AIR QUALITY PROGRESS REPORT

NORTH WEST LEICESTERSHIRE DISTRICT COUNCIL
COUNCIL OFFICES, COALVILLE

PREPARED FOR NORTH WEST LEICESTERSHIRE DISTRICT COUNCIL

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EXECUTIVE SUMMARY

This Air Quality Progress Report 2008 fulfils North West Leicestershire District Council's commitment to the Local Air Quality Management (LAQM) process. This report follows the requirements of the DEFRA guidance LAQM.TG (03) and is part of the third round of Review and Assessment undertaken by the District Council, which has comprised an Updating and Screening Assessment in 2006, a Detailed Assessment and a Progress Report both produced in 2007.

Concentrations of benzene, 1,3-butadiene, lead, sulphur dioxide and particulate matter (PM_{10}) have not exceeded or are not expected to exceed the air quality objectives. An open-cast coal mine at Ravenstone will be installing two real-time PM_{10} analysers at the site boundaries and monitoring data is expected in 2008.

North West Leicestershire District Council has designated four Air Quality Management Areas (AQMAs) for nitrogen dioxide at Kegworth and along the M1 and more recently at Castle Donington and Coalville. Monitoring work using a network of nitrogen dioxide diffusion tubes and one real time monitor has identified that nitrogen dioxide concentrations in these areas still exceed the air quality objectives. Further Assessments are currently underway to confirm the extent of the two newest AQMAs. It is recommended that hourly average monitoring is conducted at the Molehill House M1 AQMA due to possible exceedences of the one-hour objective.

A Detailed Assessment is ongoing at Copt Oak to determine whether an AQMA for nitrogen dioxide should be designated at this location. Monitoring has shown exceedences of nitrogen dioxide objectives in three of the last five years and Highways Agency data support these findings.

The quantity of passenger and freight movements at East Midlands Airport has exceeded the threshold determined by guidance at which a Detailed Assessment should be undertaken. A Detailed Assessment for nitrogen dioxide is ongoing at this site.

Three new residential developments are planned at Ashby-de-la-Zouch, Castle Donington and Coalville, with an extension of the A511 Coalville bypass also currently in the scoping stage. Issues with access via existing AQMAs are discussed.

The District Council Air Quality Action Plan has been updated; progress has been made in many areas, with six actions now complete. Further progress is expected once the options appraisal for phase 2 of the M1 improvement programme is undertaken.

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1.0 INTRODUCTION

1.1 DESCRIPTION OF THE DISTRICT

North West Leicestershire lies within the East Midlands, between Leicester, Burton-on-Trent, Derby and Nottingham and encompasses 105 square miles. The major urban areas of the district are the towns of Coalville and Ashby-de-la-Zouch, and the large villages of Castle Donington, Kegworth and Ibstock. The M1, M42/A42 between Birmingham and Nottingham and the A50/A511 from Leicester to Burton-on-Trent all run through the district and East Midlands Airport is located north of Castle Donington.

1.2 INTRODUCTION TO THE SECOND AND THIRD ROUNDS OF REVIEW AND ASSESSMENT

Part IV of the Environment Act 1995 requires local authorities to review and assess the current and likely future air quality in their areas. The reviews consider whether the air quality objectives described in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland (DEFRA, 2007) are met or are likely to be met within prescribed time frames. Those locations that do not, or are unlikely to meet the objectives, must be designated as Air Quality Management Areas (AQMAs). An

Action Plan to reduce pollutant emissions in the AQMAs is then developed and the area is monitored during further reviews.

Review and Assessment is an ongoing process, structured in a series of national 'rounds' as described in Local Air Quality Management Technical Guidance (LAQM.TG(03)) (DEFRA, 2003). Most local authorities have completed round two and round three is now underway. The phased approach to the rounds means that a report on air quality is produced every year. Updating and Screening Assessments (USA) identify matters that have changed since the previous round. Detailed Assessments are produced if the USA identifies any areas at risk of exceeding air quality objectives. In years where neither of these reports are produced, a Progress Report is required.

A Progress Report presents monitoring data for the year and describes any changes occurring within the district. This allows continuity in reporting and provides an opportunity to demonstrate the progress of Action Plans.

This Progress Report follows the USA conducted in 2006 and the subsequent Detailed Assessment in 2007. A Progress Report was also submitted in 2007.

1.3 THE AIR QUALITY OBJECTIVES

The Air Quality (England) Regulations 2000 (The Stationery Office, 2000) and The Air Quality (England) (Amendment) Regulations 2002 (The Stationery Office, 2002) prescribe air quality standards and objectives for key pollutants, which are designed to protect human health and the environment. Standards are based on scientific and medical research and are the concentrations at which there are unlikely to be any health effects, even to sensitive population groups, or below which risks to public health would be very small. Objectives set out the extent to which these standards should be achieved and provide a timeframe. The Air Quality Strategy (DEFRA, 2007) has updated the objectives and describes how different sectors including industry, transport and local government, can contribute to achieving them.

Table 1 presents the air quality objectives. These objectives only apply where members of the public are likely to be regularly present and are likely to be exposed for the averaging time of the objective. Annual mean objectives therefore apply to residential properties, schools and hospitals. One-hour objectives apply at these locations as well as at outdoor locations where a member of the public might reasonably be expected to stay for one hour or more, such as shopping streets, parks and sports grounds, as well as bus stations and railway stations that are not fully enclosed.

Table 1. Air Quality Objectives

Pollutant	Time Period	Objective / Value	Date to be Achieved by and Maintained Thereafter
Benzene	Running Annual Mean	16.25 μgm^{-3}	2003
	Annual Mean	5 μgm^{-3}	2010
1,3-Butadiene	Running Annual Mean	2.25 μgm^{-3}	2003
Carbon Monoxide	Max, daily running 8-hour mean	10.0 μgm^{-3}	2005
Sulphur Dioxide	1-hour mean	350 μgm^{-3} not to be exceeded more than 24 times per year	2005
	24-hour mean	125 μgm^{-3} not to be exceeded more than 3 times per year	2005
Particulate Matter (PM_{10})	24-hour mean	50 μgm^{-3} not to be exceeded more than 35 times per year	2004
	Annual mean	40 μgm^{-3}	2004
Nitrogen Dioxide	1-hour mean	200 μgm^{-3}not to be exceeded more than 18 times a year	2010
	Annual mean	40 μgm^{-3}	2010

1.4 KEY FINDINGS OF PREVIOUS REVIEW AND ASSESSMENT WORK

Six AQMAs were designated in North West Leicestershire during the first round of review and assessment for the level of nitrogen dioxide concentrations. After Further Assessments it was determined that only two of these locations required AQMA designations and the remaining four were revoked. The most recent USA, undertaken in 2006, concluded that these two sites should remain AQMAs and identified three additional locations where Detailed Assessments should be undertaken to determine whether new AQMAs were required for nitrogen dioxide concentrations. The two AQMAs designated during the first round are presented in Figures 1 and 2.

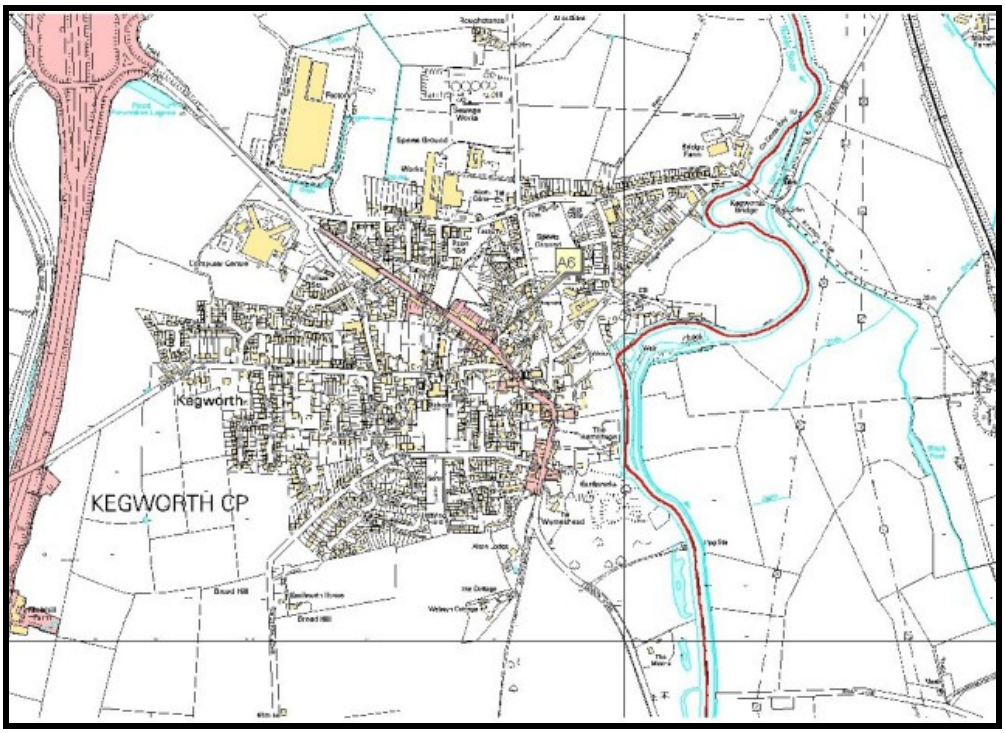


Figure 1 Kegworth AQMA (highlighted in pink). © Crown Copyright. All rights reserved. Licence number 100019329.

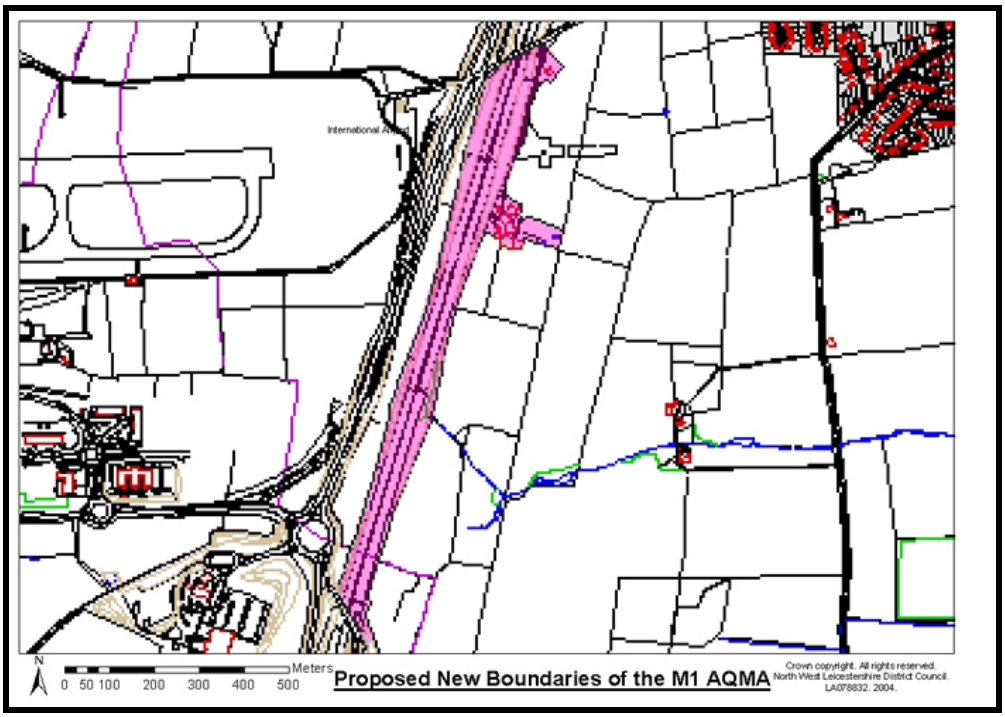


Figure 2 M1 AQMA (highlighted in pink). © Crown Copyright. All rights reserved. License number 100019329

The Detailed Assessment of the three locations identified as possible areas for AQMAs in the USA was undertaken in September 2007. The three locations were

High Street/Bondgate in Castle Donington, Broom Leys Road, Coalville and Bardon Road, Coalville. The Detailed Assessment found that exceedences of the nitrogen dioxide objective were occurring in Castle Donington at properties located next to the carriageway along High Street and Bondgate due to traffic emissions. Monitoring at both locations in Coalville identified nitrogen dioxide concentrations that exceeded the mean annual objective during 2005, 2006 and 2007. The Detailed Assessment concludes that AQMAs should be designated at all three locations.

As a result of these reports, two additional AQMAs were designated; the first in Castle Donington, presented in Figure 3, and the second covering Broom Leys Road and Bardon Road in Coalville, presented in Figure 4.

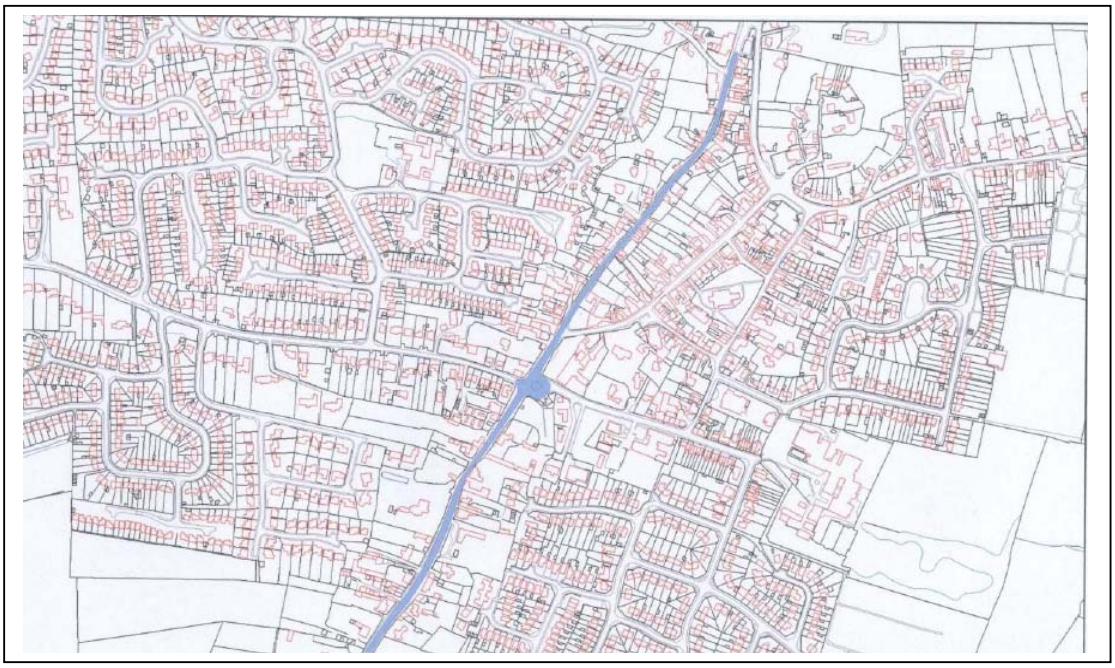


Figure 3 Castle Donington Air Quality Management Area

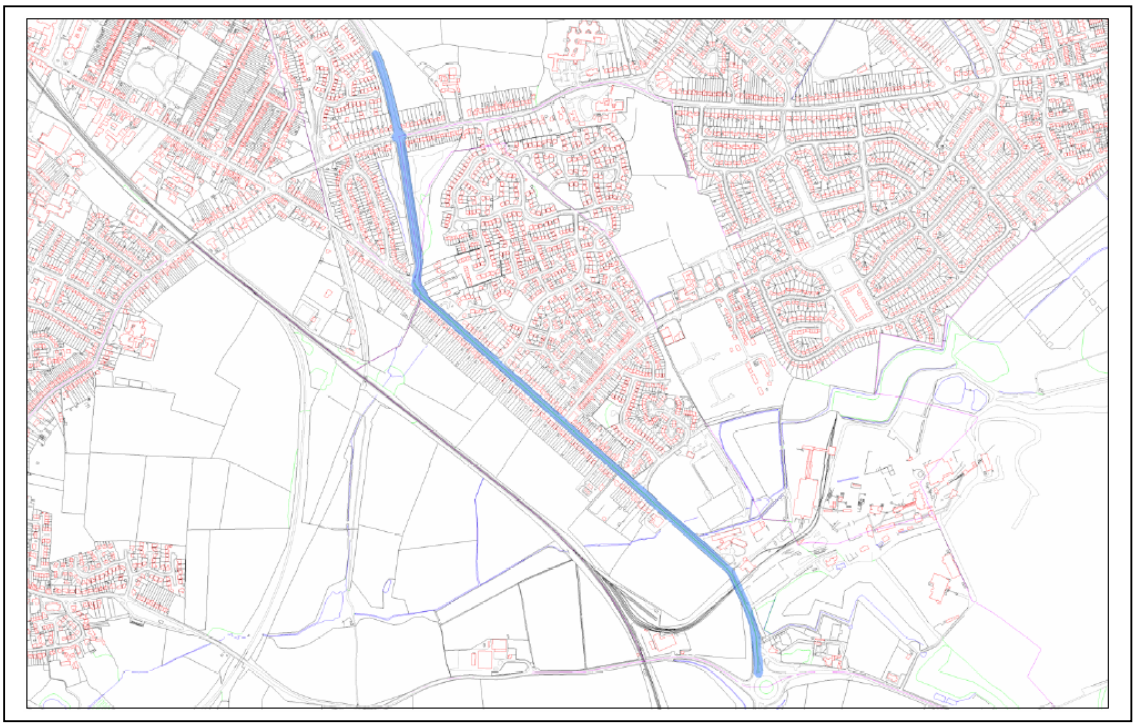


Figure 4 Coalville Air Quality Management Area (Bardon Road and Broom Leys Junction)

2.0 LOCATIONS BEING ASSESSED IN THIS REPORT

This report presents a review of six key air quality pollutants across the entire North West Leicestershire District Council area.

North West Leicestershire District Council has a widespread monitoring network for air quality. The locations of all air quality monitoring undertaken in the district are presented in Appendix A Figure A1. This previously included one real time monitor for nitrogen dioxide and 29 diffusion tubes. Following the findings of the Detailed Assessment, eight new diffusion tubes were added to the network to monitor additional points in the newly designated AQMAs. These were relocated and added to late in 2007 to provide a more comprehensive profile of the AQMAs and therefore the monitoring network in 2008 comprises 49 nitrogen dioxide diffusion tubes and one real time monitor.

East Midlands Airport (EMA) and the District Council monitor nitrogen dioxide at the Aeropark in Castle Donington, using a real time analyser. This forms part of the EMAs own network of nitrogen diffusion tube monitoring, undertaken at eight locations within the airport perimeter. The locations of these diffusion tubes are presented in Appendix A Figure A2.

Monitoring data from the two diffusion tubes located at Copt Oak is supplemented by information from two nitrogen dioxide diffusion tubes owned by ARUP on behalf of the Highways Agency. The Highways Agency also provides the Council with nitrogen dioxide concentrations from their Long Whatton monitoring site, located near to the M1.

Aggregate Industries (UK) Ltd maintains an Osiris PM_{10} monitor which is located approximately 200m from the perimeter of Bardon Quarry, Coalville. Monthly data from this analyser is provided to the Council for use in its Air Quality reporting.

UK Coal will be commissioning two PM_{10} monitors in the vicinity of Ravenstone open cast coal mine. Data is likely to be available from June 2008.

3.0 RESULTS FROM THE ASSESSMENT OF AIR QUALITY POLLUTANTS

The results from the monitoring of the six air quality pollutants of concern, benzene, 1,3-butadiene, lead, sulphur dioxide, particulate matter and nitrogen dioxide, are considered individually below.

3.1 BENZENE

It is considered that benzene emissions are unlikely to have increased in the district since June 2005, as no significant developments involving the major sources of benzene emissions, petrol-engine vehicles, petrol refining, petrol station forecourts and specific industrial uses, have been agreed since this time.

Benzene monitoring is undertaken at the Aeropark in Castle Donington, the nearest residential area to EMA. Results of this monitoring are presented in Table 2. Benzene levels have decreased since 2006 and are significantly below the objective for benzene of 5μgm^{-3}.

These results indicate that the annual mean and running mean objectives for benzene will be met within the District and therefore a Detailed Assessment will not be required for this pollutant.

Table 2 Benzene Concentrations (μgm^{-3}) recorded at the Aeropark, Castle Donington

Monitoring Period	Benzene Concentration (µgm-3)	
	2006	2007
January	1.3	0.3
February	1	0.4
March	0.7	Damaged tube
April	0.3	Damaged tube
May	0.7	Damaged tube
June	0.3	0.2
July	0.7	0.2
August	0.7	0.1
September	0.7	0.1
October	0.7	0.1
November	0.7	0.2
December	1	0.3
MEAN	**0.7**	**0.2**

3.2 1,3-BUTADIENE

DEFRA's Technical Guidance LAQM.TG(03) notes that although the major source of 1,3-butadiene is motor vehicles, national measures have reduced roadside concentrations to below the air quality objective level. It is considered that only those local authorities with installations in their district that store, use or emit 1,3-butadiene as part of an industrial process should monitor for this pollutant. There are no such installations within North West Leicestershire and therefore there is no requirement for further assessment for this pollutant.

3.3 LEAD

The sale of leaded petrol has been banned in the UK since 2000 and therefore emissions of lead to atmosphere are now only from specific industrial sources including battery manufacture, pigments for paints and glazes, alloys, radiation shielding, tank lining and piping. National monitoring has indicated that concentrations are likely to meet air quality objectives although non-ferrous metal production and foundry processes are considered at risk. It is not considered necessary to conduct any further assessment of lead emissions in North West Leicestershire.

3.4 SULPHER DIOXIDE (SO_2)

Sulphur dioxide is primarily produced by electricity producing power stations, other industrial combustion plant and domestically by solid fuel fires. The USA conducted in 2006 identified that the district was unlikely to exceed the air quality objectives for this pollutant and did not identify any new industrial sources or increases in industrial emissions that were likely to exceed the air quality objectives.

North West Leicestershire is a former coal mining area, however, there is currently only one operational opencast mine, located in Ravenstone. It is not considered that this mine will be a major source of sulphur dioxide.

The technical guidance LAQM.TG(03) notes that a detailed assessment is required where more than 100 properties within a 500m by 500m area use solid fuel as their predominant form of heating. Currently only 791 households within the district receive concessionary coal, therefore it is not likely that domestic solid fuel burning in the district will exceed the air quality objective for sulphur dioxide. There is therefore, no requirement for further assessment.

3.5 PARTICULATE MATTER (PM_{10})

Aggregate Industries (UK) Ltd, who operate Bardon Quarry, use an Osiris PM_{10} monitor located within the grounds of a residential care home, Tillson House, Greenhill Estate, Coalville, to ensure that particulate matter does not exceed the air quality objectives. This is the closest residential area to the quarry and is situated 20m from the boundary. The annual mean PM_{10} concentrations obtained from the monitor are presented in Table 3. The annual mean objective is 40 μgm^{-3} and the 24 hour mean cannot exceed 50 μgm^{-3} more than 35 times per year.

Table 3 Annual Mean PM_{10} Concentration (μgm^{-3}) and the Number of Occasions that the 24-hour Mean Exceeds 50 μgm^{-3} at Tillson House, Coalville

Year	Annual Mean (μgm^{-3})	Number of Exceedences of 24hr Mean
2002	38	33
2003	27	31
2004	26	21
2005	21	13
2006	21	17
2007	31	18

During a Detailed Assessment for PM_{10} at this location, undertaken in 2004, a gravimetric 'Partisol' analyser was co-located for nine months at Tillson House. During this time the analyser monitored 21 exceedences of the 50μgm^{-3} 24-hour mean objective. This limit cannot be exceeded more than 35 times in one year. Although monitoring covered only nine months, extrapolation to the full year indicates that there would only be 28 exceedences.

Since the Detailed Assessment was undertaken in 2004, Bardon Hill Quarry has implemented a wide range of dust suppression and dust minimisation measures. This has resulted in reductions in the both the annual mean PM_{10} concentration recorded and the number of exceedences of the 24-hour mean. There has been a slight increase in the average 24-hour mean during 2007, however, the number of exceedences remains relatively low and an AQMA has therefore not been declared for PM_{10} at this location.

North West Leicestershire is a former coal mining area, however, there is currently only one operational opencast mine, located in Ravenstone. Complaints have been received from residents in Ravenstone regarding dust from the mine. Two real time PM_{10} analysers are due to be installed at the installation boundaries in 2008. Monitoring data from this location will be considered in future assessments.

As previously discussed, only 791 households within the district receive concessionary coal, therefore it is not likely that domestic solid fuel burning in the district is a significant source of PM_{10}.

EMA, located in Castle Donington, is one of the largest cargo terminals in the UK, with an equivalent throughput of 7.85 million passengers per annum (mppa) for 2007. Although aircraft are not major sources of PM_{10} emissions, they can make a contribution close to the source. DEFRA's Technical Guidance LAQM.TG(03) determines that airports with an annual throughput of both passengers and freight of over 10 mppa require a Detailed Assessment for PM_{10} to be conducted. This contrasts with the threshold criteria of 5 mppa for NO_2. Annual throughputs of EMA are presented in Table 4.

Table 4 Annual Throughput of Passengers and Freight (mppa) in 2004 to 2007 at East Midlands Airport

Type of Cargo	Throughput			
	2004	**2005**	**2006**	**2007**
Passengers	4,382,000	4,192,000	4,727,954	5,406,505
Freight (tonnes)	279,000	293,000	328,084	244,753
Freight - Million passengers per annum (mppa)*	2.79*	2.93*	3.28*	2.44*
Total mppa	**7.17**	**7.12**	**8.00**	**7.85**

* The Technical Guidance states that the tonnes of freight should be converted to an equivalent number of passengers using 100000 tonnes = 1 million passengers per annum (mppa).

Freight movements through the airport have decreased 34,247 tonnes since 2004, to only 244,753 tonnes in 2007. Although passenger numbers have fluctuated there has been an overall increase of 1,024,505 passengers resulting in an increase in throughput of 0.68 mppa between 2004 and 2007.

As the annual throughput of passengers and freight in 2007 at EMA was below 10mppa there is no need to conduct a Detailed Assessment for PM_{10} at this location.

3.6 NITROGEN DIOXIDE (NO_2)

Nitrogen dioxide is produced during any combustion process; however, the main source is road transport, particularly in congested urban centres and motorways. The human health effects of nitrogen dioxide are mainly respiratory. Short term exposure to high concentrations can cause inflammation of respiratory airways and

long term exposure may affect lung function and cause enhanced responses to allergens in sensitised individuals. The young, old and asthmatics are particularly at risk.

In order to monitor nitrogen dioxide in North West Leicestershire, a network of diffusion tubes are in place. Diffusion tubes are passive samplers which absorb the pollutant from the surrounding air without the need for a power supply. They consist of small plastic tubes with an open and a closed end. The closed end contains an absorbent for nitrogen dioxide, and after one month the tubes are closed and returned to a laboratory for analysis. North West Leicestershire District Council use Gradko laboratories for analysis of diffusion tubes using 50% TEA in acetone. Tables 5 and 6 present the tube types and locations.

Table 5 Nitrogen Dioxide Diffusion Tube Site Types and Descriptions

Site Type	Description
(UC) Urban Centre	An urban location representative of typical population exposure in towns or city centres e.g. pedestrian precincts and shopping malls.
(UB) Urban Background	An urban location distanced from sources and therefore broadly representative of city-wide background condition e.g. urban residential areas.
(S) Suburban	A location type situated in a residential area on the outskirts of a town or city.
(R) Roadside	A site sampling between 1m of the kerbside of a busy road and the back of the pavement. Typically this will be within 5m of the road, but could be up to 15m.
(O) Other	Any special source-orientated or location category covering monitoring undertaken in relation to specific emission sources such as power stations, car-parks, airports or tunnels.

Table 6 North West Leicestershire District Council Nitrogen Dioxide Diffusion Tube Monitoring Locations

No.	Type	Location Abbreviation	Full Location Description
1	R	Belvoir	Belvoir Rd, Coalville
2	UC	Jackson	Jackson St, Coalville
3	UB	Oxford	Oxford Rd Coalville
4	S	Abbots	Abbots Oak Coalville
5	R	Bardon	Bardon Rd Coalville
6	R	Derby Rd Keg	Derby Road, Kegworth
7	R	Measham	Measham Post Office
8	R	Boundary	Heath La, Blackfordby
9	R	Keg A6 2	A6, Kegworth
10	R	M1 Mole	Sub Station, Molehill House, Kegworth
11	R	Ash A42	Ashby de la Zouch A42
12	R	CD High	Castle Donington High St
13	O	CD EMA	Castle Donington, Stonehill
14	R	CD Station	Castle Donington Station Rd
15	O	CD Dise	Castle Donington Diseworth
16	R	Keg A6	Parish Council Offices, A6, Kegworth
17	S	Keg EMA	Kegworth, Whatton Rd
18	R	Keg Mole	Sub Station, Molehill House, Kegworth
19	R	LW M1	Long Whatton M1
20	R	LW West	Long Whatton West
21	R	Copt Oak	Copt Oak next to the M1
22	R	Charley	Charley
23	R	Broom	Broom Leys Rd/Stephenson Way Junction, Coalville
24	R	Sinope	Ashby Rd, Sinope
25	R	Molehill House	Molehill House, Kegworth
26	O	Aeropark	Aeropark, Castle Donington
27	R	Bardon Rd W	Bardon Rd West Coalville
28	R	M1 Mole 2	Sub Station, Molehill House, Kegworth
29	R	Broomleys	Broom leys Rd/Stephenson Way Junction, Coalville
30	R	155 Bardon	155 Bardon Road, Coalville
31	R	242 Bardon	242 Bardon Road, Coalville
32	R	66 Bardon	66 Bardon Road, Coalville
33	R	104 Hill Top	104 Hill Top Road, , Coalville
34	R	Bond Gate	Bond Gate, Castle Donington
35	R	34 High Street	34 High Street, Castle Donington
36	R	Park Rd	Opposite High Street, Castle Donington
37	R	56 High Street	56 High Street, Castle Donington

The tubes are relatively inexpensive and therefore large numbers can be used to provide good spatial coverage. Ideally, however, they should be used to compliment more expensive automatic techniques, as laboratory analysis will introduce different levels of bias depending on the laboratory used. DEFRA's Technical Guidance

LAQM.TG(03) therefore recommends that a 'bias adjustment factor' is used for diffusion tube measurements. This should be determined by undertaking a co-location study, with a diffusion tube and a real time (reference method) analyser monitoring at the same location. The factor difference can then be applied to all diffusion monitoring undertaken in the district. Default factors have been developed should this not be possible; however North West Leicestershire District Council used a real time monitor and a diffusion tube at their Council offices in Coalville for a year and calculated a ratification factor of 1.04. This has been applied to the 2007 data presented in Figures 5-8. All data prior to this date were ratified using the database factors (spreadsheet version 03/07).

The annual mean air quality objective for nitrogen dioxide is 40µgm^{-3} and the 1-hour mean objective is 200µgm^{-3} with no more than 18 exceedences per year. A mean annual concentration of 60µgm^{-3} indicates that the 1-hour objective has been exceeded (Laxen and Marner, 2003). Figures 5-8 present the annual mean nitrogen dioxide concentrations from the diffusion tube survey.

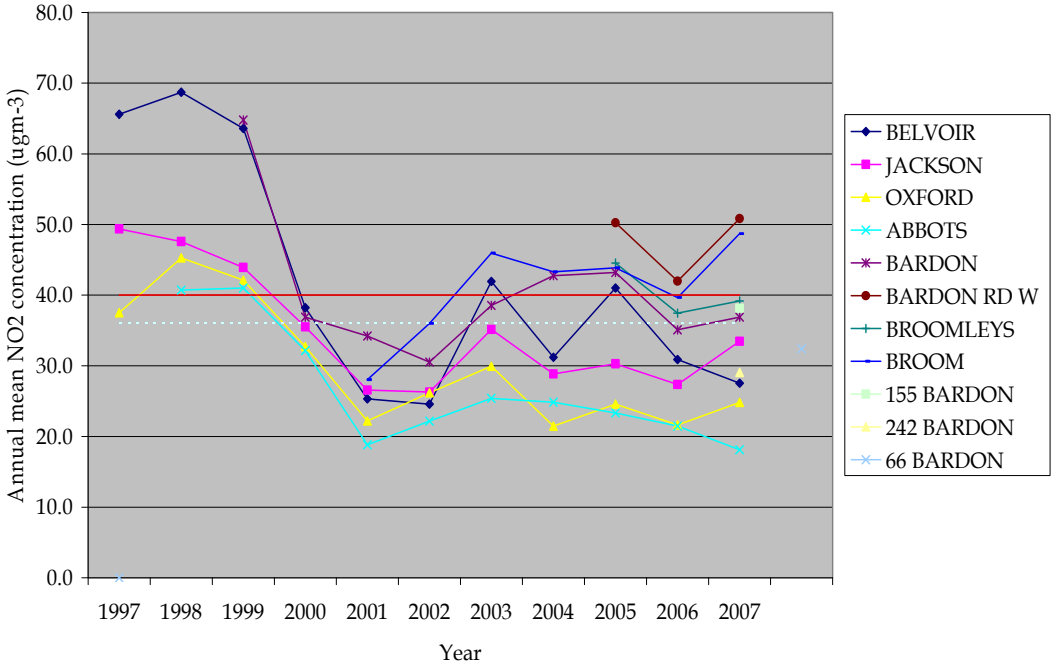


Figure 5 Trends in Nitrogen Dioxide Annual Mean Concentrations (µgm^{-3}) Located in Coalville

Trends in the annual mean nitrogen dioxide concentrations at sites within Coalville are presented in Figure 5. 2001 and 2002 had the lowest nitrogen dioxide concentrations measured with only Broom (Broom Leys Junction) falling within 1 standard deviation of the objective in 2002. In contrast five locations in 2005 exceeded the mean annual objective and therefore prompted the Detailed Assessments at Bardon Road and Broom Leys Junction.

There was a decline in nitrogen dioxide concentrations during 2006; however, in 2007 two sites have exceeded the 40 µgm^{-3} with Broom Leys Junction reaching concentrations higher than previously recorded (since 2001) and Bardon Road West exceeding the 2005 value. Both these nitrogen dioxide tube locations are now within the Bardon Road AQMA declared in January 2008. Three sites in Coalville are within 1 standard deviation of the objective and although most locations have increased in concentration from 2006, Belvoir and Abbots have seen decreases.

Ten diffusion tubes are located in and around the village of Castle Donington. The annual mean nitrogen dioxide concentrations recorded at these sites are presented in Figure 6. Since 1998 there had only been three occasions where the annual mean exceeded the nitrogen dioxide objective until 2007. The 2007 monitoring data shows CD High (Castle Donington High Street), Bondgate, 34 High Street, Park Road Opposite High Street and 56 High Street all exceeded the objective, with 56 High Street reading 43.0µgm^{-3}. A Detailed Assessment was undertaken for this location in 2007 and an AQMA was declared in January 2008.

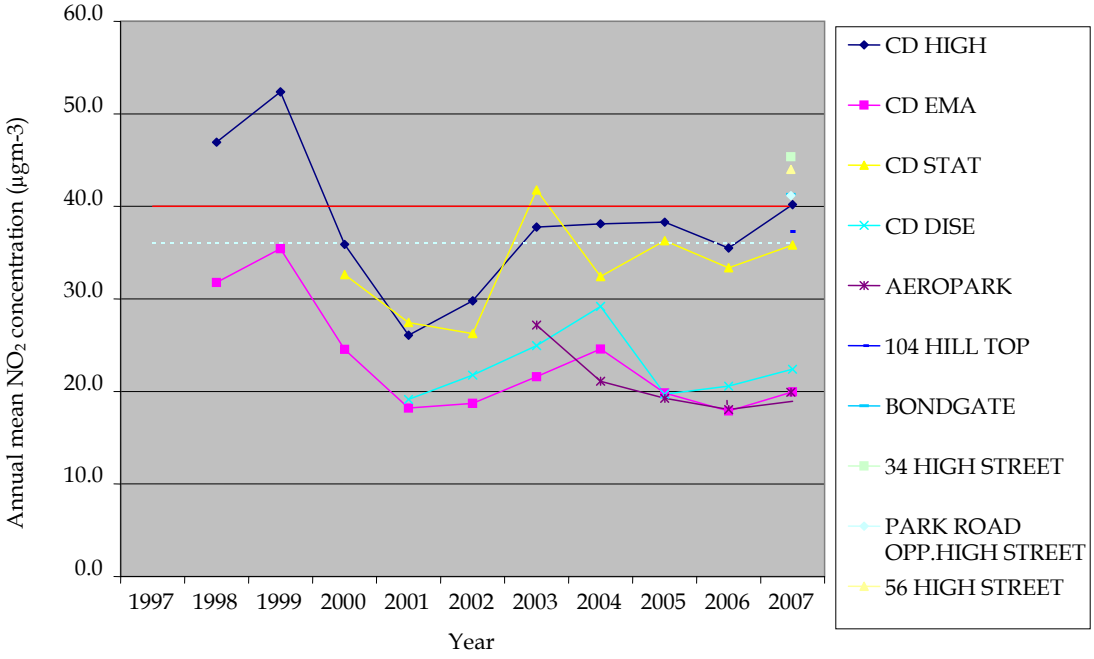


Figure 6 Trends in Annual Mean Nitrogen Dioxide Concentrations (µgm^{-3}) at Locations in Castle Donington

The village of Kegworth is monitored by eight diffusion tubes, seven of which are located in existing AQMAs. Derby Rd, Keg A6 and Keg A6 2 are all located within the Kegworth A6 AQMA. The remaining locations; M1 Mole, Keg Mole, Molehill House and M1 Mole 2 are all located within the Kegworth Molehill House AQMA.

Keg EMA is not located within an AQMA; it monitors emissions in a suburban location under one of the flight paths for East Midlands Airport and consistently records the lowest nitrogen dioxide concentrations in Kegworth.

During 2007 six of the remaining seven tubes recorded an exceedence of the mean annual objective with the seventh site falling within one standard deviation of the objective. Three locations, M1 Mole, Keg Mole and M1 Mole 2 recorded nitrogen dioxide concentrations of over 60 µgm^{-3} indicating that they may be exceeding the one-hour mean objective. These tubes are all at sites around Molehill House Farm, which is within 20m of the M1 and directly under the East Midlands Airport flight path.

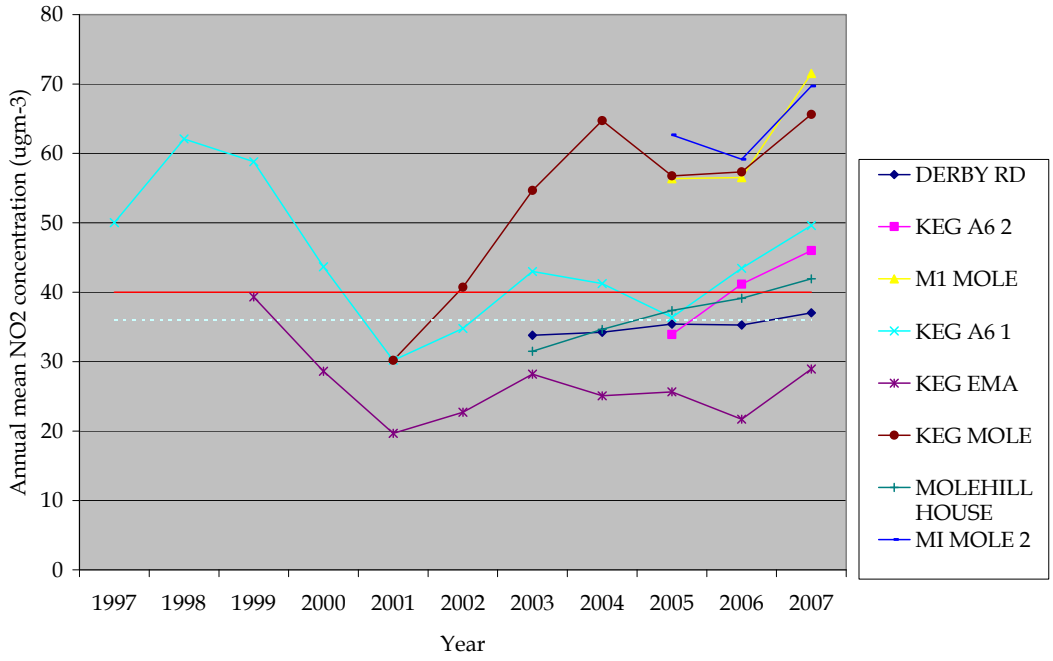


Figure 7 Trends in Annual Mean Nitrogen Dioxide Concentrations (µgm^{-3}) at locations in Kegworth

The remaining eight sites are outside of Coalville, Castle Donington and Kegworth and therefore have been grouped together for ease of reference in Figure 8. Of the eight sites all but Copt Oak are below the 40µgm^{-3} objective level in 2007. Charley was within one standard deviation of the level and had the highest nitrogen dioxide concentrations since recording at this location began in 2001.

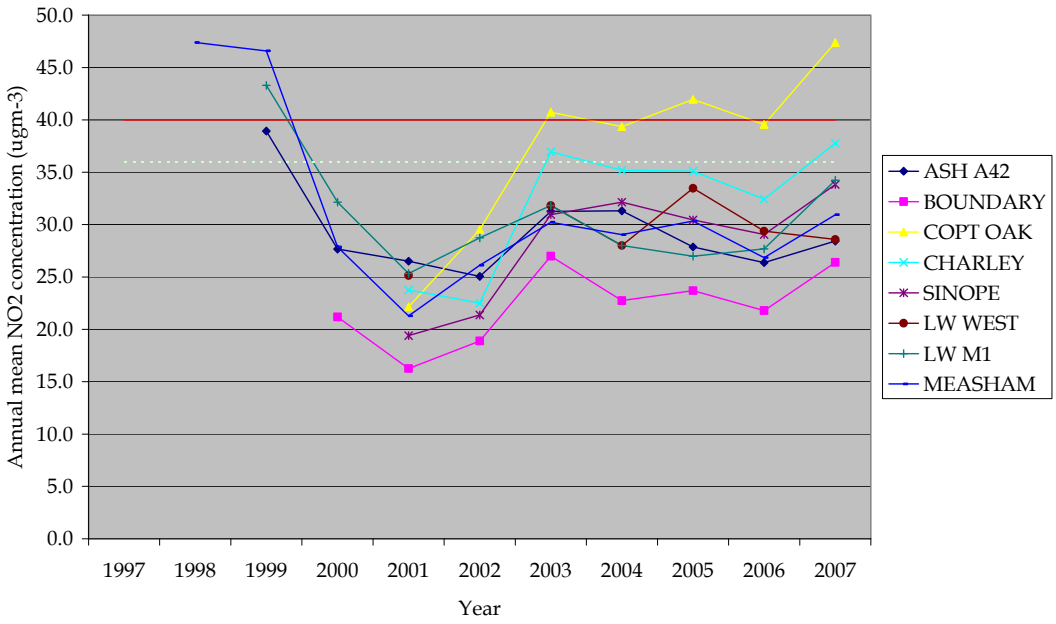


Figure 8 Trends in NO_2 Annual Mean Concentrations (μgm^{-3}) at locations outside Ashby-de-la-Zouch, Coalville and Castle Donington

Copt Oak has exceeded the objective level by 7.4 μgm^{-3}, the greatest amount recorded for this location, and has been over or within one standard deviation of the objective limit for the last five years.

Copt Oak was highlighted in the Progress Report 2007 as an area that required its own Detailed Assessment to determine whether declaration of an AQMA would be appropriate. The Detailed Assessment of Copt Oak is currently underway and North West Leicestershire District Council has recently located a new diffusion tube in addition to the current tube at the B587 Warren Hills Road. Monitoring data for the new tube is not yet available; however the results from the existing tube are presented in Table 7. Additional information is also available for Copt Oak from two nitrogen dioxide diffusion tubes located on Whitwick Road by ARUP, on behalf of the Highways Agency as part of the M1 widening scheme. The data has been provided by ARUP since August 2006 and is presented in Table 7.

Table 7 Monthly Mean Nitrogen Dioxide Concentrations (µgm^{-3}) at Three Sites in Copt Oak

Month	NO_2 Concentration (µgm^{-3})		
	Whitwick Road Copt Oak Tube 1	Whitwick Road Copt Oak Tube 2	B587 Warren Hills Road (Copt Oak)
August 2006	35.24	37.71	42.25
September 2006	44.86	39.07	35.51
October 2006	38.73	39.06	44.03
November 2006	Missing	36.43	44.47
December 2006	40.41	40.87	41.79
2006 MEAN	**39.81**	**38.63**	**41.61**
January 2007	48.17	45.41	43.56
February 2007	53.87	57.22	45.32
March 2007	46.91	46.97	42.06
April 2007	47.49	44.85	43.68
May 2007	37.31	37.55	42.35
June 2007	38.89	39.71	44.41
July 2007	42.64	42.80	46.86
August 2007	41.78	42.52	46.77
September 2007	35.74	41.69	46.78
October 2007	46.23	40.64	54.41
November 2007	59.80	59.10	56.13
December 2007	53.8	53.88	34.55
2007 MEAN	**46.36**	**46.03**	**45.57**
January 2008	36.52	42.64	39.40
February 2008	55.81	41.33	47.41
March 2008	46.34	52.07	Not yet available

The 2007 annual means of all three tubes are over the 40 µgm^{-3} air quality objective; however no tube has exceeded 60µgm^{-3}, indicating that the one-hour air quality objective is not likely to have been exceeded. Nitrogen dioxide concentrations have exceeded the annual mean air quality objective in 2003, 2005, 2007 and 2008. The Detailed Assessment will provide 12 months of data in order to investigate these findings further.

EMA is located near the village of Castle Donington in the north of the district. Aircraft are a significant source of nitrogen dioxide, particularly during take off and up to 200m in the air. Above this height, emissions will have little impact on ground concentrations. There are approximately 630 properties that are within 200m vertically of regular flight paths and 2300 properties within 1km of the airport boundary (Appendix A Figure A2).

EMA have supplied total equivalent passenger numbers in million passengers per annum (mppa) presented in Table 8.

Table 8 Annual Throughput of Passengers and Freight (mppa) for 2004 to 2007 at East Midlands Airport

Type of Cargo	Throughput			
	2004	2005	2006	2007
Passengers	4,382,000	4,192,000	4,727,954	5,406,505
Freight (tonnes)	279,000	293,000	328,084	244,753
Freight - Million passengers per annum (mppa)*	2.79*	2.93*	3.28*	2.44*
Total mppa	**7.17**	**7.12**	**8.00**	**7.85**

* The Technical Guidance states that the tonnes of freight should be converted to an equivalent number of passengers using 100000 tonnes = 1 million passengers per annum (mppa).

Freight movements through the airport have decreased 34,247 tonnes since 2004, to only 244,753 tonnes in 2007. Although passenger numbers have fluctuated there has been an overall increase of 1,024,505 passengers resulting in an increase in throughput of 0.68 mppa between 2004 and 2007. DEFRA's Technical Guidance LAQM.TG(03) recommends that a Detailed Assessment for nitrogen dioxide is conducted once passenger levels reach 5 mppa.

EMA operates its own nitrogen dioxide monitoring network. This consists of eight diffusion tubes and one real time analyser located at the Aeropark to the north of the airport (Appendix A Figure A3). Annual mean nitrogen dioxide concentrations for all locations between 2004 and 2006 are provided in Table 9. There were no exceedences of the annual mean air quality objective in 2006, and only Stand 15 exceeded this objective in 2004 and 2005.

Table 9 East Midlands Airport Maintained Nitrogen Dioxide Diffusion Tube and Real Time Analyser Annual Mean Concentrations (µgm^{-3})

Monitoring Location	Annual Mean NO_2 Concentration (µgm^{-3})		
	2004	2005	2006
Stand 15	41	42	37
Crash Gate 27	31	33	33
Crash Gate 4	31	31	27
Central IRVR	33	31	30
Western Perimeter Fence	25	25	25
Aeropark	27	28	26
Ambassador Road	29	29	28
Aeropark 2	-	23	22
Real Time Analyser	25	26	32

Table 10 presents the monthly mean real time analyser data for 2007. Data is currently unavailable for the diffusion tubes. The annual mean air quality objective has not been exceeded during 2007; however, the monthly mean concentration recorded by the real-time analyser for June was 42.5µgm^{-3}. During this month the nitrogen dioxide concentrations were above the 40 µgm^{-3} for ten days, however the maximum concentration was 61.3µgm^{-3}, well below the 200µgm^{-3} one-hour mean.

Table 10 East Midlands Airport Maintained Nitrogen Dioxide Real Time Analyser Monthly Mean Concentrations (µgm^{-3})

Month	Annual Mean NO_2 Concentration (µgm^{-3})
January	21.58
February	33.81
March	26.64
April	29.61
May	19.06
June	**42.46**
July	17.99
August	21.01
September	20.72
October	32.72
November	32.13
December	31.71
Mean	27.45

Although the monitoring at the Aeropark has shown nitrogen dioxide concentrations at low levels for the last three years, passenger equivalent movements have exceeded 5 mppa. DEFRA's Technical Guidance LAQM.TG(03) recommends a Detailed Assessment is undertaken at this point, and the conclusions of the USA and the Detailed Assessment conducted in 2007 both indicate that a Detailed Assessment would be appropriate. In response to this, a Detailed Assessment is currently underway to determine whether an AQMA is required.

The Aeropark is considered the worst case monitoring location at EMA due to its proximity to the runway; however, the additional nitrogen dioxide diffusion tubes in Castle Donington and Kegworth and the existing monitoring in Isley Walton and Wilson will provide further data concerning nitrogen dioxide concentrations under flight paths.

4.0 NEW OR PROPOSED INDUSTRIAL INSTALLATIONS

Table 11 presents the Part B installations that have been permitted under the Pollution Prevention and Control (England and Wales) Regulations 2000 during 2007. These regulations were superseded in April 2008 by the Environmental Permitting (England and Wales) Regulations 2007.

Table 11 Permitted Part B Pollution Prevention and Control Installations

Permit Ref. No.	Operator	Process Location	Date of Issue	Process Guidance Note
A/98/3.5(B)(a)	Aggregate Industries UK Ltd	Spitfire Quay, Southampton	27th April 2007	PG 3/16(04)
A/99/5.3(B)(a)	Aggregate Industries UK Ltd	Stoneycombe Quay, Newton Abbott, Devon	11th May 2007	PG 3/16(04)
M/100/6.4(B)(a)	Mitchell Grieve	Coalville, Leicestershire	16th August 2007	PG 6/45(04)
T/94/3.5(B)(a)	Terex Pegson Ltd	Coalville, Leicestershire	30th March 2007	PG 3/16(04)
T/101/3.5(B)(a)	Terex Pegson Ltd	Coalville, Leicestershire	20th August 2007	PG 3/16(04)
U/102/3.5(B)(a)	UK Coal Mining Ltd	Long Moor Surface Mine, Ravenstone, Leicestershire	21st September 2007	PG 3/5 (04)
A/103/6.4(B)(b)	Available Car Ltd	Castle Donington, Derbyshire	8th October 2007	PG 6/34 (04)

Table 12 presents the A2 installations that have been permitted under the Pollution Prevention and Control (England and Wales) Regulations 2000 during 2007.

Table 12 Permitted A2 Industrial Pollution Prevention and Control Installations

Permit Ref. No.	Operator	Process Location	Date of Issue	Sector Guidance Note
P/1/6.4(A)(2)(a)	Plastic Omnium Automotive Ltd	Measham, Swadlincote Derbyshire	24th April 2007	SG6
I/36/3.6(A)(2)(a)	Ibstock Brick	Ibstock, Leicestershire	1st June 2007	SG7
I/37/3.6(A)(2)(a)	Ibstock Brick	Ellistown, Leicestershire	1st June 2007	SG7

5.0 NEW OR PROPOSED ROADS

One new road has been proposed in this district since the last round of Review and Assessment; the Coalville Bypass A511 will be extended. This is part of a planned development described in the section below. At present the Scoping Report is being considered by the District Council.

The Local Transport Plan 2006-2011, the second produced by the County, noted that the A6 Kegworth Bypass is due for completion during the third Local Transport Plan period. This road is part of the Highway's Agency M1 improvement plans, however timescales have been delayed due to re-consideration of options for junction 21 and investigations into the feasibility of Active Traffic Management. Discussions between the Highways Agency and the County Council will consider the revised timescales.

6.0 NEW OR PROPOSED DEVELOPMENTS

A Scoping Report has been produced for a development of 5000 residential properties off Bardon Road, Coalville. The development will include shops, a school and provision for a railway station in the future. The A511 will be extended to pass through it.

Planning permission has been granted for 350 houses off Park Road, Castle Donington. Access to these properties can only be achieved by passing through the Castle Donington AQMA.

Leicester Road, Ashby-de-la-Zouch has received planning permission for 350 residential properties which also only have access via one road. Although not yet confirmed, it is likely that a condition of planning approval, using a section 106 requirement, will be to carry out air quality assessment in order to determine whether there has been any affect on local air quality conditions.

A new venue has recently been licensed at Donington Park which will hold up to 60,000 people. Any event holding over 5000 people requires a traffic management plan to be in place. These usually route all vehicles through Castle Donington to reduce traffic on the M1; it is therefore likely that the new venue will increase the nitrogen dioxide levels in the Castle Donington AQMA on event days.

7.0 PROGRESS ON AIR QUALITY ACTION PLAN

North West Leicestershire District Council published an Air Quality Management Plan in December 2005, detailing 26 actions to improve air quality in the district. The following areas were considered:

- Reducing vehicle emissions
- Improving the road network to reduce congestion
- Using area planning measures to reduce traffic volumes
- Reducing air pollution from industry, commerce and residential areas
- Changing levels of travel demand/promotion of alternative modes of transport
- Other measures

Table 13 presents the progress made in relation to each of the actions. Significant progress has been made where actions are directly under the control of the District Council. The previous Progress Report in 2007 noted that little or no progress has been made with actions that the Highways Agency has control over. Although progress in these actions is slower, many of these actions are now underway.

Table 13 North West Leicestershire Air Quality Action Plan

	Actions	Details	Stake-holder	Completion Date	Progress
Reducing Vehicle Emissions					
1	Undertake roadside vehicle emission testing	North West Leicestershire District Council will re-evaluate the viability of the resumption of vehicle emission testing.	NWLDC	Completed	Vehicle Emission Testing undertaken in early 2006. Low uptake at voluntary testing days. Unviable to continue.
2	Improve the Council Fleet	North West Leicestershire District Council will continue to favour low emission vehicles in its own fleet.	NWLDC	Completed	New refuse vehicles fitted with hydraulic system controls (known as "oil on demand") which controls engine revs and reduces fuel consumption
3	Reduction in speed	Reduction in speed limit to optimum for NOx emissions from vehicles using the M1	HA	2005 – 2011	Will be reviewed as part of the options appraisal for Phase 2 of the M1 Improvement Programme.
4	Discourage drivers from allowing their engines to idle unnecessarily when parked	The Council will carry out campaigns to raise awareness and to discourage drivers from allowing their engines to idle when their vehicles are parked for prolonged periods	NWLDC	2006	Enforcement under The Road Traffic (Vehicle Emissions) (Fixed Penalty) (England) Regulations 2002 has been carried out and fixed penalties have been issued.
Improving the Road Network to Reduce Congestion					
5	Use of Hard Shoulder	Use of hard shoulder on M1 during periods of congestion – crawler lanes	HA	2005-2011	Dependant upon the results of the M40 study.
6	Access Closure	Closure of side roads and rerouting of local traffic around Kegworth Junction 24 of the M1	HA	2005-2011	Will be reviewed as part of the options appraisal for Phase 2 of the M1 Improvement Programme.

	Actions	Details	Stake-holder	Completion Date	Progress
7	Improved signing	Improved signing on the M1 to reduce congestion	HA	Completed	Advance notification of miles/time information to reduce congestion is now regularly available
8	Use of physical barriers	Use of physical barriers to obstruct the air flow and reduce noise to neighbours	HA	2005 – 2011	Will be reviewed as part of the options appraisal for Phase 2 of the M1 Improvement Programme.
9	New Road Proposals	A bypass to be built for the A6 through Kegworth	LCC HA	2011	Need for a bypass included in LTP2. Completion is due during LTP3 depending on the outcome of Council and HA discussions.
10	Introduction of high occupancy lanes	Introduce high occupancy vehicles lanes along the M1 to reduce congestion	HA	2005 – 2010	Will be reviewed as part of the options appraisal for Phase 2 of the M1 Improvement Programme.
11	Widening of the M1	Widening of the M1 and/or A543	HA	2005 – 2010	Will be reviewed as part of the options appraisal for Phase 2 of the M1 Improvement Programme.
12	Improvements to Junction 24 of the M1	Improvements to Junction 24 of the M1 to reduce congestion in the area	HA	2005 – 2010	Will be reviewed as part of the options appraisal for Phase 2 of the M1 Improvement Programme.
Using Area Planning Measures to Reduce Traffic Volumes					
13	Consideration of air quality in respect of Planning Applications	When assessing Planning Applications the implications of new development for air quality will be taken into consideration	NWLDC	Completed	All planning applications are assessed for possible air quality implications.

	Actions	Details	Stake-holder	Completion Date	Progress
Reducing Air Pollution From Industry/Commerce and Residential Areas					
14	Control of Industrial Emissions	The Council will c regulate industrial processes under Part 1 of the Environmental Protection Act 1990. In addition the Council will continue with its programme of searching for additional industrial premises which require a permit.	NWLDC	Ongoing	The Council regulates 80 Part B installations for emissions to air and 5 A2 installations for emissions to land, air and water. Since 1st January 2006 4 installations have been found to be operating without a Permit and fines have been issued.
15	Emissions from chimneys	The Council will continue to enforce the provisions of the Clean Air Act 1993 with respect to emissions of smoke from chimneys across the District	NWLDC	Ongoing	The Council has investigated 7 alleged breaches of the Clean Air Act 1993 with respect to emissions of smoke from chimneys since 1st January 2006.
16	Boiler Plant and Chimney Heights	The Council will enforce the provisions of the Clean Air Act 1993 in respect of chimney heights for new plant and smoke control	NWLDC	Ongoing	All LA-IPPC permit applications must include chimney height calculations where appropriate.
17	Control of Bonfires	The Council will enforce the provisions of the Clean Air Act 1993 and Part III of the Environmental Protection Act 1990 in respect to bonfires across the District.	NWLDC	Ongoing	The District Council has investigated 181 garden bonfire complaints since 1st January 2006. Details of alternative to burning waste are actively promoted by the District through its' discounted compost bin scheme.

	Actions	Details	Stake-holder	Completion Date	Progress
Changing Levels of Travel Demand / Promotion of Alternative Modes of Transport					
18	Improving access to information	The Council will work with partners to encourage Travel Plans for employers and schools	NWLDC LCC	Ongoing	Staff Travel Plan to be compiled for the Council in April 2008.
19	Improved public transport network	The Council will work closely with the County Council within LTP2	NWLDC LCC	Ongoing	A new railway station is proposed at Ratcliffe-on-Soar linking to the airport with bus services.
20	School 'Walking Buses'	The Council will work with Leicestershire County Council to promote walking buses for local schools within LTP2	NWLDC LCC	Ongoing	In October 2006 School children in Ashby-de-la-Zouch set a world record for the largest walking bus.
21	Safer routes to Schools	The Council will work with Leicestershire County Council to promote safer routes to Schools within LTP2	NWLDC LCC	Ongoing	Four scheme locations have been identified for traffic calming, footpath improvements and crossings.
22	Introduce Car Parking Charges	Car Parking will be introduced to all Council owned car parks in the District	NWLDC	2005	Car parking charges have been introduced and greater enforcement following decriminalisation
23	Improved public transport network to East Midlands Airport	The Council will work with its partners to improve the public transport network to the Airport	NWLDC EMA LCC	Ongoing	A new railway station is proposed at Ratcliffe-on-Soar linking to the airport with bus services. Coalville is already linked by a bus service launched in 2007.
Other Measures					
24	Publicise Air Quality Information on the Website	Utilise the Council's Website to publicise Air Quality information	NWLDC	Ongoing	Funding has been requested from the DEFRA air quality grant scheme in 2008 for provision of this service.

	Actions	Details	Stake-holder	Completion Date	Progress
25	Promote home working	Promote home working with the Council for suitable employee's	NWLDC	Completed	Home working promoted for suitable posts.
26	Presentations to Schools	Undertake presentations to Schools highlight Air Quality issues	NWLDC	Completed	Presentations to local schools undertaken in 2007.

Since the development of the Air Quality Action Plan, the District Council has been working with Leicestershire County Council on projects which are not specifically covered by the actions detailed above. Within LTP2 targets were set for traffic growth in Kegworth as a percentage of the baseline year; which was 2004. The actual traffic figures, as a percentage of the baseline year, recorded in Kegworth are presented in Table 14. It can be seen that the percentage of traffic recorded through Kegworth in 2006 is below the projected target.

Table 14. Traffic Growth in Kegworth Village Centre as a Percentage of the Baseline Year, 2004.

	2004	2005	2006	2007	2008	2009	2010
Trajectory	100	102.7	105.4	108.1	110.8	113.5	116.2
Actual	100.0	102.0	102.0				

Within the district, 72% of schools have School Travel Plans, the highest percentage in the County. In 2006/7 26.2% of pupils within the County travelled to school by car when they were the only pupil. This percentage is very favourable when compared to local comparator authorities and it is estimated that this has decreased to 25% in 2007/8.

Work Place Travel Plans have been developed by at least six major employers (over 250 employees) within the District.

East Midlands National Cycle Network Route 15 to East Midlands Airport, was completed in 2007 and involved the installation of the first ever Cycle Activated Traffic Sign. Other cycle schemes in the district have involved the installation of cycle paths and parking at three locations.

8.0 CONCLUSIONS AND RECOMMENDATIONS

There are no significant sources of benzene, 1,3-butadiene, lead and sulphur dioxide within North West Leicestershire. A Detailed Assessment is therefore not required for these pollutants.

Monitoring undertaken in Coalville indicates that the mean annual and 24-hour mean objectives for PM_{10} have not been exceeded at Bardon Quarry during 2007. Complaints have been received from residents in Ravenstone concerning dust from the open cast coal mine. Two real time PM_{10} monitors will be located on the site boundary and consideration of whether this site will require further assessment will be made once monitoring data is available. Passenger and freight movements through EMA have not exceeded 10 mppa and therefore a Detailed Assessment for PM_{10} is not required at this location.

Information from the monitoring network of nitrogen dioxide diffusion tubes indicates that nitrogen dioxide concentrations are still exceeding the air quality objectives in all four designated AQMAs, supporting the requirement for their designation.

Work is currently underway to produce Further Assessments for the AQMAs at Bardon Road, Coalville and Broom Leys Junction, Castle Donington, in order to confirm the extent of the new AQMAs. At Castle Donington the Further Assessment includes twelve months of monitoring data at the southern and northern boundaries. At the Coalville AQMA the Further Assessment is considering twelve months of monitoring data from the facades of properties along Bardon Road.

Monitoring at Molehill House Farm and Kegworth has indicated that nitrogen dioxide concentrations have exceeded the 24-hour air quality objective during 2007. It would therefore be appropriate to consider the hourly average nitrogen dioxide concentrations at these locations, using a real time analyser. This would provide more comprehensive data to inform action planning.

The addition of a new nitrogen dioxide tube at Copt Oak will provide further information concerning air quality in this area. The existing tubes show that in the last five years three annual mean concentrations have exceeded the 40μgm^{-3} objective level and two have been within one standard deviation. In 2007, the November monitoring exceeded 60μgm^{-3} indicating the 24-hour objective may be being breached. A Detailed Assessment is currently underway to investigate this location further.

The equivalent number of passengers and freight using East Midlands Airport was 7.85 mppa in 2007. DEFRA's Technical Guidance LAQM.TG(03) recommends that a Detailed Assessment is conducted once airport throughput exceeds 5 mppa, therefore a Detailed Assessment for nitrogen dioxide is currently underway to determine whether an AQMA should be declared at this location. At present only data from one month is available.

There are three major new developments proposed within the district, at Coalville, Castle Donington and Ashby-de-la-Zouch. The development at Coalville will also involve the extension of the A511 Coalville bypass and is therefore likely to require amendments to the extent of the AQMA. The Castle Donington and Ashby-de-la-Zouch developments both only have access via one route. At Castle Donington this will be directly into the AQMA and therefore monitoring of the influence of the development will be required. There is currently no AQMA at Ashby-de-la-Zouch and section 106 conditions are being considered to ensure appropriate air quality monitoring is conducted in the area.

9.0 GLOSSARY

Standards A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal.

Objectives A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date, taking into account costs, benefits, feasibility and practicality. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides.

Exceedence A period of time where the concentration of a pollutant is greater than the appropriate air quality objective.

AQMA Air Quality Management Area

PM_{10} Small airborne particles, more specifically particulate matter less than 10 micrometers in aerodynamic diameter.

NO_2 Nitrogen dioxide.

SO_2 Sulphur dioxide

CO Carbon monoxide

μgm^{-3} Micrograms per cubic metre.

mppa Million passengers per annum

NWLDC North West Leicestershire District Council

LCC Leicestershire County Council

HA Highways Agency

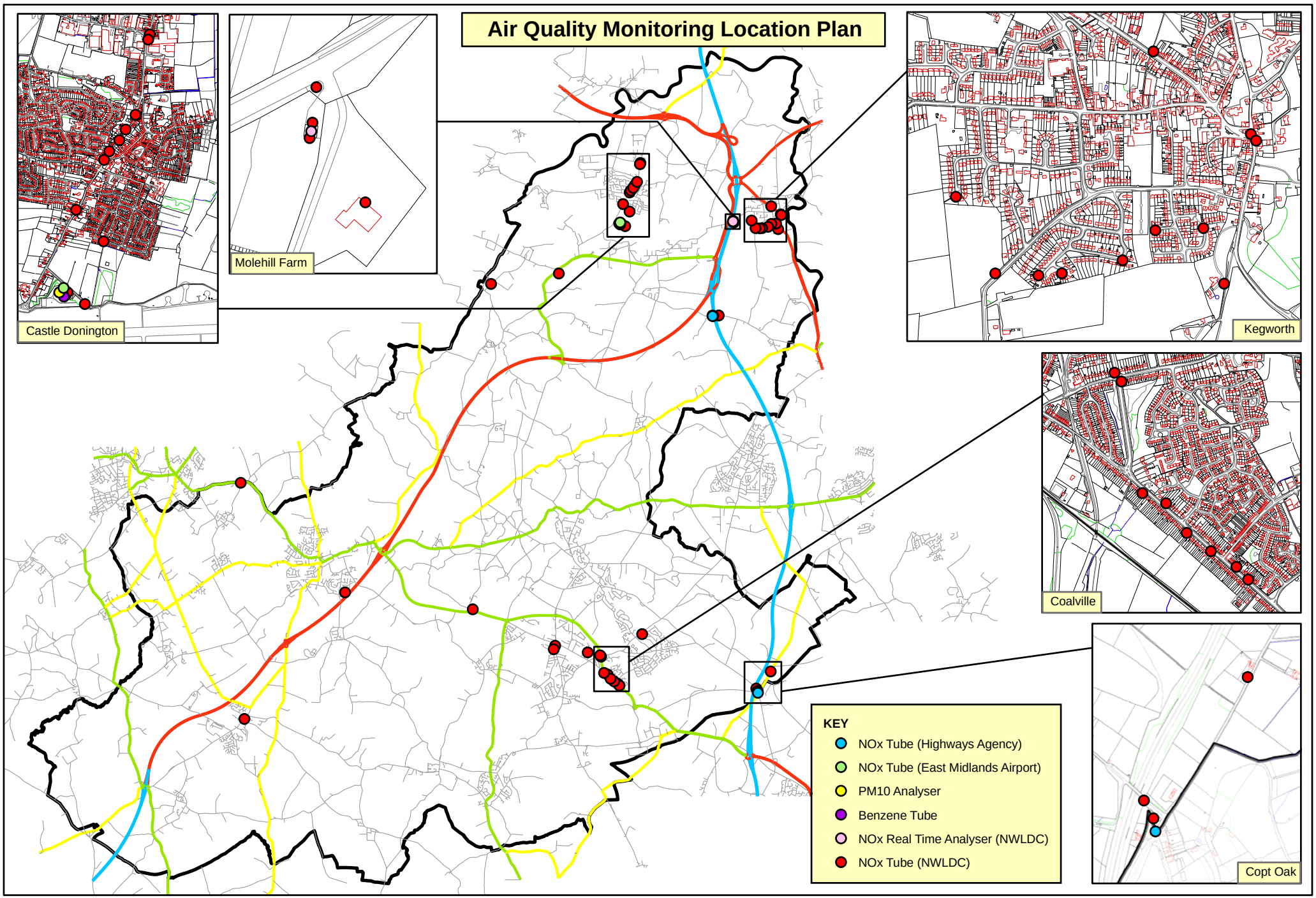
10.0 REFERENCES

DEFRA (2003). LAQM.TG (03) *Local Air Quality Management Technical Guidance*.

DEFRA (2007). *Air Quality Strategy for England, Scotland, Wales and Northern Ireland*

APPENDIX A

Air Quality Monitoring Location Plan



N

0 2,950 5,900 11,800 Meters

North West Leicestershire District Council
Planning Policy and Regeneration

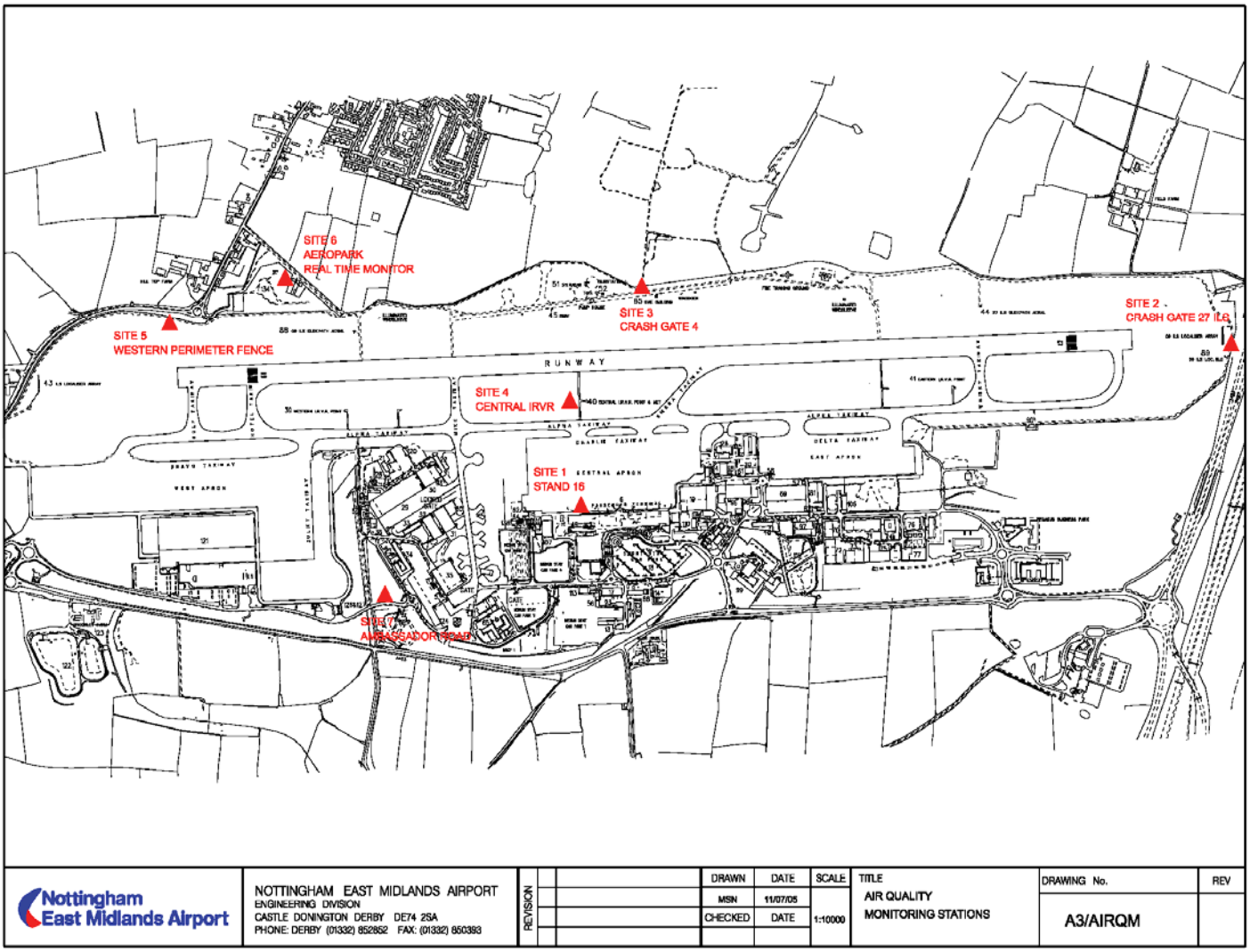


Figure A2 Nitrogen Dioxide Diffusion Tube Locations at East Midlands Airport

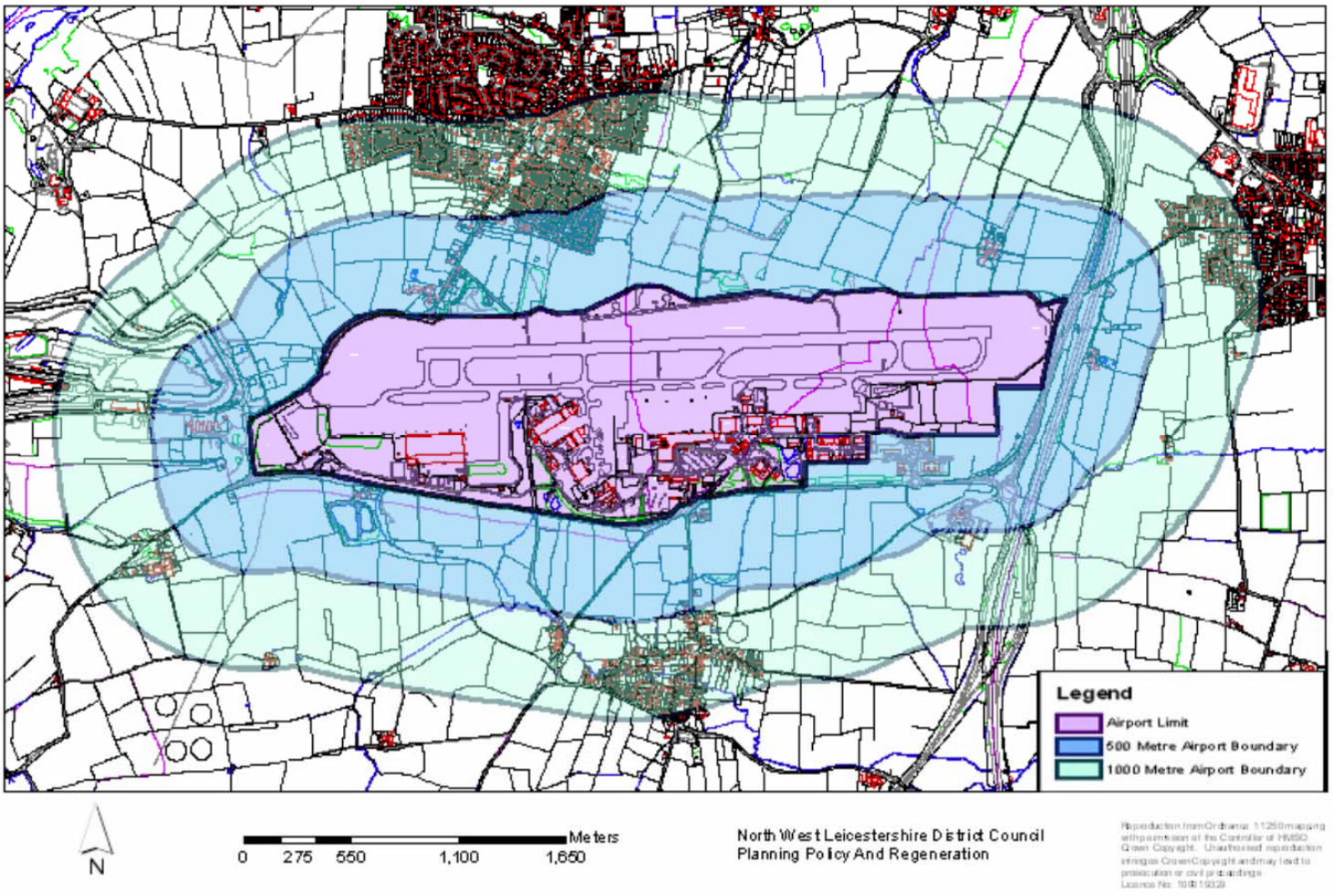


Figure A3 Locations within 500 metres and 1000 metres of East Midlands Airport