

SECTION 77 TOWN AND COUNTRY PLANNING ACT 1990 – REFERENCE
OF APPLICATIONS TO THE SECRETARY OF STATE FOR COMMUNITIES
AND LOCAL GOVERNMENT

TOWN AND COUNTRY PLANNING (INQUIRIES PROCEDURE) (ENGLAND)
RULES 2000

**PROOF OF EVIDENCE OF
DR. BETHAN TUCKETT-JONES PhD CEnv MIAQM
AIR QUALITY**

In respect of:

Appeal Reference: APP/G2435/A/11/2158154

relating to Land north Of A511 Stephenson Way, Coalville,
Leicestershire



This Proof of Evidence is presented in the following documents:

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TABLE	TITLE
Table 1	North West Leicestershire's ambient air quality monitoring in Coalville
Table 2	Appellant's predicted concentrations of annual mean nitrogen dioxide in 2022
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1 INTRODUCTION

1.1 Qualifications and Experience

1.1.1 My name is Bethan Tuckett-Jones. I am a Chartered Environmentalist and a Member of the Institute of Air Quality Management. I have a Doctorate in Meteorology from the University of Reading and Bachelor of Science Degree in Physics from the University of Edinburgh, obtained in 1992 and 1988 respectively. I have had over 20 years' experience of assessing the dispersion and impacts of pollution in the environment. I am the Head of Air Quality in the Environment Group of Parsons Brinckerhoff Ltd.

1.1.2 I have worked on all stages of environmental assessment of residential developments, from scheme and site identification through to construction environmental management planning. I have been responsible for the monitoring, modelling and assessment of the effects of the schemes on air quality.

1.1.3 I have regulatory experience in the field of air quality having worked for the Environment Agency's Air Quality Modelling and Assessment Unit, where my principal role involved the auditing of air quality impact assessments submitted to the Environment Agency for permitting purposes. I have also been involved with a number of local authorities, including supporting Devon County Council, Cornwall County Council, Darlington Borough Council, Newport City Council, Restormel Borough Council and Rhondda-Cynon-Taf Council with their air quality duties and planning application reviews.

1.1.4 I have presented expert evidence in respect of air quality at a number of Public Inquiries including the A380 South Devon Link Road (Kingskerswell Bypass) Inquiry on behalf of Devon County Council, the Middlewich Energy from Waste Facility Inquiry on behalf of Covanta Energy Limited and at the Inquiry into the expansion of London Ashford Airport on behalf of the Airport.

1.2 Scope of Evidence

1.2.1 This Proof presents evidence relating to the air quality effects associated with a sustainable urban extension to the immediate north-east of Coalville on land adjacent to Stephenson Way (the proposed development).

1.2.2 North West Leicestershire District Council appointed Parsons Brinckerhoff in September 2011 to assist them in reviewing the impacts on local air quality due to the proposed development. The main aim of this Proof is to report on the results of this review of the potential impacts and the Appellant's assessment methodology. The review has considered, amongst other documents,

- Stephenson Green Coalville, Environmental Statement Volume 1, December 2010 [CD-PA8, CD-PA14]
- Stephenson Green Coalville, Environmental Statement Volume 2, Air Quality Assessment November 2010 [CD-PA9, CD-PA15]
- Air Quality Assessment – Addendum Report October 2011 [CD-AQ8]

1.3 Structure of Evidence

1.3.1 In my evidence I will:

- a) set out the relevant policy and regulatory frameworks for ambient air quality in the UK (Chapter 2);
- b) describe the current air quality climate in Coalville (Chapter 3)
- c) summarise the Appellant's methodology and assessment results and set out my review of their submission (Chapter 4)
- d) assess the policy implications of the proposed development (Chapter 5)
- e) provide a summary and conclusions (Chapter 6)

1.3.2 Further Tables, Figures and Appendices relating to Air Quality are also presented in support of this Proof of Evidence in BTJ/C.

1.4 Summary

1.4.1 My evidence focuses on the findings of my review of the Appellant's assessment of the local air quality impacts of the proposed development at Stephenson Green, Coalville. It includes a technical review of the Appellant's assessment methodology and a summary of the potential policy implications.

2 LEGISLATION, POLICY AND REGULATION

2.1 Overview

2.1.1 In this section I will summarise national policy and regulatory frameworks of relevance to the air quality impact assessment for the Application.

2.1.2 Planning Policy Statement 23: Planning and Pollution Control (PPS23, CD 6.12) provides the national planning policy context for addressing air quality in England. It contains advice on when air quality should be a material consideration in development control decisions.

2.1.3 The national framework for the assessment of ambient air quality is set out in the Government's Air Quality Strategy [CD-AQ1] which sets 'objectives' for the concentrations of ten key pollutants and outlines measures to be taken in order to meet these objectives. The aim of the Strategy is to improve and protect ambient air quality in the UK, and to protect people's health from the adverse effects of air pollution.

2.1.4 The role of the planning system in relation to air quality is to ensure that the proposed location of any development which may affect air quality, either directly or indirectly, is appropriate. It has a significant part to play in meeting the Government's national and international commitments to improve ambient air quality.

2.2 Ambient Air Quality Policy

2.2.1 The Expert Panel on Air Quality Standards (EPAQS) was set up by the Secretary of State for the Environment in 1991 to advise the Government on air quality standards. The recommendations of EPAQS, together with those of the World Health Organisation (WHO) and European Union Air Quality Directives provided the basis for the development of an Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland. The Strategy was first published in 1997 as a requirement of Part IV of the Environment Act 1995, and underwent its first revision in 2000. In 2007, the strategy was

further updated in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland, July 2007 [CD-AQ1].

2.2.2 The AQS sets objectives for ten pollutants. They are policy targets, expressed as a maximum ambient concentration not to be exceeded, either without exception or with a permitted number of exceedences, within a specified timescale. The objectives have been derived from standards which represent minimum or zero risk levels. The standards are set purely with regard to scientific and medical evidence on the effects of the pollutants on health and or impacts on vegetation. The objectives take into account the costs, benefits, feasibility and practicality of achieving the standards, generally by imposing a time limit for achieving the standard.

2.2.3 The objectives for 7 of the pollutants considered in the AQS are set down in UK legislation in the Air Quality (England) Regulations 2000 [CD-AQ2] and the Air Quality (England) (Amendment) Regulations 2002 [CD-AQ3]. EU Directives on air quality are transcribed into UK legislation in the Air Quality Standards Regulations 2010 [CD-AQ4] ("The Standards Regulations").

2.2.4 The Environment Act 1995 also sets out the principles for local air quality management (LAQM), under which, Local Authorities are required to review current and future air quality within their area against the air quality objectives. Where it is anticipated that an air quality objective will not be met, the Local Authority is required to declare an Air Quality Management Area (AQMA) and to produce an Action Plan in pursuit of the achievement of the air quality objectives.

2.3 Planning Policy and Air Quality

2.3.1 The following advice is contained within Appendix A to PPS23 [CD-NPP6] relating to what may be material in the consideration of individual planning applications where air quality considerations arise. Matters to be considered include:

“the possible impact of potentially polluting development (both direct and indirect) on land use, including effects on health, the natural environment or general amenity;”

“the existing, and likely future, air quality in an area, including any Air Quality Management Areas (AQMAs) or other areas where air quality is likely to be poor (including the consideration of cumulative impacts of a number of small developments on air quality...”

“the need for compliance with any statutory environmental air quality standards or objectives ...”

2.3.2 Furthermore, PPS23 states that:

“The findings of air quality reviews and assessments will be important in the consideration of local air pollution problems and the siting of certain types of development;”

2.3.3 Appendix 1G to PPS23 (para 1G.1) states that impacts on air quality are likely to be particularly important *“where the development is proposed inside, or adjacent to, an air quality management area”*. Road transport is recognised as a significant contributor to poor local air quality, most notably when traffic is congested. Appendix 1G (para 1G.4) states that planning authorities should be provided with air quality assessments which *“as far as possible take account of congestion predictions”*.

2.4 Local and Regional Plans

2.4.1 Local authorities and groups of authorities set out specific policies for development control which reflect national guidance and policies. They include policies that are aimed at protecting the environment.

2.4.2 The North West Leicestershire Local Plan was adopted in August 2002 with three subsequent alterations adopted in 2004 and 2005 [CD-DP14]. The key objectives of the development strategy are identified in Strategy Policy 1, which states that:

'Measures will be taken so that:

(a) The environment is conserved and where possible enhanced;"

2.4.3 North West Leicestershire falls within the Three Cities Sub area of the East Midlands Region and is included within the Regional Spatial Strategy, adopted in 2009 [CD-DP13].

2.4.4 Policy 1 of the strategy outlines the required approach to the delivery of sustainable development within East Midlands. A core objective of Policy 1 is that any plan should "*protect and enhance the environmental quality of urban and rural settlements*".

2.4.5 Furthermore, Policy 36 sets the Regional Priorities for Air Quality as

"Local Development Frameworks and the strategies of relevant public bodies should:

- *Contribute to reducing air pollution in the region;*
- *Consider the potential effects of new developments and increased traffic levels on air quality..."*

2.5 Summary

2.5.1 Planning Policy Statement 23: Planning and Pollution Control provides the national policy context for the consideration of air quality and the protection of human health through the planning system.

2.5.2 The role of the planning system in relation to potential sources of air pollution is to ensure that the proposed location of any development which may give rise to pollution, either directly or indirectly, is appropriate. The local planning authority should ensure that the effects of existing sources of pollution, including background pollution, are not such that the cumulative effects of pollution when the proposed development is added would make that development unacceptable.

2.5.3 The assessment of the acceptability of air pollution impacts is made with reference to the UK's Air Quality Strategy and various statutory air quality standards and objectives set out in UK Regulations and European Directives.

2.5.4 Air quality may be a material consideration, which Local Authorities have a duty to consider, in the determination of a planning application. Additionally, under separate responsibilities, Local Authorities are tasked with identifying locations in which air pollution levels exceed national air quality objectives. The findings of these Local Authority air quality reviews and assessments, and in particular the designation of Air Quality Management Areas, are important in the consideration of local air pollution within the planning system.

3 AIR QUALITY IN COALVILLE

3.1 Overview

3.1.1 The assessment of existing air quality in Coalville has been based on the ambient air monitoring data collected by North West Leicestershire District Council and also the Appellant's monitoring data.

3.2 Ambient Air Quality

Local Air Quality Management

3.2.1 North West Leicestershire District Council (NWLDC) currently has five air quality management areas declared as a result of monitored exceedences of the air quality objective for annual mean nitrogen dioxide ($40\mu\text{g}/\text{m}^3$). Of these, the proposed development at Stephenson Green has a potential indirect impact on the AQMA in Coalville.

3.2.2 The Coalville Air Quality Management Area was originally declared for a section of the A511 including Bardon Road and Stephenson Way. A detailed assessment of monitored pollutant concentrations within the Coalville AQMA, undertaken by NWLDC in 2011 [CD-AQ5] reported that no exceedences of the objective for annual mean nitrogen dioxide had been monitored at relevant receptor locations along Bardon Road. Accordingly, it was recommended that the area of the Coalville AQMA be reduced to encompass Stephenson Way only, from around 300m to the north of the junction with Broom Leys Road to the junction with Bardon Road [Figure 1].

3.2.3 Table 1, presented in volume BTJ/C of my Proof, shows recent nitrogen dioxide diffusion tube monitoring within Coalville. The data confirm that the AQMA is justified, with sustained exceedence of the air quality objective for annual mean nitrogen dioxide at Broom Leys junction. There is no consistent temporal trend in the monitored concentrations. Concentrations at Broom Leys junction (1) have been steady since 2006, whereas concentrations at Broom Leys junction (2) were significantly higher in 2010 than previous years. At 244 Bardon Road, concentrations showed a slight decrease between 2006 and 2009, but then increased markedly, to above the objective, in 2010. Data

available for 2011 indicate that annual mean concentrations are lower than in 2010, but above levels seen in 2006-2009.

- 3.2.4 An automatic monitor was installed at the junction of Stephenson Way and Broom Leys Road on 15th September 2010. During the period between 15th September 2010 and 31 December 2010, the hourly mean air quality standard for nitrogen dioxide ($200\mu\text{g}/\text{m}^3$) was exceeded 29 times. The air quality objective for hourly nitrogen dioxide allows the standard to be exceeded 18 times in a calendar year and, therefore, the 29 exceedences recorded between September and December 2010 constitutes an exceedence of the UK's air quality objective.
- 3.2.5 During the period between January 2011 and 13th October 2011, the 1 hour standard was exceeded 20 times, which again constitutes an exceedence of the air quality objective.
- 3.2.6 A detailed assessment of the exceedences of the hourly objective was undertaken by NWLDC in November 2011 [CD-AQ6]. This concluded that the exceedences were strongly associated with morning and evening peak hour traffic and that the declaration of the Coalville AQMA should be extended to include exceedence of the hourly mean objective for nitrogen dioxide.
- 3.2.7 Further analysis has revealed that episodes of particularly high hourly mean concentrations are also associated with periods of relatively calm winds. Since periods of calm winds are not uncommon, and high volume traffic flows during peak hours are ubiquitous, it is likely that exceedences of the hourly mean standard for nitrogen dioxide will continue to occur sporadically for sometime in the future. Therefore, the extension of the scope of the Coalville AQMA is justified.
- 3.2.8 NWLDC do not monitor for any other pollutants in Coalville, but in the absence of significant local sources of pollutants other than nitrogen oxides, it is unlikely that these pollutants approach their relevant air quality objectives.

Site Specific Monitoring Program

3.2.9 A short duration diffusion tube monitoring survey was undertaken by the Appellants between August and November 2008. The utility of the survey is limited by its short duration and the lack of co-location of monitoring with the long term sites established by NWLDC. Furthermore, no monitoring was undertaken within the Coalville AQMA. Nevertheless, the data is broadly consistent with the monitoring of NWLDC which indicates that, outside of the AQMA, pollutant concentrations are well within the air quality objective for annual mean nitrogen dioxide.

3.3 Summary

3.3.1 Within Coalville, nitrogen dioxide is the only local air pollutant at significant risk of exceeding the objectives for ambient air quality set out in the UK's Air Quality Strategy.

3.3.2 Road transport is the dominant local source of pollutants and roadside concentrations of nitrogen dioxide are elevated, most notably at the junction of Stephenson Way and Broom Leys Road where exceedences of both the annual mean and hourly mean objectives for nitrogen dioxide have been monitored.

3.3.3 NWLDC have declared a number of Air Quality Management Areas within their district, of which, the Coalville AQMA, which lies along the A511 on Stephenson Way to the south of the development site, may be impacted by the proposed development. However, outside of the AQMA concentrations of nitrogen dioxide are well within the air quality objectives.

4 REVIEW OF APPELLANT'S ASSESSMENT

4.1 Overview

4.1.1 The proposed development has the potential to affect air quality during both the construction and operational phases. In this section, I will summarise the methodology used by the Appellant and the results of their assessment, and set out the findings of my review of the assessment.

4.2 Methodology

Construction

4.2.1 The main potential effects during construction will be related to emissions of fine particulate matter and dust. The former have potential health impacts whereas the latter can be associated with a loss of amenity or soiling of surfaces. Emissions could arise from general construction activities and construction traffic.

4.2.2 The Appellant adopted a qualitative approach to the assessment of risks associated with the construction phase, following the guidance produced by London Councils (2007, The Control of Dust and Emissions from Construction and Demolition). The methodology considers the area of the site being developed, the proximity of potentially sensitive receptors for impacts, the nature of the construction and earthworks, and the duration of the works.

Operation

4.2.3 The main potential effects during the operation of the development will be related to additional traffic on the local road network. The Appellant considered impacts on nitrogen dioxide only.

4.2.4 Impacts were assessed quantitatively using the ADMS-Roads dispersion model including scheme-specific traffic data and vehicle emissions factors from national datasets. Volume 1 and 2 of the ES considered annual mean concentrations only. The model was verified against annual mean nitrogen dioxide concentrations monitored in the vicinity of the site in 2008. Background pollutant concentrations were taken from the UK Air Quality

Archive Background Air Quality Maps provided by Department for Environment, Food and Rural Affairs. A sensitivity test was provided to consider the implications of uncertainties associated with the future projection of background air quality.

4.2.5 The model was used to assess future air quality in the planned completion year for the proposed development of 2022.

4.2.6 Further to discussions with NWLDC, additional modelling of the development impacts was undertaken by the Appellant to examine impacts on hourly mean nitrogen dioxide concentrations within the Coalville AQMA.

4.3 **Assessment Results**

Construction

4.3.1 The proposed development was categorised by the Appellant as being a medium risk site within the London Best Practice Guidance framework for construction sites.

4.3.2 The scale of the development, in terms of the area being developed and the number of properties being built, and the likely duration of the construction phase would lead to a high risk of impacts in relation to dust and particulate matter, but this risk was reduced to medium as a result of the nature of the works required and the distance to the nearest receptors from the majority of activities.

Operation

4.3.3 Table 2 shows the roadside concentrations of annual mean nitrogen dioxide, as predicted by the Appellant's modelling for 2022 and reported in the ES. The predicted future concentrations are significantly lower than existing concentrations in scenarios both with and without the proposed development. The decrease is due, primarily, to the decrease in emissions per vehicle predicted by the national emissions inventory datasets provided by the Department for Transport.

- 4.3.4 The table shows that roadside pollutant concentrations will increase with the development, at locations both outside and within the Coalville AQMA. The maximum increase is modelled at a receptor at 262 Hermitage Lane (REC 3, in the ES [CD-PA7, 8, 14 and 15]) where concentrations are predicted to increase by $1.94\mu\text{g}/\text{m}^3$. This is considered by the Appellant to be an impact of large magnitude but only slight adverse significance due to the total predicted concentrations being well within the air quality objective.
- 4.3.5 The maximum reported increase in pollutant concentrations within the Coalville AQMA is $0.94\mu\text{g}/\text{m}^3$, as modelled at 21 Broom Leys Road (REC 1 in the ES) on the junction of Stephenson Way and Broom Leys Road. This is concluded by the Appellant to be an increase of small magnitude but negligible significance due, again, to the predicted total concentration of nitrogen dioxide being well within the air quality objective both with and without the development in operation.
- 4.3.6 The sensitivity test undertaken by the Appellant to consider the implications of uncertainties associated with the future projection of background pollutant concentrations did not affect their conclusions. Namely, that the impact of development on local air quality will be negligible to slight adverse and that there is no risk of exceedence of air quality objectives in the future, either with or without the development proposed.
- 4.3.7 Table 3 shows the impacts of the development on hourly mean nitrogen dioxide concentrations within the Coalville AQMA, as predicted by the Appellant and reported in their October 2011 ES Addendum [CD-AQ8].
- 4.3.8 The Appellant's modelling shows exceedences of the air quality objective for hourly mean nitrogen dioxide at a number of properties at the Stephenson Way/Broom Leys Road junction in the baseline year of 2008. This is consistent with recent monitoring at the junction in 2010 and 2011.
- 4.3.9 By 2022, at residential properties, the Appellant's modelling predicts that hourly mean concentrations remain relatively high but will have reduced to within the air quality objective. The magnitude of the impact is considered to be small and of negligible to slight adverse significance.

4.4 Proposed Mitigation

Construction

4.4.1 As a result of their concluding that there is a medium risk of air quality impacts during the construction of the proposed development, the Appellant has proposed a set of mitigation measures based on current best practice. These should become part of the approved Construction Environmental Management Plan.

Operation

4.4.2 The Appellant has not considered it necessary to propose any mitigation measures for the operational impacts of the proposed development.

4.5 Limitations of Assessment

4.5.1 Overall, the Appellant's approach to the air quality assessment, namely a qualitative assessment of construction impacts and detailed modelling of operational impacts is, in my opinion appropriate. However, I have below outlined a number of shortcomings in the assessment methodology and areas where the Appellant has not provided sufficient commentary on the model results and the conclusions reached.

4.5.2 The assessment of construction impacts, although not reported in detail, appears robust and, with the application of the best practice mitigation measures set out in the ES, significant adverse effects should be avoided. Construction impacts will not be considered further in my proof of evidence.

Model Verification

4.5.3 Dispersion model verification is an essential step in the provision of a robust air quality impact assessment. The Appellant verified their modelling against a very short term survey (3 months) of air quality at nine locations around Stephenson Green and just two locations from NWLDC's long running monitoring surveys within Coalville AQMA.

- 4.5.4 For use in the verification process, the 3 months survey data required 'annualisation', in which temporal trends at the closest national monitoring stations (in Leicester and Nottingham) are assumed to apply at the development site.
- 4.5.5 The methodology used to undertake the annualisation was as set out in government guidance (Defra's LAQM TG(09)), but the uncertainties associated with this process have not been acknowledged by the Appellant. Since the verification was based on 9 annualised sites and just 2 long term sites, this has a potentially significant impact on the robustness of the model verification process.
- 4.5.6 Furthermore, the area of greatest concern in relation to air quality is the AQMA. Again, with the Appellant using a disproportionate number of sites outside the AQMA for verification (9 out of 11), the results have been biased towards areas where, for whatever reason, air quality is relatively good. It is significant that in their comparison of modelled versus monitored data (Figure 11.2 and Table 11.14 of December 2010 ES), the Appellant shows that concentrations within the AQMA are under-predicted in the modelling by more than 10%, even after the verification of the model. That is to say, in the area of greatest concern, the model underestimates the impacts of traffic on local air quality. Since the verification factors are applied in future years, this implies that concentrations within the AQMA in the future are also potentially underestimated.
- 4.5.7 It is a shortcoming of the Appellant's monitoring survey that, despite the knowledge that the survey would be limited in duration, no data was collected within the AQMA and, in particular, at sites alongside existing NWLDC long term monitoring locations to enable local comparisons to be made.
- 4.5.8 As a result, it is my opinion, that uncertainties in the Appellant's modelling are significant and, more importantly, at a maximum in the area of greatest concern, namely the Coalville AQMA.

Modelling of Hourly Mean Concentrations

- 4.5.9 The Appellant has, in the ES addendum, modelled hourly mean concentrations of nitrogen dioxide. Whilst it is acknowledged that the formal verification of hourly predictions is not feasible with available data, the Appellant has not provided information to demonstrate that the modelling is based on technically appropriate assumptions and is consistent with the available monitoring in terms of the observed association of the peak hourly mean concentrations with particular weather conditions. These are crucial in establishing confidence in the future predictions of pollution levels.
- 4.5.10 The Appellant's addendum states (3rd paragraph, Section 4.2 of the addendum ES [CD-AQ8]) that "*following primary model correction the prediction road contribution NO₂ was calculated using the NOX to NO₂ calculator spreadsheet published by DEFRA*". However the notes provided by Defra with this calculator state:
- "This workbook calculates annual mean nitrogen dioxide concentrations from modelled annual mean oxides of nitrogen concentrations"*.
- 4.5.11 The note make no reference to the applicability of the calculator to the estimation of nitrogen dioxide concentrations on an hourly basis and the Appellant provides no justification for its use in the assessment.
- 4.5.12 Furthermore, the Appellant states that (3rd paragraph, Section 4.2 of the addendum ES [CD-AQ8]), following the use of the DEFRA calculator and secondary model adjustment, "*...the background levels of NO₂...were added*". The data provided by the Appellant, and reproduced in Table 2 of my proof, demonstrate that the background levels of nitrogen dioxide added to the hourly mean concentrations were taken directly from the mapped data provided by DEFRA for the UK. However, these mapped data represent long term mean concentrations and their direct application on an hourly basis has not been justified by the Appellant. Actual background concentrations will vary in time and the Appellant has provided no information in support of their assumption.

- 4.5.13 One common approach to the derivation of an appropriate background concentration for hourly mean assessment is to double the annual mean background concentration. This approach is used by the Environment Agency and DEFRA in the assessment of impacts from point sources. Had this approach been used in the current assessment, then modelled hourly mean concentrations of nitrogen dioxide would exceed the air quality objective at 44 Broom Leys Road (R4) with the operation of the proposed development in 2022, but would be just within the objective without the proposed development.
- 4.5.14 As a result of these short comings in the Appellant's modelling, I consider that it is not possible to draw robust conclusions regarding the robustness of the Appellant's assessment of hourly concentrations of nitrogen dioxide. Furthermore, the Appellant has failed to acknowledge the significant risks of ongoing exceedences of the air quality objective.

Assessment scenarios

- 4.5.15 The Appellant has assessed future air quality in the year 2022 only. This is the estimated completion date for the development and does not take into account the staged nature of the development.
- 4.5.16 With vehicle emissions predicted by government emissions databases to decline over time, the use of the completion year for the assessment minimises the modelled impacts and does not necessarily reflect the worst case impacts. This is of particular importance within the Coalville AQMA, where pollutant concentrations currently exceed the air quality objectives and do not show a significant decreasing trend over time.
- 4.5.17 As a result, it is my opinion that the Appellants have not fully considered the implications of the occupation of the development during the staged construction nor have they considered the potential acceleration of the development schedule.

Vehicle Emissions

- 4.5.18 The Appellant has used the vehicle emissions factors provided by the Department of Transport in the Design Manual for Roads and Bridges (HA207/07) and has used the year specific emissions factors for 2008 in the model verification process and 2022 for the future year assessments.
- 4.5.19 This is appropriate as a base case for the estimation of impacts but should be considered to represent the most optimistic estimate of future air quality rather than worst case impacts. A significant shortcoming of the appellant's assessment as presented in the ES and addendum report, is that they have not undertaken any sensitivity testing of the uncertainties associated with the future estimation of vehicle emissions.
- 4.5.20 A recent report, prepared on behalf of Department for Environment, Food and Rural Affairs [CD-AQ7] found that ambient concentrations of nitrogen oxides and nitrogen dioxide in the UK have not decreased by as much as suggested by current UK emission factors. This observation applies across all areas of the UK, from urban roadside sites to rural areas and is consistent with the monitored trends in pollutant concentrations in Coalville.
- 4.5.21 The report's analysis of monitored emissions from vehicles, and in particular diesel vehicles, showed that exhaust emissions are also significantly higher than emissions factors would suggest. Essentially, the introduction of new vehicles, with increasingly stringent emissions standards, has not provided the expected emissions reductions over time under real world driving conditions.
- 4.5.22 With monitored concentrations of annual mean and hourly mean nitrogen dioxide in the Coalville AQMA at or above the relevant objectives, information on the sensitivity of the assessment results to more realistic assumptions regarding future vehicle emissions should have been provided in the ES. It is possible that, using less conservative assumptions regarding the improvement of vehicle emissions over time, the impact of the development on the Coalville AQMA could be to worsen existing exceedences of the

objectives or to re-establish exceedences. This applies to predictions of both annual mean and hourly mean concentrations of nitrogen dioxide.

- 4.5.23 Furthermore, it is also not clear from the Appellant's submissions whether the dispersion modelling used emissions which were constant in time (as stated in Table 11.11 of the Volume 1 of the ES, December 2010, CD-PA7) or varying in time (as stated in Table 13 of Volume 2 of the ES, November 2010, CD-PA8).

Vehicle Speeds and Traffic Congestion

- 4.5.24 The Appellant has provided only high level information on how variations in vehicle speeds over time and space have been taken into account in the modelling. The Appellant states that "slow down" links have been used in the model, but does not provide information on the length of these links, their correspondence to the observed behaviour of traffic queues within the Coalville AQMA or even to which junctions they have been applied.

- 4.5.25 As a consequence, I do not consider that the Appellant has demonstrated that they have fully taken into account slow moving traffic and traffic congestion in their assessment. They have not provided any commentary within the air quality assessment on potential changes in traffic queuing with the addition of the development traffic to the local road network.

Analysis of Results

- 4.5.26 The Appellant has, in their presentation of the model results, provided no commentary or discussion of the predicted impacts. An apparent mismatch between changes in traffic and air quality impacts, as outlined below, implies that without this commentary, it is not possible to interpret the results provided by the Appellant and to use that information in the development of action plans for the Coalville AQMA.

- 4.5.27 The Appellant reports that the maximum impact of the proposed development on pollutant concentrations occurs at REC 3 on Hermitage Road. However, the traffic data on which the assessment is based, as reproduced in Table 4 of

my proof, shows that there is no change in traffic on Hermitage Road with the development.

4.5.28 Furthermore, REC 1 and 2, which are strongly influenced by changes in traffic flow on Stephenson Way on which traffic flows increase by more than 3000 vehicles per day (>10% of flows without the development), show increases in annual mean nitrogen dioxide concentration of 0.6 – 0.9 $\mu\text{g}/\text{m}^3$. However, receptors REC 16 and 17 which are a similar distance from Stephenson Way show similar total pollutant concentrations but an increase with the development of only 0.2 – 0.3 $\mu\text{g}/\text{m}^3$. These results appear inconsistent but the Appellant makes no reference to this and does not provide an analysis of the model results.

Mitigation

4.5.29 The Appellant has provided no information on potential mitigation measures for operational impacts from the proposed development. The impacts are not universally negligible and, it must be acknowledged that the development will increase traffic and pollution levels in an AQMA that is directly linked to existing traffic emissions.

4.6 Summary

4.6.1 The Appellant has undertaken a qualitative assessment of the impacts of the development during the construction phase and a quantitative assessment of impacts during the operational phase. The latter are related to changes in emissions from vehicles on the local road network.

4.6.2 Overall I consider the Appellant's approach to the air quality assessment to be appropriate. However, my detailed review of the assessment has identified a number of deficiencies in their specific application of the methodologies to the proposed development, namely

- The model verification has been largely based on a limited duration monitoring survey in areas of existing good air quality and does not adequately reproduce high concentrations within the Coalville AQMA

- The modelling of hourly mean concentrations has been based on the application of methods and datasets designed for use with annual mean concentrations without justification
- The assessment scenarios do not take into account the staged nature of the proposed development
- The Appellant has not taken into account recent research which demonstrates that real world vehicle emissions are not decreasing at the rate predicted by the national emissions datasets used in the assessment. As such, the model results presented by the Appellant in the ES are likely to be over-optimistic and do not adequately represent the risks of ongoing exceedences of the UK's air quality objectives within the Coalville AQMA.
- The applicant has not provided sufficient information on the modelling of the impacts of congested traffic in their modelling
- The model results presented by the Appellant appear to be inconsistent with the traffic data on which the model is based.

4.6.3 As a result of these deficiencies, it is my opinion that the Appellant has failed to demonstrate robustly that the impacts of the proposed development on local air quality, and in particular on the Coalville AQMA, are acceptable and that the development will not worsen existing exceedences of the UK's air quality objectives.

5 POLICY ASSESSMENT

5.1 Overview

5.1.1 I have already set out, in Section 2 of my proof, the key national, regional and local policies that apply to the assessment of the proposed development at Stephenson Green. Principal amongst these policies are the UK's Air Quality Strategy and PPS23. In this section, I provide an overview of the compliance of the proposed development with national and local/regional policies.

5.2 National Policies

5.2.1 The air quality assessment takes into account the UK's air quality objectives and, with detailed dispersion modelling having been undertaken, recognises that air quality is an important consideration in the planning process for the proposed development. Additionally, the assessment takes account of the findings of NWLDC's reviews and assessment of air quality and the potential impacts of the development on the Coalville AQMA.

5.2.2 Whilst this approach is broadly consistent with national policy set out in PPS23, shortcomings in the detailed methodology imply that the development is potentially contrary to a number of core principles within PPS23.

5.2.3 PPS23 states that impacts on air quality should be considered to be particularly important where the development is proposed inside, or adjacent to an air quality management area and that the assessment should take account of the need for compliance with statutory environmental air quality standards or objectives.

5.2.4 In my review of the Appellant's assessment, I have described how their modelling potentially underestimates the impacts of the development on pollution levels within the Coalville AQMA, both in the baseline and more importantly in the future. As a result, the Appellant's modelling does not clearly demonstrate that the development would not contribute to a worsening of air quality within an AQMA and to exceedence of air quality objectives, most notably for hourly mean concentrations of nitrogen dioxide. Hence the proposed development does not comply with national planning policy PPS23.

5.2.5 PPS23, recognising that road traffic impacts are a significant contributor to poor air quality, states that planning authorities should be provided with air quality assessments which take account of congestion predictions. The Appellant has not provided sufficient information to demonstrate that congestion and slow moving traffic at the junction of Stephenson Way and Broom Leys Road has been adequately taken into account. This applies both in the baseline and with the increased traffic levels predicted with the occupation of the proposed development. The assessment does not, therefore, comply with national policy.

5.2.6 Finally, PPS23 makes clear the principal that it is the role of the planning system to ensure that the proposed location of any development is appropriate. The location of the proposed development at Stephenson Green is such that the most significant increases in traffic levels, and associated exhaust emissions, occur along Stephenson Way and in particular within the Coalville AQMA. The proposed development is, therefore, in disregard to PPS23 since it could interfere with NWLDC's efforts to reduce pollution levels within the AQMA.

5.3 Local and Regional Policies

5.3.1 Policy 1 of the East Midlands Regional Spatial Strategy states that any plan should protect and enhance environmental quality. The proposed development is contrary to this policy since it would result in a deterioration of air quality, including areas of existing poor air quality.

5.3.2 Policy 26 states that local development frameworks should contribute to reducing air pollution in the region. The Appellant has considered only nitrogen dioxide in their assessment. This is considered appropriate as an indicator of trends in all pollutants associated with traffic emissions, including particulate matter and some carcinogenic hydrocarbons such as benzene. These pollutants are 'non-threshold' pollutants for which no safe limit in ambient air can be set. For particulate matter, it is acknowledged that measurable impacts on health occur at pollutant levels below the existing UK air quality objectives. (World Health Organisation, Air Quality Guidelines,

Global Update 2005) The Appellant has acknowledged that the development will result in an increase in roadside pollutant concentrations but has not proposed any measures within the air quality assessment that would contribute to a reduction in pollutant emissions. The development is, therefore, in contradiction to the regional priorities for air quality.

5.4 Summary

5.4.1 The proposed development is contrary to a number of national, regional and local policies on air quality. This is primarily a result of the fact that the location of the development is such that it will contribute to a deterioration in air quality within an area of existing poor air quality. Furthermore, deficiencies in the Appellant's assessment methodology imply that potential impacts within the Coalville AQMA have been underestimated and no measures to reduce these impacts have been proposed.

6 SUMMARY AND CONCLUSIONS

6.1 Summary

6.1.1 My Proof has provided a review of the potential air quality impacts and the Appellant's assessment methodology for the proposed development at Stephenson Green, Coalville. It has addressed local impacts during both construction and operation.

6.1.2 The Appellant has undertaken a qualitative assessment of potential impacts during the construction phase of the development. The site has been identified as being a medium risk site in relation to potential dust and particulate matter impacts and a package of mitigation measures has been proposed to minimise dust emissions. The mitigation measures will be set out in greater detail in a Construction Environmental Management Plan prior to the start of works. My review of the Appellant's construction assessment concluded that the methodology and results were acceptable, and that the proposed mitigation measures were appropriate.

6.1.3 The Appellant undertook a detailed dispersion modelling study of the potential operational impact of the proposed development focussing on the effects of increased traffic on the local road network. The proposed development is expected to result in a deterioration in local air quality. In the Appellant's assessment, at most locations the impact is considered negligible but at some properties is considered slight adverse. The Appellant has not proposed any mitigation measures for local air quality.

6.1.4 My review of the Appellant's assessment methodology identified a number of deficiencies in the information provided in the Environmental Statement and associated AQ Addendum. In particular, it was identified that, as a result of various factors, the Appellant's assessment potentially underestimated impacts within the Coalville AQMA. Overall, the Appellant's assessment failed to adequately take into account uncertainties associated with air quality

monitoring, modelling and the future projection of vehicle emissions, particularly in areas of congested flows.

6.2 Conclusion

6.2.1 The review of the air quality assessment provided by the Appellants concludes that air quality is a potential constraint on the location of the proposed development and that the proposal runs contrary to a number of national, regional and local policies on air quality and the conservation of environmental quality.

SECTION 77 TOWN AND COUNTRY PLANNING ACT 1990 – REFERENCE
OF APPLICATIONS TO THE SECRETARY OF STATE FOR COMMUNITIES
AND LOCAL GOVERNMENT

TOWN AND COUNTRY PLANNING (INQUIRIES PROCEDURE) (ENGLAND)
RULES 2000

**PROOF OF EVIDENCE OF
DR. BETHAN TUCKETT-JONES PhD CEnv MIAQM
AIR QUALITY**

In respect of:

Appeal Reference: APP/G2435/A/11/2158154

relating to Land north Of A511 Stephenson Way, Coalville,
Leicestershire



This Proof of Evidence is presented in the following documents:

BTJ/A Proof of Evidence

BTJ/B **Summary**

BTJ/C Appendices

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Table 4	Appellant's future year traffic data, with and without the proposed development

1 INTRODUCTION

1.1.1 My name is Bethan Tuckett-Jones. I am a Chartered Environmentalist and a Member of the Institute of Air Quality Management. I have a Doctorate in Meteorology from the University of Reading. I am the Head of Air Quality in the Environment Group of Parsons Brinckerhoff Ltd.

1.1.2 This Proof presents evidence relating to the air quality effects associated with a sustainable urban extension to the immediate north-east of Coalville (the proposed development). North West Leicestershire District Council appointed Parsons Brinckerhoff in September 2011 to assist them in assessing the impacts on local air quality due to the proposed development.

1.1.3 My evidence focuses on the findings of my review of the Appellant's assessment of the local air quality impacts of the proposed development at Stephenson Green, Coalville submitted within Volume 1 and 2 of the Environmental Statement (December 2010) and an addendum to that ES provided in October 2011. It includes a technical review of the Appellant's assessment methodology and a summary of the potential policy implications.

2 LEGISLATION, POLICY AND REGULATION

2.1.1 Planning Policy Statement 23: Planning and Pollution Control (PPS23, CD-NPP6) provides the national planning policy context for addressing air quality in England. It contains advice on when air quality should be a material consideration in development control decisions.

2.1.2 The national framework for the assessment of ambient air quality is set out in the Government's Air Quality Strategy [CD-AQ1] which sets 'objectives' for the concentrations of ten key pollutants and outlines measures to be taken in order to meet these objectives. The aim of the Strategy is to improve and protect ambient air quality in the UK, and to protect people's health from the adverse effects of air pollution.

2.1.3 The role of the planning system in relation to air quality is to ensure that the proposed location of any development which may affect air quality, either

directly or indirectly, is appropriate. It has a significant part to play in meeting the Government's national and international commitments to improve ambient air quality.

- 2.1.4 Local Authorities are tasked by the UK Government with identifying locations in which air pollution levels exceed national air quality objectives. The findings of these Local Authority air quality reviews and assessments, and in particular the designation of Air Quality Management Areas, are important in the consideration of local air pollution within the planning system.

3 AIR QUALITY IN COALVILLE

- 3.1.1 Within Coalville, nitrogen dioxide is the only local air pollutant at significant risk of exceeding the objectives for ambient air quality set out in the UK's Air Quality Strategy.

- 3.1.2 Road transport is the dominant local source of pollutants and roadside concentrations of nitrogen dioxide are elevated, most notably at the junction of Stephenson Way and Broom Leys Road where exceedences of both the annual mean and hourly mean objectives for nitrogen dioxide have been monitored.

- 3.1.3 NWLDC have declared a number of Air Quality Management Areas within their district, of which, the Coalville AQMA, which lies along the A511 on Stephenson Way to the south of the development site, may be impacted by the proposed development. However, outside of the AQMA, concentrations of nitrogen dioxide are well within the air quality objectives.

4 REVIEW OF APPELLANT'S ASSESSMENT

- 4.1.1 The proposed development has the potential to affect air quality during both the construction and operational phases.

- 4.1.2 The Appellant has undertaken a qualitative assessment of the impacts of the development during the construction phase and a quantitative assessment of impacts during the operational phase. The former are primarily related to emissions of dust and particulate matter from general construction activities

and traffic; the latter are related to changes in emissions from vehicles on the local road network.

4.1.3 The site has been identified as being a medium risk site in relation to potential dust and particulate matter impacts during construction and a package of mitigation measures has been proposed to minimise dust emissions. The mitigation measures will be set out in greater detail in a Construction Environmental Management Plan prior to the start of works. My review of the Appellant's construction assessment concluded that the methodology and results were acceptable, and that the proposed mitigation measures were appropriate.

4.1.4 Overall I consider the Appellant's approach to the assessment of operational impacts, namely a detailed dispersion modelling study, to be appropriate. However, my detailed review of the assessment has identified a number of deficiencies in their specific application of the methodologies to the proposed development, namely

- The model verification has been largely based on a limited duration monitoring survey in areas of existing good air quality and does not adequately reproduce high concentrations within the Coalville AQMA
- The modelling of hourly mean concentrations has been based on the application of methods and datasets designed for use with annual mean concentrations without justification
- The assessment scenarios do not take into account the staged nature of the proposed development
- The Appellant has not taken into account recent research which demonstrates that real world vehicle emissions are not decreasing at the rate predicted by the national emissions datasets used in the assessment. As such, the model results presented by the Appellant in the ES are likely to be over-optimistic and do not adequately represent the risks of ongoing exceedences of the UK's air quality objectives within the Coalville AQMA.

- The Appellant has not provided sufficient information on the modelling of the impacts of congested traffic in their modelling
- The model results presented by the Appellant appear to be inconsistent with the traffic data on which the model is based.

4.1.5 As a result of these deficiencies, it is my opinion that the Appellant has failed to demonstrate robustly that the impacts of the proposed development on local air quality, and in particular on the Coalville AQMA, are acceptable and that the development will not worsen existing exceedences of the UK's air quality objectives.

5 POLICY ASSESSMENT

5.1.1 PPS23 states that impacts on air quality should be considered to be particularly important where the development is proposed inside, or adjacent to an air quality management area and that the assessment should take account of the need for compliance with statutory environmental air quality standards or objectives.

5.1.2 The proposed development is contrary to a number of national, regional and local policies on air quality. This is primarily a result of the fact that the location of the development is such that it will contribute to a deterioration in air quality within an area of existing poor air quality.

5.1.3 Deficiencies in the Appellant's assessment methodology imply that potential impacts within the Coalville AQMA have been underestimated and that the risks of continued exceedences of the air quality objectives have not been adequately considered. Furthermore, no measures to reduce these impacts have been proposed by the Appellant.

6 SUMMARY AND CONCLUSIONS

6.1.1 My Proof has provided a review of the potential air quality impacts and the Appellant's assessment methodology for the proposed development at Stephenson Green, Coalville. It has addressed local impacts during both construction and operation.

6.1.2 My review of the assessments provided by the Appellants concluded that air quality is a potential constraint on the location of the proposed development and that the proposal runs contrary to a number of national, regional and local policies on air quality and the conservation of environmental quality.

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APPENDIX A: TABLES

Table 1: North West Leicestershire's ambient air quality monitoring in Coalville. Data show annual mean nitrogen dioxide in $\mu\text{g}/\text{m}^3$ from passive diffusion tubes plus single automatic continuous monitor. Exceedences of the air quality objective are shown in bold italic.

NWLDC ID	Site	2005	2006	2007	2008	2009	2010	2011 ¹
03N	181 Bardon Road				27.9	25.86	33.71	26.93
04N	244 Bardon Road	45.73	34.07	32.3	31.88	31.47	43.88	37.94
05N	62 Bardon Road				23.29	21.16	30.06	
06N	Broom Leys junction (1)	46.37	40.32	40.15	40.05	39.37	42.12	38.89
07N	Broom Leys junction (2)	45.76	37.57	32.96	39.63	35.57	51.98	
	87 Bardon Road				23.81	24.48		
	134 Bardon Road				25.82	25.78		
	Bardon Road West		42.24	48.1	44.26	38.65		
	Continuous Monitor at Broom Leys							36.6

1. Data for 2011 are indicative, based on between 7 and 10 months monitoring and pending confirmation of bias correction factor

Table 2: Appellant's predicted concentrations of annual mean nitrogen dioxide in 2022 in $\mu\text{g}/\text{m}^3$. DM = Without Development, DS = With Development.

ID	Location	Total Annual Mean Nitrogen Dioxide		Change with Development	
		DM 2022	DS 2022	Conc.	As % of DM
REC 1	21 Broom Leys Road	22.2	23.2	0.94	4.24%
REC 2	26 Stimson Road	15.5	16.1	0.57	3.69%
REC 3	262 Hermitage Road	19.3	21.2	1.94	10.05%
REC 4	112 Silver Street	13	13.3	0.22	1.72%
REC 5	68 Green Lane	9.6	9.9	0.28	2.93%
REC 6	215 Hall Lane	11.9	12.3	0.41	3.43%
REC 7	1 Sharpley Avenue	10.4	10.6	0.12	1.12%
REC 8	8 Meadow Lane	9.4	9.4	0.04	0.41%
REC 9	67 Broom Leys Road (East)	17.1	17.2	0.1	0.57%
REC 10	318 Hall Lane	10.8	11	0.23	2.17%
REC 11	115 Hermitage Road	14.1	14.2	0.16	1.11%
REC 12	Meadow lane School	10.6	10.6	0.04	0.37%
REC 13	Community Hospital	10.7	10.7	0.05	0.46%
REC 14	Community Hospital	9.7	9.8	0.05	0.50%
REC 15	Broom Leys Farm	12.7	12.9	0.14	1.07%
REC 16	44 Broom Leys Road West	25	25.2	0.27	1.09%
REC 17	34 Broom Leys Road East	17.4	17.6	0.21	1.23%

Table 3: Appellant's predicted concentrations of hourly mean nitrogen dioxide in 2008 and 2022. Data shown as 99.79th percentiles of hourly mean model predictions in $\mu\text{g}/\text{m}^3$, as a traffic contribution alone and as a total predicted contribution. DM = Without Development, DS = With Development. Exceedences of the air quality objective are shown in bold italic.

Receptor	2008		2022 DM		2022 DS	
	Traffic Contribution	Total	Traffic Contribution	Total	Traffic Contribution	Total
21 Broom Leys Road	187.1	204.5	140.9	158.3	150.2	167.6
34 Broom Leys Road	192.1	209.5	145.9	163.3	148.4	165.8
27 Broom Leys Road	174.7	192.1	137.9	155.3	147.6	165
44 Broom Leys Road	207.4	224.8	164.8	182.2	169.2	186.6
Continuous Monitor	255.9	273.3	201.3	218.7	206.5	223.9

Table 4: Appellant's future year traffic data for 2022, with (Do Something) and without (Do Minimum) the proposed development. Data are vehicle flows as an Annual Average Daily Traffic (AADT)

Road Link	Do Minimum 2022		Do Something 2022	
	LGV AADT	HGV AADT	LGV AADT	HGV AADT
A511 Stephenson Way North of Hermitage Road	27917	1782	29010	1852
A511 Stephenson Way South of Hermitage Road	27037	1726	30143	1924
A511 Stephenson Way North of Broom Leys	25091	1602	28349	1809
A511 Stephenson Way South of Broom Leys	20465	1306	23722	1514
Broom Leys East of A511	16568	1058	16568	1058
Broom Leys West of A511	8656	552	8655	552
Hermitage Road	7123	303	7123	303
Whitwick Road	20140	643	22153	707
Hall Lane North Section	6962	296	8366	356
Hall Lane Central Section	7108	302	8101	345
Hall Lane South Section	8597	366	9236	393
George Lane	49	2	494	21

APPENDIX B: REFERENCE DOCUMENT EXTRACTS

Extract 1: Notes page from Defra's NOX to NO2 Calculator, downloaded from <http://lagm.defra.gov.uk/tools-monitoring-data/no-calculator.html>

NOx to NO2 conversion spreadsheet

Version	2.1
Prepared by	John Abbott & Sally Cooke, AEA
Date	22-Jan-10

Description

This workbook calculates annual mean nitrogen dioxide concentrations from modelled annual mean oxides of nitrogen concentrations. It also allows estimates to be made of annual mean oxides of nitrogen concentrations to be made from nitrogen dioxide concentrations measured by diffusion tube.

The workbook uses a one-dimensional finite difference model of the reactions and mixing of nitric oxide, nitrogen dioxide and ozone in the surface stress layer of the atmospheric boundary layer. The model is based on a research carried out for the Department for the Environment, Food and Rural Affairs; Scottish Executive; Welsh Assembly Government; Department of the Environment for Northern Ireland. A report - "Primary nitrogen dioxide emissions from road traffic: analysis of monitoring data" - can be downloaded from the following internet address:

http://www.airquality.co.uk/archive/reports/cat05/0703151041_primno2v3.pdf