Proof of Evidence Volume 5/1

5th September 2014

THE METROPOLITAN BOROUGH OF STOCKPORT (HAZEL GROVE (A6) TO MANCHESTER AIRPORT A555 CLASSIFIED ROAD) COMPULSORY PURCHASE ORDER 2013

THE METROPOLITAN BOROUGH OF STOCKPORT (HAZEL GROVE (A6) TO MANCHESTER AIRPORT A555 CLASSIFIED ROAD) (SIDE ROADS) ORDER 2013

THE HIGHWAYS ACT 1980

-and-

THE ACQUISITION OF LAND ACT 1981

THE HIGHWAYS (INQUIRIES PROCEDURE) RULES 1994

COMPULSORY PURCHASE (INQUIRIES PROCEDURE) RULES 2007

REFERENCE: LAO/NW/SRO/2013/40 and LAO/NW/CPO/2013/41

A proof of evidence relating to the AIRQUALITY aspect of the

A6 to Manchester Airport Relief Road

-of-

Paul Colclough

BSc (Hons) MSc CChem MRSC

on behalf of

The Metropolitan Borough Council of Stockport

acting on its behalf and on behalf

-of-

Manchester City Council

-and-

Cheshire East Borough Council

VOLUME 1 – PROOF OF EVIDENCE

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1. Introduction

1.1. My name is Paul Colclough and I am Team Leader in Mouchel's Infrastructure Services business unit with specific responsibilities relating to Air Quality.

1.2. I obtained a BSc (Hons) in Chemistry at Birmingham University in 1976, specialising in the chemistry of the environment. I completed an MSc in Applied Organic Chemistry in 1977.

1.3. As Head of Air Quality I am responsible for the monitoring, modelling and assessment of emissions to atmosphere of transport, commercial and industrial related pollutants.

1.4. I have been responsible for numerous programmes of work involving monitoring, modelling and assessment of the effects of transport infrastructure on ambient air quality including the A6 to Manchester Airport Relief Road. I am familiar with air quality in Greater Manchester and East Cheshire, having been involved in the assessment of a number of developments in this area.

1.5. I am giving evidence on behalf of the Metropolitan Borough Council of Stockport on its behalf and on behalf of Manchester City Council and Cheshire East Borough Council by virtue of an Agreement entered into between the three partnering Authorities pursuant to Section 8 of the Highways Act 1980. I am therefore aware of the case advanced to promote the aforementioned Orders, including: the need, background and details of the scheme and the impact of the scheme and its implications related to air quality issues. This evidence is given in support of that case.

1.6. In my evidence I set out the Council's case in relation to concerns raised in objections to the CPO relating to construction dust, local air quality once the proposed scheme is open, and whether the scheme breaches the Air Quality Directive.

1.7. I will make reference to the findings of the studies and assessments reported in the A6 to Manchester Airport Relief Road Environmental Statement (ES) published in October 2013 and taken into account by the

three planning authorities prior to their approval of the planning applications for the proposed scheme.

1.8. In my evidence I shall:

- Set out the current EU and UK air quality policy framework;
- Provide an overview of existing air quality in the study area;
- Describe the assessment methodology applied in the Environmental Statement (ES) (Core Document 2092);
- Describe the changes in local air quality that would be associated with the construction and operation of the proposed scheme;
- Outline changes in traffic flow characteristics associated with proposed mitigation measures requested by Cheshire East Council
- Describe predicted changes in air quality in Disley associated with the new mitigated traffic flows and current air quality guidance; and
- Provide a Summary and Conclusions.

1.9. My evidence should be read alongside the evidence of Nazrul Huda, Nasar Malik and Paul Reid which I am familiar with.

2. Air Quality Obligations

2.1. The key air quality legislation, policy and guidance is summarised below.

European Clean Air for Europe (CAFE) Directive (2008/50/EC) (Core Document 4403)

2.2. The Directive details air quality limit values, target values, and critical levels for a number of air pollutants established by the European Parliament and Council for the protection of human health, vegetation and ecosystems. The 2008 directive replaced nearly all the previous EU air quality legislation and was made law in England through the Air Quality Standards Regulations 2010.

Air Quality Standards Regulations (2010)

2.3. The regulations provide definitions and designate the Secretary of State as the competent authority, who for these regulations, must divide the territory of England into zones and agglomerations. Zones are

classified as an agglomeration if it is a conurbation with a population in excess of 250,000 inhabitants.

2.4. The Secretary of State must assess the levels of sulphur dioxide, nitrogen dioxide, benzene, carbon monoxide, lead and particulate matter in all zones and the levels must not exceed the limit values set out in Schedule 2.

2.5. In zones where levels of the pollutants are below the limit values set, the Secretary of State must ensure that levels are maintained below those limit values and must endeavour to maintain the best ambient air quality compatible with sustainable development.

2.6. The Regulations impose requirements on the Secretary of State to draw up air quality plans in relation to limit values and target values and short-term action plans in relation to alert thresholds. Where the levels of specified pollutants exceed their limit values the Secretary of State must draw up and implement an air quality plan so as to ensure compliance within the shortest possible time

The Environment Act 1995 (EA) (Core Document 4412)

2.7. Part IV of the Environment Act 1995 sets provisions for protecting air quality in the UK and for local air quality management, whereby all local authorities are required to assess air quality within their area. If a likely exceedence of an objective is identified, then the authority must declare an Air Quality Management Area (AQMA) and prepare an Action Plan with the aim of improving air quality in that area.

Air Quality Strategy (2007) (Core Document 4405)

2.8. The UK Government and the devolved administrations are required under the Environment Act 1995 to produce a national air quality strategy. The latest Air Quality Strategy for England, Scotland, Wales and Northern Ireland was published in 2007. Standards and objectives for each of a range of air pollutants, defined in Volume 2 are based on assessment of the effects of each pollutant on human health and ecosystems The pollutants are as prescribed within The Air Quality

(England) Regulations 2000 (Stationery Office, 2000) (Core Document 4406) and The Air Quality (England) (Amendment) Regulations 2002 (Stationery Office, 2002) (termed the 'Regulations') (Core Document 4407).

2.9. In setting pollutant concentration objectives derived from the health and ecosystem requirements, the UK Government and the devolved administrations have also sought to take into account economic efficiency, practicability, technical feasibility and timescale.

The National Planning Policy Framework (NPPF) March 2012 (Core Document 4408)

2.10. The National Planning Policy Framework (NPPF) (March 2012) replaced existing national planning policy.

2.11. Paragraph 109 of the NPPF states: "*The planning system should contribute to and enhance the natural and local environment by preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water pollution*"

2.12. Annex 2 of the NPPF defines 'Pollution' as "*Anything that affects the quality of land, air, water or soils, which might lead to an adverse impact on human health, the natural environment or general amenity. Pollution can arise from a range of emissions, including smoke, fumes, gases, dust, steam, odour, noise and light*."

2.13. Paragraph 124 of the NPPF states "*Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan.*"

2.14. The environmental impact of the proposed development, including air quality considerations, was a material consideration during the planning process.

Draft National Policy Statement for National Networks (NPS NN) (Core Document 4409)

2.15. The NPS NN, although draft at this time, is aimed at setting the overall policy against which the Secretary of State for Transport will make decisions on applications for nationally significant infrastructure projects on the national road and rail networks. It describes the need for development of these networks and Government policies for ensuring necessary development, within the Government's long term goal for sustainable transport, designed to minimise environmental and social impacts and also address existing problems.

2.16. Paragraph 2.7 of the NPS NN states "*Government policy is to bring forward targeted works to address existing environmental problems on the strategic road network and improve the performance of the network. This includes reconnecting habitats and ecosystems, enhancing the settings of historic and cultural heritage features, respecting and enhancing landscape quality, improving water quality and reducing flood risk, reducing excessive noise and addressing areas of poor air quality*."

2.17. Para 5.3 states "*Developments on the National Networks can also have beneficial effects on air quality, for example through reduced congestion. The geographical extent and distribution of these effects can cover a large area, well beyond an individual scheme*".

Applicant's assessment

2.18. Para 5.4 states "*Where the project is likely to have significant air quality impacts (both on and off-scheme) the applicant should undertake an assessment of the impacts of the proposed project as part of the Environmental Statement (ES).*

In an applicant's application the ES should describe:

- *Existing air quality levels;*
- *A forecast of air quality at the time of opening, assuming that the scheme is not built (the 'future baseline') and taking account of the impact of the scheme; and*
- *Any significant air quality effects, their mitigation and any residual effects, distinguishing between the construction and*

operation stages and taking account of the impact of road traffic generated by the project;

- *In addition to information on the likely significant effects of a project, the Secretary of State should be provided with a judgment on the risk as to whether the project would affect the UK's ability to comply with the Air Quality Directive.*

Decision making

5.7 The Secretary of State should consider air quality impacts over the wider area likely to be affected, as well as in the near vicinity of the scheme. In all cases the Secretary of State must take account of relevant statutory air quality thresholds set out in domestic and European legislation.

5.8 Air quality considerations are likely to be particularly relevant where schemes are proposed within or adjacent to Air Quality Management Areas, areas with exceedences of Limit Values or national objectives or where they may have potential impacts on Natura 2000 sites including those outside England.

5.9 The Secretary of State must give air quality considerations substantial weight where a project would lead to a significant air quality impact and/or lead to a deterioration in air quality in a zone/agglomeration where the air quality breaches the air quality limit values.

5.10 Where a project is likely to lead to a breach of the air quality thresholds, the applicant should work with the relevant authorities to secure appropriate mitigation measures to allow the proposal to proceed. The Secretary of State should refuse consent where, even taking into account mitigation, the air quality impacts of the scheme will:

- *Result in a zone/agglomeration which is currently reported as being compliant with the Air Quality Directive becoming non-compliant; or*
- *Substantially affect the ability of a non-compliant area to achieve compliance within the timescales as reported to the European Commission"*.

2.19. While the proposed A6MARR scheme is not deemed a `strategic network', the NPS NN provides an insight into the Government's latest thinking. It might also be argued that what is applicable to the strategic network should also hold good for large local highway developments.

The Environmental Protection Act 1990 (EPA) (Core Document 4411)

2.20. The EPA (Section 79, Chapter 43, Part III - Statutory Nuisance and Inspections) contains a definition of what constitutes a *'statutory nuisance*' with regard to dust and places a duty on Local Authorities to detect any such nuisances within their area.

2.21. Dust arising from construction works could lead to statutory nuisance if it "*interferes materially with the well being of the residents, i.e. affects their well being, even though it may not be prejudicial to health"*.

Local Action Plans,

2.22. The 10 Greater Manchester Authorities have worked together to produce an Air Quality Action Plan (Core Document 4413), which covers the whole of Greater Manchester and details the measures that will be taken across the area to reduce air pollution. It is accompanied by related annexes for each of the 10 district authorities providing a more detailed, local focus to the wider actions and strategies. This includes guidance for developers submitting planning applications on air quality information to be provided on submission.

Guidance

DMRB

2.23. The Design Manual for Roads and Bridges (DMRB) (Core Document 4414) is a series of 15 volumes that provide official guidance, advice notes and other documents relating to the design, assessment and operation of trunk roads, including motorways in the United Kingdom. Air Quality is addressed in HA207/07 DMRB Volume 11 Section 3 Part 1 (Core Document 4415).

Interim Advice Note (IAN) 170/12 Updated air quality advice on the assessment of future NOx and NO_2 projections for users of DMRB Volume

11, Section 3, Part 1 'Air Quality'.

2.24. IAN 170/12 (Core Document 4416) provides advice for users of DMRB HA207/07 on long term trends (LTT) for NO_2 and enables HA scheme assessments to take into account the impact of future projects. This IAN was subsequently updated in 2014 (IAN170/12v3).

IAN 174/13 Updated air quality advice on the application of the test for evaluating significant effects; for users of DMRB Volume 11, Section 3, Part 1 'Air Quality' Core Document 4417

2.25. This Note provides a methodology for the assessment of the significance of the predicted change in air quality associated with the proposed Highways Agency schemes to be evaluated.

IAN 175/13 Risk assessment of compliance with EU Directive on ambient Air quality; for users of DMRB Volume 11, Section 3, Part 1 'Air Quality' (Core Document 4418).

2.26. This Note provides advice on the methodology and reporting for a Compliance Risk Assessment, to be used in combination with Defra's National Compliance reporting on the EU Directive on ambient air quality and Clean Air for Europe (208/50/EC).

2.27. The assessment identifies and quantifies the impact of a scheme on Defra `UK National Compliance Assessment for the EU Directive on ambient air quality'. It uses the reported information from Defras Pollution Climate Mapping (PCM) model and the air quality assessment of the proposed scheme to determine a compliance risk rating on the Compliance Risk Road Network. Compliance is determined by the potential for the scheme to:

- *"Make a compliant zone non compliant*
- *Delay Defras date for achieving compliance, and*
- *Increasing the length of roads in exceedence in the zone by greater than 1%".*

2.28. Where schemes are judged to be at high risk of non compliance, the IAN provides guidance on the production of Scheme Air Quality Action Plans containing mitigation to reduce this risk

UK Local Air Quality Management Technical Guidance (LAQM TG(09)) (Core Document 4419)

2.29. This document published in February 2009 provides guidance to support Local Authorities in carrying out their review and assessment of local air quality and sets out the general approach to be used in local air quality assessments, including monitoring and modelling methods.

2.30. LAQM TG(09) states:

- "*2.03 Background concentrations of nitrogen dioxide are expected to decline, in the future, despite the recent increasing proportion of primary nitrogen dioxide in nitrogen oxides emissions. This increase in primary nitrogen dioxide has had a greater impact at roadside locations, but even here concentrations of nitrogen dioxide are expected to resume a downward trend."*
- *"2.23 Recent trends in concentrations of NOx have shown a general downward trend across urban areas, in line with the reductions in emissions from road traffic. However, measured NO_2 concentrations have not declined as expected, particularly at roadside sites, and at some locations have actually increased in recent years*."

Construction Dust

2.31. Guidance on the Assessment of the Impacts of Construction on Air Quality and Determination of their Significance was issued by the Institute of Air Quality Management (IAQM) in 2012 to provide assistance on how to assess construction impacts of developments or schemes. It focuses on classifying sites according to the risk effects and on identifying the mitigation appropriate to the risk.

3. Scheme Assessment Methodology

3.1. Concentrations of pollutants and their associated health impacts are dependent on traffic composition and density, climatic conditions, vehicle travelling speeds and road layout.

3.2. The methodology utilised in the ES to determine the potential local

and regional air quality impacts associated with the proposed scheme was based on the guidance provided in DMRB and LAQM.TG(09).

3.3. The assessment involved consultation with the local authorities concerned and the collection of the following data:

- Background NOx, NO_2 and PM_{10} concentrations;
- Local pollutant monitoring results;
- Relevant receptor locations;
- Traffic data; and
- Representative meteorological data.

Study Area

3.4. The study area for the assessment of the operational effects of the proposed scheme was determined by the traffic network considered to have the potential to be influenced by the proposed scheme, the Traffic Reliability Area (TRA). The qualifying criteria for `affected links' provided by DMRB HA207/07 in paragraph 3.12 was subsequently applied to all traffic links within the TRA to identify those links and all links within 200m of the affected links.

Baseline Conditions

3.5. Defra uses its Pollution Climate Mapping Model to generate 1x1km background maps of pollutant concentrations, for the UK. The Defra background maps used in the ES were issued for a base year of 2010, with the concentration calibrated against monitoring data collected in that year.

Local and Project Specific Monitoring Data

3.6. Consultation in respect of local monitoring data and outline scheme proposals was undertaken with the local authorities. Air quality information was obtained from continuous and passive monitoring undertaken by Stockport, Manchester and Cheshire East councils. Scheme specific diffusion tube monitoring was undertaken between March and December 2009 to provide additional information where local authority data was lacking.

3.7. Local Authority, national and scheme specific data was used to enhance the robustness of model verification results.

Sensitive Receptors

3.8. The Local Air Quality Assessment contained in the ES considers the number and location of sensitive receptors potentially subjected to change in air quality, as a result of the proposed scheme, against the UK AQS Objectives and EU Limit Values identified in Schedule 2 of the Air Quality Standards Regulations 2010. Particular attention was paid to the locations of the young, the elderly and other susceptible populations, such as schools, care homes and hospitals.

3.9. Ecologically sensitive areas were also identified for assessment.

Traffic Data

3.10. Changes in local traffic flow characteristics and the distance of that traffic from receptors associated with the operation of the proposed scheme may have an impact on local air quality. DMRB requires that an assessment be carried out for the “Do Minimum” (without the scheme) and “Do Something” (with the scheme) for the opening year.

3.11. Traffic data for 2009 (Base Year) and 2017 (Opening Year) was provided by Highways Forecasting & Analytical Services at Transport for Greater Manchester.

Construction Related Dust

3.12. The assessment provided in the ES was undertaken in accordance with the current guidance provided in the Assessment of the Impacts of Construction on Air Quality and the Determination of their Significance published by the Institute of Air Quality Management (IAQM) in 2012 (Core Document 4420).

3.13. Activities related to construction were divided into three types to reflect their different potential impacts. These were:

- Earthworks (Site clearance and landscaping);
- Construction (infrastructure development); and
- Trackout (movement of dust off site by natural or mechanical means).

Construction Phase - Traffic Related Emissions Impacts

3.14. As information on the number of vehicles associated with the construction phase was not available at the time of writing the ES, a qualitative assessment of their impact on local air quality was undertaken considering:

- The levels of construction traffic likely to be generated by the various phases of the proposed scheme;
- The number and distance of sensitive receptors in the vicinity of the site and along the likely route to be used by construction vehicles; and
- The likely duration of the construction phases and the nature of the construction activities undertaken.

3.15. The location and duration of each activity were not definitive. However, construction is likely to be phased so that at any one time the number of receptors in proximity to construction activities will be relatively small and any potential exposure relatively short in duration.

Local Air Quality Assessment

3.16. Nitrogen Dioxide (NO_2) and fine particulate matter (PM_{10}) are the pollutants of major public health concern. The prediction of NO_2 and PM_{10} concentrations in the Baseline Year and Opening Year involved the use of Atmospheric Dispersion Modelling System (ADMS) Roads, widely used in the UK for the air quality assessments of road networks, and in accordance with the DMRB.

3.17. Data inputs to the assessment include:

- Annual Average Daily Traffic (AADT) vehicle counts for affected links broken down into flows for the following categories: Light Goods vehicles (LGVs), and Heavy Duty Vehicles (HDVs);
- The diurnal variation (24-hour profile) in traffic flows for the roads

affected;

- Projected traffic flows and speeds with anticipated growth applied to enable predictions to be made in Opening Year (2017);
- Speed (km/hour) of vehicles listed above on the identified roads for each year modelled; and
- Hourly sequential meteorological data obtained from Manchester Airport meteorological station.

3.18. The local air quality assessment estimates NO_2 and PM_{10} concentrations at relevant receptors, both human and ecological, within 200m of 'affected roads'.

3.19. There are many components that contribute to the potential uncertainty of air quality modelling predictions. Dispersion models rely on the output from traffic models, vehicle emissions, meteorological conditions, and the dispersion model itself. Consequently, an important stage in the process is verifying model results against real measurements, as this allows the combined uncertainties in the model to be evaluated.

3.20. Verification of the model was undertaken in accordance with the requirements of LAQM TG(09) for a baseline year where predicted emissions concentrations were compared against real monitoring data. Traffic data for 2009 (base year) were modelled using the monitoring data obtained from local, national and scheme specific monitoring programmes. The air quality model verification review provided adjustment factors, broadly based on geographical locations, which were applied to the pollutant concentration predictions to better represent real conditions.

3.21. The projected Opening Year scenarios were then modelled to determine the predicted changes in pollutant concentrations with and without the proposed scheme and their significance.

3.22. Defra's Emission Factors Toolkit for Vehicle Emissions (EFT 5.2) current at the time of the preparation of the ES was used to calculate emissions of oxides of nitrogen (NOx) and PM_{10} for the roads identified within the study area. All modelled road-based concentrations of NOx

were converted to annual mean NO_2 using the 'NOx to NO_2' calculator (Defra, Version 3.2, released in August 2012).

NO_2 Long Term Trends

3.23. In April 2012 Defra published a report (Core Document 4421) on projecting NO_2 concentrations to address concerns that background concentrations and vehicle emissions were not reducing with time at the rate predicted in LAQM.TG(09). The emissions standards for Euro IV and Euro V vehicles were not being met under real road conditions. Consequently, the predicted benefits of those emissions reductions were not being achieved. The switch from petrol to diesel cars in the UK vehicle fleet to reduce greenhouse gas emissions exacerbated the lack of predicted ambient NO_2 concentration reductions being achieved.

3.24. The report suggested that it may be appropriate to use a combination of assumptions about both background concentrations and emissions factors where both background and roadside monitoring data do not appear to be declining in accordance with LAQM TG(09). The report indicated that projection factors may be used for air quality assessments based on an analysis of real monitoring data to adjust future projected concentrations. This essentially forms a 'Gap Analysis' to assess future concentrations more conservatively, and in-line with the current observed monitoring data. The projected gap analysis factors may then be applied to the modelling results to provide more realistic predicted concentrations for future years.

3.25. In response to this Defra report, the Highways Agency issued an Interim Advice Note (IAN 170/12) (Core Document 4416) to provide supplementary advice to users of DMRB Volume 11, Section 3, Part 1 (HA207/07).

3.26. LAQM TG(09) was considered to underestimate the potential for future roadside NO_2 exceedences. IAN 170/12 provided a more conservative approach in line with recent national trends in observed monitoring data, which showed no improvements after 2008 due to the failure of current Euro engines to meet their emissions limits under road

conditions.

3.27. IAN 170/12 was applied to the projected air quality modelling results in the ES in order to provide a conservative approach in line with real world monitoring data at the time of the assessment. This approach would now, with the benefit of new emissions data from Euro VI engines introduced in January 2014, appear to have been overly conservative and a worst case.

Significance Criteria

3.28. The significance of the local exposure assessment results for NO_2 and PM_{10} was based on the Highways Agency Interim Advice Note 174/13 (IAN 174/13) (Core Document 4417). The IAN provides guidance on how to collate the information required to support an informed professional judgement on the significance of local air quality effects for public exposure and Designated Ecological Sites.

Compliance

3.29. A risk assessment of the compliance of the scheme with the Ambient Air Quality Directive was undertaken in accordance with Highways Agency Interim Advice Note 175/13 (IAN 175/13) Risk assessment of Compliance with EU Directive on Ambient Air Quality and Production of Scheme Air Quality Action Plans (Core Document 4418).

4. Air Quality Assessment Presented in the ES

4.1. The findings of the air quality assessment presented in the ES are summarised below.

- 11,036 potentially sensitive receptors were identified and assessed within the study area.
- The scheme produced a net reduction of 844 sensitive receptors in the study area exceeding the annual mean NO_2 objective value of 40 $\mu g/m^3$, with the scheme when compared to without the scheme.
- The number of receptors predicted to exceed an annual mean NO_2 concentration of 60$\mu g/m^3$ used as an indicator of potential exceedence of the 1 hour mean NO_2 objective, decreased from 217

without the scheme, to 145 with the scheme, thereby reducing the number of receptors in the study area predicted to exceed the short term (1 hour) NO_2 objective.

- No exceedences of annual mean or short term PM_{10} objectives were predicted either with or without the proposed scheme.
- Approximately 79% of receptors in the study area were predicted to experience a reduction in annual mean NO_2 concentrations as a result of the implementation of the proposed scheme, 2% of receptors were unchanged and 19% were subject to an increase in annual mean NO_2.
- Approximately 61% of receptors were predicted to experience a reduction in annual mean PM_{10} concentrations as a result of the implementation of the proposed scheme, 22% were unchanged and 17% were subject to an increase in PM_{10} concentrations.
- The Greater Manchester AQMA would experience three new, but an overall decrease of 780, properties exceeding annual mean NO_2 concentrations as a result of the implementation of the scheme.
- 3 additional exceedences of the annual mean NO_2 concentration would be generated at properties within the Disley AQMA as a result of the implementation of the scheme.
- 7743 receptors (94%) within the Greater Manchester AQMA were predicted to experience an overall decrease in NO_2 concentrations with the scheme. 373 receptors were predicted to experience an increase in NO_2.
- 73% of receptors within the AQMAs (Greater Manchester and Disley) were predicted to experience an overall decrease in PM_{10} particulates with the scheme. The proposed scheme would not introduce any exceedences of the PM_{10} objective in either of the AQMAs.
- Receptors in the Disley AQMA received an overall increase in NO_2 and PM_{10} concentrations as a result of the proposed scheme.
- Implementation of the proposed scheme would reduce the annual mean concentration of NOx at the Cotteril Clough (E) and Cotteril

Clough (W)) designated sites in the study area, with the designated site at Lindow Common remaining unaffected.

4.2. In accordance with guidance provided IAN 174/13 at the time of the publication of the ES, the scheme provided significant impacts both adverse and beneficial. However, there would be a 23 fold number of receptors which would benefit in air quality terms from the implementation of the proposed scheme compared with those adversely affected by it. Consequently, it was considered that there would be a significant net air quality benefit to sensitive receptors in the study area as a result of the implementation of the proposed scheme.

4.3. Construction activities and earthworks during the construction phase of the scheme were predicted to have a `slight' to `moderate adverse' effect on areas in proximity to construction activities without mitigation.

4.4. With the implementation of mitigation measures during the construction phase, no significant impacts associated with construction were anticipated and there should be no long term residual effects from the construction period on local air quality.

5. Scheme Mitigation

5.1. While the assessment undertaken and reported in the ES indicated that a total of 780 receptors in Air Quality Management Areas (AQMAs) within the study area would be taken out of exceedence for NO_2 with the scheme in place, 3 additional receptors in the Disley AQMA would be subject to exceedence for NO_2, though increasing by less than 1$\mu g/m^3$.

5.2. Cheshire East in its Planning Consent (Core Document 2099) have required "a package of mitigation measures (intended to alleviate and manage traffic flow increases, at locations identified and to levels indicated through enhanced mitigation". Agreement on these measures has been made the subject of a planning condition as part of the approved planning application.

5.3. In order to "alleviate and manage traffic flow increases" it was proposed to introduce a speed constraint along the A6 corridor which would make this route less attractive and hence constrain traffic growth.

5.4. In order to assess the impact of this proposed traffic mitigation

management on local air quality in Disley, new modelled traffic data was generated.

5.5. Since the publication of the ES there have also been a number of changes to air quality guidance and new LAQM assessment tools issued by Defra in June 2014. These have included:

- Background maps (updated to reflect recent UK wide monitoring);
- Vehicle emission factors (updated to reflect current and predicted UK vehicle fleets);
- NOx to NO_2 conversion factors (updated to reflect changes in primary and secondary emissions of NO_2 within the vehicle fleet); and
- Highways Agency NOx and NO_2 projections (Gap Analysis) (IAN 170/12v3).

5.6. Air quality modelling was therefore undertaken with the aim of evaluating the impact on air quality in the Disley AQMA of enhanced mitigation in the A6 corridor using current air quality guidance for comparison with that presented in the ES.

Enhanced Mitigation

5.7. Traffic model predictions provided for the ES indicated a potential 30% growth in traffic along the A6 in Disley associated with the A6MARR scheme. The enhanced mitigation traffic model provided a predicted traffic growth of between 11% and 16% in the A6 corridor following the implementation of the proposed scheme.

5.8. While traffic flows reduced compared with the proposals presented in the ES, traffic speeds in Disley also reduced from 41kph to 26kph with the enhanced mitigation.

5.9. Reducing road traffic speeds can have a marked impact on road vehicle emissions (see Figure 1). Decreasing traffic speeds in the Disley AQMA from 41kph to 26kph could increase NOx emissions by up to 20%.

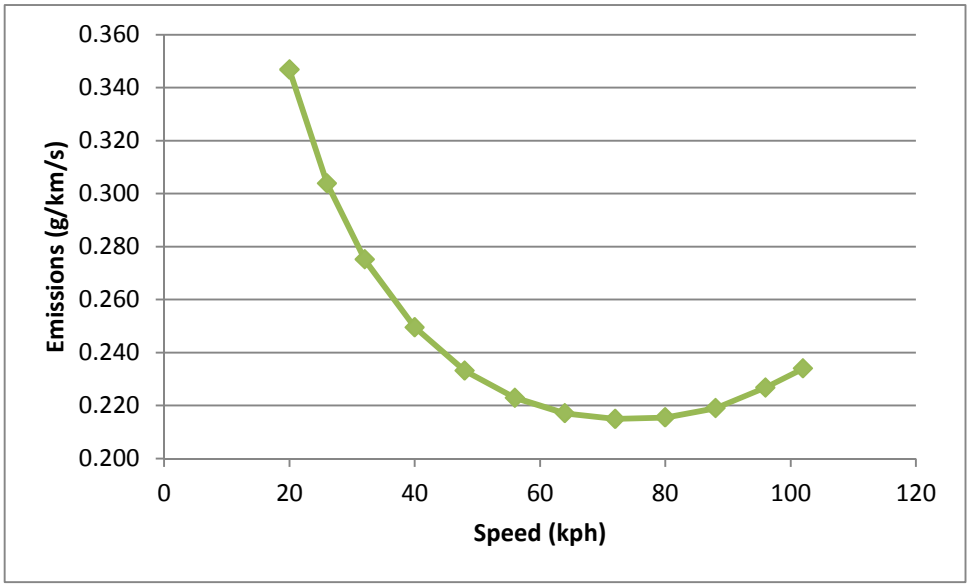

Figure 1 Variation in road traffic NOx emissions in Disley with AADT speed

5.10. A primary influence on the prediction of NO_2 exceedences is the methodology employed to best represent predicted changes in future NO_2 emissions and concentrations (Gap Analysis).

5.11. At the time of the preparation of the ES it was considered that the current advice from Defra presented in LAQM TG(09), predicting major improvements in air quality post 2008 was overly optimistic. In 2012, the Highways Agency issued an Interim Advice Note (IAN170/12). All assessments undertaken in accordance with DMRB were required to adopt this Note. This conservative assessment was based on the lack of improvement in Euro IV and Euro V vehicle emissions, ambient NO_2 monitoring data after 2008 and a lack of evidence of potential engine emissions improvements over the next few years. The assessment was therefore considered conservative and now seen to be worst case. (See paragraphs 3.23-3.27 above).

5.12. In November 2013, the Highways Agency re-issued its IAN170/12v3 guidance following the publication of road tested emissions trials of the new Euro VI and Euro 6 engines, to be introduced in January 2014, which showed real reductions in emissions which meet EU legal limits.

5.13. A comparison of the number of predicted annual mean NO_2 exceedences at receptors in the Disley AQMA, in the scheme opening year (2017), has therefore been undertaken using traffic predictions presented in the ES and with enhanced mitigation using the 2013 issued

IAN170/12v3 Gap Analysis.

Predicted Annual Mean NO_2 Exceedences in Disley using ES traffic

5.14. The number of predicted annual mean NO_2 exceedences in the Disley AQMA using ES traffic with EFT v5.2 is presented in Table 1 using the 2012 and 2013 Gap Analysis methodologies.

Table 1 Annual Mean NO_2 exceedences in Disley AQMA using ES traffic and EFT v5.2

	ES traffic forecast and EFT 5.2		
	No gap analysis	with IAN 170/12 gap analysis	with IAN 170/12v3 gap analysis
Without scheme	32	85	73
With scheme	55	88	78
Change	23	3	5

5.15. The number of annual mean NO_2 objective exceedences in the Disley AQMA undertaken for the ES using the projection factors provided in LAQM TG(09) and Defra's emission factors EFTv5.2, indicated a predicted increase from 32 without the scheme to 55 with the proposed scheme.

5.16. Using the Gap Analysis methodology presented in IAN170/12 to provide a worst case assessment, the predicted annual mean NO_2 objective exceedences increased from 32 to 85 without the scheme and from 55 to 88 with the scheme, giving a net increase in exceedences in Disley of 3 as a result of the proposed A6MARR scheme.

5.17. Using the current 2013 Gap Analysis methodology (IAN170/12v3), predicted annual mean NO_2 exceedences in the Disley AQMA decreased from 85 to 73 without the scheme and from 88 to 78 with the scheme, giving a net increase of 5 exceedences in Disley as a result of the proposed A6MARR scheme using the more `optimistic' Gap Analysis.

5.18. The reduction in the number of receptors predicted to exceed the annual mean NO_2 objective in 2017 reflects the more optimistic view that road traffic emissions will reduce as a result of the introduction of the new Euro VI engines following recent road tests.

5.19. The effect of utilising the current EFT v6.01 emission factors on the number of predicted annual mean NO_2 exceedences in the Disley AQMA using ES traffic is presented in Table 2, using the 2013 Gap Analysis methodologies.

Table 2 Annual Mean NO_2 exceedences in Disley AQMA using ES traffic and EFT v6.01

	ES traffic forecast	
	EFT 6.01 No gap analysis	EFT 6.01 with IAN 170/12v3 gap analysis
Without scheme	40	66
With scheme	64	77
Change	24	11

5.20. The number of annual mean NO_2 objective exceedences in the Disley AQMA undertaken using the ES traffic data, the projection factors provided in LAQM TG(09) and Defra's emission factors EFTv6.01, indicated a predicted increase in annual mean NO_2 exceedences from 40 without the scheme to 64 with the proposed scheme.

5.21. Using the new 2013 Gap Analysis methodology (IAN170/12v3) and ES traffic, annual mean NO_2 exceedences in the Disley AQMA increased from 40 to 66 without the scheme and from 64 to 77 with the scheme, giving a net increase of 11 exceedences in Disley as a result of the proposed A6MARR scheme.

5.22. It should also be noted that the number of properties predicted to be in exceedence in the Disley AQMA in 2017 was reduced from 85 to 66 without the scheme and from 88 to 77 with the scheme using the more `optimistic' Gap Analysis and new emission factors.

<u>Predicted NO_2 Exceedences in Disley using Enhanced Mitigation.</u>

5.23. The number of predicted annual mean NO_2 exceedences in the Disley AQMA using the enhanced mitigation traffic predictions with the current EFT v6.01 and 2013 Gap Analysis methodology is presented in Table 3.

Table 3 Annual Mean NO2 exceedences in Disley AQMA using EFT v6.01

	EFT 6.01 No gap analysis	EFT 6.01 with IAN 170/12v3 gap analysis
Without scheme (ES)	40	66
With enhanced Mitigation	67	78
Change	27	12

5.24. The reduced traffic flows and reduced traffic speeds associated with the enhanced mitigation increased the number of annual mean NO_2 objective exceedences in the Disley AQMA using the projection factors provided in LAQM TG(09) and Defra's current emission factors (EFTv6.01) from 40 without the scheme to 67 with the proposed scheme.

5.25. Using the current Gap Analysis methodology (IAN170/12v3), annual mean NO_2 exceedences in the Disley AQMA increased from 66 to 78 with the scheme.

5.26. The increase in exceedences generated with the enhanced mitigation traffic flows compared with the ES traffic, despite a reduction in the number of vehicles travelling through Disley, was attributed to the predicted reduction in traffic speeds moving through Disley from 41kph to 26kph (see Figure 1). This suggests reducing traffic speeds through Disley could have a deleterious effect on local air quality.

<u>Influence of Traffic Speed on Enhanced Mitigation Traffic Flows.</u>

5.27. The influence of traffic speeds on annual mean NO_2 objective exceedences in the Disley AQMA using the enhanced mitigation traffic flows is illustrated in Figure 1.

5.28. In designing a mitigation scheme for Disley, the design team should bear in mind the impact on road traffic emissions of reduced speeds through the AQMA. The mitigation scheme designed to discharge the Planning Condition should therefore have the twin objective of reducing the forecast increase in traffic on the A6, but without any significant reduction in traffic speed through the Disley AQMA. Speed reduction measures could, for example be applied elsewhere along the A6 to achieve this.

6. Objector concerns

6.1. A number of objections to the CPO have been received by the Secretary of State relating to construction dust, local air quality once the proposed scheme is open, and whether the scheme breaches the Air Quality Directive.

Construction related dust

6.2. Concerns have been raised by four parties in respect of construction dust.

6.3. The construction of any major road scheme will inevitably involve the generation of dust as a result of activities such as demolition, earthworks, construction and trackout. The assessment reported in the ES identified that the scale and nature of the proposed works could pose a risk of dust-related nuisance for properties within 350m of the working areas, but that those most susceptible would be receptors within 50m and to the north / north-west, namely downwind of the works.

6.4. The ES identified a range of mitigation measures focused on the control of dust during construction (Appendix A). The measures are routinely adopted for the construction of major road schemes and recognise the nature of the principal activities associated with the generation of dust. The planning consents for the project include conditions requiring the implementation of the commitments made in the ES. It will also be a requirement of the contracts for the construction of the proposed scheme that the measures identified are formalised in a project specific Construction Environmental Management Plan (CEMP).

6.5. Taking into account the measures proposed and contractual requirements which are to be imposed for their implementation, it is not anticipated that the temporary short term activities with the potential for dust generation during construction will have a significant effect on people, property and activities located in the vicinity of the required works.

6.6. None of the land included in the draft CPO has been taken for the purposes of dust mitigation.

Increased Traffic pollution

6.7. Twelve parties have registered their objection to the proposed CPO related to increased traffic pollution associated with the operation of the proposed scheme. While one objector is predicted to experience an improvement in air quality associated with the proposed development, the remainder will experience a predicted deterioration in air quality. Predicted increases in annual mean NO_2 and PM_{10} concentrations at these receptors ranged from 1.9 µg/m^3 to 7.7 µg/m^3 and 0.6 µg/m^3 to 1.0 µg/m^3 respectively. However, predicted NO_2 and PM_{10} concentrations with the scheme remain well below air quality objectives. Environmental Protection (UK) in its guidance on air quality impacts (Core Document 4423) would deem the predicted changes in pollutant concentrations at these concentration levels as `negligible' to `moderate adverse'.

Breach of EU Directive

6.8. Four parties have registered their objection to the proposed CPO related to the scheme being in breach of the EU Air Quality Directive. The objectors have suggested that the scheme gives rise to increases in pollutant levels in an existing Air Quality Management Area, and so the scheme breaches the Air Quality Directive (2008/50/EC).

6.9. Directives are addressed to member states rather than their citizens, and are therefore only legally binding upon the states themselves. While the Directive sets the framework, the practical details of implementation are left for the member states to decide.

6.10. Member states are required to transpose the Directive into local law. If a member state fails to pass the required national legislation, or if the national legislation does not adequately comply with the requirements of the Directive, the European Commission may initiate legal action against the member state in the European Court of Justice. This may also happen when a member state has transposed a Directive, but fails to abide by its provisions in practice.

6.11. This Directive lays down measures aimed at the following:

- Defining and establishing objectives for ambient air quality designed to avoid, prevent or reduce harmful effects on human health and the environment as a whole;
- Assessing the ambient air quality in Member States on the basis of common methods and criteria;
- Obtaining information on ambient air quality in order to help combat air pollution and nuisance and to monitor long-term trends and improvements resulting from national and Community measures
- Ensuring that such information on ambient air quality is made available to the public
- Maintaining air quality where it is good and improving it in other cases.

Article 4 Establishment of zones and agglomerations

6.12. "*Member States shall establish zones and agglomerations throughout their territory. Air quality assessment and air quality management shall be carried out in all zones and agglomerations*."

Article 12 Requirements where levels are lower than the limit values

6.13. *"In zones and agglomerations where the levels of sulphur dioxide, nitrogen dioxide, PM_{10}, $PM_{2.5}$, lead, benzene and carbon monoxide in ambient air are below the respective limit values specified in Annexes XI and XIV, Member States shall maintain the levels of those pollutants below the limit values and shall endeavour to preserve the best ambient air quality, compatible with sustainable development."*

Article 13 Limit values and alert thresholds for the protection of human health

6.14. *"Member States shall ensure that, throughout their zones and agglomerations, levels of sulphur dioxide, PM_{10}, lead, and carbon monoxide in ambient air do not exceed the limit values laid down in Annex XI.*

6.15. *In respect of nitrogen dioxide and benzene, the limit values specified in Annex XI may not be exceeded from the dates specified therein.*

6.16. *Compliance with these requirements shall be assessed in accordance with Annex III."*

Article 22 Postponement of attainment deadlines and exemption from the obligation to apply certain limit values

6.17. *"Where, in a given zone or agglomeration, conformity with the limit values for nitrogen dioxide or benzene cannot be achieved by the deadlines specified in Annex XI, a Member State may postpone those deadlines by a maximum of five years for that particular zone or agglomeration, on condition that an air quality plan is established in accordance with Article 23 for the zone or agglomeration to which the postponement would apply; such air quality plan shall be supplemented by the information listed in Section B of Annex XV related to the pollutants concerned and shall demonstrate how conformity will be achieved with the limit values before the new deadline."*

Article 23 Air quality plans

6.18. *"Where, in given zones or agglomerations, the levels of pollutants in ambient air exceed any limit value or target value, plus any relevant margin of tolerance in each case, Member States shall ensure that air quality plans are established for those zones and agglomerations in order to achieve the related limit value or target value specified in Annexes XI and XIV.*

6.19. *In the event of exceedences of those limit values for which the attainment deadline is already expired, the air quality plans shall set out appropriate measures, so that the exceedence period can be kept as short as possible. The air quality plans may additionally include specific measures aiming at the protection of sensitive population groups, including children."*

6.20. The Directive (Article 23) recognises that some Member States will sometimes fail to meet air quality objectives, so contains a mechanism for ensuring that air quality is improved in order to minimise the impact on human health. The Directive requires that where, in any zone or agglomeration, a limit value or target value is exceeded, the Member

State must prepare an air quality plan in order to achieve the limit value or target value.

6.21. Where a breach occurs after the relevant deadline has expired, the air quality plans must "set out appropriate measures, "so that the exceedence period can be kept as short as possible". However, the Directive does not define how long "as short as possible" might be.

6.22. At this time, there is no case in which the European Court of Justice (ECoJ) has ruled on the content of the Directive. The ECoJ is currently hearing the case brought by ClientEarth against the UK Government. The case is based on a failure to comply with limit values for NO_2 in 16 zones and agglomerations, and that the UK's air quality plans showed that these limits would not be achieved until 2020, or in the case of London, 2025.

6.23. The case was brought to the ECoJ following a ruling by Britain's Supreme Court that said the government had failed to comply with the EU directive (Core Document 4424). The case went to the Supreme Court after the High Court and the Court of Appeal refused to take action. The court ruled that the ECoJ will have to step in to clarify the precise meaning of certain provisions of the Air Quality Directive.

6.24. A Commission statement reads: "*The UK has not presented any such plan for the zones in question. The Commission is therefore of the opinion that the UK is in breach of its obligations under the Directive, and a letter of formal notice has been sent*.

6.25. The Directive therefore applies to UK Government and its duty to develop plans to meet its obligation to meet pollutant limit values in the designated framework

6.26. The ES identified 3 new exceedences in the Disley AQMA. These areas are already designated for the exceedence of annual mean NO_2. The zones and agglomerations in which these receptors are located are therefore already in exceedence.

6.27. A risk assessment related to compliance with the EU Directive on ambient air quality (IAN 175/13) was carried out in accordance with best practice and the requirements of Article 23 of the Directive and its findings reported in the ES. The assessment determined that no new

zones and agglomerations were brought into exceedence as a result of the proposed scheme, and that the compliance date identified by Defra would not be affected by the proposed scheme. Consequently, it was deemed that the proposed scheme would not affect the UK's ability to comply with the Air Quality Directive.

6.28. The draft NPS NN was issued in December 2013, after the completion of the ES. The draft NPS NN states

"Mitigation

Where a project is likely to lead to a breach of the air quality thresholds, the applicant should work with the relevant authorities to secure appropriate mitigation measures to allow the proposal to proceed. The Secretary of State should refuse consent where, even taking into account mitigation, the air quality impacts of the scheme will:

- *Result in a zone/agglomeration which is currently reported as being compliant with the Air Quality Directive becoming non-compliant; or*
- *Substantially affect the ability of a non-compliant area to achieve compliance within the timescales as reported to the European Commission*."

6.29. While the scheme does not result in a zone/agglomeration becoming non compliant, or affecting the time to achieve compliance, mitigation measures in terms of traffic constraints are under consideration in order to order to reduce the potential impact of the proposed scheme in Disley.

6.30. The enhanced mitigation measures proposed reduce potential traffic growth through Disley from 30% reported in the ES to between 11% and 16% thereby reducing the number of vehicles travelling through Disley once the proposed scheme is operational. The enhanced mitigation reduced traffic speeds in Disley, increasing road vehicle emissions and, from an air quality perspective, negate the benefit of the reduction in traffic flows. Managing traffic flows in the Disley AQMA to increase traffic speeds while retaining the enhanced mitigation on the A6 corridor will reduce the number of new exceedences.

6.31. Regardless of the last point, the provision of enhanced mitigation on

the A6 corridor, with traffic management in Disley AQMA, will not result in a zone/agglomeration becoming non compliant, or affecting the time to achieve compliance. The exceedences will not affect a non compliant zone or the ability of a non-compliant area to achieve compliance within the timescales reported to the EU by Defra.

7. Conclusion

7.1. The air quality assessment presented in the ES was carried out in accordance with best practice using all current guidance for a major highways scheme.

7.2. The assessment for local air quality was undertaken in accordance with the guidance provided in Section 3 Part 1 of Volume 11 of the DMRB – HA207/07 Air Quality which is adopted and recognised as being appropriate for major road schemes throughout the UK.

7.3. Significance tests were undertaken in accordance with HA Interim Guidance Note 174/13

7.4. Compliance with the EU Air Quality Directive was assessed in accordance with HA Interim Guidance Note 175/13.

7.5. The outputs from the complex dispersion modelling undertaken for the ES was verified by comparison of current emission factors from real traffic against measured ambient pollutant concentrations obtained from local authority monitoring and the project specific site surveys.

7.6. The findings of the ES for the proposed scheme indicated there would be significant impacts, both adverse and beneficial. However, there would be a 23 fold number of receptors which benefitted from the scheme compared with those adversely affected by it. Consequently, it was considered that there would be a significant net air quality benefit to sensitive receptors in the study area as a result of the implementation of the proposed scheme.

7.7. Approximately 79% of receptors in the ES study area were predicted to experience a reduction in annual mean NO_2 concentrations as a result of the implementation of the proposed scheme, 2% of receptors were unchanged and 19% were subject to an increase in annual mean NO_2.

7.8. Approximately 61% of receptors were predicted to experience a reduction in annual mean PM_{10} concentrations as a result of the implementation of the proposed scheme, 22% were unchanged and 17% were subject to an increase in PM_{10} concentrations.

7.9. The Greater Manchester AQMA would experience a decrease of 780 properties exceeding annual mean NO_2 concentrations with the scheme. 3 additional exceedences at properties within the Disley AQMA would be generated as a result of the implementation of the scheme.

7.10. 7743 receptors (94%) within the Greater Manchester AQMA were predicted to experience an overall decrease in NO_2 concentrations with the scheme. 373 receptors were predicted to experience an increase in NO_2.

7.11. 73% of receptors were predicted to experience an overall decrease in PM_{10} particulates with the scheme. The proposed scheme would not introduce any exceedences of the PM_{10} objective in either of the AQMAs.

7.12. Receptors in the Disley AQMA receive an overall increase in NO_2 and PM_{10} concentrations as a result of the proposed scheme.

7.13. Implementation of the proposed scheme would reduce the annual mean concentration of NOx at the Cotteril Clough (E) and Cotteril Clough (W)) designated sites in the study area, with the designated site at Lindow Common remaining unaffected.

Construction objections

7.14. The construction of any major road scheme will inevitably involve the generation of dust as a result of activities such as demolition, earthworks, construction and trackout.

7.15. The ES identified a range of mitigation measures focused on the control of dust during construction which are routinely adopted for the construction of major road schemes and which recognise the nature of the principal activities associated with the generation of dust. It will also be a requirement of the contracts for the construction of the proposed scheme that the measures identified are formalised in a project specific Construction Environmental Management Plan (CEMP).

7.16. Taking into account the measures proposed and contractual requirements which are to be imposed for their implementation, it is not anticipated that the temporary short term activities with the potential for dust generation during construction will have a significant effect on people, property and activities located in the vicinity of the required works.

7.17. None of the land included in the draft CPO has been taken for the purposes of dust mitigation.

Local Air Quality objections

7.18. Of the parties who have registered their objection to the proposed CPO related to increased traffic pollution associated with the operation of the proposed scheme, one objector is predicted to experience an improvement in air quality associated with the proposed development. The remainder will experience an increase in annual mean NO_2 and PM_{10} concentrations ranged from 1.9 $\mu g/m^3$ to 7.7 $\mu g/m^3$ and 0.6 $\mu g/m^3$ to 1.0 $\mu g/m^3$ respectively. However, predicted pollutant concentrations with the scheme at these locations remain well below UK air quality objectives. Environmental Protection (UK) in its guidance on air quality impacts would deem the change at these pollutant concentrations as negligible to moderate adverse.

EU Air Quality Directive objections

7.19. A compliance assessment was carried out in accordance with best practice and the requirements of Article 23 of the Directive. The assessment determined that no new zones and agglomerations were brought into exceedence as a result of the proposed scheme, and that the compliance date determined by Defra would not be affected by the proposed scheme. Consequently, it was deemed that the proposed scheme would not affect the UK's ability to comply with the Air Quality Directive

7.20. In this evidence I have described the existing and projected local air quality assessments associated with the proposed scheme which have

been included as part of the approved A6MARR planning application..

7.21. I have responded to concerns raised in objections in respect of nuisance dust during construction, increased traffic pollution once the scheme is operational and the alleged breach of the Air Quality Directive (2008/50/EC).

7.22. It is my view that the environmental impact of the proposed scheme has been appropriately assessed, that the construction of the scheme will not impact significantly on local sensitive receptors, that the scheme will provide overall air quality benefits to the study area and that the obligation to comply with the EU Air Quality Directive is not affected.

7.23. I Paul Colclough believe the matters set out in my evidence to be true to the best of my knowledge and belief.

Signed… 

Dated…4th September 2014.