'Smoke Control Areas' and no areas of 'significant' solid fuel use (more than 50 properties in a 500m x 500m area) had been identified from surveys undertaken for the First and Second Stage Review and Assessment.

Quarries, landfill sites, opencast coal, handling of dusty cargoes at ports etc (L)

There are no identified operational quarries, landfill or opencast coal sites or ports in the Nottingham City area nor have any been identified within 1000m of locations of 'relevant exposure'.

Aircraft (M)

Two small aerodromes exist within 5km of the City's boundary. There are no areas of 'relevant exposure' within 500m of either aerodrome's boundary.

Conclusion for particles (PM_{10})

It is not necessary to proceed to a Detailed Assessment.

The Updating and Screening Assessment: nitrogen dioxide

Air Quality Objectives

Two Air Quality Objectives have been set for nitrogen dioxide;

40 ug/m^3 measured as an annual mean,
200 ug/m^3 measured as a 1-hour mean to be exceeded no more than 18 times per year, to be achieved by the end of 2005.

The first Air Quality Daughter Directive also sets limit values for nitrogen dioxide which have been transposed into UK legislation. The Directive includes a 1-hour limit value of 200 ug/m3, not to be exceeded more than 18 times per year, and an annual mean limit value of 40 ug/m3, both to be achieved by 1 January 2010.

The National Perspective

The principle source of nitrogen oxides (NOx = NO_2 + NO) emissions is road transport. However, the contribution of road transport to nitrogen oxides (NOx) emissions has declined significantly in recent years as a result of various policy measures, and further reductions are expected up until 2010 and beyond. E.g. urban traffic NOx emissions are estimated to fall by about 20% between 2000 and 2005.

An analysis of monitoring data in the vicinity of roads throughout the UK has been undertaken and concludes that, outside of major conurbations, exceedances of the annual mean objective are only likely to occur within about 10 metres of the kerbside of single carriageway roads.

Authorities are therefore required to focus on locations where they expect pollutant concentrations to be the highest.

Other significant sources of NOx emissions include the electricity supply industry and other industrial and commercial sectors, accounting for 24% and 23% of emissions respectively in 1999. Emissions from both sources have also declined, due to the fitting of ‘low nitrogen oxides burners’ and the increased use of natural gas fired plant. Industrial sources make only a very small contribution to annual mean nitrogen dioxide levels, although breaches of the hourly objective may occur under rare, extreme meteorological conditions due to emissions from these sources.

The Local Perspective

Nottingham City Council’s Second Stage & Third Stage Air Quality Review and Assessment (September 2001) concluded that exceedances of the Air Quality Objective of 40 ug/m3, when expressed as an annual mean, were likely in a number of locations. Consequently two Air Quality Management Areas have been declared in the Nottingham City Area.

USA Checklist Parts A,B,C,D,E,F,G,H,I,J,K,L,M

Monitoring data (A,B)

Monitoring for the period 2001 to April 2003 was undertaken at two sites.

DEFRA AURN, Clinton Street East, Nottingham
Nottingham City Council’s Air Quality Mobile Station AQMS at
Queens Medical Centre since March 2002,

Site	2001	2002	June 2002 – May 2003
AURN (adjacent to AQMA	36*	34*	-
AQMS (Dunkirk, AQMA 3)	-	-	42*

* annual mean

Within AQMA's

The Air Quality Mobile Station located within the Dunkirk AQMA measured an annual mean (June 2002 – May 2003) of 42 *u*g/m^3. This is an exceedance of the annual mean AQO.

There were no recorded exceedances of the1-hour 200*u*gm^{-3} AQO at this location.

Outside AQMA

The AURN station is located adjacent to the City Centre AQMA and measured an annual mean for 2002 of 34. There were no recorded exceedances of the annual mean AQO or the 1-hour 200*u*gm^{-3} AQO at the City Centre AURN.

Sources

Reference was made to the Environment Agency's process and emission database, and Traffic Flow data from the Transportation Team.

Narrow congested streets with residential properties close to kerb (C)

No streets meeting the criteria were identified.

Junctions (D)

The Second and Third Stage Review and Assessment considered a number of busy Junctions in detail using both DMRB and ADMS. For those junctions outside the AQMA's it was concluded unlikely that the Air Quality Objectives for 2004 and beyond would be exceeded, and were not reconsidered during the USA.

Busy streets where people may spend 1-hour or more close to traffic (E)

These were considered in detail as part of the Second and Third Stage Review and Assessment. Only those within or immediately adjacent to AQMAs were considered by the Fourth Stage Review and Assessment using advanced dispersion modelling. The model predicted the areas where the AQOs were likely to be exceeded.

Roads with high flow of buses and/or HGV's (F)

These were considered as part of the Second and Third Stage Review and Assessment. No roads in the Nottingham City area were identified where 20% of the AADT comprises buses/HGV's.

New Roads (G)

No new roads have been constructed or proposed for completion by the AQO dates.

Roads close to the objective during First and Second round of Review and Assessment (H)

Major arterial routes and junctions were considered in detail during the Second and Third Stage Review and Assessment using both DMRB and ADMS. Only those within or immediately adjacent to AQMAs were considered by the Fourth Stage Review and Assessment using advanced dispersion modelling using the latest DMRB emission factors. The model predicted the areas where the AQOs were likely to be exceeded.

The Second and Third Stage Review and Assessment predicted a number of roads where the annual mean concentration in 2005 would be between 36 and 40 ug^{-3}. These have not been reassessed using the new emission factors and it is therefore necessary to proceed to a Detailed Assessment for nitrogen dioxide on these roads (Appendix Figure 1).

Roads with Significantly changed flows (I)

The AADT figures provided for 2001 and predicted for future years do not indicate ‘large’ increases (greater than 25%) in flow.

Bus Stations (J)

Nottingham has one open air bus station. The station is separated from the public waiting area by self closing doors and screens effectively enclosing the public waiting area within a mechanically ventilated space. The closest location of relevant exposure is a building with some residential use at first floor level. It is horizontally at a distance of 15 metres and does not therefore satisfy the criteria required to proceed to a Detailed Assessment.

Industrial (K,L)

Nottingham City Council is not aware of any new industrial processes of a size requiring authorization or permitting under the Industrial Pollution Prevention and Control regime.

Five Part A processes were identified from the Part A’s process and emission database in or adjacent to the City area. Their 2001 emissions were compared with the applicable nomograms. It was determined that emissions did not satisfy the criteria necessary to proceed to a Detailed Review and Assessment.

Aircraft (M)

Two small aerodromes exist within 5km of the City’s boundary. There are no areas of ‘relevant exposure’ within 1000m of either aerodrome’s boundary.

Conclusion for nitrogen dioxide

It is necessary to proceed to a Detailed Review and Assessment for nitrogen dioxide with respect to a number of roads which were predicted to have an annual mean of between 36-40 ugm^{-3} using the original DMRB emission factors.

Updating and Screening Assessment: Conclusions

The Updating and Screening Assessment was undertaken following the guidance and checklist scheme recommended in LAQM.TG(03). The following conclusions were reached for each pollutant of concern:

Lead

It is not necessary to proceed to a Detailed Assessment for lead.

Carbon monoxide

It is not necessary to proceed to a Detailed Assessment for carbon monoxide.

Benzene

It is not necessary to proceed to a Detailed Assessment for benzene.

1,3 butadiene

It is not necessary to proceed to a Detailed Assessment for 1,3 butadiene.

Sulphur dioxide

It is necessary to proceed to a Detailed Assessment for sulphur dioxide only in the vicinity of the Nottingham Main-line Station.

Particles (PM_{10})

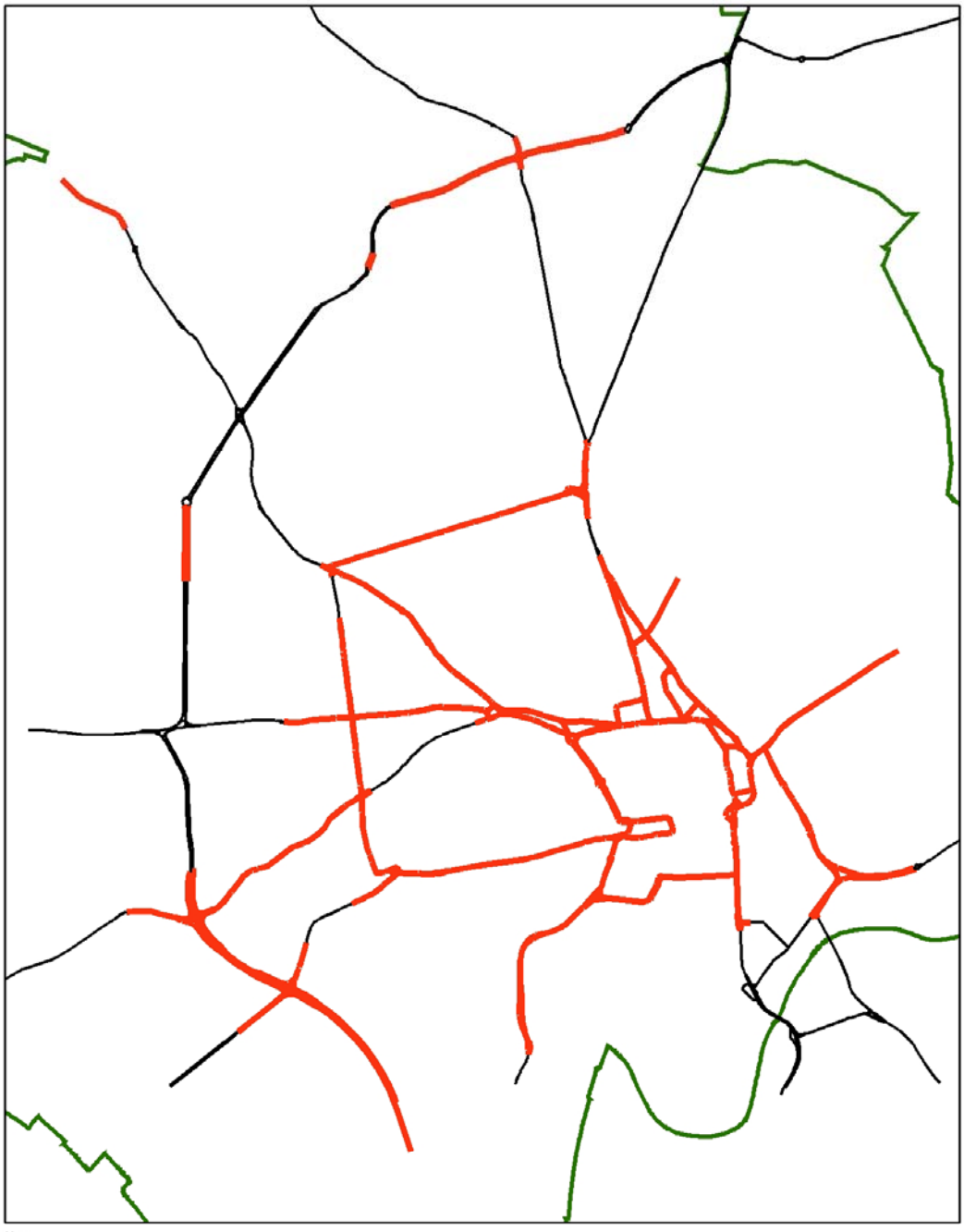
It is not necessary to proceed to a Detailed Review and Assessment for particles.

Nitrogen dioxide

It is necessary to proceed to a Detailed Review and Assessment for nitrogen dioxide with respect to a number of roads which were predicted to have an annual mean of between 36-40 ugm^{-3} using the original DMRB emission factors.

Appendix 1

2005 Predicted Annual Mean Nitrogen Dioxide Concentrations
Main Roads with Exceedances above 36ugs/m3



Key:

NO2 Levels

- <36 NO2 ugs/m3
- >36 NO2 ugs/m3

City of NOTTINGHAM
Development & Environmental Services
Pollution Control Section

N

Scale : 1:35000
Drawn : JCW
Date : 18/07/2003

Scheme : Main Roads within Nottingham with predicted exceedances above 36 ugs/m3
Title : City Location Plan

Appendix 2

Automatic Monitoring Stations



Key:

Monitoring Station

▲ Existing

● Proposed

AQMAs

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City of NOTTINGHAM
Development & Environmental Services
Pollution Control Section

N

Scale : 1:35000
Drawn : JCW
Date : 16/07/2003

Scheme : Automatic Monitoring Stations

Title : City Location Plan

List of links to internet sites used for information/data

http://www.environment-agency.gov.uk/subjects/airquality/

follow links to access information on emissions in Nottingham City Area

http://www.airquality.co.uk/archive/data_and_statistics.php

follow links to obtain information on concentrations of pollutants

http://www.uwe.ac.uk/aqm/review/

follow links for information on updating and screening, review and assessment processes.

Pollutant Specific calculations

Carbon monoxide (CO)

The maximum daily running 8-hour mean (2001) at the Nottingham AURN was 5.7 mg/m^3.

If used to estimate annual average carbon monoxide concentrations in future years using the correction factors detailed in LAQM.TG(03) Box 2.3 :

5.7 mg/m^3 x 0.826 = **4.7 mg/m^3**

This is substantially less than the 10 mg/m^3 objective to be achieved by 2003.