WYG Environment

Charnwood Borough Council

Humberstone Lane Junction, Thurmaston

Detailed Air Quality Assessment

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13 March 2009

Document:	Detailed Air Quality Assessment Report
Project:	Humberstone Lane Junction, Thurmaston
Client:	Charnwood Borough Council
Job Number:	A053523
File Origin:	O:\Acoustics Air Quality and Noise\Active Projects\A053523

Document Checking:

Primary Author	Daniel Birkinshaw	Initialled:	
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Review By	Dr Stephen Bolt	Initialled:	

Issue	Date	Status	Checked for Issue
1	13/03/2009	First Issue	Matt Holford
2	7 April 2009	Final Version	Matt Holford
3			
4			

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EXECUTIVE SUMMARY

Part IV of the Environment Act 1995 places a statutory duty on local authorities to review and assess the air quality within their area. For local authorities that have identified areas, within their Annual Progress Reports, where there is a potential risk of exceedences of Air Quality Strategy (AQS) objectives a Detailed Assessment is required. This Detailed Assessment is being undertaken, following the assessment of monitoring results for 2008 that indicated a risk of exceedences of air quality objectives for nitrogen dioxide (NO_2) in the vicinity of the A46 / Humberstone Lane junction in Thurmaston, Leicestershire.

The assessment has been undertaken in general accordance with the Technical Guidance LAQM.TG (09).

Annual average concentrations for NO_2 are predicted using the ADMS-Roads 2.3 model at relevant receptors for the baseline year 2008. Receptors have been selected at the façades of buildings near the modelled road links. The selected receptors represent locations with relevant exposure for the NO_2. All predicted results are produced using the methodology described in Section 3 and 4 of this report. The predicted NO_2 concentrations at specific receptors for 2008 are shown in Section 6 and SK03.

Detailed dispersion modelling has been undertaken using the ADMS-Roads Extra 2.3 dispersion Model. NO_2 concentrations have been modelled at residential receptors at the junction and along Humberstone Lane and in the vicinity of locations where exceedences or near exceedences have been monitored. The model has been verified against local air quality data which has itself been bias and precision adjusted against continuous nitrogen dioxide analysers operated by Charnwood Borough Council.

Based on this detailed assessment and review of the monitoring data within the areas under assessment, the following recommendations are made for Charnwood Borough Council:

- To consider declaration of an Air Quality Management Area on the northern side of Humberstone Lane, Thurmaston between Festival Avenue and Wayside Drive on the basis of predicted exceedences of the annual average mean Air Quality Standard for NO_2.

- To continue monitoring NO_2 at the current monitoring locations in order to ensure that any future changes in air quality are detected.

- To provide additional NO_2 monitoring at relevant locations on the northern side of Humberstone Lane to provide further data to support the outcomes of the dispersion modelling study.

- To obtain more detailed data relating to the road traffic on Humberstone Lane and Melton Road, specifically an improved understanding of the total flows, the flow of each vehicle class and the average daily traffic speeds.

1.0 Introduction and Scope

This report presents a Detailed Air Quality Assessment of the existing air quality at the A46/ Humberstone Lane junction in Thurmaston.

The Detailed Assessment is required following the completion of an Updating and Screening assessment in 2007 which identified potential exceedences of the annual average UK Air Quality Objective for Nitrogen Dioxide at receptor locations close to the junction. Continued, more extensive monitoring during 2008 identified that levels of nitrogen dioxide at the junction remained high and this assessment has been undertaken in order to fully investigate the potential for exceedences of NO_2 and to provide a fuller understanding of the spatial variation of air quality surrounding the junction and on nearby residential locations.

1.1 Legislative Context

The Environment Act 1995 introduced legislation for local management of air quality. Part IV introduced a statutory duty for local authorities to review and assess the air quality within their districts and to identify areas where further local measures are required to achieve the air quality standards shown in Table 1.

Where a local authority considers that the air quality standards will not be achieved it has the duty to declare the area affected as an Air Quality Management Area (AQMA). Following the declaration of an AQMA the authority then has the duty to produce an Air Quality Action Plan which demonstrates what actions the local authority will take to work towards achieving the standards.

1.2 National Air Quality Objectives

The UK Air Quality Standards (UK-AQS) standards are defined in accordance with the recommendations of the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO) and define pollution concentration levels that minimise risks to health. The UK-AQS Objectives are policy targets and have been set with regard to that which is realistically achievable within the timescale specified. It should be noted that the approach adopted by the strategy is to apply the objectives where "members of the public, in a non-occupational capacity and at locations close to ground level, are likely to be exposed over the averaging time of the objective".

For the purposes of this assessment the key class of receptor considered are residential receptors in houses and flats on the local road network, all of which are relevant to consider for their compliance with the annual mean objective.

Table 1: National Air Quality Objectives

Pollutant	Objective	Measured As	Target Date
Nitrogen dioxide	200 µg/m^3 (105ppb) Not to be exceeded more than 18 times per year	1 Hour Mean	31/12/2010
	40µg/m^3	Annual Mean	31/12/2010

1.3 Local Air Quality Management

In December 2000 Charnwood Borough Council (CBC) completed a first Review and Assessment of air quality in the Borough. The object of the project was to determine whether concentrations of seven pollutants identified by UK Government as being most concern to public health were likely to

be above air quality objectives set in the National Air Quality Strategy. The objectives of the Strategy are based on levels at which there are considered to be no effect on human health.

Three Air Quality Management Areas (AQMA's) were declared in 2001 on the basis of this report. In May 2003 an Updating and Screening Assessment was issued to review the findings of the original project by taking into consideration any changes that had occurred outside of the three AQMA's that had been declared on the basis of the first assessment, as well as any improvements that had been made in the methods of predicting air quality changes.

2004 saw two further detailed assessments published. One provided a detailed review and assessment of traffic related air quality – the Round 1, Stage 4 Review and Assessment. The other provided a detailed review and assessment of air quality around two industrial locations – the Round 2 Detailed Review and Assessment.

These reports were undertaken to examine and refine in more detail the predictions of how air quality is likely to change in each of those areas in relation to the possibility of potential breaches against the set objectives, in order to produce an Action Plan implementing changes that would endeavour to see that the objectives are met.

Following a Progress Report submitted in 2005, a full review and assessment of air quality in Charnwood was undertaken in the Round 3 Updating and Screening Assessment, completed in 2006. All sources of air pollution were considered in this report, with collated monitoring data from previous years being fully analysed based on the methodology outlined in Technical Guidance LAQM.TG (03) Update – January 2006 published by the Department for the Environment Food and Rural Affairs.

In 2007 a Progress Report was prepared for DEFRA, presenting results from the monitoring network throughout 2006.

In 2007 an Updating and Screening Assessment was published within which relatively high levels of nitrogen dioxide were identified around the Humberstone Lane junction in Thurmaston. Following agreement with DEFRA, additional monitoring was commissioned to improve the spatial resolution of the monitoring data during 2008 and it was agreed, if necessary, to produce a Detailed Assessment on the basis of the additional monitoring data.

1.4 Scope and Methodology of the Detailed Assessment

The scope of this assessment is to predict NO_2 concentrations at sensitive receptor locations surrounding the A46/Humberstone junction. Diffusion tube monitoring throughout the year 2008 has indicated that levels of NO_2 could breach the UK-AQS annual average. The purpose of the detailed assessment is to allow CBC to assess the impact of NO2 sources on local receptors throughout the detailed modelling area and to determine if there is a need to progress to declaring and AQMA.

This verified detailed assessment aims to identify whether or not current pollutant concentrations are likely to exceed the AQS objectives and, if so, define the extent and magnitude of the exceedences.

The effects of local traffic movements will be predicted using ADMS Roads Extra 2.3 using the latest available DMRB emission factors. This is an Environment Agency approved and fully validated modelling system for the prediction of the dispersion of air pollution based on Gaussian dispersion theory. Full details of the model's validation can be found on the following web site, http://www.cerc.co.uk/software/publications.htm.

The methods used in constructing the model are undertaken in accordance with recommendations outlined by the model developers, Cambridge Environmental Research Consultants (CERC). The most significant factors that affect model results are the following:

- background concentrations;
- meteorological data;
- source inputs (traffic data, stack emissions data).

Concentrations of NO_2 measured at continuous monitoring and diffusion tubes locations within the assessment areas in 2008 have been used to verify the model results and concentrations of NO_2 and have been predicted for 2008. The Detailed Assessment has been undertaken in accordance with the methodologies provided in the revised Technical Guidance (LAQM. TG (09)

2 Baseline Information

2.1 Air Quality Monitoring

CBC have undertaken diffusion tube monitoring in and around the detailed assessment modelled area over the year of 2008. Four representative monitoring locations have been used for model verification. The diffusion tubes are supplied and analysed by Gradko utilising the 20% Triethanolamine (TEA) in water preparation method.

Gradko participate in the Workplace Analysis Scheme for Proficiency (WASP) for NO_2 diffusion tube analysis and the Annual Field Inter-Comparison Exercise.

With regard to the application of a bias adjustment factor for the diffusion tubes, the technical guidance LAQM.TG (03) and Review and Assessment Helpdesk*9* recommends use of a local bias adjustment factor where available and relevant to diffusion tube sites.

Charnwood Borough Council has in triplicate co-located diffusion tubes at the Melton Road, Syston continuous monitoring station. Based on the guidance contained in Box 3.3 of LAQM TG(09) this is the most appropriate data source from which to obtain a bias correction factor for the diffusion tube results around the Humberstone Lane junction. The bias in 2008 is 0.94. The bias correction factor is based on the calculation contained in table 2 below.

Table 2: Local Bias Correction Factor 2008 from Melton Road, Syston monitoring station

Data Capture (%)	97.2
Mean Annual Average (chemiluminescent monitor) in µg/m^3	34.38
Mean Annual Average (diffusion tubes) in µg/m^3	36.76
Bias Correction Factor	0.94

The local survey uses nitrogen dioxide diffusion tubes which are positioned at facade locations in and around the area and exposed for periods of approximately one month. The tubes are then analysed by a UKAS accredited laboratory (Gradko International Ltd) using the 20% TEA method. Table 3 describes the locations of the monitoring positions and SK01 illustrates their relative locations.

Table 3: Charnwood Nitrogen Dioxide Monitoring Locations for 2008

CBC Monitoring Location	Name	OS Coordinates X,Y	Description
CBC 1	21 Humberstone Lane	460821,308757	Roadside Façade Location
CBC 2	43 Humberstone Lane	460895, 308749	Roadside Façade Location
CBC 3	620 Melton Road	460759, 308897	Roadside Façade Location
CBC 4	565 Melton Road	460655, 308616	Roadside Façade Location

The bias corrected results from the 2008 diffusion tube survey are summarised in table 4.

Table 4 NO_2 Diffusion Tube Monitoring Results 2008 (µg/m3)

CBC Monitoring Location	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Average	Bias Adjusted
CBC 1	49.79	51.9	37.75	47.69	37.07	29.75	30.01	40.3	29.47	37.0	39.59	47.65	39.8	37.41
CBC 2	-	47.1	26.65	39.88	33.77	37.01	35.71	33.85	26.89	34.7	42.39	38.77	36.1	33.93
CBC 3	-	38.4	33.32	31.66	23.15	24.54	26.12	26.64	20.28	35.6	32.13	38.3	30	28.20
CBC 4	-	45.3	35.51	32.98	21.84	29.25	26.66	30.56	31.98	29.1	41.53	38.93	33.1	31.11

The 2008 survey results were bias corrected in accordance with the guidance in draft TG (08) with a correction factor of 0.94 derived from the continuous monitoring data at the Melton Road site.

2.2 Local Emission Sources

The site walkover identified that traffic derived pollutants were likely to be the most significant local source of pollutants affecting the site. The principal source of nitrogen dioxide likely to be affecting the proposed development is road traffic emissions from the surrounding road traffic network.

Beyond the immediate site surroundings there are three installations on the Environment Agency emissions database which are permitted under the Pollution Prevention and Control Act and which may have the potential to contribute to additional nitrogen dioxide emissions. These are summarised in Table 6 below:

Table 6: Local industrial sources of nitrogen dioxide regulated by the Environment Agency

Installation Name	Address	Emission Year	Amount Released NO_2 (tonnes per year)
Farago Fabrics Ltd	21 Nanasen Road, Leicester	2007	<100
Walkers Snack Foods Limited	11 Bursom Road, Leicester	2007	<100
Biffa Waste Services	Wanlip Sewage Treatment Works, Fillingate, Wanlip	2007	<100

The impact of nitrogen dioxide emissions from all of these sources and other sources regulated by CBC under the Environmental Permitting Regulations are included in the CBC diffusion tube survey as background and therefore are accounted for in the modelling scenarios.

3.0 Model Inputs

The chemical reaction scheme module of ADMS-Roads 2.3 was selected for this assessment. A minimum Monin-Obukhov length of 30m was selected to represent the stability of the atmosphere due to the characteristics of the local area. The model considers this the minimum height above ground level above which vertical turbulence is inhibited. A surface roughness length of 0.5 was assigned in the model for the area.

Table 7 below provides a summary of the proposed inputs into the ADMS Roads model.

Table 7: Summary of ADMS Roads model Inputs

Parameter	Description	Input Value
Chemistry	A facility within ADMS-Roads to calculate the chemical reactions in the atmosphere between Nitric Oxide (NO), nitrogen dioxide (NO_2), Ozone (O_3) and Volatile organic compounds (VOCs).	**Generic Chemistry Set** – This models the important reactions involving nitrogen, volatile organics and ozone to determine the concentration of NO_2 produced from a given concentration of NO_X and accounting for chemical and environmental factors.
Metrology	Representative meteorological data from a local source	East Midland Airport 2008, hourly sequential data
Surface Roughness	A setting to define the surface roughness of the model area based upon its location.	**0.5m** representing a typical surface roughness for a suburban setting
Latitude	Allows the location of the model area to be set	United Kingdom = **52°**.
Monin-Obukhov Length	This allows a measure of the stability of the atmosphere within the model area to be specified depending upon its character.	Cities and large towns = **30m**.
Elevation of Road	Allows the height of the road link above ground level to be specified.	All road links were set at ground level = **0m**.
Road Width	Allows the width of the road link to be specified.	Road width used depended on data obtained from OS map data for the specific road link
Topography	This enables complex terrain data to be included within the model in order to account for turbulence and plume spread effects of topography	No topographical information used
Time Varied Emissions	This enables daily, weekly or monthly variations in emissions to be applied to road sources	No time varied emissions used
Road Type	Allows the effect of different types of roads to be assessed.	**Urban Road** settings were used
Road Speeds	Enables individual road speeds to be added for each road link	Specific to individual links
Canyon Height	Allows the model to take account turbulent flow patterns occurring inside a street with relatively tall buildings on both sides, known as a "street canyon".	No canyon settings used
Road Source Emissions	Road source emission rates are calculated from traffic flow data using the in-built DMRB database of traffic emission factors.	The **DMRB 2003** dataset was used.
Year	Predicted DMRB emissions rates depend on the year of emission.	**2008** data for the model validation.

3.1 Traffic Data

There is relatively little traffic count data for the study area and therefore the traffic data input into the ADMS model has had to be based on best estimates from the available information. Historical data from a 12hour traffic count at the Humberstone/Silverdale Road Junction from July 2005 is the most comprehensive available dataset. Peak hour AM and PM flows were added and then multiplied by a factor of 5.75 to give AADT flows for Humberstone Lane. Additional data from various 12 hour traffic counts during different years on the local road network between 2000 and 2005 are the only other existing sources of data. All of the traffic data provided has been converted to annual average daily traffic (AADT) counts for 2008 based on National Road Traffic Flow factors and have subsequently been used in the detailed assessment.

Where speed data has not been made available, speeds have been based on speed limits and modified according to local conditions to take account of congestion and stop/start vehicle movements at junctions.

Table 8: Traffic Flows 2008

Road Link	AADT LGV	AADT HGV	Speed (kph)
Humberstone Lane	7197	182	50
Melton Road E	8400	240	60
Melton Road W	7440	336	60
Newark Road E	8400	360	60
Newark Road W	8400	360	60
Melton Road North Split	1920	120	60
Wayside Drive	24	0	50

All roads expected to make a contribution have been included within Table 6 above. It is noted that some smaller roads have been excluded as contributions from these roads will be represented within the background concentrations. All flows in Table 7 are 2 way flows and have been calculated from peak hour traffic counts undertaken in 2008.

3.2 Background Concentrations

Background concentrations used for the verification of the ADMS model have been referenced from the UK National Air Quality Information Archive database based on the National Grid Co-ordinates of the 1 x 1 km grid square nearest to the receptor.

It is noted that the background air pollution maps were produced using the recently published 2006-2020 data. In order to estimate background concentrations for the assessment years, conversion factors were obtained from the Local Air Quality Management web page (www.airquality.co.uk).

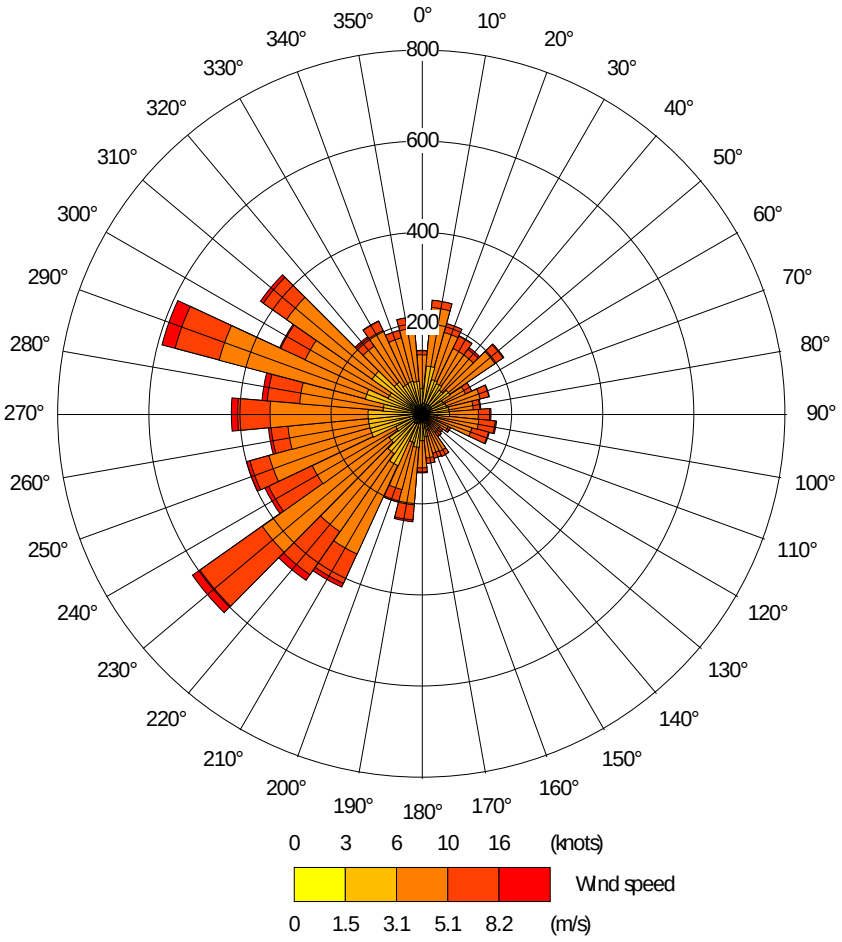
Table 9. Background Air Quality Levels Used ($\mu g/m^3$)

Pollutant	Year 2008
NO_x	32.30
NO_2	22.73

3.3 Meteorology

Meteorological conditions have significant influence over air pollutant concentrations and dispersion. Pollutant levels can vary significantly from season to season as well as year to year, thus any long-term trends need to be established using several years of data. The ADMS models calculate the dispersion of pollutants on an hourly basis using a year of local hourly meteorological data. The meteorological data used in the assessment is derived from the East Midlands Airport for 2008, which is the nearest meteorological station with all the complete parameters necessary for the ADMS model.

East Midland Airport Meteorological Data 2008



4.0 Model Verification

Model verification involves the comparison of modelled data to monitored data in order to gain the best possible representation of current pollutant concentrations for the assessment years. Monitoring results used are those obtained from the WYG Environment air quality survey.

The verification process is based on the guidance in Annex 3 of draft LAQM.TG (09) and consists of using the monitoring data and the published background air quality data in the UK National Air Quality Information Archive to calculate the road traffic contribution of nitrogen oxides (NOx) at the monitoring locations. Outputs from the ADMS Roads model are provided as predicted road traffic contribution NOx emissions are then converted into total predicted NO_2 levels based on the updated approach to deriving NO_2 from NOx for road traffic sources published by Air Quality Consultants (March 2007).

Based on these results an overall adjustment factor is calculated which produces a best fit correlation between the model predictions and monitoring results. This approach ensures that the model provides the best possible representation of local traffic emissions. Table 8 below indicates the correlation after model adjustments.

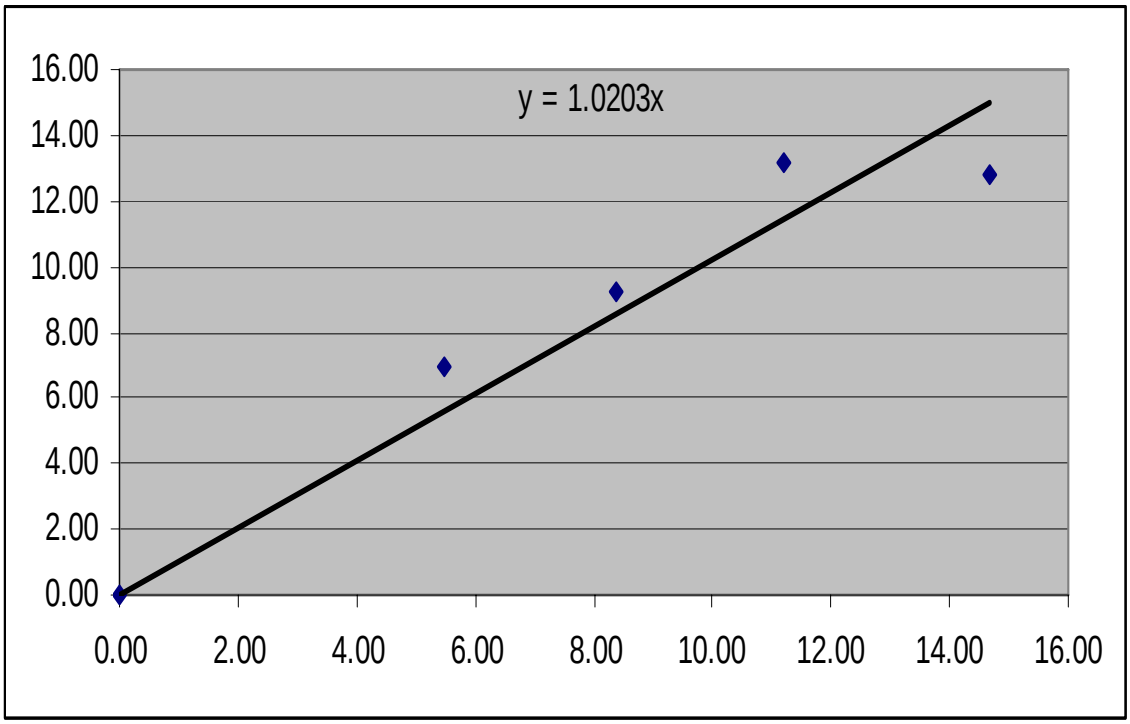
A primary model correction of 7.68 was applied to roadside predicted NO_x concentrations before converting to NO_2. This figure demonstrates that the model was under predicting the road traffic emissions at the monitoring locations, probably due to the effects of congestion and stop-start driving behaviour in the study area. Figure 1 and Table 10 below summarise the final model/monitored data correlation following the application of the relevant adjustment factor.

The full verification evaluation is tabulated in Appendix A.

Table 10: Comparison of Roadside Modelling & Monitoring Results for NO_2 ($\mu g/m^3$)

Tube location	NO_2 $\mu g/m^3$		
	Monitored NO_2	Modelled NO_2	Difference (%)
CBC 1	37.41	35.49	-1.92
CBC 2	33.93	35.92	1.98
CBC 3	28.20	29.68	1.48
CBC 4	31.11	31.92	0.81

Figure 1. Monitored Roadside NO_2 and Modelled Roadside NO_2 Correlation after model adjustment



In order to provide an acceptable level of verification, model results would normally be expected to predict to within 25% of monitored results. All 4 monitoring locations modelled are within 6%. The model has therefore been acceptably modelled within the model tolerance limits.

5.0 ASSESSMENT OF AIR QUALITY

5.1 Modelled Receptors

A number of existing residential receptors have been selected identified as having the potential to be most affected by changes in ambient air quality from current traffic conditions. A summary of the locations used within the assessment are contained in Table 11 and the spatial positioning of the receptors is indicated in SK02.

Table 11: Receptor Locations

Modelled Receptors		OS Reference Position	
		Northing	Easting
REC 1	21 Humberstone Lane	460821.1	308757
REC 2	35 Humberstone Lane	460880.0	308750.5
REC 3	22 Humberstone Lane	460834.6	308783.3
REC 4	53 Humberstone Lane	460951.4	308742.5
REC 5	62 Humberstone Lane	461025.3	308759.5
REC 6	40 Humberstone Lane	460920.9	308772.9
REC 7	1 Humberstone Lane	460756.8	308769.8
REC 8	583 Melton Road	460735.3	308770.0
REC 9	5 Wayside Drive	460859.6	308824.4
REC 10	600 Melton Road	460738.9	308837.9
REC 11	614 Melton Road	460753.1	308872.5
REC 12	593 Melton Road	460779.5	308872.2
REC 13	593 Manor Road/Melton road (Surgery)	460673.9	308648.9
REC 14	565 Melton Road	460654.1	308614.8
REC 15	79 Church Street/Newark Road	460664.1	308624.8

Some of the receptors locations are in flats above commercial properties. Where this is the case the receptor heights have been taken to be at first floor level – (4 meters above ground level). All other receptors are treated as being at ground levels – namely 1.5 meters above ground level.

REC 6 and REC 7 have both been modelled at 4meters. It is not clear whether the properties above the shops on Humberstone Lane are occupied for residential purposes. However, for the purposes of this assessment it is assumed that they are at least capable of being used as residential units and that they should therefore be assessed.

6.0 ADMS Modelling Results

The verified ADMS Roads Model has predicted concentrations of NO_2 at key receptor façades surrounding the Melton Road/Humberstone Lane Junction. The model outputs are based on adjusted model results from the verified model. Table 12 summarises the predicted 2008 annual average nitrogen dioxide levels at each receptor. A contour plot of the predicted spatial distribution of nitrogen dioxide at a height of 1.5meters is illustrated in SK03.

Table 12: Predicted 2008 Concentrations of NO_2 at each Receptor Location

Existing Receptor		Nitrogen Dioxide µg/m³
		2008
REC 1	21 Humberstone Lane	35.35
REC 2	35 Humberstone Lane	35.63
REC 3	22 Humberstone Lane	40.62
REC 4	53 Humberstone Lane	30.81
REC 5	62 Humberstone Lane	30.32
REC 6	40 Humberstone Lane	38.95
REC 7	1 Humberstone Lane	31.44
REC 8	583 Melton Road	32.47
REC 9	5 Wayside Drive	32.96
REC 10	600 Melton Road	34.73
REC 11	614 Melton Road	31.73
REC 12	593 Melton Road	33.90
REC 13	593 Manor Road/Melton road (Surgery)	31.12
REC 14	565 Melton Road	32.10
REC 15	79 Church Street/Newark Road	35.35
Target		**40 µg/m³**

The model outputs estimate that all receptors meet the UK-AQS annual average for NO_2 in 2008 with the exception of REC 3 (22 Humberstone Lane).The contour plots in SK03 indicate that residential properties on the northern side of Humberstone Lane are estimated marginally to exceed the UK-AQS of 40µg/m^3.

7.0 Conclusions

Annual average concentrations for NO_2 are predicted using the ADMS-Roads 2.3 model at relevant receptors for the baseline year 2008. Receptors have been selected at the façades of buildings near the modelled road links. The selected receptors represent locations with relevant exposure for the NO_2. All predicted results are produced using the methodology described in Section 3 and 4 of this report. The predicted NO_2 concentrations at specific receptors for 2008 are shown in Section 6 and SK03.

Based on this detailed assessment and review of the monitoring data within the Areas under assessment, the following recommendations are made for Charnwood Borough Council:

- To consider declaration of an Air Quality Management Area on the northern side of Humberstone Lane, Thurmaston between Festival Avenue and Wayside Drive on the basis of predicted exceedences of the annual average mean Air Quality Standard for NO_2.

- To continue monitoring NO_2 at the current monitoring locations in order to ensure that any future changes in air quality are detected.

- To provide additional NO_2 monitoring at relevant locations on the northern side of Humberstone Lane to provide further data to support the outcomes of the dispersion modelling study.

- To obtain more detailed data relating to the road traffic on Humberstone Lane and Melton Road, specifically an improved understanding of the total flows, the flow of each vehicle class and the average daily traffic speeds.

APPENDIX A

SK01 Modelled Road Network and Monitoring Locations

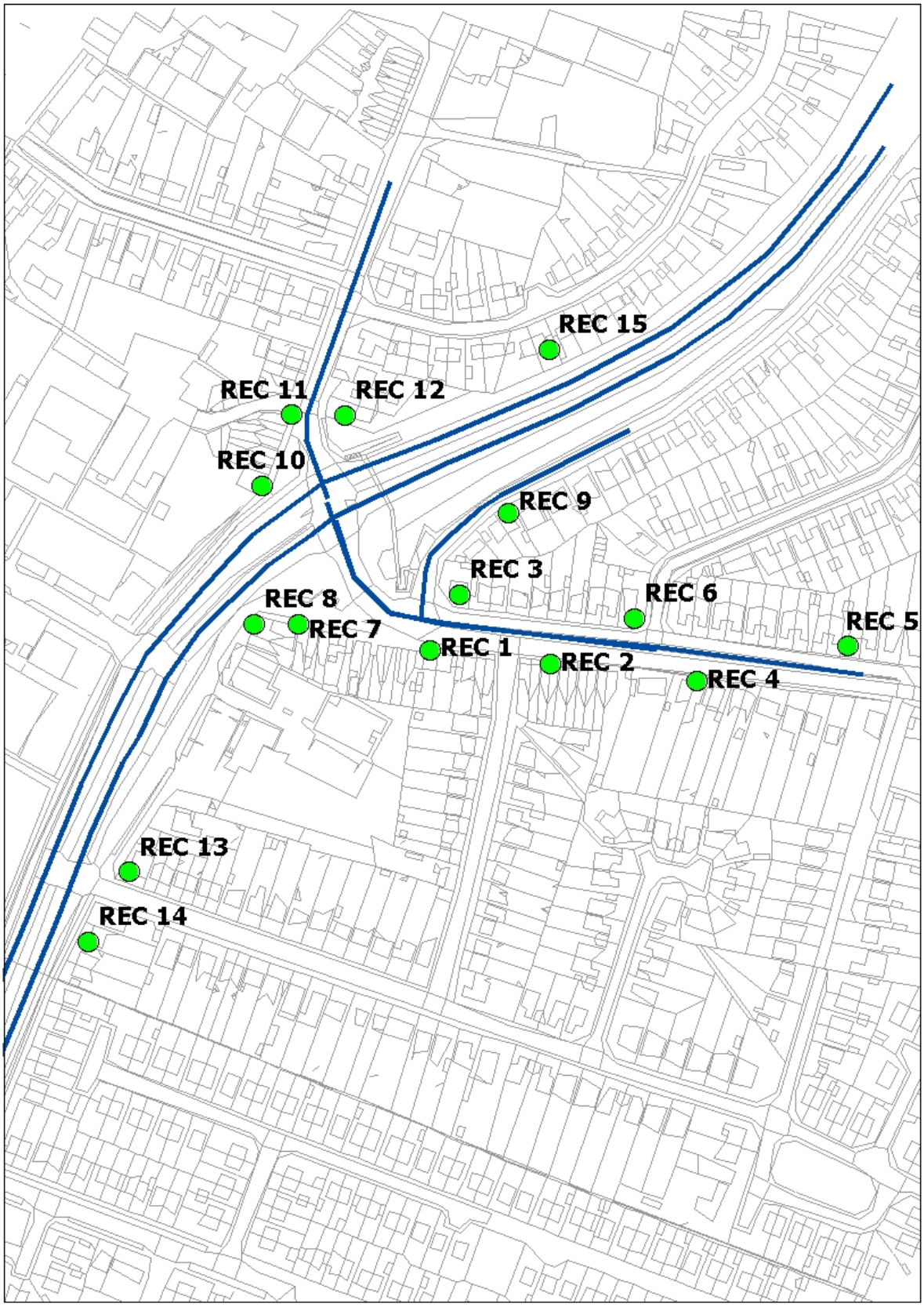
SK02 Modelled Receptor Locations

SK03 Predicted NO_2 Concentration in 2008 µg/m^3

SK04 Model Verification Calculations

SK01 – Existing Modelled Road Network and Monitoring Locations

SK02– Modelled Receptor Locations



SK03 –Predicted NO_2 Concentration in 2008 µg/m^3 (red contour @40 µg/m^3 and yellow @ 36 µg/m^3)

SK04 Model Verification and Receptor Concentration Calculations

Monitoring Location	Total Monitored NO2	Roadside Monitored NO2	Roadside Monitored NOx	Total Monitored NOx	Roadside Modelled NOx	Adjusted Roadside Modelled NOx
21 HUMBERSTONE LANE,THURMASTON	37.41	14.68	47.90	84.20	5.25	40.30
43 HUMBERSTONE LANE, THURMASTON	33.93	11.20	35.20	71.50	5.45	41.84
620 MELTON RD, THURMASTON	28.20	5.47	16.00	52.30	2.66	20.47
565 MELTON RD, THURMASTON	31.11	8.38	25.50	61.80	3.62	27.84

Monitoring Location	Adjusted Roadside Modelled NO2	Background NOx	Background NO2	Total Adjusted Modelled NOx	Total Adjusted Modelled NO2	Difference (Monitored / Modelled)
21 HUMBERSTONE LANE,THURMASTON	12.76	32.3	22.73	72.60	35.49	-1.92
43 HUMBERSTONE LANE, THURMASTON	13.19	32.3	22.73	74.14	35.92	1.98
620 MELTON RD, THURMASTON	6.95	32.3	22.73	52.77	29.68	1.48
565 MELTON RD, THURMASTON	9.19	32.3	22.73	60.14	31.92	0.81

APPENDIX B – REPORT CONDITIONS

ENVIRONMENTAL IMPACT ASSESSMENT –AIR QUALITY

Melton Road/Humberstone Junction, Thurmaston, Leicester

This report is produced solely for the benefit of Charnwood Borough Council and no liability is accepted for any reliance placed on it by any other party unless specifically agreed in writing otherwise. This report, within the limitations stated, to the condition of the site at the time of the inspections. No warranty is given as to the possibility of future changes in the condition of the site characteristics, especially liquid and gaseous materials, are likely to vary with time.

This report is based on a visual site inspection, the physical investigation as detailed and information supplied by those parties noted in the text. Some of the opinions are based on unconfirmed data and information and are presented in good faith without exhaustive clarification. The impact of our assessment on other aspects of the development requires evaluation by other involved parties. The possibility of the occurrence of pollutant levels not revealed by this research, cannot be discounted.

Whilst confident in the findings detailed within this report, because there are no exact UK definitions in this matters, being subject to risk analysis, we are unable to give categoric assurances that they will be accepted by Authorities or Funds, etc. without question, as such bodies may have unpublished, often more stringent objectives. This report is prepared for the proposed uses stated in the report and should not be used in a different context without reference to WYGE. In time improved practices or amended legislation may necessitate a re-assessment.

The opinions expressed cannot be absolute due to the limitations of time and resources within the context of the agreed brief.

Detailed Air Quality Assessment for Charnwood Borough Council

Humberstone Lane Junction (Thurmaston)

In fulfillment of Part IV of the Environment Act 1995
Local Air Quality Management

June 2009

Comments by Charnwood Borough Council in respect to the Humberstone Lane Junction Detailed Assessment, as prepared by WYG Environmental

Whilst we accept the general conclusions of the report, in that consideration is given to the declaration of an Air Quality Management Area on the northern side of Humberstone Lane, between Festival Avenue and Wayside Drive on the basis of predicted exceedences of the annual average mean Air Quality Standard for NO_2; we do feel that the output of the model does not fully fulful the criteria aims as specificed for the declaration of an AQMA under paragraph 1.19 of Technical Guidance LAQM.TG(09); in that it has been possible to ***"Identify with reasonable certainty"*** whether a likely exceedence will occur at the highlighted properties.

Similarly when further determination is given to the objectives of this particular paragraph, in respect to the magnitude and geographical extent of the area concerned, then our 3 main concerns relating to the certainty and confidence of potential exceedences are as follows:

i. Local Monitoring

Since June 2007, a real-time ROMON NO_2 monitor has been operational in the nearby town of Syston. This monitor is approx 3.5Km from the junction studied in this report which is in comparison to a distance of approx 15Km from the junction to our monitoring station in Loughborough which had historically been used to bias correct all our diffusion tube data.

This additional monitor, which is operated with triplicate diffusion tubes, is now capable of providing us with more localised site information from which to bias correct diffusion tubes located in this southern area of the Borough.

As we believe it is only appropriate to give more weight to the data obtained from the Syston monitor due to its relative local positioning to the area studied; it is important for us to highlight that whilst our previous recorded/submitted diffusion tube results have suggested that there may be a potential exceedence of the Air Quality Objective at Thurmaston, now that we are able to bias correct and compare results against both our Syston and Loughborough analysers, there is evidence to show a considerable variance between the analysers and a strong possibility that our previously reported data (based on the Loughborough monitor) may have been higher than first suggested.

As can be seen from our 2008 results, no tube in the vicinity of the junction breached the objective level of 40µgm^{-1}

	Corrected against Loughborough ROMON (µgm^{-1})						Corrected against Syston ROMON (µgm^{-1})					
Tube Location	2003	2004	2005	2006	2007	2008	2003	2004	2005	2006	2007	2008
21 Humberstone Lane	45.4	42.1	39.9	46.2	48.3	45.0	nd	nd	nd	nd	nd	37.4
43 Humberstone Lane	Nd	Nd	nd	nd	nd	40.8	nd	nd	nd	nd	nd	33.9
620 Melton Road	Nd	Nd	nd	nd	nd	33.9	nd	nd	nd	nd	nd	28.2
565 Melton Road	Nd	Nd	nd	nd	nd	37.4	nd	nd	nd	nd	nd	31.1
5 Wayside Drive	Nd	Nd	nd	nd	nd	31.8	nd	nd	nd	nd	nd	26.5

(where nd = no monitoring data undertaken)

ii. Properties Exposed

Local knowledge of the area would suggest that the properties on the southern side of Humberstone Lane would be more likely to be exposed to higher NO_2 levels than those properties facing them; primarily as they are positioned on the "problem traffic" side of the road and approx 5m from facade to kerbside, in comparison to approx 15m for those on the north.

To give a visual representation of the area; the photo below shows the view taken on Humberstone Lane facing westwards towards the junction. The junction itself is just out of view, but traffic frequently queues back to the position of the silver car/lamppost on the left hand side.

As can be seen, the houses on the left (southern side) are immediately adjacent to the road whilst those on the right (northern side) are essentially separated from Humberstone Lane by a small tree-lined access road (where the 4x4 is parked). It is those properties on the right which have been highlighted in the report as being susceptible to exceedences.

Figure 1 : Westward view of Humberstone Lane

Our initial thoughts are that the model is over predicting levels for the northern situated properties, especially when considering the positioning of the houses in relation to the traffic flow of the road.

The predicted ADMS modelling results [Table 12] show that the receptors in this proposed area drop from a potential breach of the objective at a highest level of 40.62µgm^{-1} at 22 Humberstone Lane (Humberstone/Wayside junction) down to a level of 38.95µg^{-1} at 40 Humberstone Lane (Humberstone/Festival junction).

As the values are indicating only a minimal predicted objective exceedence at a maximum of 9 properties, then we are therefore cautious of declaring an AQMA purely on the basis of a theoretical model without first gathering some further "at site" data.

iii. Accurate Traffic Data

Data used in the generation of the DA relied on limited available traffic flow composition from 2005 provided by Leicestershire County Council.

More up to date information is not available for the area immediately in the vicinity of the junction and therefore it is unlikely that it accurately reflects the current extent of traffic movement/impact.

Proposals

With consideration to the issues raised above and the borderline predicted modelled exceedences that this report has highlighted, we have already deployed 2 additional diffusion tubes on the property facades at 22 & 38 Humberstone Lane to gather first hand monitoring data.

We would therefore like to propose that we are permitted to gather 9 months diffusion tube data prior to considering the necessity to declare an AQMA for this area. If the resultant data indicates that the objective levels are being breached then we would proceed to a declaration at that time.