

CABINET

3 September 2003

AIR QUALITY MANAGEMENT AREA (AQMA) WITHIN WINCHESTER TOWN CENTRE

REPORT OF DIRECTOR OF HEALTH AND HOUSING

Contact Officer: Phil Tidridge Tel No: 01962 848519

RECENT REFERENCES:

CAB 332 – Air Quality Management Area (AQMA) within Winchester Town Centre, 30 January 2002.

HE 10 – Health Performance Improvement Committee, Update on Air Quality Assessment, 4 March 2003.

EXECUTIVE SUMMARY:

This report details the current position regarding the Council's statutory duty to review air quality across its district, in accordance with the Air Quality (England) Regulations 2000.

A report to Cabinet in January 2002 recommended that an Air Quality Management Area (AQMA) be declared due to the potential for Nitrogen Dioxide levels near to busy town centre roads to fail the relevant air quality standard. Cabinet agreed in principle to the declaration of an AQMA but required further investigations and discussions prior to its declaration. This report details additional actions performed and recommends that an AQMA be declared for the area marked on the attached map.

RECOMMENDATIONS:

1. That the City Secretary and Solicitor be authorised to make an order for the declaration of an Air Quality Management Area (AQMA) for the Winchester Town area using the boundaries marked on the map titled "Proposed air quality management area - Winchester town centre" attached to this report.
2. That Cabinet agrees to the formation of an Informal Member/ Officer working group to develop the air quality action plan in accordance with current guidance issued by DEFRA.

3. That Cabinet notes the possible need for a supplementary estimate for the Stage 4 Air Quality Assessment if these costs cannot be absorbed within existing 2003/04 budgets.
4. That Cabinet notes the anticipated costs for the following financial year, which will be included in the 2004/05 budget preparation process.

CABINET3 September 2003AIR QUALITY MANAGEMENT AREA (AQMA) WITHIN WINCHESTER TOWN CENTREREPORT OF DIRECTOR OF HEALTH AND HOUSINGDETAIL:1 Introduction

- 1.1 Since the implementation of Part IV of the Environment Act 1995 all local authorities have been under a duty to review air quality within their district. The current standards that have to be met are prescribed under the Air Quality (England) Regulations 2000 (as amended). It is a requirement that each local authority conducts a formal staged review of air quality within its district in accordance with a comprehensive set of guidance documents. These reports are then sent to the Department of Environment, Food and Rural Affairs (DEFRA) for approval.
- 1.2 The Regulations include a set of air quality standards with different compliance dates between 2003 and 2010. Where it is predicted that air quality is unlikely to meet these standards then an Air Quality Management Area (AQMA) needs to be declared to implement additional measures to try and achieve such compliance. The Council has to first declare a specified area by a legal process of issuing a local order. It then has 18 months to perform any additional monitoring to fully quantify the extent of the problem, which is termed a stage 4 assessment. It also has to produce a strategy document identifying actions that will be taken, which must involve public consultation and stakeholder input. Declaring an AQMA has significant cost implications both in terms of capital costs for additional monitoring and staff time involved in collating this data and producing the strategy document.
- 1.3 There are now 113 active AQMA's within England and Wales, so any proposals by the City Council to declare an AQMA would not be anything unusual within the current national framework of air quality controls. At Winchester three reports have been prepared and issued in compliance with the above duty. They are summarised below, with hard copies available upon request:
  - **Winchester City Council Stage 1 Review** – Concluded that only three pollutants needed further assessment, these being Carbon monoxide (CO), Nitrogen dioxide (NO<sub>2</sub>) and Particles (PM<sub>10</sub>'s).
  - **Winchester City Council Stage 2/3 Review** – Concluded that CO, NO<sub>2</sub>, and PM<sub>10</sub> levels would comply with relevant standards. However, DEFRA required further assessment for Nitrogen dioxide levels at houses close to main roads within the town centre.
  - **Winchester City Council Air Quality Review and Assessment (Additional Assessment of Nitrogen dioxide levels within Winchester Town Centre)** - This report was in response to DEFRA's comments. It concluded that there were a small number of properties close to busy city centre roads that could have levels higher than the background site and that dispersion modelling should be

performed to investigate these locations further. DEFRA rejected this conclusion advising that we should declare an AQMA and then perform this dispersion modelling.

- 1.4 This matter was the subject of committee report CAB 332, which recommended the declaration of an AQMA. Cabinet did not follow this recommendation and instead resolved “that it be agreed in principle that an Air Quality Management Area (AQMA) be declared if required following further discussions about the boundaries of the area, its implications and improvement measures, with the County Council, through the Winchester Movement and Access Plan Joint Members Panel.”

## 2. Current Position

- 2.1 CAB 332 confirmed that in order to obtain further information on the most appropriate boundaries of an AQMA, additional dispersion modelling would be required. Quotations from consultants in air quality modelling were obtained in January 2002 and funding of over £10,000 was obtained from Hampshire County Council (HCC) to perform this work. However, due to HCC committee cycles, agreement for this project was not received until June 2002.
- 2.2 The work was undertaken by Casella Stanger, who have considerable experience in this field, including the assessment of air quality reports on behalf of DEFRA. They identified the need for additional traffic flow data and at least six months of nitrogen dioxide diffusion tube results at 28 locations within the town centre. Hampshire County Council arranged for the required traffic studies to be performed but delays were caused whilst they awaited the completion of the City Road development. This was to ensure traffic data collected was representative of long term trends, rather than short-term bias arising from the diversions that were in place.
- 2.3 The dispersion modelling has now been completed and a draft report was received on 6 June 2003, which recommended the declaration of an AQMA. The covering letter attached to the draft report provides a good summary of the position and is therefore enclosed in Appendix 2. Importantly this report concluded that, close to town centre main roads, levels of nitrogen dioxide would fail to meet the annual average air quality standard of  $40\mu\text{g}/\text{m}^3$ . With regards to particle levels it proved impossible to ratify modelling results against available monitoring data and it was therefore recommended to include particles in any AQMA declared. Additional monitoring/modelling for particles was recommended to explore this issue further.
- 2.4 Subsequent advice on the shape of the actual AQMA has been sought from Casella Stanger, who coincidentally run the DEFRA help line on air quality action plans. They have advised that the AQMA should be declared to cover the problem areas including the arterial roads, although within the town centre there were advantages of a single zone. The proposed AQMA can be described as the “area surrounded by the town centre one way system and the town centre end of the major roads feeding into it.” and is shown at Appendix 1.
- 2.5 The AQMA does not include the majority of the pedestrianised town centre, only those areas used by the buses to allow the potential for control over such movements.
- 2.6 Over the last year, several letters have been received from DEFRA regarding the declaration of an AQMA in Winchester. Whilst in the past DEFRA has had some

sympathy with the need to undertake additional modelling and monitoring of pollutants, they now require clear confirmation of the way forward following the latest results. It is DEFRA's view that Winchester City Council should declare an AQMA and they have brought to our attention the powers that the Secretary of State has to direct the Council to declare such an AQMA if we fail to act. They have therefore been advised of this report to Cabinet and the proposed consideration of declaration of an AQMA.3.

### 3.0 Recommended Way Forward

- 3.1 It is recommended that the City Secretary and Solicitor be authorised to make the Order for the declaration of an AQMA for the area marked on the attached map (appendix 1) in order to secure compliance with the air quality standards for particles (PM<sub>10</sub>) and Nitrogen dioxide. The shape of the area has already been discussed with Casella Stanger who agree that the most feasible option is the inclusion of the main City Centre area together with all arterial roads where air quality failures will occur.
- 3.2 Following the declaration of an AQMA there is a maximum period of 18 months in which further investigations can be conducted in order to fully establish the exact extent and causes of the failures, referred to as a stage 4 assessment. This work has then to be translated with full consultation into an Air Quality Action Plan that is submitted to DEFRA for approval. This identifies options, impacts, costs and benefits of options available locally to achieve compliance with the relevant air quality standards.
- 3.3 Policy guidance issued by DEFRA makes it clear that action plans need to be developed in "a corporate and multi-disciplinary way" with a "need to ensure that the measures within the action plan enjoy the support of and whenever possible are actively endorsed by, all parts of the Council". It is therefore recommended that an Informal Member/Officer Air Quality Group be formed to develop the action plan. Representation on the group will include relevant officers from the Development Services and Health & Housing Departments and appropriate Portfolio holders/ward members. Representatives would also be invited from the Winchester Movement and Access Panel and transport staff within Hampshire County Council.
- 3.4 The majority of the stage 4 work for nitrogen dioxide has already been performed. Casella have recommended that real time monitoring be continued and investigations undertaken to find an additional site for particle monitoring. In addition, they have also recommended that the town centre diffusion tube survey for nitrogen dioxide be continued. Further information on both of these proposals is contained within the Casella letter at Appendix 2.
- 3.5 Last year saw the launch of the MIRACLES (Multi Initiative For Rationalised Accessibility And Clean Liveable Environments) project. This European initiative is seeking improvements in the living environment within Winchester, Cork, Barcelona and Rome and is part of a wider European project called CIVITAS (City Vitality and Sustainability). The key objectives relate to "economic and efficient energy and sustainable mobility and intermodality". Hampshire County Council is running the project within Winchester with assistance from Winchester City Council. The programme is broken down into a series of projects that encourage the use of public transport, seeks to reduce congestion and encourages the uptake of cleaner vehicle technologies.

- 3.6 Many of these work programmes have the potential to improve air quality. Initial discussions with staff involved in the MIRACLES initiative indicate that the declaration of an AQMA will be seen in a favourable light. MIRACLES is considered to be an ideal forum in which to achieve such air quality improvements. Environmental Health Staff already attend the monthly technical management committee meetings and as part of work programme 4, MIRACLES funded the diffusion tube survey used to provide some of the monitoring data.

#### 4. Corporate Strategy (Relevance to):

- 4.1 It is a key objective of the corporate strategy to promote a healthier, safer and more caring community by enforcing legalisation designed to safeguard public health.
- 4.2 An Air Quality Management Area (AQMA) would also help to meet the key objective of helping to look after the built and natural environment for the benefit of present and further generations, for example by promoting more environmentally friendly forms of transport.

#### 5. Resource Implications:

- 5.1 There are significant cost implications in the short to medium term. In the past the City Council has been very fortunate in securing considerable funding from Hampshire County Council. Although this funding will continue to be explored at every opportunity, other local authorities are now performing monitoring/modelling exercises, resulting in an increased demand on these limited funds. The City Council therefore needs to begin to put in place its own funding streams to procure the required works bearing in mind that an allowance for such expenditure is included within the standard spending assessment (Environmental, Protective & Cultural Services Block). The following is a summary of likely expenditure over the next 2 years of air quality workload.

##### 5.2 Current Financial Year (2003/04)

- Legal costs and officer time associated with the declaration of an air quality order will be absorbed within existing budget provision although there will be an impact upon existing services.
- Consultation exercise – Production of publicity material, hire of venues etc. estimated at £3000.
- Continuation of Nitrogen Dioxide diffusion tube survey – cost of this work is £1,203 for next twelve-month period.
- Additional Stage 4 assessments – Additional modelling for particle levels will be required during the current financial year. This is an unexpected cost due to the need to carry out further modelling to provide the level of data expected. The detailed cost of this work is currently being investigated in addition to the possibility of meeting it from MIRACLES funds. However, if this funding is unavailable, costs could be in the order of £10,000.

Every effort will be made to manage these costs within the existing budget. However, if no additional support for the additional stage 4 assessments can be secured (from MIRACLES or other sources), a supplementary estimate may be

required to fund this work. In addition, there will be significant staffing costs for compiling a stage 4 assessment and co-ordinating the production of an action plan, estimated to be equivalent to one full time post for at least six months. This will be met using existing staff resources, although it is likely that this may be at the detriment of other services.

### 5.3 Next Financial year (2004/2005)

Ongoing monitoring is essential in assessing pollutant levels as part of any AQMA action plan, it will therefore be necessary to schedule the replacement of the real time air quality monitoring equipment currently used in the roadside and background monitoring stations. This equipment was originally installed in 1996 using funds mainly provided by Hampshire County Council but is now proving unreliable and costly due to breakdowns and increased staff time resolving such issues. The availability of reliable current data is a critical contributor to overall air quality work and it is considered that complete replacement is the only option available. This will be the more cost effective procurement option, as monitoring will need to continue at these locations until at least 2010.

Based on these considerations, costs for 2004/05 are likely to be:

- Continuation of nitrogen dioxide tube survey – £1,203/year (current cost). This can be absorbed within existing budgets.
- Possible provision of an additional PM<sub>10</sub> real time site at £30,000 -£40,000 although discussions are still continuing with Casella Stanger as to whether this has to be provided.
- Replacement of the existing roadside and background air quality monitoring stations at an estimated cost of about £75,000.

These figures will be taken into account in preparing proposals for the 2004/05 revenue and capital budgets later this year.

## 6. Background Documents:

### 6.1 The following reports issued by Winchester City Council can be provided upon request:

- Winchester City Council Stage 1 Review (Dec 1998) – Reported to Environmental Health Committee 18 January 1999 (EH508).
- Winchester City Council, Stage 2 & 3 Air Quality Review and Assessment (Aug 2000). Reported to Winchester Movement and Access Plan (WMAP) Joint Member's Panel. 11 September 2000 (Item 5).
- Winchester City Council, Air Quality Review and Assessment – Additional Assessment of Nitrogen dioxide levels within Winchester Town Centre (Oct 2001).
- Casella Stanger – Winchester City Council – Air Quality Review and Assessment – Detailed Dispersion Modelling, July 2003 (Draft issued June 2003)

6.2 The following is a list of the new guidance issued by DEFRA relating to air quality reviews and assessments, this replaces the previous guidance. A working copy of all these documents is held by the Environmental Protection Team of the Health and Housing Department:

- Local Air Quality Management – Technical Guidance LAQM TG(03)
- Local Air Quality Management – Policy Guidance LAQM PG(03)
- The Air Quality Strategy for England, Scotland, Wales and Northern Ireland: Addendum

## APPENDICES

Appendix 1 Map indicating proposed AQMA for Winchester Town Centre

Appendix 2 - Letter from Casella Stanger



## **APPENDIX 2 – Transcribed copy of letter from Casella Stanger regarding dispersion modelling report**

06 June 2003

PT/YB/Win021730102/060603a

Phil Tidridge  
Environmental Protection Department  
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Dear Phil

### **Winchester LAQM - Further Review of NO<sub>2</sub> Concentrations**

I am pleased to include with this letter our report detailing the predicted NO<sub>x</sub>/NO<sub>2</sub> concentrations for Winchester City for both the year 2002 and 2005.

Continuous monitoring undertaken in George Street has been used along with over 20 roadside diffusion tube sites in order to locally verify the predicted concentrations of NO<sub>x</sub> and NO<sub>2</sub>. Comparison of final modelled and monitored NO<sub>2</sub> concentrations show that the predictions compare well with monitored levels. Details of the comparisons are provided in the enclosed report.

Further to the conclusions detailed in the report, it is recommended that Winchester City Council declare an Air Quality Management Area (AQMA) within the main city centre area and consider declaration along some of the major roads into the City, particularly Stockbridge Road and Chesil Street. There are predicted exceedences of 40 µg/m<sub>3</sub> within the City Centre, and predicted marginal exceedences, or concentrations approaching 40 µg/m<sub>3</sub>, on Stockbridge Road and Chesil Street.

Additional to the recommendation to declare an AQMA, and following previous NSCA guidance, it is suggested the Winchester City Council define the extent of the AQMA on levels of 36 µg/m<sub>3</sub> (where exceedences of 40 µg/m<sub>3</sub> are predicted). This takes into account additional uncertainty in the prediction of future concentrations and considers the occurrence of 'random' error, once systematic error has been taken into consideration.

The enclosed report provides both maps in the form of pollutant contours and with respect to pollutant predictions at specific receptors, along with maps showing only the 40 and 36 µg/m<sub>3</sub> contour levels in 2005. In addition, a map highlighting those buildings that fall within the 36 µg/m<sub>3</sub> contour level in 2005 is also provided.

As you are aware, previous dispersion modelling undertaken for Winchester City Council has not indicated exceedences of the NO<sub>2</sub> or PM<sub>10</sub> objectives within the City, whilst continuous monitoring indicates likely exceedences do occur. For NO<sub>2</sub>, exceedences of

the annual average objective have been measured over the last few years, while for PM<sub>10</sub>, exceedences of both the annual and daily mean objective were measured in 2002, the first year that this has occurred. This may be due to local activities (such as construction work) adjacent to the continuous monitoring site. Consequently, in order that no overemphasis is placed on PM<sub>10</sub> monitoring, you should confirm whether any local activities are likely to have contributed to higher levels of PM<sub>10</sub> than would normally be experienced.

The dispersion modelling undertaken using Breeze Roads has been verified against and increased amount of monitoring data and final results indicate the need for declaration of an AQMA for NO<sub>2</sub>. However, when comparing the modelled levels of NO<sub>x</sub> concentrations from road traffic to that estimated at the continuous roadside site, a large model adjustment was undertaken as the model under predicted roadside NO<sub>x</sub> concentrations. This model adjustment is undertaken prior to any consideration of the conversion of NO<sub>x</sub> to NO<sub>2</sub> as these relationships are based on empirical (measured) relationships and it would therefore be expected the NO<sub>x</sub> levels should compare well with the monitored concentrations before applying these relationships. Once the NO<sub>x</sub> model was verified, the final levels of predicted NO<sub>2</sub> concentrations compare well with the monitored concentrations at different roadside locations across the City.

In respect of PM<sub>10</sub>, the model does not perform well when compared against the monitored PM<sub>10</sub> concentrations on George Street. Extremely low levels of PM<sub>10</sub> are predicted from the road traffic, while monitoring indicates over 15 µg/m<sup>3</sup> of roadside PM<sub>10</sub> is being generated (as an annual average). The presence of a street canyon like environment, and re-suspension of roadside PM<sub>10</sub> may be factors that are affecting the predictions of PM<sub>10</sub>, and in this respect the results of the PM<sub>10</sub> predictions have not been presented as they do not reflect the monitored levels.

The year 2002 was the first year that exceedences of the PM<sub>10</sub> objectives (both annual and daily) were monitored at the roadside suggesting either that there is a general increase in PM<sub>10</sub> concentrations in Winchester, or that the monitoring for the year 2002 was influenced by high background levels of PM<sub>10</sub>.

For PM<sub>10</sub>, it is recommended that the same area declared for NO<sub>2</sub> as also declared for PM<sub>10</sub> as precautionary approach. In general, where declarations for PM<sub>10</sub> are based on road traffic, the areas are similar, or smaller than those for NO<sub>2</sub> so using the line defined by NO<sub>2</sub> predictions would be a reasonable approach in the absence of suitable predicted concentrations.

It is recommended that both continuous monitoring and diffusion tube monitoring is continued in Winchester City and there may be benefit in considering an additional continuous monitoring site for PM<sub>10</sub> in order to provide information on levels at another roadside site.

Casella Stanger also recommends that further investigation into the models available for urban situations are investigated prior to Winchester City Council purchasing their own model, which is believed to be the intent. The current and previous work undertaken by other bodies for Winchester City Council has indicated difficulties modelling the Winchester area, which in the past has resulted in the non-declaration of an AQMA even though monitoring has shown exceedences. While the results of the Breeze Roads modelling undertaken in this study indicate the need for an AQMA, the correction factor for NO<sub>x</sub> modelling is considered to be high, and PM<sub>10</sub> modelling does not reflect the

expected levels.

It is therefore recommended that an investigation into the use of the ADMS-Roads model developed by CERC is undertaken and a comparison of the performance of the model against both monitoring data and the Breeze Roads modelling is undertaken prior to Winchester City Council purchasing their own dispersion model. Casella Stanger would be happy to undertake such an exercise using our licensed version of ADMSRoads, using the same input data as used in the current study in order to facilitate the Council's decision on purchasing a dispersion model for their own use. Casella Stanger would be happy to provide the relevant input and model set-up files for either model depending once the decision to purchase the model has been taken, however there would be additional costs for undertaking the comparison exercise expected to be 2 to 3 days full work.

Once you have read the report into NO<sub>2</sub> predictions, please do not hesitate to contact me with any questions. In addition, it would be useful to arrange a meeting to discuss the project and further work that may be necessary.

If you have any queries or concerns, please do not hesitate to contact me.

Kind regards

Yvonne Brown  
Senior Consultant  
Air Quality Department