Nottingham City Council

Local Air Quality Management

Updating and Screening Assessment: June 2006

City Development
Public Health, Pollution Control & Envirocrime Section
Lawrence House
Talbot Street
Nottingham
NG1 5NT

Local Air Quality Management

The Environment Act 1995 placed a statutory duty on Local Authorities to undertake assessments of air quality in their areas and where air quality did not meet, or was predicted not to meet, specified 'Air Quality Objectives' to declare Air Quality Management Areas and publish Air Quality Action Plans.

The process has been revised over time and now consists of three elements that are conducted sequentially over a period of three years (Table 1):

- 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** (DA) of those pollutants and specific locations that are identified in the USA as requiring further work.

- A **Progress Report** detailing developments and changes in the authority's area that may affect air quality and progress made towards improving air quality.

Table 1

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

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) (Table 2), 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 Table 1.

Table 2

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

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**. See Table 3.

Table 3

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	

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'.

The administrative framework LAQM.PG (03) Policy Guidance and LAQM.TG (03) Technical Guidance 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 technical guidance was updated in January 2006.

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 Air Quality Management Area, 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 has 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 (USA) methodology

To ensure consistency and completeness the guidance LAQM.TG (03) (updated January 2006) recommends the USA is undertaken with reference to the tables and itemised 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 cross-checking with the guidance by using the same headings and titles.

A summary of the 2005 monitoring data from the analysers located within 1) Automatic Urban and Rural Network Station(AURN), Clinton Street East 2) Air Quality Monitoring Station (AQMS) at Queens Medical Centre (QMC), Dunkirk, 3) Romon, Carter Gate, 4) Romon, City Hospital, Edwards Lane and from the diffusion tube survey is included in Appendix 1.

Quality assurance/quality control information was previously reported in Nottingham City Council's Local Air Quality Management Stage 2 & 3 Review and Assessment 2001. This report, along with other Nottingham City LAQM reports, is available to view and download from the website address:

http://www.nottinghamcity.gov.uk/sitemap/environment/pollution/air_pollution/air_quality.htm

Updating and Screening Assessment: Carbon Monoxide (CO)

Air Quality Objective

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

USA Checklist Parts A,B

Monitoring Data (A)

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

CO maximum daily running 8-hour mean in during 2005

AURN = 3.0 mg/m^3
AQMS = 4.2 mg/m^3

(see Appendix 1 Table 4)

Sources

Very busy roads or junctions in built-up areas (B)

Very busy roads are identified 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.

Updating and Screening Assessment: Benzene

Air Quality Objective

The Air Quality Objective for benzene was 16.25 ug/m^3 measured as a running annual mean to be achieved by 31st December 2003. The objective is now 5 μg/m^3 as a running annual mean to be achieved by the 31st December 2010.

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

Monitoring data outside an AQMA (A)

Monitoring is undertaken at the AURN site at Clinton Street East.
No exceedance of the 2003 Air Quality Objective occurred; the monitored annual mean was also below the 2010 AQO.

Benzene 2005 annual mean

AURN = 1.6 $\mu g/m^3$ (see Appendix 1 Table 4)

Monitoring data within an AQMA (B)

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 AQMAs with respect to benzene and does not therefore undertake any monitoring of benzene.

Very busy roads or junctions in built up areas (C)

There are no 'very busy' roads with daily average traffic flows in excess of 80,000 vehicles per day on a single carriage way or dual carriage ways with flows in excess of 120,000 vehicles per day where the 2010 background level is expected to be above 2 μgm^{-3}

Sources

New Industrial Sources (D) and Industrial sources with substantially increased emissions, or new relevant exposure (E)

Nottingham City Council is not aware of any new industrial processes requiring 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 (F)

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 (G)

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'. 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.

Updating and Screening Assessment: 1,3 butadiene

Air Quality Objective

The Air Quality Objective for 1,3 butadiene is 2.25 μg/m^3 measured as a running annual mean to be achieved by 31st December 2003.

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.

New Industrial sources (B) and Industrial sources with substantially increased emissions, or new relevant exposure (C)

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.

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

Conclusion for 1,3 butadiene

It is not necessary to proceed to a Detailed Assessment.

Updating and Screening Assessment: Lead (Pb)

Air Quality Objective

The Air Quality Objective for lead is 0.5 μg/m^3 measured as an annual mean to be achieved by 31st December 2004.

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 AQMAs with respect to lead and therefore does not 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.

New Industrial sources (B) and Industrial sources with substantially increased emissions, or new relevant exposure (C)

Nottingham City Council is not aware of any new industrial processes requiring permitting under the Industrial Pollution Prevention and Control regime, within or adjacent to the area, or of any increase in emissions from existing processes.

Conclusion for lead

It is not necessary to proceed to a Detailed Assessment.

The Updating and Screening Assessment: Nitrogen dioxide (NO_2)

Air Quality Objectives

Two Air Quality Objectives have been set for nitrogen dioxide to be achieved by the end of 2005. These are:

i) 40 μg/m^3 measured as an annual mean and

ii) 200 μg/m^3 measured as a 1-hour mean to be exceeded no more than 18 times per year.

The first Air Quality Daughter Directive set limit values for nitrogen dioxide which have been transposed into UK legislation. The Directive includes a 1-hour limit value of 200 μg/m^3, not to be exceeded more than 18 times per year, and an annual mean limit value of 40 μg/m^3, both to be achieved by 1 January 2010.

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

Monitoring data outside an AQMA (A)

Monitoring was undertaken at the AURN, Clinton Street East and with diffusion tubes at various locations (Appendix 1– results, appendix 2 – monitoring equipment locations).

The AURN station is located adjacent to AQMA 2. The 2005 annual mean was 33 μg/m^3. This was not an exceedance of the annual mean AQO. There were no recorded exceedances of the1-hour 200 μg/m^3 AQO at this location (Appendix 1 Table 4).

A number of diffusion tubes, after bias adjustment, indicated nitrogen dioxide levels exceeding the annual mean of 40 μg/m^3 (Appendix 1 Table 10).

Monitoring data within an AQMA (B)

Automatic (continuous) monitoring was undertaken at two sites; AQMS at QMC, Dunkirk and the Romon unit, Carter Gate and with diffusion tubes at various locations (Appendix 1– results, appendix 2 – monitoring equipment locations).

At the AQMS located within the AQMA 3 (Dunkirk) the 2005 annual mean concentration was 35 μg/m^3. This was not an exceedance of the annual mean

AQO. There were no recorded exceedances of the1-hour 200 μg/m^3 AQO at this location.

The Romon at Carter Gate located within AQMA 2 measured the 2005 annual mean as 36 μg/m^3. This is not an exceedance of the annual mean AQO. There were no recorded exceedances of the1-hour 200 μg/m^3 AQO at this location.

A number of diffusion tubes, after bias adjustment, indicated nitrogen dioxide levels exceeding the annual mean of 40 μg/m^3 (Appendix 1 Tables 8 and 9).

Sources

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

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

No streets meeting the criteria were identified.

Junctions (D)

A number of junctions have been identified as having flows of more than 10,000 vehicles per day.

Previous detailed modelling of the city area included these junctions and predicted that it was unlikely that the 2005 Air Quality Objectives would be exceeded.

Because of the two existing AQMAs for nitrogen dioxide a Detailed Assessment will be required for 2007 and therefore all junctions meeting the 10,000 vehicle criteria will be considered.

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

These were considered in detail in the Second and Third Stage Review and Assessment. Only those roads within or immediately adjacent to AQMAs were considered by the Fourth Stage Review and Assessment using advanced dispersion modelling. The modelling predicted no areas where the AQO was likely to be exceeded.

Roads with high flow of buses and/or HGVs (F)

No roads in the Nottingham City area were identified where 25% of the AADT comprises buses/HGVs.

New Roads constructed or proposed since the previous round of R&A (G)

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

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

No roads were identified with significantly changed flows. No new locations of 'relevant exposure' were identified.

Bus Stations (I)

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.

New Industrial Sources (J) and Industrial sources with substantially increased emissions, or new relevant exposure (K)

Nottingham City Council is not aware of any new industrial processes requiring permitting under the Industrial Pollution Prevention and Control regime or of any processes with substantially increased emissions.
No new relevant exposure has been identified.

Aircraft (L)

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 Assessment for nitrogen dioxide with respect to i. the existing Air Quality Management Areas ii. a number of roads and junctions with traffic flows meeting the guidance criteria and iii. some of the diffusion tube monitoring data.

The Updating and Screening Assessment: Sulphur dioxide (SO_2)

Air Quality Objectives

Three Air Quality Objectives have been set for sulphur dioxide:
266 $\mu g/m^3$ measured as a 15-minute mean not to be exceeded more than 35 times in a year by the end of December 2005,
350 $\mu g/m^3$ measured as a 1-hour mean to be exceeded no more than 24 times in a year, by the end of 2004,
125 $\mu g/m^3$ measured as a 24-hour mean to be exceeded no more than 3 times in a year by the end of 2004,

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

Monitoring data outside an AQMA (A)

Monitoring is undertaken at two locations outside the AQMA: the AURN, Clinton Street West and the AQMS at Queens Medical Centre/Dunkirk.

No exceedances of the Air Quality Objectives occurred at either site.
Appendix 1 Tables 4 and 5.

Monitoring data within an AQMA (B)

Monitoring is undertaken at a location within AQMA 1 where advanced dispersion modelling predicted the highest ground level concentrations were likely to occur.

No exceedances of the Air Quality Objectives occurred at the monitoring site. Appendix 1 Table 7.

New Industrial sources (C) and Industrial sources with substantially increased emissions (D)

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

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

Three major combustion processes exist in and adjacent to the City area. These were examined in the 2003 USA. Nottingham City Council is not aware of any significant operational changes to the plant or any substantial increase in emissions from existing plant.

Domestic (E)

Smoke Control Areas have been designated for the whole of the Nottingham City area and no areas of 'significant' solid fuel use (more than 100 properties in a 500m x500m area) have been identified.

Small Boilers > 5 MW (thermal) (F)

There have been no new small boilers in the Authorities area since the 2003 USA.

Emissions from the City Hospital Boiler Plant were assessed as part of the 2004 Detailed Assessment and reported on in the 2005 Progress Report. Monitoring within the AQMA continues to show no exceedance of the Air Quality Objectives.

Shipping (G)

There are no local sources of shipping emissions.

Railway Locomotives (H)

The Updating and Screening Assessment 2003 process identified the Nottingham Main Line Station as a location with the potential for 'regular outdoor exposure' of members of the public to sulphur dioxide, and therefore the requirement to undertake a Detailed Assessment for sulphur dioxide in the vicinity of the Station.

The Detailed Assessment of the Station conducted using complex computer modelling predicted a maximum 99.9^{th} percentile concentration of 235 $\mu g/m^3$ (which included a 6 $\mu g/m^3$ background contribution). This was lower than the 15-minute AQO of 266 $\mu g/m^3$ and it was therefore concluded that the Air Quality Objectives for sulphur dioxide would be met in all locations at the mainline station.

Updated information received from the local rail operator in 2006 indicated that the original information received for the Detailed Assessment had changed. The two older classes of High Speed Trains had been replaced by a more modern, more fuel efficient / lower emission type locomotive. Although there has been a slight increase in the number of weekly train movements it is not significant with respect to the AQOs.

Conclusion for sulphur dioxide

It is not necessary to proceed to a Detailed Assessment for sulphur dioxide. Sufficient monitoring data exists to allow revocation of AQMA 1.

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

Air Quality Objectives

Two Air Quality Objectives have been set for PM_{10};
40 $\mu g/m^3$ measured as an annual mean,
50 $\mu g/m^3$ 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 $\mu g/m^3$ 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 $\mu g/m^3$ measured as an annual mean, to be achieved by the end of 2010.

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

Monitoring data outside an AQMA (A)

Monitoring is undertaken at two locations outside the AQMA: AURN, Clinton Street East and the AQMS at Queens Medical Centre/Dunkirk.

Particles PM_{10} 2005 annual mean
AURN = 23 $\mu g/m^3$
AQMS = 25 $\mu g/m^3$

No exceedances of the Air Quality Objectives occurred at either site.
Appendix 1 Tables 4 and 5.

Monitoring data within an AQMA (B)

Not applicable as no AQMA for PM_{10} (NO_2 and SO_2 only)

Sources

Reference was made to the Environment Agency's process and emission database, and AADT traffic flow data from the Transportation Team.

Busy roads and junctions in Scotland (C)
Not applicable

Junctions (D)

A number of junctions have been identified as having flows of more than 10,000 vehicles per day.

Previous detailed modelling of the city area included these junctions and predicted that it was unlikely that the 2004 Air Quality Objectives would be exceeded. However, as a detailed assessment for nitrogen dioxide will be undertaken for these junctions the opportunity will be taken to model PM_{10} as well.

Roads with high flow of buses and/or HGVs (E)

Two roads have been identified as meeting the criteria, for which a detailed assessment for PM_{10} will be undertaken.

New Roads constructed or proposed since last round of R&A (F)

No new roads have been constructed or proposed.

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

No roads were identified with significantly changed flows. No new locations of 'relevant exposure' were identified.

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 Urban an advanced dispersion model. Complex modelling predicted the 90th percentile (which approximates to 35 exceedances of the 24-hour mean) as 46 $\mu g/m^3$. Thus the 24-hour mean objective was not exceeded and it is not necessary to proceed to a Detailed Assessment.

New Industrial sources (I) and Industrial sources with substantially increased emissions, or new relevant exposure (J)

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

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

Nottingham City Council is not aware of any significant operational changes to plant or any substantial increase in emissions from existing plant or of any new relevant exposure.

Areas of domestic solid fuel burning (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) were 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 necessary to proceed to a Detailed Assessment for two roads in the City Centre area.

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:

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.

Lead

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

Sulphur dioxide

It is not necessary to proceed to a Detailed Assessment for sulphur dioxide.

Nitrogen dioxide

It is necessary to proceed to a Detailed Assessment for nitrogen dioxide with respect to i. a number of roads and junctions with traffic flows meeting the guidance criteria and ii. the existing air quality management areas.

Particles (PM_{10})

It is necessary to proceed to a Detailed Assessment for two roads in the City Centre area.

Appendix 1

Table 4

2005 Annual Summary Statistics for Pollutants Measured at AURN, Clinton Street East, City Centre

Nitrogen Dioxide NO_2		
	μgm^{-3}	**Objective exceeded?**
Annual mean	33	No
Maximum 1 hour mean	145	No
Data Capture	91.8%	
Sulphur Dioxide SO_2		
	μgm^{-3}	**Objective exceeded?**
Maximum 15 minute mean	69	No
Maximum 1 hour mean	51	No
Maximum 24 hour mean	24	No
Data Capture	92.6%	
Particulate Matter PM_{10} (Gr eq)		
	μgm^{-3}	**Objective exceeded?**
Annual mean	23	No
Maximum 24 hour mean	84.0 6 occurrences >= 50 ☒gm^{-3}	No
Data Capture	97%	
Carbon Monoxide CO		
	mgm^{-3}	**Objective exceeded?**
Maximum daily running 8 hour mean	3.0	No
Data Capture	87%	
Benzene		
	μgm^{-3}	**Objective exceeded?**
Annual mean	1.6	No
Data Capture	99.9%	No

12 months data – 01.01.05 to 31.12.05 ratified

Gr.eq = gravimetric equivalent

Table 5

2005 Summary Statistics for Pollutants Measured at AQMS, Queens Medical Centre, Clifton Boulevard

Nitrogen Dioxide NO_2		
	μgm^{-3}	**Objective exceeded?**
Annual mean	35	No
Maximum 1 hour mean	143	No
Data Capture	99.3%	
Sulphur Dioxide SO_2		
	μgm^{-3}	**Objective exceeded?**
Maximum 15 minute mean	64	No
Maximum 1 hour mean	44	No
Maximum 24 hour mean	17	No
Data Capture	98.3%	
Particulate Matter PM_{10} (Gr eq)		
	μgm^{-3}	**Objective exceeded?**
Annual mean	25	No
Maximum 24 hour mean	90 9 occurrences >= 50 ☒gm^{-3}	No
Data Capture	97.7%	
Carbon Monoxide CO		
	mgm^{-3}	**Objective exceeded?**
Maximum daily running 8 hour mean	4.2	No
Data Capture	99.6%	

12 months data – 01.01.05 to 31.12.05 Ratified

Gr.eq = gravimetric equivalent

Table 6

2005 Summary Statistics for Nitrogen Dioxide Measured at Carter Gate, City Centre

Nitrogen Dioxide NO_2		
	μgm^{-3}	**Objective exceeded?**
Annual mean	36	No
Maximum 1 hour mean	185	No
Data Capture	93.2%	

12 months data – 01.01.05 to 31.12.05 Ratified

Table 7

2005 Summary Statistics for Sulphur Dioxide Measured at City Hospital Site, Edwards Lane.

Sulphur Dioxide SO_2		
	μgm^{-3}	**Objective exceeded?**
Maximum 15 minute mean	132	No
Maximum 1 hour mean	50	No
Maximum 24 hour mean	21	No
Data Capture	99.0%	

12 months data – 01.12.05 to 31.12.05 Ratified

Table 8

Diffusion Tube Nitrogen Dioxide Concentrations

2005 Nitrogen Dioxide Concentrations Measured with Diffusion Tubes located within AQMA No.2 - City Centre

Site Type	Site ID	Location	Bias Adjusted Average NO_2 μgm^{-3}	Unbiased Data Average NO_2 μgm^{-3}	Tube on Building Facade	Tube Distance from Façade (m)
R	B	Langtry's PH Upper Parl. St	**43**	53	Yes	0
R	N	The Castle PH Lower Parl St*	**48**	60	No	3

Table 9

2005 Nitrogen Dioxide Concentrations Measured with Diffusion Tubes located within AQMA No.3 - Dunkirk

Site Type	Site ID	Location	Bias Adjusted Average NO_2 μgm^{-3}	Unbiased Data Average NO_2 μgm^{-3}	Tube on Building Facade	Tube Distance from Façade (m)
R	A	Sids Beeston Road (1)	**43**	53	Yes	0
R	G	25 Beeston Road (2)	**62**	77	No	3
R	J	31 Clifton Boulevard*	36	45	No	12
R	K	Derby Road A	37	46	No	10

Table 10

2005 Nitrogen Dioxide Concentrations measured with Diffusion Tubes Located Outside AQMAs

Site Type	Site ID	Location	Bias Adjusted Average NO_2 μgm^{-3}	Unbiased Data Average NO_2 μgm^{-3}	Tube on Building Facade	Tube Distance from Façade (m)
R	C	Mansfield Road*	**45**	55	Yes	0
R	D	High Cross Woodborough Road	**43**	54	Yes	0
R	E	Selincourt Queen's Road*	**47**	58	Yes	0
R	F	Trent Bridge	**41**	51	Yes	0
R	H	82 Beeston Road (3)*	**49**	61	No	6
R	I	121 Beeston Road (4)**	**42**	51	No	4
R	L	Derby Road B	34	42	No	25
R	M	328 Derby Road C**	34	43	No	9
R	P	87-89 Castle Boulevard**	40	50	Yes	0
R	Q	10 Canning Terrace*	**48**	60	No	2
R	R	YMCA**	**43**	53	Yes	0
R	S	Alfreton / Bentinck Road**	**45**	55	No	4
R	T	Ilkeston Road - *National Survey*	26	32	Yes	0
UB	U	Ransom Drive - *National Survey*	10	12	No	N/A
UB	V	Noel Street Baths - *National Survey*	21	27	No	N/A

Figures in bold type face indicate concentrations above the annual mean NO_2 AQO

R = Roadside
UB = Urban Background
NS **=** National Survey
***** **=** 11 months data February 2005 to December 2005
****** **=** 9 months data April 2005 to December 2005

Table 11

Bias Adjustment Factor Details

Continuous Analyser and Diffusion Tube Annual Mean Nitrogen Dioxide Concentrations at Co-Located Sites

Site / Site Type	Cm NO_2 μgm^{-3}	Dm NO_2 μgm^{-3}	Bias Adjustment Factor, A	Data Capture %	Precision (CoV) %
AURN Urban Centre	33	42	0.773	91.8	6.1
Carter Gate Roadside	36	49	0.740	93.2	8.5
Queen's Medical Centre	35	40	0.910	99.3	8.3
Averaged Bias Adjustment factor, A	-	-	0.808		

12 Months data January 2005 to December 2005

Cm = chemiluminesence (continuous) analyser measurement

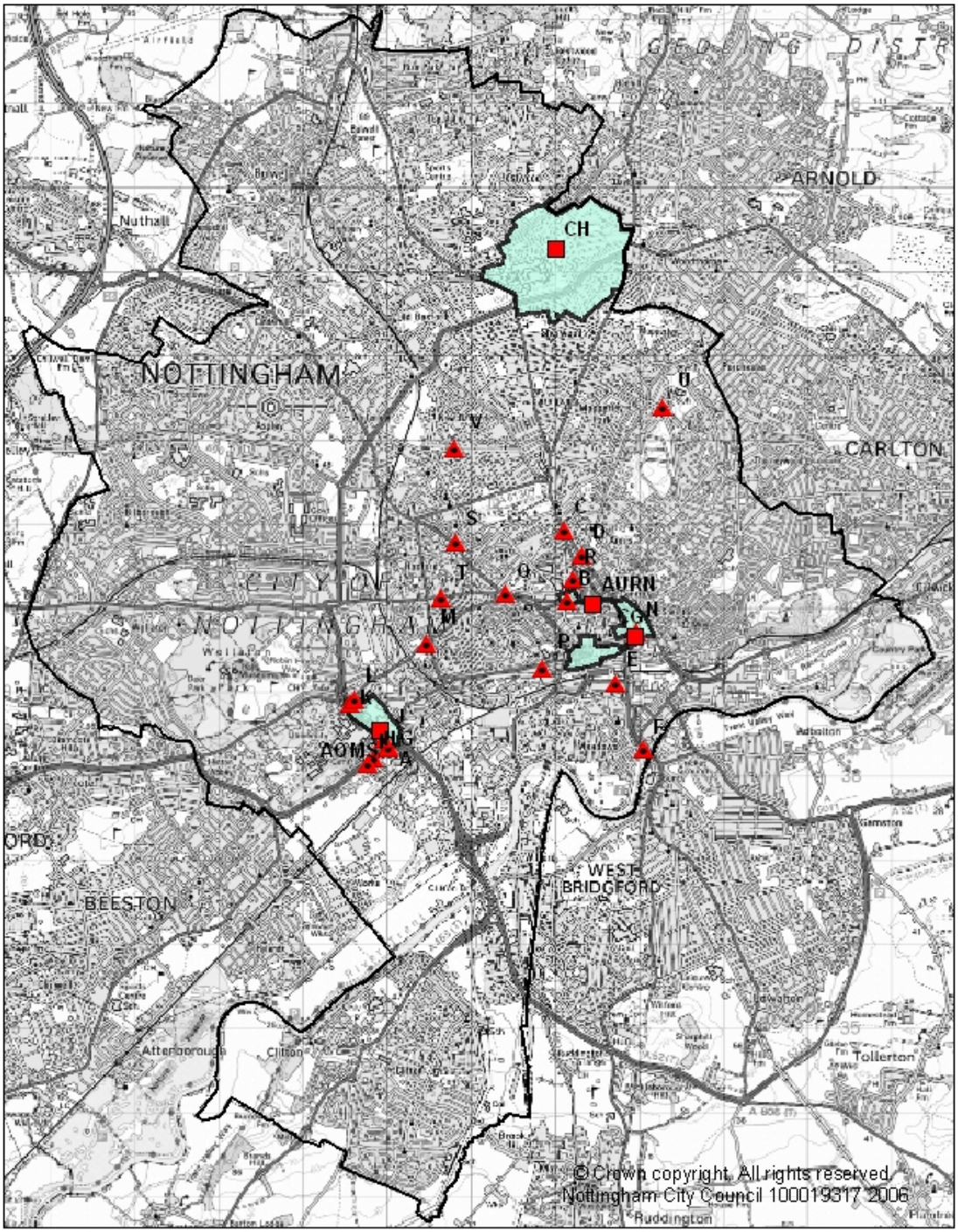
Dm = diffusion tube measurement

Bias Adjustment Factor =Cm/Dm

CoV = Coefficient of variation

Appendix 2

Nottingham City Council Monitoring Sites & Air Quality Management Areas



Key

- Diffusion Tube
- Continuous Analysers
- Air Quality Management Areas
- City Boundary

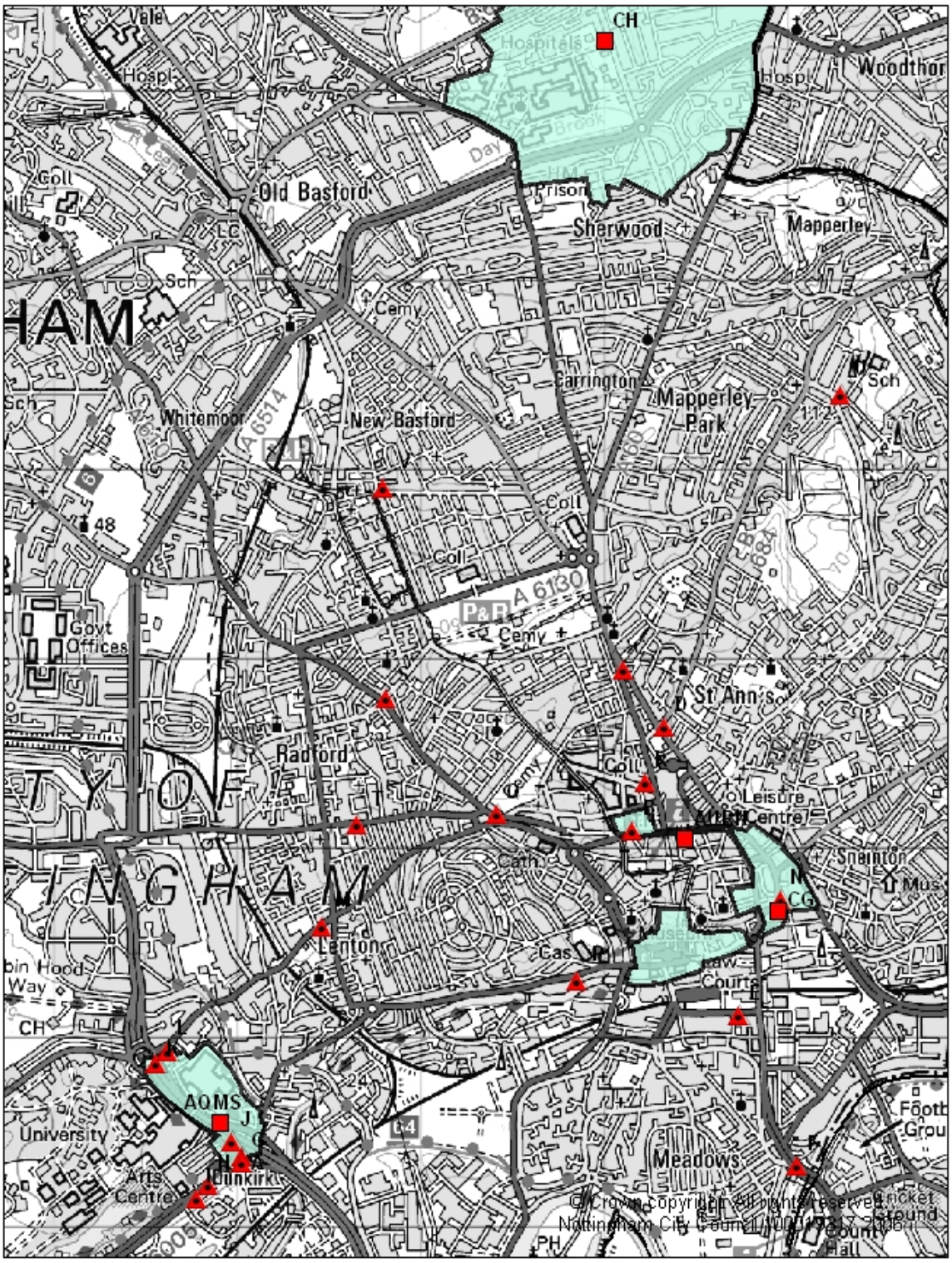
0 1 2 4 Kilometers

City of NOTTINGHAM
City Development
Pollution Control Section

N

Scale : 1:66000
Drawn : GJT/JA
Date : June 2006

Nottingham City Council Monitoring Sites & Air Quality Management Areas



References

Department for Environment Food and Rural Affairs (2003) Part IV of the Environment Act 1995, Local Air Quality Management: Policy Guidance LAQM.PG (03)

DEFRA (2003) Part IV of the Environment Act 1995, Local Air Quality Management: Technical Guidance LAQM.TG (03)

DETR (2000) **The Air Quality Strategy for England, Scotland, Wales and Northern Ireland**, Department of the Environment, Transport and the Regions, London

DETR **Air and Environment Quality** [on line] Available at: http://www.environment.detr.gov.uk/airq/aqinfo.htm

NETCEN **The UK National Air Quality Information Archive** [on line] Available at: http://www.aeat.co.uk/NETCEN/airqual

Nottingham City Council (2000) **Air Quality Review and Assessment. First and Second Stage.**

Nottingham City Council (2001) **Air Quality Review and Assessment. Second and Third Stage.**

Nottingham City Council (2003) **Air Quality Review and Assessment: Fourth Stage.**

Nottingham City Council (2003) **Local Air Quality Management: Updating and Screening Assessment.**

Nottingham City Council (2004) **Local Air Quality Management: Detailed Assessment.**

Nottingham City Council (2005) **Local Air Quality Management: Progress Report.**

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.

http://www.nottinghamcity.gov.uk/sitemap/environment/pollution/air_pollution/air_quality.htm