Wealden District Council Local Plan - Comments on Regulation 19 Response of:

Natural England

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Experts in air quality management & assessment

Document Control

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1 Introduction

1.1 Air Quality Consultants Ltd. (AQC) has reviewed the response of Natural England (NE) to the Wealden Local Plan – Proposed Submission Document (Regulation 19) (hereafter called the 'NE response'). This note provides AQC's comments on the NE response. Many of NE's comments are similar to those of AECOM's ecologist. These have been addressed separately in AQC's comments on AECOM's review[1]. This current note should thus be read in conjunction with those comments. The areas where NE's comments are considered to require an additional response are addressed here. These are considered under the following headings:

- Concentration Reductions Since 1990;
- CURED V3A Model;
- Future-year Assessment Scenario;
- Modelling Methodology; and
- Other Points.

1.2 At the present time AQC has avoided commenting on points related to mitigation. The qualifications of the authors of this note are summarised in Appendix A1.

[1] Wealden District Council Local Plan - Comments on Regulation 19 Response of: Lewes District Council, Tunbridge Wells Borough Council, South Downs National Park Authority, and AECOM. November 2018.

2 Concentration Reductions Since 1990

2.1 In Paragraph 19 of Annex 1 of the NE response, it is stated that Table 1 in Chapter 5 of the HRA "*is misleading in that it states that the levels have not decreased as expected*". NE then refers to national estimates that NOx emissions from road transport, from the whole country, have fallen 76% since 1990. The text in the HRA to which NE appears to be referring states: "*Further reductions in NOx emissions were anticipated. However, to date the NO_2 concentrations have not decreased as expected due to the failure of Euro vehicle emission standards for diesel vehicles to deliver the anticipated reductions in NOx emissions in real world driving conditions*."

2.2 NE appears to be confused on two separate, but equally important, issues. The first is that changes in 'estimated' emissions are the same as changes in 'actual' concentrations. This is not the case. NE's second point of confusion appears to be that, because NOx emissions (and concentrations) are mostly lower than they were in 1990, that this implies a linear and continuous trend. This is also incorrect.

2.3 Concentrations of NOx and NO_2 fell appreciably at most UK monitoring sites from about 1996 to 2002. This fitted well with improvements that had been predicted based on Defra's published emissions estimates. These emissions estimates then predicted continued improvements for the period 2004 to 2009. However, during this period there was growing concern amongst air quality professionals in the UK that measured concentrations were not falling in line with these projections.

2.4 Defra commented on this in 2010 in a Frequently Asked Question (FAQ) on its Local Air Quality Management helpdesk website: "*Measured nitrogen oxides (NOx) and/or nitrogen dioxide (NO_2) concentrations in my local authority area do not appear to be declining in line with national forecasts. Should I take this into account in my Review and Assessment work?*"[2]. The answer to this FAQ is repeated in full in Appendix A2 to this note. In particular it explains that:

"analyses of historical monitoring data have identified a disparity between the measured concentrations and the projected decline in concentrations associated with the emissions forecasts. Trends in ambient concentrations of NOx and NO_2 in the UK have generally shown two characteristics; a decrease in concentration from about 1996 to 2002-2004, followed by a period of more stable concentrations from 2002-2004 up until 2009.

As a whole, urban roadside sites show evidence that NOx concentrations have declined very weakly over the past 6 – 8 years [as at 2010]*. NOx concentrations at urban background sites broadly reflect the same trend, and have been close to stable over this same period. For NO_2, levels have largely remained stable at urban roadside and background sites, but show a slight*

[2] https://laqm.defra.gov.uk/laqm-faqs/faq5.html

upward trend in inner London. At monitoring sites close to motorways and dual-carriageways, there is evidence that NOx concentrations have fallen at some, but not all locations, while NO_2 concentrations have levelled off.

In all cases there are differences between individual sites (with some showing upward or downward trends) but overall, there is little evidence of a consistent downward trend in either NOx or NO_2 concentrations, that would be suggested by emission inventory estimates." …

"On this basis, it might also be expected that the forecast reductions in background NOx and NO_2 concentrations associated with the road traffic component are optimistic. There is no evidence to suggest that background concentrations associated with the other (non-traffic) source contributions should not behave as forecast."

This summarises the position in 2010 and is still provided by Defra as current guidance.

2.5 Defra's 2009 guidance to local authorities (LAQM.TG(09))[3] contained factors for "*projecting measured annual mean roadside nitrogen dioxide concentrations to future years*" which covered the period 2006 to 2020. These were derived using what, at that time, were Defra's official projections[4]. For roadside sites outside of London, these predicted reductions of 3 to 4% per year in total NO_2 concentrations (thus falling, for example, by 16% between 2012 and 2016).

2.6 AQC's comments on the AECOM review show that the published measured NO_2 concentrations at the roadside monitoring site closest to Ashdown Forest, rather than falling by a double-digit percentage, actually increased between 2012 and 2017. Appendix 2 to AQC's comments on the AECOM review shows that this pattern was not unusual in this region. AQC[5] has shown that nationally, over the period 2005-2017, NO_2 concentrations have increased at some sites and reduced at others. On average, there has been a downward trend but this has been much smaller than the concurrent reductions predicted by emissions models.

2.7 The emissions model which is cited by NE provides no basis for stating that WDC's comment in Chapter 5 of the HRA, which refers to NO_2 concentrations, is misleading. The likelihood of air quality improvements in the future is a separate discussion point (Sections 3 and 4 of this note) but it is unhelpful to overlook the air quality industry's well-documented failures to predict the scale, rate, and existence of past air quality improvements.

[3] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69334/pb13081-tech-guidance-laqm-tg-09-090218.pdf

[4] The factors published in 2009 have been re-issued several times subsequently, using different national emissions models and base years, but a consistent feature of all of these datasets has been the prediction of substantial reductions in the (each time) near future.

[5] http://www.aqconsultants.co.uk/AQC/media/Reports/NO2-NOx-Trend-Report.pdf.

3 CURED V3A Model

3.1 As the creator of the CURED model, AQC is gratified that NE considers the CURED model to be the most likely future scenario. AQC agrees with this position. It does, however, appear that NE may have misunderstood the basis of the CURED V3A model which underpins Scenario B of the Ashdown Forest, Pevensey Levels, and Lewes Downs air quality modelling.

3.2 AQC reviewed available evidence of NOx emissions from Euro 6 diesel cars and Euro VI heavy duty vehicles in 2016. This evidence was used to create a calibrated emissions model and this calibration was the basis of CURED V1A and CURED V2A. Subsequent to this, the European Environment Agency published Version 5 of its COPERT emissions model, and Defra used this to create Version 8 of its Emissions Factors Toolkit (EFT V8.0). COPERT V5 included very similar calibrated emissions factors to CURED V1A and V2A and so there was no longer a need to provide a separate calibration for these vehicles.

3.3 While the emissions functions for the first tranche of Euro 6 diesel cars in COPERT V5 are based on emissions tests, this is not true for the second or third tranches of these vehicles. The second and third tranches for Euro 6 diesel cars and vans were based on EXPECTED improvements and not on any real-world emissions tests.

3.4 CURED V3A assumes that BOTH the first and second tranches of Euro 6 diesel cars are implemented in line with EFT V8.0. CURED V3A does not, however, include the third tranche.

3.5 AQC does not seek to cast doubt on its own model, but does question NE's reasoning, which is summarised in Paragraph 21 of Annex 1 of the NE response. This states that CURED V3A (i.e. Scenario B) is its preferred model and that EFT V8.0 (i.e. Scenario C) should not be considered since it includes "*untested technology*". AQC also believes that Scenario B is likely in 2028 but still recognises that it still includes an element of "*untested technology*". It is thus not just Scenario C that includes untested technology.

4 Future-year Assessment Scenario

4.1 AQC believes that Scenario B provides a reasonable representation of the future in 2028. AQC, however, also believes that for the purpose of assessing air quality impacts on designated European sites, the advice of Advocate General Kokott (delivered to the European Court of Justice on 25 July 2018), and the subsequent Judgement of the European Court of Justice (handed down on 7th November 2018 on Joined Cases C-293/17 and C294/17) are relevant. Basing a Habitats Regulations Assessment on either Scenario B or Scenario C would run directly counter to the clear guidance provided by Advocate General Kokott, and would also be incompatible with Ruling 6 of the 7th November Judgement. These points are expanded on in AQC's response to the AECOM review. It is considered that both the Advocate General's Opinion and the subsequent Judgement have significant implications for much of NE's response, which frequently seeks to interpret the increases that will be caused by the Wealden Local Plan as a retardation of expected autonomous improvements, rather than as adverse impacts. AQC does not believe that this is consistent with either the Opinion or the Judgement.

4.2 Related to this, in Paragraph 44 of Annex 1, NE state that the fact that the site will continue to exceed the critical levels or critical loads in the future is of no relevance to the HRA. This statement appears to take no account of the Advocate General's Opinion regarding when autonomous improvements may, and may not, be taken into consideration.

5 Modelling Methodology

5.1 In Paragraph 35 of Annex 1, NE suggest that the modelling is "experimental" and not the "standard" approach that it has recommended. WDC has asked NE for clarification of what it considers a standard method to be. This has not been provided and so the following comments relate to AQC's assumptions regarding what NE might consider to be an appropriate method.

Predicting Concentrations

5.2 AQC understands that NE's modelling supports use of the DMRB spreadsheet for calculating concentrations. AQC was involved with producing the current published (2007)[6] and unpublished (2013) versions of this tool but does not believe that, when used on their own, either these tools provide robust predictions (or that the 2007 tool is currently fit for purpose). Without understanding how they have been used, it is considered that any predictions made using either model should not be relied on. The modelling carried out by AQC uses ADMS-Roads and is considered superior to using the DMRB screening tool.

Predicting Deposition Fluxes

5.3 It is also assumed that NE's description of a "standard" approach is to use annual average deposition velocities, but it is unclear which deposition velocities it prefers. Given NE's reliance on DMRB guidance, it is assumed that the single fixed velocity published included in DMRB guidance is considered by NE to be most appropriate; although it is also noted that other commonly-used fixed velocities are up to 3 times higher than this[7]. It is well established that a single annual average deposition velocity cannot accurately predict concentrations at both roadside and non-roadside settings. This is because the diurnal and seasonal profiles in concentrations in these locations will be different. As such, it can be demonstrated from first principals that any study which uses an annual average deposition velocity for both roadside and non-roadside vegetation must give an incorrect answer. Typically, the level of error is accepted and so this basic approach is generally considered to be suitable. This does not, however, make it correct.

5.4 The "AQC" deposition model used for the Ashdown Forest, Pevensey Levels, and Lewes Downs assessments is based on the national modelling which underpins the APIS deposition maps that NE frequently relies on for its own work. It is considered to be superior to any method using annual average deposition velocities. It is also assumed that it is AQC's derivation of the APIS method, and rather than the APIS method itself, which NE considers to be experimental and non-

6 This version of the spreadsheet was actually released in 2002. An error was corrected in 2003. The 2007 update was restricted to carbon emissions only.

7 AQTAG06. Technical guidance on detailed modelling approach for an appropriate assessment for emissions to air.

standard. The "EA" model follows an approach which the EA has previously suggested AQC follow[8] at complex and sensitive sites.

[8] Jim Storey, AQ Senior Advisor at Environment Agency, pers comm.

6 Other Points

6.1 In Paragraph 23 to Annex 1 of the NE review, it is suggested that the inclusion of an ammonia standard for Euro VI heavy duty vehicles is "*likely to reduce background ammonia levels over time*". AQC questions the evidence base for this statement.

6.2 In Paragraph 30 of Annex 1, NE states that increases in concentrations or fluxes smaller than 1% are widely considered to be imperceptible and therefore cannot have an adverse effect. AQC does not have the expertise to comment on what level of change might affect designated sites, but does note that being too small to measure is not the same thing as being incapable of having an effect.

6.3 Paragraph 40 of Annex 1 of the NE response states that: "*A SNAP is the recommended approach to tackling background pollution*" and that "*other inputs including agriculture … have a much higher influence on the site than local transport*". As explained in Section 10 of AQC's response to the AECOM review, **local** traffic may not dominate the deposition flux well away from roads but it does dominate the flux at roadside locations. Thus, a measure which might be most effective at reducing area-wide deposition fluxes may not be the measure which is most effective at providing improvements where they are most needed.

6.4 Throughout the NE response, there is a focus on reducing "*background*" levels. AQC has assumed that the word "*background*" has been used loosely and does not refer to any one thing in particular. In-case this assumption is incorrect, it is AQC's view that there is a need to reduce concentrations and deposition fluxes at all locations and not only those that occur well away from roads or that might be taken from, for example, Defra's maps of background concentrations.

6.5 Paragraph 6 of Annex 1 makes reference to NE's internal approach to air emissions on road traffic. As mentioned in AQC's response to the AECOM review, Natural England's position is considered to be ill-informed and also does not appear to take account of UK High Court Case No: CO/3943/2016 nor the Advocate General Kokott Opinion or subsequent Judgement on ECJ Joined Cases C-293/17 and C-294/17. As a result of this, adherence to NE's published guidance would mean providing an air quality assessment which is not the most appropriate or robust scientific assessment as required by the Habitats Regulations and therefore not fit for purpose for the protection of the environment.

7 Appendices

A1 Professional Experience

Prof. Duncan Laxen, BSc (Hons) MSc PhD MIEnvSc FIAQM

Prof Laxen is an Associate of Air Quality Consultants, a company which he founded in 1993. He has over forty years' experience in environmental sciences and has been a member of Defra's Air Quality Expert Group and the Department of Health's Committee on the Medical Effects of Air Pollution. He has been involved in major studies of air quality, including nitrogen dioxide, lead, dust, acid rain, PM_{10}, $PM_{2.5}$ and ozone and was responsible for setting up the UK's urban air quality monitoring network. Prof Laxen has been responsible for appraisals of all local authorities' air quality Review & Assessment reports and for providing guidance and support to local authorities carrying out their local air quality management duties. He has carried out air quality assessments for power stations; road schemes; ports; airports; railways; mineral and landfill sites; and residential/commercial developments. He has also been involved in numerous investigations into industrial emissions; ambient air quality; indoor air quality; nuisance dust and transport emissions. Prof Laxen has prepared specialist reviews on air quality topics and contributed to the development of air quality management in the UK. He has been an expert witness at numerous Public Inquiries, published over 70 scientific papers and given numerous presentations at conferences. He is a Fellow of the Institute of Air Quality Management.

Dr Ben Marner, BSc (Hons) PhD CSci MIEnvSc MIAQM

Dr Marner is a Technical Director with AQC and has twenty years' experience in the field of air quality. He has been responsible for air quality and greenhouse gas assessments of road schemes, rail schemes, airports, power stations, waste incinerators, commercial developments and residential developments in the UK and abroad. He has been an expert witness at several public inquiries, where he has presented evidence on health-related air quality impacts, the impacts of air quality on sensitive ecosystems, and greenhouse gas impacts. He has extensive experience of using detailed dispersion models, as well as contributing to the development of modelling best practices. Dr Marner has arranged and overseen air quality monitoring surveys, as well as contributing to Defra guidance on harmonising monitoring methods. He has been responsible for air quality review and assessments on behalf of numerous local authorities. He has also developed methods to predict nitrogen deposition fluxes on behalf of the Environment Agency, provided support and advice to the UK Government's air quality review and assessment helpdesk, Transport Scotland, Transport for London, and numerous local authorities. He is a Member of the Institute of Air Quality Management and a Chartered Scientist. Dr Marner is a member of Defra's Network of Evidence Experts and a member of Defra's Air Quality Expert Group.

Full CVs are available at www.aqconsultants.co.uk.

A2 Defra's FAQ on Declining NOx and NO_2 Concentrations

Measured nitrogen oxides (NOx) and/or nitrogen dioxide (NO_2) concentrations in my local authority area do not appear to be declining in line with national forecasts. Should I take this into account in my Review and Assessment work

Defra and the devolved administrations have published "year –adjustment" factors for roadside NO2 concentrations, and background (1x1 km) maps for NOx and NO_2 concentrations for all years up until 2020. Technical Guidance (LAQM.TG(09)) advises local authorities to use this information to adjust measured concentrations to future years (e.g. annual mean NO_2 concentrations measured in 2009 can be projected forwards to 2013). Background maps for future years are also used to support modelling studies for Reviews and Assessments.

These projections are based on the Pollution Climate Modelling studies carried out on behalf of Defra and the devolved administrations, and take full account of current understanding of the expected changes in sector-based emissions up until 2020. They also take account of the expected changes to primary NO_2 emissions.

However, recent analyses of historical monitoring data have identified a disparity between the measured concentrations and the projected decline in concentrations associated with the emissions forecasts. Trends in ambient concentrations of NOx and NO_2 in the UK have generally shown two characteristics; a decrease in concentration from about 1996 to 2002-2004, followed by a period of more stable concentrations from 2002-2004 up until 2009.

As a whole, urban roadside sites show evidence that NOx concentrations have declined very weakly over the past 6 – 8 years. NOx concentrations at urban background sites broadly reflect the same trend, and have been close to stable over this same period. For NO_2, levels have largely remained stable at urban roadside and background sites, but show a slight upward trend in inner London. At monitoring sites close to motorways and dual-carriageways, there is evidence that NOx concentrations have fallen at some, but not all locations, while NO_2 concentrations have levelled off.

In all cases there are differences between individual sites (with some showing upward or downward trends) but overall, there is little evidence of a consistent downward trend in either NOx or NO_2 concentrations, that would be suggested by emission inventory estimates.

The precise reason for this disparity is not fully understood, and is currently under investigation, but it is thought to be related to the actual on-road performance of diesel road vehicles when compared with calculations based on the Euro standards. Preliminary studies suggest that:

- NOx emissions from petrol vehicles appear to be in line with current projections and have decreased by 96% since the introduction of the 3 way catalysts in 1993;
- NOx emissions from diesel cars, under urban driving conditions, do not appear to have declined substantially, up to and including Euro 5. There is limited evidence that the same pattern may occur for motorway driving conditions.
- NOx emissions from HGV vehicles equipped with SCR reduction are much higher than expected when driving at low speeds.

On this basis, it might also be expected that the forecast reductions in background NOx and NO_2 concentrations associated with the road traffic component are optimistic. There is no evidence to suggest that background concentrations associated with the other (non-traffic) source contributions should not behave as forecast.

This disparity in the historical data highlights the uncertainty of future year projections of both NOx and NO_2, but at this stage there is no robust evidence upon which to base any revised road traffic emissions projections.

Defra and the devolved administrations are currently investigating these issues, and once the reasons are fully understood updated guidance will be issued. However, the preliminary findings would suggest that the Euro standards will deliver only marginal, if any, reductions in NOx and NO_2 concentrations until the Euro 6 emission standards begin, as is currently forecast, to play a major role (i.e. circa post-2015).

There existing forecasting information is used for decision making or review and assessment and action planning work, local authorities may wish to take account of the emerging findings on the performance of different vehicle types, the performance of Euro standards overall, and the expected effect on forecast background concentrations.

https://laqm.defra.gov.uk/laqm-faqs/faq5.html