Submitted to
Guildford Borough Council

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Habitats Regulations Assessment for Guildford Borough Local Plan: Strategy and Sites

Response to Comments Made on the January 2019 HRA Addendum

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1.1.1 A series of queries have been raised in a letter (from Baker Consultants dated 16th April 2019) reviewing AECOM's January 2019 Addendum to the Guildford Local Plan HRA. This document discusses the key criticisms made.

2 Forecasting a net improving trend in roadside nitrogen deposition

2.1.1 The main criticism made in the recent review of the 2019 HRA Addendum is that it is not legally appropriate to allow for a net improvement in nitrogen deposition due to autonomous measures (i.e. improved vehicle emissions technology) over the plan period having regard to the ruling of the Court of Justice of the European Union (CJEU) in the 'Dutch Nitrogen' cases C-293/17 and C-294/17. There is also a criticism that the Addendum is selective in its use of local evidence to support a future improving baseline due to its use of the graph for background oxidised nitrogen deposition available on the UK Air Pollution Information System (APIS), rather than that for background total nitrogen deposition available on the same website and which shows a shallower improving trend. Total nitrogen is a combination of oxidised nitrogen deriving from combustion, particularly traffic, and 'reduced' nitrogen deriving from ammonia, particularly from livestock and fertiliser. This was explained in the January 2019 Addendum.

2.2 The Implication of the Dutch Nitrogen ruling

2.2.1 In 2018 the Court of Justice of the European Union (CJEU) ruled in cases C-293/17 and C-294/17 (often dubbed the Dutch Nitrogen cases). One aspect of that ruling concerned the extent to which autonomous measures (i.e. improvements in baseline nitrogen deposition that are not attributable to the plan or project being assessed) can be taken into account in appropriate assessments. In understanding the implications of the ruling for other plans/projects it is necessary to understand the details of the cases. The autonomous measures in question were set out in a national Programmatic Approach to Nitrogen (PAS) and included reducing ammonia emissions from stables, introducing low-emission fertilisers, introducing 'feed measures', introducing management measures and making European sites more 'resilient' to nitrogen deposition. They were intended to address ammonia emissions from the national agriculture sector, for which there is no long-term improving trend and very limited evidence of effective mitigation of ammonia emissions, in stark contrast to the much better evidence that exists regarding NOx emissions from traffic and resulting improving trend in oxidised nitrogen deposition. The reduction in resulting nitrogen deposition postulated by the Netherlands government (a reduction of 6.4 kilotonnes per annum by 2020) was also very ambitious given a five year timetable, the novel nature of the measures and the fact that some of the measures had still not been introduced at the time the ruling was handed down (2018).

2.2.2 There was thus considerable uncertainty over the scale of any benefits that might be achieved as a result of the PAS within five years, or indeed whether any benefits would realistically be achieved at all in such a short timeframe. This was acknowledged by the Netherlands government which included provisions in the PAS to monitor the outcome of the measures and introduce further ones if the improvement in nitrogen deposition was less than forecast. It is in that context that the CJEU stated that the autonomous measures set out by the Netherlands government had '*not yet been taken or have not yielded any results, so that their effects are still uncertain*' (para. 127 of the ruling) and thus that '*The appropriate assessment of the implications of a plan or project for the sites concerned is not to take into account the future benefits of such 'measures'* [i.e. those in the PAS] *if those benefits are uncertain, inter alia* [i.e. among other things] *because the procedures needed to accomplish them have not yet been carried out or because the level of scientific knowledge does not allow them to be identified or quantified with certainty*' (para. 130). Note that other case law on the interpretation of the Habitats Directive[1] has clarified that 'certain' does <u>not</u> mean absolute certainty but 'where no <u>reasonable</u> scientific doubt remains'.

2.2.3 It would appear that Baker Consultants share this understanding of the Dutch Nitrogen cases, as they state that *"[a]s we know from the Dutch nitrogen case (C293/17 and C294/17) while it is acceptable to factor in autonomous declines in air pollution this must be based on robust scientific evidence which is 'beyond reasonable scientific doubt'*." (p4).

[1] Case C239/04 Commission v Portugal [2006] ECR 10183, para. 24; Holohan et al vs. An Bord Pleanála (C-461/17), para. 33

2.2.4 The Addendum to the Guildford Local Plan HRA prepared in January 2019 explains the evidence underlying the projection of a net improvement in roadside nitrogen deposition (rather than net deterioration) over long time periods notwithstanding traffic growth and why the projected improvements have the requisite level of certainty.

2.2.5 The general long-term trend for NOx (oxides of nitrogen, the source of oxidised nitrogen) has been one of improvement (particularly since 1990) despite an increase in vehicles on the roads[2]. Total nitrogen deposition to the UK as a whole decreased by 13% between 1988 and 2008[3]. Further evidence that was not cited in the Addendum is available to evidence this national trend; for example, according to Plantlife, '*There is an overall decreasing trend in the percentage of UK habitats affected by nitrogen deposition, with levels exceeding critical loads dropping from 75% of UK sensitive habitats in 1996, to 62.5% in 2011-2013*'[4]. The trend has also been observed and documented by the European Union and has been recently used by them to develop a tool to monetise the biodiversity benefit of such improvements[5]. Therefore, there is a strong evidence base for an improving long-term trend in nitrogen deposition notwithstanding traffic growth. This is due, for example, to the effects of improved emission technology and its increasing integration into the vehicle fleet. The number of vehicles and the amount of pollution they emit are far from autonomous, they are inextricably linked. In order to model a certain amount of traffic one must also decide what emissions factors to apply and it would be illogical to ignore the fact that those factors have improved in the past and will improve in the future due, for example, to the further integration of Euro6 vehicles into the UK fleet.

2.2.6 The Dutch nitrogen cases involved speculative improvements in ammonia emissions/deposition of 'reduced nitrogen' (a pollutant with no long-term established improving trend) from untried measures over a very short timescale with a high level of uncertainty that was acknowledged by the Netherlands government. In stark contrast, improvements in NOx and oxidised nitrogen deposition are justified by empirical evidence of an existing long-term trend at national and local level and are largely associated with the expected further take-up of measures that have already been implemented (such as motorists replacing vehicles compliant with earlier Euro standards with vehicles compliant with later Euro standards, up to and including Euro 6/VI). Making a reasonable allowance for improvements in roadside NOx concentrations and resulting roadside nitrogen deposition rates over the kind of long timetables associated with Local Plans <u>is</u> therefore entirely compatible with the Dutch Nitrogen ruling since it constitutes an acknowledgement of an existing trend that is attributable to existing technology (i.e. improved vehicle emissions) that has been shown to be effective in real world emissions trials. While absolute certainty is impossible to achieve, there is no *reasonable* scientific doubt that this improving roadside trend will continue, and indeed steepen, in the future over the long timescales associated with Local Plans.

2.3 Local evidence for a net improvement in nitrogen deposition

2.3.1 An improving trend in nitrogen deposition can be seen locally to Thames Basin Heaths SPA, as well as nationally, as is acknowledged in the letter from Baker Consultants. Figure 1 overleaf presents two graphs showing recent trends in nitrogen deposition at Thames Basin Heaths SPA.

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[2] Emissions of nitrogen oxides fell by 69% between 1970 and 2017. Source: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/778483/Emissions_of_air_pollutants_1990_2017.pdf [accessed 24/04/19]

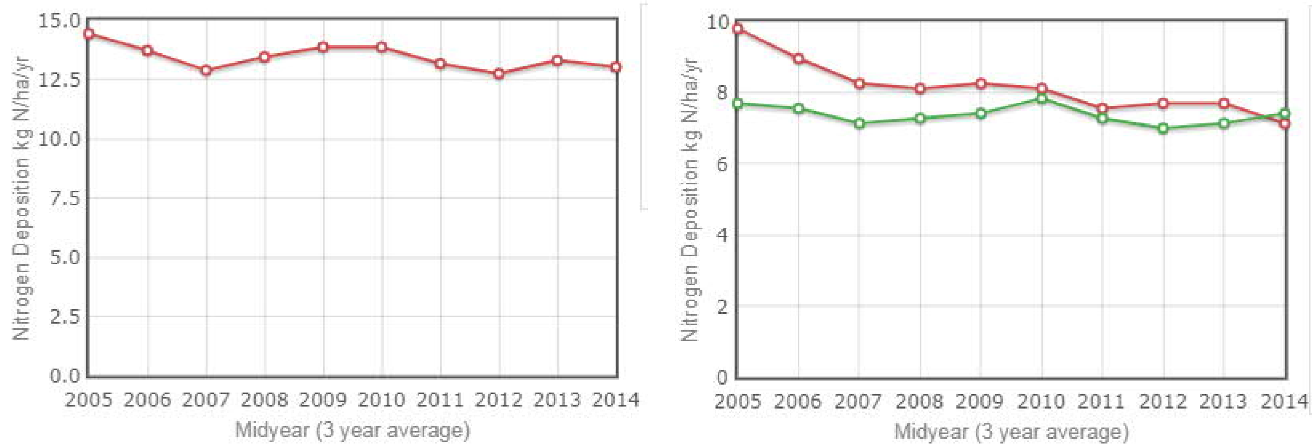
[3] Rowe EC, Jones L, Stevens CJ, Vieno M, Dore AJ, Hall J, Sutton M, Mills G, Evans CD, Helliwell RC, Britton AJ, Mitchell RJ, Caporn SJ, Dise NB, Field C & Emmett BA (2014) Measures to evaluate benefits to UK semi-natural habitats of reductions in nitrogen deposition. Final report on REBEND project (Defra AQ0823; CEH NEC04307)

[4] https://www.plantlife.org.uk/application/files/1614/9086/5868/We_need_to_talk_Nitrogen_webpdf2.pdf

[5] Jones, L., Milne, A., Hall, J., Mills, G., Provins, A. and Christie, M. (2018). Valuing Improvements in Biodiversity Due to Controls on Atmospheric Nitrogen Pollution. Ecological Economics, 152: 358-366. http://ec.europa.eu/environment/integration/research/newsalert/pdf/monetising_biodiversity_benefit_of_reducing_nitrogen_pollution_in_air_522na2_en.pdf

Figure 1: Recent trends in nitrogen deposition at Thames Basin Heaths SPA (Ockham and Wisley Commons) (Source: APIS, 2019)

Trend in background total nitrogen deposition at Thames Basin Heaths SPA	Trend in background oxidised nitrogen deposition (red line) and reduced nitrogen deposition (green line) at Thames Basin Heaths SPA



2.3.2 The graph on the left shows the trend in total nitrogen deposition (i.e. oxidised nitrogen from combustion, particularly vehicle emissions, plus reduced nitrogen from ammonia, particularly livestock and fertiliser) within the 5km grid-square in which Thames Basin Heaths SPA is situated, between 2005 and 2014. While in the short-term there were fluctuations, there was an improvement in total nitrogen deposition within the 5km grid square of 1.4 kgN/ha/yr even over the relatively short (nine years) time period in question. The graph to the right breaks this down into its constituent elements (oxidised and reduced). It can be seen that the reason why the fall in total nitrogen was not greater was because, although oxidised nitrogen (from combustion, particularly traffic) fell considerably (by 3 kgN/ha/yr) reduced nitrogen (from ammonia, particularly livestock and fertiliser) fell to a much smaller degree (1 kgN/ha/yr).

2.3.3 A major road like the A3 or M25 has its greatest influence on air quality close to the roadside, within 200m. This is important because the graphs in Figure 1 show that even though the nitrogen deposition rates depicted are average data across the 5km grid square around the SPA, and therefore include areas remote from the roads that are much less influenced by the local road network, there was still a net reduction in total nitrogen deposition. Since these graphs do not take account of improvements in emissions technology post-2014 the trends shown for oxidised nitrogen (and thus its influence on total nitrogen) will be conservative. For example, the latest (Euro 6/VI) emissions standard only became mandatory in 2014 (for heavy duty vehicles) and 2015 (for cars) and the effects will not therefore be visible in the data available from APIS because relatively few people will have been driving vehicles compliant with that standard as early as 2014. Far more drivers will be using 'cleaner' vehicles e.g. Euro 6 compliant vehicles by the end of the Local Plan period (2034). Defra's UK vehicle fleet projections show that in 2030, 99% of petrol and diesel cars are expected to be Euro 6 compliant[6].

2.3.4 In road traffic analyses, 'baseline' nitrogen deposition consists of two elements:

- The 'background' – this is the average nitrogen deposition rate within the 5km grid square in which the SPA is situated, which has already been discussed; and
- The 'road contribution' – the contribution of modelled emissions of nitrogen-containing pollutants from road traffic to nitrogen deposition. The greatest pollutant concentrations are modelled and observed at the roadside, and drop off quickly towards background concentrations (i.e. within 200m). Therefore the greatest 'road contribution' to nitrogen deposition will be experienced at the roadside. Dispersion modelling of vehicle emissions is used to derive the 'road contribution', employing fleet composition data including percentage of

[6] Defra's Emission Factor Toolkit (EFT) v8.0.1 available at https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html

heavy duty vehicles (HDV), traffic flow and average vehicle speeds so as to determine appropriate emission factors.

2.3.5 This is how baseline nitrogen deposition was calculated for the HRA modelling. This is relevant because close to the road (i.e. within 200m) the influence of the road on air quality will therefore be much greater than it is remote from the road (i.e. well over 200m distant). Therefore, the trend in total nitrogen deposition close to the road (the area of greatest interest for traffic-related impact assessments as this is where the effect of the road on the European site will be worst) will more closely reflect the steeper improving trend for oxidised nitrogen deposition within the grid square than the shallower improving trend for total nitrogen deposition, because within 200m of the road is also where the benefits of improved vehicle emissions technology will have the greatest effect. This will in turn cause NOx concentrations and oxidised nitrogen deposition rates to fall close to the road and thus reduce total deposition rates. In contrast, the benefit of improvements in roadside emissions of NOx will be much less felt at locations remote from the road and thus the resulting reduction in oxidised nitrogen is likely to result in a much shallower reduction in total nitrogen deposition, as is seen within the 5km grid square at Thames Basin Heaths SPA. This is why the 2019 HRA Addendum only cited the graph for oxidised nitrogen rather than that for total nitrogen.

2.3.6 Taking these trends into account, the robustness of AECOM's forecast of a net improvement in nitrogen deposition close to the road notwithstanding traffic growth is easily discerned. AECOM's modelling forecasts a maximum[7] net improvement in nitrogen deposition that averages out at 0.29 kgN/ha/yr per annum at the roadside of the busiest link when all traffic growth (including RHS Wisley) is taken into account. This includes an allowance for improvement in the background nitrogen deposition rate of 0.19 kgN/ha/yr, which is comparable to the 2005-2014 rate of improvement in background total nitrogen deposition on APIS (0.16 kgN/ha/yr), while making an allowance for the effect of improved emissions technology to 2034 that is not reflected in the APIS data. The remainder of the net improvement (averaging 0.1 kgN/ha/yr per annum) is attributable to improvement in the road contribution close to the road, notwithstanding traffic growth, due to the greater benefit of emissions technology improvements.

2.3.7 The overall net roadside improvement of 0.29 kgN/ha/yr per annum compares to an average rate of improvement in background oxidised nitrogen deposition remote from the road between 2005 and 2014 of 0.33 kgN/ha/yr per annum according to APIS. Taking into account the disproportionate benefit that improved vehicle emissions technology has on NOx concentrations and nitrogen deposition close to the road, and the fact that the cited background deposition rates are not only remote from the road but do not allow for existing technology that post-dates 2014, it is appropriate and robust to expect a greater net improvement in total nitrogen close to the road than distant from the road.

2.3.8 It should be noted that AECOM's modelling is cautious because no allowance is made for the UK Government's decision to end the sale of all new petrol and diesel cars and vans from 2040[8], or the Government's 2019 Clean Air Strategy[9]. However, those announcements both illustrate the general long-term direction of travel for roadside air quality in the UK and underline that allowing for improvements in both vehicle emissions factors and background rates of nitrogen deposition over long timescales is both appropriate and realistic.

[7] This is the maximum because on other links, and at greater distances from the road, a smaller improvement is forecast.
[8] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/633270/air-quality-plan-detail.pdf
[9] https://www.gov.uk/government/publications/clean-air-strategy-2019

3 Effects of traffic growth including RHS Wisley the on ability of Ockham & Wisley Commons to support nightjar, woodlark and Dartford warbler

3.1.1 The improvement in background and road contribution is not the only relevant factor in forming a conclusion regarding effects on the integrity of the SPA (i.e. its ability to achieve its conservation objectives). It is also necessary to consider the effect that any projected deposition will have on the function of the affected area.

3.1.2 The second principal criticism made in the letter is with regard to the effect of nitrogen above the critical load on the ability of the vegetation of the Thames Basin Heaths SPA to support nightjar, woodlark and Dartford warbler. Specifically, two criticisms are made:

1. That any additional nitrogen deposition above the critical load must lead to a conclusion of adverse effects on integrity. The following part of Advocate General Kokott's opinion in the Dutch Nitrogen cases is cited: '*it seems difficult, if not impossible, to accept values that are higher than the critical loads. These are intended to define scientifically-based load limits for vegetation types or other protected assets, compliance with which means that pollutant deposition is not expected to have significant harmful effects even in the long term* (paragraph 62 of the opinion).'

2. That the January 2019 Addendum ignores effects on foraging value of roadside habitat to SPA birds and also ignores effects on botanical composition and function.

3.1.3 Firstly, we would point out that: a) Advocate-General Kokott's opinion is merely advisory, it does not constitute case law; and that b) the European Court of Justice's judgment in the Dutch Nitrogen case does not contain any comparable ruling to the cited text from Advocate-General Kokott's opinion. In their judgment the CJEU observed that '*where the conservation status of a natural habitat is unfavourable* [such as may be the case where the critical load for nitrogen deposition is exceeded], *the possibility of authorising activities <u>which may subsequently affect the ecological situation of the sites concerned</u>* [emphasis added] *seems necessarily limited*' (paragraph 103 of the judgment) but they did <u>not</u> rule that any further nitrogen deposition where the critical load is exceeded must *ipso facto* be deemed to constitute an adverse effect on integrity, although they had the opportunity to do so.

3.1.4 Secondly, it is not correct to state that the impact on foraging habitat was overlooked in the January 2019 Addendum, or that the addendum ignored effects on function and species composition. For example, paragraph 3.1.1 of the Addendum discusses foraging requirements as follows: '*Woodlarks require dry soils and short vegetation for foraging, interspersed with more tussocky vegetation for nesting*[10]*; this structure is characteristic of heathland or early stage plantation. Dartford warbler forages predominantly on a range of insects found on gorse*[11]*, a characteristic shrub species of heathland. Nightjars have slightly broader foraging habitat requirements; in addition to heathland and early stage plantation they will also forage in grazed grass heath and have been recorded foraging occasionally in deciduous woodland and rough pasture. …there seems little doubt that heathland and early stage plantation are key habitats. <u>Dense bracken, mature plantation and permanent deciduous woodland are not favoured by any of the SPA species either for nesting or foraging</u>* [emphasis added]'.

3.1.5 In paragraph 3.1.3 the Addendum goes on to state that '*There is therefore strong reason to conclude that nightjar, woodlark and Dartford warbler (particularly the first two species) would be unlikely to successfully establish nesting territories, <u>or undertake much foraging activity</u>, within at least 50m of either the A3 dual carriageway or M25 motorway. <u>This is probably partly a function of habitat distribution (since the majority of the habitat within 200m of the A3/M25 junction is mature</u>* <u>[unmanaged]</u> *<u>plantation, bracken and permanent deciduous woodland which are generally unsuitable</u>*

[10] Bowden C. 1990. Selection of Foraging Habitats by Woodlarks Nesting in Pine Plantations. Journal of Applied Ecology. 27 410-419

[11] Bibby C. 1979. Foods of the Dartford warbler Sylvia undata on southern English heathland. Journal of Zoology, Volume 188, issue 4. Pp 557-576

for nesting or foraging)[12]' … [emphasis added]. This is supported by Natural England's Supplementary Advice on Conserving and Restoring Site Features[13] for the Thames Basin Heaths SPA, which states on page 4 that *'Within this SPA the principal habitats supporting these qualifying species are lowland heathland and rotationally managed coniferous plantation woodland'.*

3.1.6 This is relevant because, as per paragraph 3.1.7 of the January 2019 Addendum… '*Even with RHS Wisley included therefore, the modelling forecasts total nitrogen deposition rates to have fallen to the critical load at the roadside*[14] *and below the critical load for heathland by 15-30m from the roadside by the end of the plan period. This would mean that atmospheric nitrogen (irrespective of source) would cease having an influence on vegetation composition/structure except possibly within a narrow band along both the A3 and M25 which, as has been established, is the area of the SPA least likely to be functionally used by SPA birds'*. Note that, contrary to the criticism made in the letter from Baker Consultants, habitat composition (i.e. plant species composition) and function is discussed here, rather than just habitat structure. The information in this paragraph is fundamental to the overall conclusion of no adverse effects on integrity because it indicates that a) the critical load for heathland is not projected to be breached, and b) even if the improving trends in nitrogen deposition were slower than predicted in AECOM's modelling (such that deposition rates at the roadside remained above the critical load for heathland) the affected area consists almost entirely of common and widespread habitats of low value to the SPA birds for nesting or foraging, and this is highly likely to remain the case.

3.1.7 AECOM remains of the view that the strip of habitat within 15-30m of the roadside of the A3/M25 junction will not be of high significance as foraging habitat for nightjar, woodlark or Dartford warbler because (as already discussed in paragraph 3.1.3 of the January 2019 Addendum) it consists primarily of habitat that is of relatively low foraging value for the three species (which do not have highly specialised prey requirements, eating a wide range of insects) and which is abundant in the wider area within and outside the SPA: dense bracken, mature plantation and permanent deciduous woodland. Moreover it is very unlikely to be reverted to heathland, as this would remove the useful buffer the woodland currently provides between the A3 and M25 and the SPA. Therefore this band of vegetation is of very limited significance to sustaining or increasing the SPA population of nightjar, woodlark and Dartford warbler and is in any event forecast to be subject to lower nitrogen deposition by 2034 than is currently the case, such that invertebrate diversity and abundance in this zone may increase and is certainly not expected to decline. As such, it is considered that effects in this 15-30m zone will not '*affect the ecological situation of the sites concerned*' (in the words of the European Court of Justice) or materially retard the ability of the SPA to achieve its conservation objectives. This is reflected in the fact that Natural England has never objected to the Local Plan or its HRA.

[12] Moreover, it would seem unlikely that habitat close to the M25 or A3 would be put to heathland or managed plantation in the future, due to a combination of difficulty creating heathland in this area of dense woodland and the low desirability of removing the tree belt which currently shelters the rest of the SPA from the M25 and A3.
[13] http://publications.naturalengland.org.uk/file/4590853229117440
[14] The critical load for heathland (10 kgN/ha/yr) is not precise to a set number of decimal places so the forecast deposition rate of 10.1 kgN/ha/yr at the A3 and 10.4 kgN/ha/yr at the M25 essentially reaches the critical load

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