ADVICE NOTE ON THE IMPLICATIONS OF THE YEAR ONE MONITORING OF AIR QUALITY IN RELATION TO OXFORD MEADOWS SAC AND HOOK MEADOW AND THE TRAP GROUNDS SSSI

1.1 INTRODUCTION

This Advice Note accompanies the draft report *Conditions 31 and 32: Year One Scheme of Further Assessment of Air Quality in relation to Oxford Meadows SAC and Hook Meadow and Trap Grounds SSSI* (the report). The report sets out the results of the Year One monitoring and compares it to the baseline findings.

In accordance with the Scheme of Further Assessment, this draft report has been submitted to Oxford City Council (OCC) and Cherwell District Council (CDC), as local planning authorities, and to Natural England (NE). This has been done prior to a meeting to discuss the findings and proposed changes to the monitoring approach going forward.

The purpose of this Advice Note is to set out the key findings from the draft report, focussing on the need for further monitoring and modelling, for discussion with OCC and CDC, advised by NE.

1.2 RATIONALE FOR THE IMPOSITION OF THE MONITORING REQUIREMENTS UNDER CONDITIONS 31 AND 32

The rationale for the imposition of Conditions 31 and 32 as part of the deemed permission attached to the TWA Order (TWA/10/APP/01) is set out in the Inspector's report of the re-opened Transport and Works Act (TWA) Inquiry in 2012(1). Conditions 31 and 32 are reproduced in full in **Annex A** to the report.

The stated rationale for the requirement for monitoring was that the data presented at the re-opened TWA Inquiry was completely based on modelling and left room for uncertainty and consequently a precautionary approach was taken in light of the significance and sensitivity of Oxford Meadows SAC and Hook Meadow and Trap Grounds SSSI, to be achieved through the imposition of Conditions 31 and 32.

The analysis presented in the report removes the uncertainty around the impact of East West Rail (EWR) Phase 1 on the qualifying interests of the Oxford Meadows SAC and Hook Meadow and The Trap Grounds SSSI and confirms that there is no need for or benefit from the continuation of monitoring of air quality on these designated sites.

(1) Second Addendum Report to the Secretary of State for Transport and the Secretary of State for Communities and Local Government, 31 August 2012.

1.3 PURPOSE OF THE MONITORING

The purpose of the monitoring is to demonstrate that the operation of EWR Phase 1, including the associated road traffic effects, has not caused harm to the qualifying interests for which the Oxford Meadows SAC and Hook Meadow and The Trap Grounds SSSI were designated.

Emissions from road traffic using the A40 and the A34(T) could potentially impact on the 'lowland hay meadow' sensitive habitat on the adjoining parts of the Oxford Meadows SAC. In the case of trains using the Oxford to Bicester line and the mainline, the relevant designated sensitive habitat is the 'lowland hay meadow' on parts of Hook Meadow and The Trap Grounds SSSI. Those parts of the Oxford Meadows SAC close to the railway do not support sensitive habitat, for the purposes of Condition 31.

The aim of the monitoring is to identify signs of change attributable to EWR Phase 1, which could potentially give rise to a significant effect on the designated sites.

1.4 CURRENT MONITORING REQUIREMENTS

The current requirements are for further monitoring in Year Four and Year Six of operation of EWR Phase 1 as set out in Section 2 of the approved Scheme of Further Assessment(1). The agreed scope of these surveys is as follows:

- Year Four, 2020 – a full set of surveys which replicate the baseline survey programme, undertaken in 2014/15; and

- Year Six, 2022 - the extent of the monitoring to be undertaken in Year Six is currently dependant on the findings from Year Four. If the Year Four findings are insignificant, then it may be only necessary to undertake some further airborne NO_x monitoring. However, if there are effects in Year Four, which require mitigation or there is a worsening of condition that may need mitigation to be implemented, a more extensive survey may be required. The exact requirements would be determined in discussion with NE, OCC and CDC.

(1) Conditions 31 and 32: Air Quality Monitoring and Mitigation Report in relation to Oxford Meadows SAC and Hook Meadow and Trap Grounds SSSI, approved November 2015.

1.5 IMPLICATIONS OF THE YEAR ONE FINDINGS FOR FURTHER MONITORING

1.5.1 Proposed Changes to the Future Monitoring Requirements

The overwhelming evidence set out in the report supports the conclusion that future monitoring would not be meaningful in respect of its original purpose. The arguments that support this conclusion, based on the evidence in the report, are set out in the following sections of this Advice Note.

1.5.2 Support for the Changes to Future Monitoring Requirements

Since the baseline year, there has been an overall reduction in the actual concentrations measured in Year One which reflects a regional lowering in NO_x in the background concentrations. This change is greater than that experienced elsewhere in the UK. Extensive measures have been implemented in Oxford City to reduce emissions, as part of a £3.25m investment programme to reduce NO_x and NO_2 concentrations, driven by exceedances of NO_2 air quality standards in the city centre. As a result, NO_2 concentrations decreased by 22.7% on average across the city as a whole between 2016 and 2017[(1)]. As a consequence, there has been a regional impact on measured concentrations at Oxford Meadows SAC and Hook Meadow and The Trap Grounds SSSI. The NO_2 levels on the Oxford Meadows SAC in Year One were on average 4 µg m^{-3} lower than the levels measured during the baseline survey, which correspond to a 19% reduction on average. On Hook Meadow and The Trap Grounds SSSI, the NO_2 levels were on average 1.8 µg m^{-3} lower than the levels measured during the baseline survey, which corresponds to an 18% reduction on average. Any changes in airborne pollution due to EWR Phase 1 will have been marginal.

The traffic impacts of EWR Phase 1 rail passengers on the A34(T) accounts for a reduction in total daily traffic flows of around 1% and for a marginal increase of 0.39% in the total daily flows on the A40. For the A40, the marginal increase equates to less than 100 vehicles (two-way) per day, as a consequence of EWR Phase 1, which is not considered to be material given the traffic flows on the A40 on a typical day. The increase in traffic flows on the A40 is markedly lower than had been predicted at the time of the public inquiry, which suggested an increase in traffic on the A40 of some 750 vehicles (two-way) per day, as a consequence of EWR Phase 1.

There has been little change to the EWR Phase 1 service levels and patterns between 2017 and 2020 and it is reasonable to assume there will be no further substantial increases in rail services in future years that would lead to increased traffic on the A34(T) and A40, above that reported for Year One of monitoring.

The analyses of the plant tissue, lichen and soil has not shown any direct relationship between the operation of EWR Phase 1, and associated traffic, and the levels of nitrogen deposition found in the samples. Both Oxford

(1)

https://www.oxford.gov.uk/news/article/798/significant_reduction_in_oxford_s_air_pollution_after_cleaner_buses_introduced_%E2%80%93_but_city_still_has_toxic_air_in_some_streets

Meadows SAC and Hook Meadow and The Trap Grounds SSSI are in the floodplain and are susceptible to flooding which, alongside variations in grazing regimes, can influence the levels of nitrogen in the soil. Given that there is no clear relationship between distance from source along the transects and levels of total nitrogen in the plant and soil samples, it is likely that these other factors are having a greater influence than road or rail traffic. This further supports the conclusion that there is no need or benefit from the continuation of monitoring on these designated sites

In light of the wider regional improvements in air quality and the very small changes in traffic attributable to EWR Phase 1, no impacts are apparent from the monitoring, nor is it likely that any impacts will be discernible from future monitoring. What is instead clear, is that there has been considerable improvement in air quality at Oxford Meadows SAC and Hook Meadow and The Trap Grounds SSSI since the imposition of the monitoring requirements under Conditions 31 and 32 and the baseline monitoring.

It is anticipated that due to further improvements planned in Oxford, including lower emissions from both trains and road vehicles, there will continue to be substantial reductions in the background NO_2 concentrations in future years.

There are national air quality and carbon reduction policies that will continue to drive air quality improvements over the period intended to be covered by future monitoring. This includes lower emissions from transport, industry, domestic and commercial sources, both locally in Oxford, regionally and nationally. As a result there will continue to be substantial improvements in the background NO_2 concentrations in future years. These changes are likely to be far greater than any marginal changes in contribution as a result of the operation of EWR Phase 1.

In addition, the Clean Air Strategy published by the UK Government in January 2019 specifically highlights ammonia emissions from agriculture. Ammonia is recognised in the Strategy as one of the most important pollutants impacting the UKs natural habitats. This focus and subsequent policy will be a further influence that will improve air quality at Oxford Meadows SAC and Hook Meadow and The Trap Grounds SSSI in future years. Although not directly in scope for this study, changes in grazing activity on these sites can also be anticipated, arising from changes in agri-environmental policies.

Taken together, the marginal impacts of EWR Phase 1 on traffic levels and the recorded and future improvements in NO_x levels means that the operation of EWR Phase 1 will not harm the qualifying interests for which the Oxford Meadows SAC and the Hook Meadow and The Trap Grounds SSSI were designated. The analysis of the plant and soil samples shows no direct relationship with the operation of EWR Phase 1 and levels of nitrogen deposition which supports the conclusion that there is no need for or benefit from the continuation of monitoring.

1.6 IMPLICATIONS OF THE YEAR ONE FINDINGS FOR FURTHER MODELLING

1.6.1 Introduction

As a requirement under Condition 31 item (iii) and Condition 32 item (iv) of the deemed planning permission attached to the TWA Order, an *Air Quality Modelling Report in relation to Oxford Meadows SAC and Hook Meadow and The Trap Grounds SSSI* was submitted to, and approved by, OCC and CDC in 2015.

The purpose of the modelling was to determine if future emissions from EWR Phase 1 would be likely to cause the Critical Levels and Critical Loads (based on the inferred levels of nitrogen deposition calculated) to be exceeded due to the change in road and rail traffic for up to and including 10 years after the first year of operation. The modelling used predicted, rather than actual, road and rail traffic movements, arising from EWR Phase 1, derived from transport models.

The Further Scheme of Assessment contained a commitment to review the findings of this modelling for Year One, against the actual findings of the Year One air quality monitoring, in order to validate the modelled findings. The Scheme of Further Assessment states that should the results of the Year One monitoring cast doubt on the modelled predictions, the model will then be re-run for the remainder of the ten year period, taking account of the findings of this validation process.

A comparison of Year One modelled and calculated annual mean NO_x concentrations for Oxford Meadows SAC and Hook Meadow and The Trap Grounds SSSI are found in **Appendix A** to this Advice Note which, in our view, is sufficient to fulfil that commitment. **Table A.1** presents both the modelled and calculated annual mean NO_x concentrations from the measured NO_2 levels for Oxford Meadows SAC for Year One and **Table A.2** for Hook Meadow and The Trap Grounds SSSI.

1.6.2 Need for Further Modelling

The purpose of the modelling was to determine if future emissions from EWR Phase 1 would be likely to cause the Critical Levels and Critical Loads (based on the inferred levels of nitrogen deposition calculated) to be exceeded due to the change in road and rail traffic for up to and including 10 years after the first year of operation.

The Year One monitoring shows that the NO_x levels on the Oxford Meadows SAC are all well below the 30 µg m^{-3} critical level, except for one point on one transect. On Hook Meadow and The Trap Grounds SSSI, all of the estimated NO_x levels are below the critical level. On Oxford Meadows SAC and Hook Meadow and The Trap Grounds SSSI, the Year One findings show that loads are significantly below 70% of the critical load.

Importantly, in all cases the Year One monitored levels are below the recorded baseline NO_x concentrations showing a clear improvement in air quality.

Given the further improvements planned in Oxford together with national air quality and carbon reduction policies, there will continue to be substantial reductions in the background NO_2 concentrations in future years. Given the stability in future rail services, it is not anticipated there would be any increased traffic on the A34(T) and A40 attributable to EWR Phase 1 above that reported for Year One of monitoring.

In light of this, levels of nitrogen deposition will be no worse than those which have been modelled to date and, in reality, they can be expected to improve over the remainder of the ten years to 2026, for the reasons outlined above. Given the findings in Year One in respect of nitrogen critical levels and critical loads and acid deposition, there would be no useful purpose in redoing the modelling exercise.

The monitoring to date has also demonstrated that there is no reliable way of separating out the effects of future city-wide initiatives and wider national reductions in emissions to air from the marginal (if any) effects from EWR Phase 1.

1.7 CONCLUSION

Future monitoring and modelling is not justified when considered against the rationale for the imposition of the monitoring requirements under Conditions 31 and 32 and the stated aims of that monitoring. The aim of the monitoring is to identify signs of change attributable to EWR Phase 1 which could potentially give rise to a significant effect on the designated sites.

The evidence presented in the report is clear that the operation of EWR Phase 1, including the associated road traffic effects, has had marginal, if any, impact on Oxford Meadows SAC and Hook Meadow and The Trap Grounds SSSI. The marginal increase of traffic flows on the A40 is not considered to be material and is significantly less than that predicted from the traffic modelling which informed the public inquiry. The A34 traffic flows have decreased as anticipated.

The overall improvements in air quality at Oxford Meadows SAC and Hook Meadow and The Trap Grounds SSSI that have been recorded (together with the expectation that air quality will continue to improve in future), confirms that there has not been and will not be any harm caused to the qualifying interests for which the Oxford Meadows SAC and Hook Meadow and The Trap Grounds SSSI were designated.

The Year One results shows that is no justification for the continued application of the precautionary approach to future monitoring as contained in Conditions 31 and 32.

Network Rail will seek to formalise the conclusions in this note that no further monitoring or modelling is required by agreement with OCC and CDC (in consultation with NE) in order to fully discharge Conditions 31 and 32. Conditions 31 and 32 required that the Scheme of Further Assessment shall be implemented as approved. A revised Scheme of Further Assessment based on this note will be submitted for approval to OCC and CDC.

Appendix A

Comparison of Year One Monitoring Data to Modelled Predictions

Table A.1 Year One, NO_x Annual Mean Concentrations on Oxford Meadows SAC – 2017 Modelled and Calculated

Transect	Modelled NO_x for 2017, with Scheme ($\mu g/m^3$)	Calculated NO_x Concentration in 2017, with Scheme ($\mu g/m^3$)
Transect T1 – A40		
50m	21.4	19.3
100m	20.3	16.8
200m	19.5	15.6
Transect T2 – A40		
10m	26.4	26.4
20m	24.3	22.4
50m	21.4	18.6
100m	20.2	18.7
200m	19.6	17.9
Transect T3 – A34		
20m	29.8	28.1
50m	24.7	26.2
100m	22.0	24.7
200m	20.2	22.5
Transect T4 – A34		
10m	49.2	45.0
20m	37.9	38.0
50m	29.1	32.7
100m	24.8	28.0
200m	21.8	22.5

Table A.2 Year One, NO_x Annual Mean Concentrations on Hook Meadow and the Trap Grounds SSSI – Modelled and Calculated

Transect	Modelled NO_x for 2017, with Scheme ($\mu g/m^3$)	Calculated NO_x Concentration in 2017, with Scheme ($\mu g/m^3$)
Transect T5 – Oxford/Birmingham Train Line		
20m	17.3	21.7
50m	16.8	21.2
100m	16.6	19.3
200m	16.5	19.2
Transect T6 – Both Train Lines		
10m	18.2	21.1
20m	17.6	22.7
50m	17.1	21.4
Transect T7 – Oxford/Bicester Train Line		
10m	17.4	22.1
20m	17.2	22.0
50m	16.9	21.9
Transect T8 – Oxford/Bicester Train Line		
10m	17.7	23.5
20m	17.4	23.9
50m	17.0	22.6